#97 - Cont.

4. Exposures 11772-85 F, C were examined after 18 months at Florida, vertical south, and 26 months at Chicago, both north and south. These are cedar bevel siding panels. Regular Rex 471 SWP Gloss White, all linseed-all anatase titanium, is tested against National Lead Company's Dutch Boy #110 Bright White and against O'Brien's Thermolyzed Tung Oil (T.T.O.) White. Also, Dutch Boy #124 Buff is tested against SWP tint base shaded to match. SWP and O'Brien (no tint tested) are applied both two coats self-primed and over Rex 450 Undercoater, while the Dutch Boy tests are both self-primed and over their #010 Primer. Though the series is small, many significant details arise which cannot be presented here in full. Briefly, the Dutch Boy White represents a high (42%) lead - low (20%) zinc oxide formula as against our earlier 24% lead and 32% zinc formula, with the #124 Buff and our tint base differing in a similar manner. We have no formula for O'Brien's paint.

O'Brien's shows up very poorly at Florida, with serious checking and bad dirt; it also stands out as dirty at Chicago, although reasonably good on south exposure. The Dutch Boy - SWP comparisons, both white and tint, are characterized by an almost complete contradiction of results, Chicago as against Florida. At Chicago Dutch Boy White is cleaner than Rex 471, at Florida the opposite; however, in neither case is there a wide difference, and there have been fluctuations in the past. The Florida tints show the Dutch Boy as dirtier and more faded than SWP, while the Chicago results are quite the opposite.

A subsequent re-check series of tints, using identical tinting colors, shows, at one year, that the #124 formula does have better color at Chicago and at least as good at Florida, with slightly less dirt than our tint base. The tests as a whole point up the variations in behavior which may be expected from a given tint base in various parts of the country.

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c. Wolin IS, presumably a polyallyl ester of dehydrated castor fatty acids, used both for all oil and for (2) only: slightly more microscopic film failure than the guide, but unsatisfactory mainly because of serious dirt and unsven clean-up both trends being a little less noticeable in the case of the lesser amount of IS oil.

Chicago results at 38 months confirm the above almost exactly, but both the failure and the dirt differences are much less advanced.

5. Panels 10927-32 F were retired after 24 months' exposure at Florida, vertical south, cedar bevel siding primed with Rex 450 Undercoater. Although of considerable interest, this group had to be retired because of hurricane damage; for this reason also, no positive conclusions could be drawn. All top coats are based on Rex 471 SWP Gloss White with all 1403 anatase titanium, testing oil variations, with results briefly as follows:

OJ 62 K - Regular (48), factory production — Good film, clean.

OJ 65 K - Using P.P.G. #500 Selected Soya for (2) — Clean, but appears to have most microscopic checking of the series.

OJ 66 K - CVR-569, linseed (44), used for (48) — Much like preceding, probably slightly better.

OJ 151 K - CVR-571, catalyst-bodied soya, used for (48) — Good film, clean.

OJ 152 K - CVR-570, #500 bodied, used for (48) — Good film, clean.

Incidentally, at 12 months, Pittsburgh's #500 unbodied, CVR-569 and CVR-571 were cleaner than the others by a slight margin, but all were satisfactory. Chicago panels show no differences in dirt and no failure except equal erosion, at 30 months.

#97 - Cont.

Exposures examined and reported during the month include the following:

1. Panels 7667-72 C, F were exposed 4 years at Florida, vertical south, and 64 months at Chicago, both north and south. All are tint bases shaded to Rex 462 SWP Cream and painted over Rex 450 Undercoater on cedar bevel siding. The regular of 7-21-45, using 116 pounds of 2174 dry Ti-Pure R-610, is about average for the group in durability, all locations considered, and is definitely better than another regular (2-10-43) using 1895 lead titanate and 2031 Ti-Pure O rutile titanium. Fading and dirt collection results have varied at the three locations in the past, with the 1895-2031 formula having a slight advantage, but final results show fading the same and give the 1895-2031 sample only a very slight advantage as to dirt. None of the other four tests show any final difference in either dirt or fading, except on north exposure. These tests are: (1) a formula suggested by Mr. Fasig, pigmented with 44 pounds of 2174 and 148 pounds of 2140 Titanox RC, and using Lowe Brothers' leaded oil vehicle, (2) the same with SWP vehicle, (3) same, with SWP vehicle but 2140 increased to 225 pounds, and (4) same, but further increase of 2140 to 250 pounds. These showed some variations in earlier stages, especially less chalking with the increasing 2140, but no really noticeable differences in dirt or fading ever occurred. However, the Chicago north exposures, which have always held quite a heavy film of dirt and some mildew, indicate that the (1) Lowe Brothers sample holds the most dirt, (2) somewhat less, (3) still less and (4) slightly least.

2. Panels 10630-5 F were retired after 36 months at Florida, vertical south, all Rex 450-primed cedar bevel siding. The Rex 471 SWP Gloss White tests are based on the 9-14-45 formula, a 50/50% rutile/anatase titanium type, and show the following results due to variation of experimental oils:

   a. SN-1172, Dow's experimental Resin X-480, a 15% styrene modified linseed, used for all oil in the vehicle: slight microscopic checking but less than the guide, clean and white (though rather dirty in the earlier months).

   b. Archer-Daniels-Midland's #75-5, containing cyclopentadiene, used for all oil except 12 gallons of (2) linseed, both Y and Z_4 variations of #75-5 oil being tried: very poor durability, checks and cracks much more than others, but is satisfactory in clean-up.

#97 - SWP 471

Two samples of treated dehydrated castor oil were submitted by the Vegetable Products Research Laboratory. AVM 56 had a viscosity of 3-1/2 seconds, acid value of 10.7 and color 10. AVM 57 had a viscosity of 41 seconds, acid value of 7.9 and color 9 +. They were compared with linseed (310) and Dehydrol for drying and wrinkling, using lead and manganese driers in the amounts used in SWP.

Drying Characteristics of Various Oils

Oil	Set-to-Touch	Through Dry	Wrinkling .008" at 150° F.	Flow-Outs on Glass	
				Wrinkling	Transparency
(310)	2 hr. 40 min.	Good; considerable tack.	Slight	None	Very good
(2525)	1 hr. 30 min.	Good; considerable tack.	V. V. bad	Very bad	" "
AVM 56	3 hr. 25 min.	Good; very bad tack.	Coma.	None	" "
AVM 57	2 hr. 5 min.	Good; slight tack.	V. V. bad	Very bad	" "

Laboratory batches of Rex 450 SWP Undercoater and Rex 471 SWP Gloss White made with the light bodied AVM 56 were short in flow and low in gloss. There appears to be no particular use for this type of oil in house paints at this time.

Panels 14414-SS C and F were prepared during the month for exposure at Chicago and Florida. This series represents a number of clear finishes for exterior use of wood siding and trim, including some alkyd and phenolic varnishes with or without added fungicide (Nuodex 72) and clear shingle stain. Specific products are 75% (4100) plus 25% (4103), 03401 phenolic varnish, Cabin Exterior Finish, Floor Seal 031 as is and plus raw linseed oil, Rexpar as is and plus (310), and Clear Shingle Stain 01110. Exposures are on maple and white pine. Supplementary additives include Nuodex 136 zinc alkyl sulfate, Copper Phenolate, and Cunilate #40 and #40-A (copper-8-quinolinolate). We would appreciate suggestions for additional clears to include in later tests.

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5. cont.

RB 8474 (old number, CV-7027) - Bis soya, air-blown.

RB 8471 (old number, CV-7028) - SO_2 treated soya.

RB 8472 (old number, CV-7029) - Catalyst bodied soya.

RB 8473 (old number, CVR-584) - 80/20% (1275) soya/(140) CWO, bodied.

RB 8477 - Pittsburgh's SO-500 soya, bodied.
Our number CVR-670, not used previously.

The whites show up very well at both locations. SO-500 and our soya/CWO blend show slightly faster chalking tendencies. The tints are also generally satisfactory throughout, but slightly dirtier than the guide. This dirt tendency is especially true of the SO_2-bodied soya, but this and the bis-bodied, seem a little better than the average in color. SO-500 and the soya/CWO blend tend to be most faded but good in clean-up.

4. Panels 15185-96 F were examined after 12 months' exposure, vertical south, at Florida, cedar bevel siding primed with Rex 450 Undercoater of contrasting shade. Micronized 20 F magnesium silicate from International Talc Company is tested in Rex 471 SWP Gloss White of 7-29-47 against regular 20 F dry, and also against 20 F in Rex 459 Berkeley Yellow of 7-31-47. Except for a slightly greater chalk rub-off at present, there are no differences between test and regular. Past records show a somewhat faster loss of gloss due to the special extender. Chicago results at 12 months, north and south, show no differences except very slightly less fading on the special.

A supplementary group of tests covers CW 2747 Nytal 300 in Rex 471 and Rex 475 SWP Colonial Yellow. In this case, the regular or basic formulas of Rex 471 with less lead-zinc and more titanium and extender are used, also with 2201-2203 drys Metronite B4X and Carbola Talc. The 2201-2203 combination is also used in the Rex 475 as well as 20 F. In the several direct and indirect comparisons of Rex 471, there are no appreciable differences. In the Colonial Yellows, the 20 F regular seems less faded and better in gloss retention, but dirtier than the others, part of the dirt being mildew. There is little choice between 2201-2203 and Nytal, which in this case is an "off-grade" material coded CW 2748. The Chicago panels show nothing additional on the whites, but give contradictory indications on the Colonial Yellows, in that the 20 F and 2201-2203 samples seem very much alike, but the Nytal sample seems less faded and more dirty.

#97 - Cont.

1. Panels 10056-7 F, C were examined after essentially 4 years at Chicago and Florida, vertical south, cedar bevel siding primed with regular Rex 450 Undercoater. This series is a simple comparison of a normal laboratory batch of Rex 471 SWP Gloss White against a special batch made with the mill paste temperature advanced to 200° F. This was suggested by Newark Technical Service as a means of increasing mill efficiency, but only a very slight increase in mill speed resulted. The exposures show no appreciable differences, and the past records show that they have always been very closely alike in durability and appearance.

2. Panels 10065-8 C, F covering Atlas Powder Company's oil G-875-X were discontinued after 4 years at Florida, vertical south and Chicago, north and south. Regular cedar bevel siding was used, with Rex 450 Undercoater as the primer in a 2-coat system. The tests compared G-875-X oil, which is the recovered linseed fatty acid ester of Atlas' sorbitol isomeric mixture, against regular Rex 471 SWP Gloss White and Rex 375 Colonial Yellow, regular bodied oil types. It was found that 1 part of (48) plus 5 parts of G-875-X gave a viscosity equal to the SWP vehicle blend of 4 parts (48) plus 6 parts (2). Thus, the test batches carry 40 gallons of the special oil to the 100 gallon batch of paint.

   Both Florida and Chicago tests show quite similar results for regular and specials, as far as general appearance characteristics are concerned. Therefore, considering the large volume used, the oil must be said to have some merit. However, closer inspection shows up many disadvantages. The Atlas oil results in a puffy paint with serious brush marks. It shows rather serious film failure, especially cracking at Florida, which is in most cases definitely more advanced than on the guide. There has been a general trend toward poorer clean-up with the special oil, although it has a possible slight advantage in color retention.

3. Exposures 12914-29 F, C were examined after one year at Chicago, vertical north and south, and Florida, vertical south, all cedar bevel siding primed with Rex 450 Undercoater of contrasting shade. These panels test bodied soya oils and blends, the same as tested in series 10945-63, which gave some erratic results due to warping at Florida and also due to the use of chrome tinting colors. The present series tests the following oils in Rex 478 SWP Geneva Cream (ferrite tinting colors) of 7-31-47 and Rex 471 SWP Gloss White of 2-9-48, both regular guides having 100% linseed vehicles:

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Properties of SWP Gloss White
Using (310), (48), AVM 53 and AVM 54

Batch	Character-istics	Actual Wt./Gal.	Viscosity #5 Orifice Fresh	Viscosity #5 Orifice O'Nite	Brush-ing	Flow	Gloss	Drying Set	Drying Thru Dry
704 N	Card 60 Using (510) No (324)	14.21	26.4"	29.2"	Sl. sticky	Good	Good	5 hr. 30 min.	Good
705 N	As above but CV 49	14.21	29.8	52.2	Sl. sticky	Short	Good	7 hr. 30 min.	Good
706 N	As above but AVM 53	14.32	19.2	18.6	OK	Sl. short	Very good	5 hr. 25 min.	Good
707 N	As above but AVM 54	14.51	25	25.4	V. Sl. sticky	Short	Very good	5 hr. 40 min.	Very good

	AVM 53	AVM 54
Viscosity	6 - 7" (Base oil 60")	6" (Base oil 60")
Acid Value	2.5	5.2
Color	12 - 13	10 - 11
Solids	80%	80%

Panels 14403-7 C, F were prepared for exposure at Chicago and Miami for the Chicago Technical Service Department. They will compare resin coated pigment shading bases with conventional oil bases for shading Rex 496 SWP Ivory.

Panels 14349-58 CS and CN were prepared for exposure of SWP Gloss Whites and Colonial Yellows comparing the transparent litho oils of the 300 series with the 500 series oils. Paints made with the 500 series oils had shown considerable viscosity increase during four years' storage as compared with those made using the transparent litho oils.

Exposure series examined during the month included the following:

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Panels 14359-71 CS, CN and F were prepared for exposure at Chicago and Miami, exposing these special Dehydrol SWP's over Rex 450. This group also included exposures of the P. E. soya ester paints described in the following paragraph.

P. E. soya esters AVM 53 and 54 submitted by Dr. Hunn were compared in SWP with linseed (310) and CV 49 for general paint characteristics. The paints made with the P. E. soya esters were on the low side for consistency, especially the paint made with AVM 53 (special catalyst). Comparisons were also made of the clears blended with raw linseed oil and driers as used in SWP. The drying properties of the oil blends and paints were as follows:

	Clear Vehicles	Set-to-touch
694 N	Blend using linseed (310)	4 hr. 40 min.
695 N	" " (48)	4 " 55 "
696 N	" " AVM 53 (special catalyst)	5 " 48 "
697 N	" " AVM 54 (regular catalyst)	4 " 45 "
	Pigmented Vehicles	
698 N	Rex 471 made using (310)	9 hr. 40 min.
699 N	" " " " (48)	9 " 10 "
700 N	" " " " AVM 53	8 " 40 "
701 N	" " " " AVM 54	5 " 40 "

In addition to the tests above, four additional paints were made in the usual manner. These compared as follows for general characteristics.

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These oils were compared in SWP with regular (48) introduced as CV 49. Each bodied oil was introduced for 40% of the total oil in SWP as in the regular formula. The laboratory batches were checked for body, brushing, flow, gloss and wrinkling tendencies at 140° F. in the ultra-violet drying cabinet. The batches made with the special (48) oils showed no particular improvement in flow, whereas the factory production made with the same oils was very good in flow as well as in gloss characteristics. The lack of flow in the laboratory batches may be due in part to the higher viscosities obtained with the special (48) oils.

Laboratory Batches

Paint	Bodied Oil	Viscosity #5 Orifice			Drying	
		Fresh	O'Nite	2 Mo.	Set-to-touch	O'Nite
OJ 511 N	Sp. (48) Batch #1	35.8"	45"	86.4"	9 hr. 20 min.	Good
OJ 512 N	Sp. (48) Batch #2	38	51.4	55	9 hr. -	Good
OJ 513 N	CV 49	29.4	31.2	29.8	7 hr. 40 min.	Good

Paint	Brushing	Flow	Gloss
OJ 511 N	Sl. sticky	Short	Good
OJ 512 N	" "	"	"
OJ 513 N	Good	Sl. short	"

Factory Batches

Paint	Bodied Oil	Viscosity #3 Orifice			Drying	
		Fresh	O'Nite	1 Mo.	Set-to-touch	O'Nite
Rex 471 C 3089 C	Sp. (48) Batch #1	27"	24.2"	23.6"	OK	OK
Rex 471 C 3049 C	Sp. (48) Batch #2	25"	24"	26"	OK	OK

The brushing, flow, and gloss were very good on these two batches.

#97 - SWP 471

A sample of Nytal 200 from R. T. Vanderbilt was compared with 20 dry magnesium silicate and CW 2747 Nytal 500 for general characteristics. Nytal 200 was supposedly designed to match International Talc Company's 5 X Asbestine, material purchased some time ago as 20 F. Due to the fact that our specification has been revised to limit the maximum 325 mesh residue to 0.5%, Nytal 200 would be too coarse for our usage. It was found to be very poor in texture and requires a much longer grinding time than 20 dry or Nytal 500 to obtain the same degree of fineness. If the 20 dry used in our tests had been within our specification for texture, we would have obtained a larger spread in grinding time also.

Properties of SWP Gloss Whites
Using Various Inerts

Batch	Characteristics	Wt./Gal.	Viscosity #5 Orifice Fresh	Viscosity #5 Orifice O'Nite	Grind Rate	Grind
OJ 629 N	Rex 471 - Cam 59 275 pounds 20 dry 1.1% residue	14.25	28"	29.2"	5' 42"	2 H
OJ 630 N	275 pounds CW 2747 .15% residue	14.24	24.6	28.0	4' 47"	2-1/4 H
OJ 631 N	275 pounds Nytal 200 2.6% residue	14.50	25.8	27.6	7' 12"	2 H

Brushing, flow, gloss and drying characteristics were standard in all the batches, with the Nytal 500 batch showing slightly more gloss and Nytal 200 slightly more flow.

The Varnish Department prepared two plant batches of (48) made with Dehydrol replacing the tung oil.

Special (48) Batch #1 - 50% linseed, 30% soya, 20% (3017).

Special (48) Batch #2 - 50% linseed, 30% soya, 20% (2325).

CV 49 - 50% linseed, 30% soya, 20% (140) reduced with (348) to 71% solids.

	Body	A. V.	Color	Solids
Special (48) Batch #1	60"	13	6-7	100%
Special (48) Batch #2	63"	11	7-8	100%
CV 49	H	6.2	-	Approx. 71%

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SWP Gloss White

Batch	Drier Under Test	Set-to-touch Time With (543)	Set-to-touch Time Without (543)
OJ 385 M	3-1/2 gals. RC 1038	5 hr. 15 min.	19 hr. 45 min.
386 M	1-3/4 " "	5 " 30 "	17 " 15 "
387 M	7/8 " "	5 " 45 "	16 " 25 "
388 M	3-1/2 " RC 1039	5 " 30 "	18 " 25 "
389 M	1-3/4 " "	5 " 45 "	18 " 5 "
390 M	7/8 " "	6 " -	19 " 15 "
391 M	1-3/4 " (4230)	5 " 45 "	15 " 45 "

The batches containing manganese drier all dried well over night, but without manganese the films were slightly soft.

In addition to the above organic driers, samples of RC 2207, 2208, 2209, 2210, 2211, 2212, 2213 and 2214 were also tested as replacements for (4230). In most cases the driers are too bad in odor or too slow in drying compared with (4230). Sample RC 2210 is quite good in drying but poor in color. RC 2212 and RC 2213 would warrant further tests in other formulations.

SWP Gloss White - Using Organic Driers
for (4230), Regular Amount of (543) in all Paints

Batch	Drier	Fresh	O'Nite	Drying Properties Set-to-touch	Through Dry	Paint Odor	Characteristics
515 N	Regular Driers	39.6"	36.4"	8 hr. 40 min.	Good	Characteristic odor, good -	
516 N	RC 2207	44	44	10 " 30 "	"	Good -	Too slow in drying.
517 N	RC 2208	44	44	8 " 40 "	"	Bad	Bad odor
518 N	RC 2209	43.8	40.2	8 " 10 "	"	Bad	" "
519 N	RC 2210	44	40.2	7 " 50 "	"	Good -	Poor in color.
520 N	RC 2211	31.2	7 days 27.8	14 " 40 "	Fair	Bad	Bad odor
521 N	RC 2212	42	7 days 38.2	8 " 30 "	Good -	Fair	Only fair in odor.
522 N	RC 2213	37.8	7 days 33	8 " 40 "	Fair	Good -	Only fair on thru dry.
523 N	RC 2214	34.6	7 days 35.4	12 " -	Poor	Good -	Too slow drying.

#97 - SWP 471

Preliminary work is under way to study means of easing the brushing of SWP. Several trial formulations have been tested with no marked improvement to date.

R. Bruhn spoke before the Peoria section of the American Chemical Society on October 20 on the subject "Progress in Paint Technology."

Panels 14300-50 CS, CN and F were prepared and placed on exposure at Chicago and Florida. The tests compare SWP made with various special soya oils, PE soya esters, etc. which were listed on page 14 of the September report. The special oils include Ardol, ASV #4, Var oils, 75-5 oils, etc., and the pigmentations include some lead- and zinc-free formulas as well as the conventional pigments. Inspection of the Chicago panels show no great differences, but the 2030 TiO_2-Nytal (lead and zinc-free) formulas in general are whiter than the conventional paints.

Additional experimental SWP paints were prepared for exposure comparing CV 49 (reduced 50/30/20 linseed/soya/tung bodied to $Z_2 - Z_3$) with two special bodied oils with the dehydrated castor oils (3017) and (2325) replacing the tung oil in CV 49. The paints made with the special oils brushed quite well in spite of high body, were fair in flow but did not dry quite as well as the regular. Additional special paints included paints made with PE soya esters with sodium hydroxide and barium oxides as catalysts.

Organic Driers in SWP

The Resin Research Department have submitted a number of organic driers for evaluation. Two substitute driers, RC 1038 and RC 1039 were tested as replacements for (4230) in SWP. If the substitute lead driers are not reinforced by manganese, they are not equivalent in drying to (4230) regardless of the concentration used. RC 1038 improved in drying at lower concentrations whereas RC 1039 had better drying properties at higher concentrations. When manganese drier is used with RC 1038 and RC 1039 the drying properties are equal to the regular drier combination of (4230) and (545). From an odor standpoint RC 1038 and RC 1039 are rather sweet in odor, even at low concentrations.

See following table.

#97 - Cont.

Batch	Inert Used Dry No.	O. A.	Grind	Grinding Rate	Viscosity Fresh	24 Hrs.	3 Days	Brushing	Flow
478 N	20 dry	28.4	2-1/2 H	6' 37"	23.3"	28"	30.2"	Sl. pull	Sl. short
479 N	CW 2747	35.5	3 H	4' 28"	21"	26"	27.2"	"	"
480 N	Nytal 220	37.1*	2-1/4 H	4' 37"	22.2"	26.2"	28.2"	"	"

*Taken on composite sample from car.

The first production batch of SWP Gloss White made with Nytal 220 had an initial viscosity of 31 seconds with excellent brushing and good flow properties. However, the factory has reported that when the paint was checked on the grind gauge it showed more of the extremely hard, coarse particles than show up with Nytal 300, CW 2747. According to their results these hard particles are evident in the paint film and give the print-out a fuzzy appearance. The grinding time was equal to that of CW 2747 but the paint was not ground to the same fineness. Nytal 220 would require a longer grinding time, which is not desirable.

Cleveland has used some Soapstone Talc 1246 dry in SWP to reduce brightness when pure zinc oxide was used. Batches of SWP were made using 75 and 275 pounds of 1246 replacing an equal weight of 20 dry. The paints containing 1246 dry were lower in viscosity and rather dirty compared with the standard.

Batch			Viscosity #3 Fresh	24 Hrs.
OJ 445 N	Rex 471, card #59.	Regular 20 dry extender.	24.4"	29.6"
OJ 446 N	" "	Using 75 pounds 1246 dry.	23	25.6
OJ 447 N	" "	Using 275 pounds 1246 dry	18.4	20.8

Panels 13992 - 14021 CS, CN were prepared for exposure at Chicago south and north vertical. These paints were applied under fair fall conditions and were a repeat of series 13378 - 13407 carrying special soya-CWO oils and painted in cooler weather.

Considerable time was spent in the preparation of photographs and publicity matter on SWP for our advertising agency.

#97 - Cont.

The Inspection Trip Report for 1949 mentioned the good performance of special house paint binders such as 75-5, Ardol, Var, etc., and the possibility of making a copper and iron stain resistant paint by eliminating zinc oxide. A series of paints were made using the regular Rex 471 card 57 pigmentation, using the following oils, as well as some zinc-less pigmentations with a group of oils selected from the following list:

AV 1100, AV 1101 and AV 1141 - P. E. Soya Esters (Regular catalyst)
AVM 51 - P. E. Soya Ester (Special catalyst)
Ardol - A.D.M.
ASV #4 - "
Aliphat 17 B Ester R5C4206 - General Mills, Inc.
Aliphat 17 B Ester R5C4597 - " " "
Drisoy A and Z_2 - Spencer Kellogg
75-5 (Vis. Z_2) Cyclopentadiene Copolymer - A.D.M.
75-5 (Visc. Y) " " "
Var 70 - A.D.M.
Var Z_3 - A.D.M.

The various oils were used to the extent of 40% of the binder. A number of other variations were also included based on the use of 50% and 100% in conjunction with variations in pigment composition and pigment volume.

Panels are being prepared and exposures will be made this fall at Chicago north and south and Florida south only.

House paint storage tests are under way to check the granulation tendencies of Harshaw's new manganese naphthenate versus (545) in SWP Gloss White. These paints will be added to another series made on formula card #55 using (5321) and (510) as the bodied oil.

A car of Nytal 220 received from R. T. Vanderbilt Company was compared with CW 2747 Nytal 300 and 20 dry in SWP. (Note this is not Nytal 200.) The test batches made in the laboratory indicated that Nytal 220 was actually quite close to 20 dry in consistency characteristics. This was not indicated by the oil absorption. The laboratory grinding rate on Nytal 220 was faster than in the case of 20 dry when ground to approximately the same degree of fineness. In comparison with Nytal 300, the grinding time was about the same but the grind was not as good.

#97 - SWP 471

The Vegetable Products Research Laboratory has submitted a sample of P.E. soya ester AVM 51 made with a special catalyst in place of the regular catalyst for making the methyl ester.

This oil has the following characteristics:

N.V.M.	80%
(548)	20%
A. V.	2.9 on solids
Color	12 - 13
Viscosity	6 - 7 seconds

The laboratory batch of SWP made with AVM 51 was slightly low in viscosity and gloss as compared with (510) linseed. As indicated below, AVM 51 and AV 1101 (regular catalyst) produced paints that were short in flow and low in viscosity.

Batch	Characteristics	Wt./Gal.	Viscosity Fresh	Viscosity O'Nite	Brushing
416 N	Rex 471, card #59 Using 19 gals. (510)	14.22	25.2"	28.7"	Slight pull (Good -)
417 N	Rex 471 as 416 N but AV 1101 for (510)	14.24	17"	18.2"	Sl. puffy (Good -)
418 N	As 416 N but AVM 51 for (510) at equal solids	14.30	19.6"	22"	Sl. puffy (Good -)

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Batch	Characteristics	Flow	Gloss	Grind
416 N	Rex 471, card #59 Using 19 gals. (510)	Slightly short (Good -)	Good	1-1/2 H
417 N	Rex 471, as 416 N but AV 1101 for (510)	Short (Fair)	Good	1-1/2 H
418 N	As 416 N but AVM 51 for (510) at equal solids	Short (Fair)	Less than 416 N or 417 N	1-1/2 H

New samples of the two P. E. Soya Esters with higher body have been requested. The higher body should increase the viscosity and gloss and give a better comparison of their properties when used in SWP.

#97 - Cont.

Panels 12472-12487 F, C were examined after 12 months at Florida and slightly less than 16 months at Chicago, vertical south, plus vertical north exposure at Chicago. Regular Rex 471 SWP Gloss White of 6-13-46 and regular Rex 465 SWP Colonial Yellow and Rex 363 Slate, tint bases of 7-31-47, all linseed formulas, are the basic formulas for testing (1) 19 gallons of (3316) bodied linseed/soya/chinawood and (2) all oil as AVM 14 and AVM 15, bodied and normal body High Polymer oils from Vegetable Products Research Laboratory. In addition, a similar test is made using 20 MSK magnesium silicate replacing the regular 20 F, in Rex 471 only. The panels are cedar bevel siding, using regular Rex 450 Undercoater, tinted gray under the Rex 471 for Chicago exposure.

In general, there seems to be a trend toward improvement of the usual soya dirt-collection tendency in the use of the High Polymer Oils. The history shown in routine Florida reports indicates very little, but the present appearance shows the High Polymer paints cleanest of all in the whites. Though differences at Chicago at 3, 9 and 16 months have not been great, there is a rather consistent over-all pattern. Both the (3316) and High Polymer paints started out more glossy, slower in chalking and more dirty than the linseed, with (3316) the more pronounced in most cases. Both have cleaned up and achieved fairly free chalking at 16 months, but the (3316) is still inferior to the regulars in most instances. The High Polymer paints are at least as clean and in several cases noticeably cleaner.

#97 - Cont.

Rex	Card No.	Agent	Settling Period	Settled state
471	49	Control	9 Mo.	Stiff, firm cake, stirred lumpy.
471	49	6# (4081)	9 Mo.	Firm cake, stirred lumpy.
471	49	6# 2270 dry	9 Mo.	Very soft cake, stirred smooth.
471	49	5# 1826 dry	9 Mo.	Very soft cake, stirred smooth.

The redispersibility of settled portions in these tests was evaluated by mixing each sample with a spatula in its full container. Every sample containing lecithin, 2270 dry, was readily dispersed to a smooth consistency in this manner. 1826 dry looked very good in Rex 471. Rex 450 samples show no appreciable differences with respect to suspension characteristics when agents (4081) and 2270 dry are introduced before or after the grind.

Last December a series of exposure panels was started, vertical north and south at Chicago only, using regular Rex 450 Undercoater - Rex 471 Gloss White of certified quality, the panels to be painted at intervals whenever the weather is typical of each season. The purpose is to give a succession of year-around painting tests with the same paint and carefully selected wood, to check on The Glidden Company's advertising of last fall to the effect that fall was the ideal time to paint. We now have painting tests done in December, April, June and August, panels numbered 13331-13334 C.

At the time of the August painting it was decided to expand the series to cover possible changes if (3321) High Polymer Oil were used in Rex 450 and Rex 471. A tie-in test was used, testing the (3321) type Rex 471 over both (3321) type Rex 450 and over the regular Rex 450 used in the previous series. The numbers of the newer series start with 13930-13931 C.

Panels 13683-702 CS, CN and F were prepared for exposure at Chicago south and north vertical, and south vertical at Miami. The paints were variations of SWP Gloss White, Berkley Yellow and Chelsea Gray comparing linseed, P. E. soya esters and Drisoy in the vehicle. This series was painted in warm weather and will be repeated in cooler fall temperatures.

#97 - Cont.

Box	Card No.	Agent	Settling Period	Settled state
210	5	Control	6 Mo.	Deep firm cake, stirred lumpy.
210	5	4# (4081)	6 Mo.	Deep cake, stirred lumpy.
210	5	4# 2270 dry	6 Mo.	Deep soft cake, stirred smooth.
210	5	4# 1826 dry	6 Mo.	Deep cake, stirred slightly lumpy.
210	4	Control	6 Mo.	Large firm bead, stirred lumpy.
210	4	4# (4081)	6 Mo.	Large soft bead, stirred lumpy.
210	4	4# 2270 dry	6 Mo.	Full, very soft bead, stirred smooth.
210	4	4# 1826 dry	6 Mo.	Full soft bead, stirred smooth.
450	26	Control	6 Mo.	Firm, dry cake, stirred lumpy.
450	26	6# (4081)	6 Mo.	Firm, dry cake, stirred lumpy.
450	26	6# 2270 dry	6 Mo.	Large, soft bead, stirred smooth.
450	26	6# (4081) in let-down	6 Mo.	Very large soft bead, stirred lumpy.
450	26	6# 2270 dry in let-down	6 Mo.	Large, soft bead, stirred smooth.
465 Alt.C	4	Control	6 Mo.	Moderately firm bead, stirred smooth.
465 Alt C	4	6# (4081)	6 Mo.	Soft bead, stirred smooth.
465 Alt C	4	6# 2270 dry	6 Mo.	Very soft bead, stirred smooth.

(Cont.)

#97 - SWP 471

A sample of Sierra Mistron Talc T-076 has been received from the Sierra Talc Company. When compared with 1989 Microne Talc it was found to conform very closely to this material. Oil absorption was 58.25 as compared to an average rating of 55 to 56 for 1989. Color and texture are slightly better than 1989. Paint consistency is slightly higher than a corresponding SWP made using 1989 dry.

Tests were made to determine the effect of grind on SWP consistency. Three batches were made varying only the degree of dispersion. This test would indicate that viscosity is not affected.

Paint	Grind	Viscosity Fresh	1 Day	14 Days
Rex 471 - RB 2635	1	30.8"	35.6"	33.0"
Rex 471 - RB 2636	2	30.0	33.2	33.2
Rex 471 - RB 2637	2-1/2	30.0	33.2	34.0

John Moore, Director of the Scientific Section of the NPVLA, was in to discuss moisture problems. Also during the month representatives of the Minnesota Paint Company visited the exposure farm. Time was also spent preparing publicity matter for SWP advertising and dealer meetings, as well as in reviewing a rewrite of Booklet No. 3 on handling of house paint complaints.

A comparison of the effect of Acto 450 (4081), Lecithin 2270 dry, and calcium stearate 1826 dry, upon the suspension characteristics of SWP 450 Undercoater, SWP Gloss White - Rex 471, Colonial Yellow - Rex 465 and Semi-Lustre - Rex 210 is being made. Consistent patterns of performance establish themselves in this series. Acto 450 shows improved suspension, calcium stearate performs better than Acto 450, and lecithin does the best job of the agents under test.

This inspection was made on Rex 210, Rex 450, and Rex 465 systems after six months' storage in quart cans. The Rex 471 samples had stood over a 9-month period in one gallon containers. Inspection data is tabled below:

See next page.

#97 - Cont.

Batch No.	Characteristics	Wt./Gal.	Viscosity - #3 Orifice Fresh	2 Weeks	Brushing
OJ 207 N	Rex 471 - using 5/8 gal. (545)	14.26	20"	21.6"	Good
OJ 208 N	Rex 471 - using 1/8 gal. Nuodex 6% Mn	14.26	19.8	25.2	Good
OJ 209 N	Rex 471 - using 5/8 gal. (4251)	14.24	19.8	22.5	Good

Batch No.	Flow	Gloss	Drying Set-to-touch	Over Night
OJ 207 N	Good	Good	7 hr.	Very good
OJ 208 N	Good	Good	7 hr. 50 min.	Good
OJ 209 N	Good	Good	8 hr.	Good

The 1949 house painting test program is well under way in both Cleveland and Chicago. Since many of these tests involve variations in both undercoaters and top coats, reference should also be made to Projects No. 12 and No. 155.

Materials have been supplied Cleveland for the following two coat systems, emphasizing top coat tests:

1. Remy house. Comparison of clean-up of SWP Gloss White with TiO_2 as 100% 1405, 50/50 1405/2050 and 100% 2050.

2. McMillan house. Regular undercoater. Top coats compare SWP Rex 471 Gloss White, Cards #49, 55 and 56 covering recent reductions in lead contents.

3. Ryan house. Top coats compare Rex 471 - SWP Gloss White, self-primed and over Rex 450 versus Rex 456 - SWP Fume Resisting Gloss White, self-primed.

#87 - SWP Gloss White

Messrs. E. W. Fasig and M. Van Loo made their annual inspection of the house paint exposures of du Pont's Pigment Division at Wilmington, Delaware; of the Titanium Pigment Company at Sayville, New York; and of the basic silicate paints exposed by National Lead Company, also at Sayville. A report is being distributed herewith.

The Linseed Oil Mill forwarded two gallons of linseed oil (2) for the evaluation of the performance of extracted and expelled raw linseed in SWP 450 Undercoater and SWP Gloss White.

	Extracted (2) Lot 1729	Expelled (2) Lot 1729
Foots (Heated Oil Test)	0.6%	0.2%
Acid Value	1.7%	2.3%
Iodine Value (Wijs - 1 hr.)	185.5	182.8
Color (Gardner 1933)	11 +	11 +
Sp. Gr. 60° F./60° F.	0.933	0.933

There seemed to be little difference in the immediate characteristics and performance of the paints. A comparison follows:

Batch No.	Paint	Viscosity - #5 Orifice Fresh	O'Nite	1 Week	Brushing	Flow	Gloss
OJ 231 N	Rex 471 using expelled (2)	26.4"	35.4"	35.2"	Good	Good	Good
OJ 232 N	Rex 471 using solvent extracted (2)	31.6"	37.6"	36"	Good	Good +	Very good
OJ 233 N	Rex 450 using expelled (2)	17"	20.2"	25.4"	Good +	Good	Good
OJ 234 N	Rex 450 using solvent extracted (2)	16.4"	17.6"	21"	Good +	Good	Good

A sample of Nuodex 6% manganese drier from Nuodex Products Company was compared with (4231) and (543) (at equal metal content) in SWP. The paints were checked for drying, brushing and flow, and samples were placed in storage to check on granulation and loss of drying. No apparent difference could be detected in manganese float or color difference when the batches were freshly made. The properties of the paints were as follows:

#97 - Cont.

Several tests of Rex 462 SWP Cream showed good results, with no appreciable differences. These tests used the following liquids, over regular Rex 450 only: RA 4245 B, RA 4248 B, RA 4249 B, 5-34 A-B bodied P.E. black oil ester and 5-36 and 5-37 normal body P.E. black oil esters.

A few tests covered Kromik Primer and Metalastic Gray using RA 4245-B as against the regular (2)-(2325) vehicle. All gave satisfactory results.

#97 - SWP 471

The 1949 house painting test program is getting under way with eight tests in some stage of progress.

Panels 15902-3 CS, CN and F were prepared for exposure in Chicago south and north vertical and south vertical in Florida. The paints compare regular SWP with specials in which from 40% to 100% of the total binder were petroleum drying oils submitted by Sinclair Refining Company. In general the special oils were too slow in drying, and the paints made with these oils retained a bad tack for over a week. See page 19, Monthly Report for April, 1949.

Panels 8391-8425 F, C were examined after four years' exposure at Florida and at Chicago, vertical south. The purpose of this series was to determine the possibilities of esterified black oil and (548) linseed fatty acids for use in SWP and other exterior paints. The durability and appearance characteristics of most of the special liquids were surprisingly good, with no particularly poor results. The materials used, with mention of noticeably good or poor durability results in Rex 450 Undercoater and Rex 471 Gloss White, bodied oil type, are:

RA 4245 A - glyceryl ester of Wilson fatty acids, light. (Not used in Rex 471).

RA 4245 B - ditto, bodied to (48). Results on these two tended to be rather poor as used in Rex 450, followed by RA 4245-B in Rex 471.

RA 4247 - (548) esterified with 1/4 P.E., 3/4 glycerine, both A, light and B, bodied. Conflicting results - good film at Chicago (erosion the main type of failure) but below average at Florida (checking and cracking), emphasized in both cases when used in both Rex 450 and Rex 471.

RA 4248 - (1761) black oil, esterified with 1/3 P.E., 2/3 glycerine. A and B, latter only being used in Rex 471. Satisfactory except for one sample at Florida.

RA 4249 - glyceryl ester of (1761). A and B, latter only used in Rex 471. Perhaps poorest of the list, as there are more instances of noticeable inferiority, but some samples are satisfactory. It should be noted that, in general, the special oils seem less suitable for Rex 450 than for Rex 471.

#97 - Cont.

Batch	Materials	Set-to-touch
54 N	Approximately 75% (4100) + 25% (4103) + 1% Nuodex 72	5 hr. 45 min.
68 N	Same as above, but no Nuodex 72	Wet at 5 P.M.
70 N	03401 (Phenolic) + 1% Nuodex 72	2 hr.
69 N	03401	2 hr. 10 min.
71 N	Floor Seal Rex 051	2 hr. 10 min.
72 N	1/2 Floor Seal, 1/2 (2) + driers	4 hr.
73 N	Rexpar (Rex 04)	1 hr. 52 min.
90 N	Rexpar + (2) = (54-1/2 gal. varnish)	1 hr. 50 min.
91 N	As 54 N + extra drier	2 hr. 5 min.

Panels 9102-20 C, F, Cof. were examined after four years' exposure vertical south and north at Chicago and south in Florida, and 51 months at Coffeyville. All are on cedar bevel siding and are 2-coat work using Rex 450 Undercoater. The tests are a series of formulas considered for post-war SWP Gloss White, as discussed in November, 1944. One group includes SWP at 25% total lead content as against the more generally used 50%. In general, there is no difference in performance. The formula used in most cases is a "modified oil conservation" type with 16-1/2 gallons of (48) bodied linseed and a p.v.c. of 34%. Regular pre-war "high oil" formulas show generally poorer durability, while the full oil conservation type with 19 gallons of (48) is about the same as the "modified." Other variations involve mainly titanium content, although one of the most significant tests of the series shows 566 mineral whiting as clearly inferior to magnesium silicate in both durability and dirt collection. 2152 Titanox RC HT tends to be durable but poor in clean-up. In a blend with 1271 anatase titanium-calcium it shows serious failure and only fair self-cleaning, but results in a blend with 1405 straight anatase are very good in almost all cases. Another good blend in this series is 1403 and 2173 rutile. 5 gallons of bodied fish oil does fairly well with 35% zinc oxide and 27% extender, but is definitely on the poor side with 31% zinc and 50% extender.

#97 - Cont.

A. House Paints - cedar siding, vertical south exposure.

Rex 450 Undercoater - Rex 471 SWP Gloss White vs. Rex 471 self-primed.
Rex 450 - Rex 456 SWP Fume Resisting White vs. Rex 456 self-primed.
Rex 450 - One Coat House Paint White
Kem Bulletin White, self-primed.
Rex 500 Family Paint (old lithopone type), self-primed.
3 coats lead-in-oil as per label (Rex 17).

B. Metal protective and others - 8" x 12" steel, 45° exposure.

Kromik Primer - Metalastic Gray vs. Carclad Enamel (vinyl system).
Kem Lustral White and Green, both 1 coat and with Fast-Dri Primer.
Kem Transport Ruby Maroon and Birch Gray, regular items.
Opex Automotive Lacquer Light Gray and Opalescent Maroon, regular.

C. Clear finishes - 8" x 12" hardwood, 45° exposure.

3 coats Rexpar Varnish vs. Kem Finishing Clear.

Other panels prepared for exposure include the following series:

Panels 15606-27 CS, CN and F. SWP Gloss Whites and Colonial Yellows, exposed south and north vertical at Chicago, and south vertical Florida. Using regular blends of soya and tung oils versus similar combinations made by directed interesterification by the Eckey process, as the bodied oil portions of the vehicles.

Panels 15689-702 CS, CN and F. The paints represent SWP Gloss White Rex 471, formula of 2-7-49 and SWP Berkeley Yellow and Chelsea Gray and variations using 40% AV 1123 P.E. Soya ester, Drisoy Z_2, and with all the oil replaced by a combination of AV 1100 and AV 1123 or Drisoy Z_2 and Drisoy D-F. It was intended that this set should be painted in low temperatures. However, while initial temperatures were as low as 44° F. a period of hot weather brought day temperatures as high as 86° F. including one period of precipitation when 2" of rain fell.

The following clear finishes have been gathered for exterior exposure, three coats on 8" x 24" maple panels. The tests include Nuodex 72 added to impart mildew resistance, and also Clear Shingle Stain 01110.

(See next page.)

#97 - Cont.

Properties of SWP Gloss Whites - Rex 471
(Cont.)

(All ground at same mill adjustment.)

Viscosities - #3 S-W Orifice at 75° F.

Batch No.	Fresh	O'Nite	2 Days	4 Days	8 Days	14 Days	Brushing	Flow	Gloss
OJ 97 N	20.2"	29"	29"	28.4"	27.8"	27.6"	Very good	Good	Very good
OJ 98 N	17"	21.8"	22.8"	22.2"	22.0"	21.0"	"	"	Sl. lower than 97 N
OJ 99 N	20.4"	25"	27"	26.6"	25.4"	25.4"	"	"	Sl. lower than 98 N
OJ 100 N	28.6"	45"	46"	45.4"	36.8"	37.8"	Good -	Short	Sl. lower than 99 N
(An effort was made to obtain an equal grind, 5 H)									
OJ 115 N	21"	30.2"	29.6"	28.8"	31.6"	30.8"	Very good	Good	Very good
OJ 116 N	17"	21.8"	21.4"	21.2"	23.0"	23.6"	"	"	Good +
OJ 117 N	20"	26.6"	26.8"	25.8"	27.4"	29.2"	"	"	Good
OJ 118 N	28.6"	47.2"	48.6"	46.8"	50.2"	49.6"	Good -	Short	Good -

A special group of exposures was prepared this month, panels numbered 15654-15671. Mr. C. R. Caryl has started an exposure testing station at Wickenburg, Arizona. The claims made for this location are: 292 days of sunshine yearly as against 97 for Miami, brilliant sunshine for 90% of the daylight hours, no smoke, fog or dust, and low humidity. We realize that mere concentration of ultraviolet is only one of many conditions needed to evaluate paint performance, and that the arid southwest is of minor importance from a sales standpoint. Nevertheless, we feel that the Wickenburg exposure conditions might give especially significant results with certain types of finishes. We have therefore set up what seems to be a minimum test program to evaluate this location, and to check against our other exposure locations. Other departments have helped in the preparation of panels, as indicated below. The series consists of representative coatings of several types normally used outdoors, and are to be exposed and examined in as nearly as possible the same manner at four locations: Miami, Coffeyville, Wickenburg and Chicago (both north and south for the house paints). The materials tested are:

#97 - SWP 471

At our request, the International Talc Company supplied samples of magnesium silicate with low, medium and high oil absorption properties. The samples were coded with respect to oil absorption characteristics as calculated for 100 grams of pigment using superior linseed oil (acid number less than 0.5) and the ball method of Gardner-Coleman, as follows:

Asbestine 50 cc
" 55 cc
" 57.5 cc

We also checked the three samples for oil absorption and made paints on the SWP Rex 471 formula, card No. 55. The two samples coded 55 cc and 57.5 cc were found to be very poor in texture. The sample coded 57.5 cc (2.2% residue) could not be ground to a 5 H on the laboratory 3-roll mill without bad discoloration.

In all cases our oil absorption determinations are somewhat lower than the figures reported by International. However, we found that the sample coded 55 cc, as used in paint 99 N, appears to be in a desirable range in oil absorption but too poor in texture.

Properties of SWP Gloss Whites - Rex 471

(All ground at same mill adjustment.)

Batch No.	Sample of Talc	Oil Absorption	% Moisture	% Residue	Grind	Grind Time
OJ 97 N	Our 6 bag stock sample	50.7	.333%	.402%	2-1/2 H	-
OJ 98 N	International Talc (50 cc)	25.5	.256%	.470%	2 H	-
OJ 99 N	International Talc (35 cc)	28.5	.328%	1.304%	1-1/2 H	-
OJ 100 N	International Talc (37.5 cc)	35.0	.335%	2.2%	1 H	-
	(An effort was made to obtain an equal grind, 3-H)					
OJ 115 N	As OJ 97 N				3 H	1' 52"
OJ 116 N	As OJ 98 N				3 H	2' 10"
OJ 117 N	As OJ 99 N				2-3/4 H	2' 45"
OJ 118 N	As OJ 100 N				2 H	3' 20"

(Cont.)

#97 - SWP 471

The house test program for 1949 will include in addition to the undercoater tests described under Project No. 12, a number of variations in top coats. The two coat systems will include the following:

1. Lead Reduction Series. Type of house required - normal repaint. Rex 450 Undercoater. Compare Rex 471 at various BCWL levels as represented by standard formula revisions over the past two years.

   (a) Rex 471, card 49. 0.6 lbs. BCWL and 1.57 lbs. BSWL per gal.
   (b) Rex 471, card 55. No BCWL, 1.66 lbs. BSWL per gal.
   (c) Rex 471, card 55. No BCWL, 0.95 lbs. BSWL per gal.

2. Basic Silicate White Lead Series. Type of house required: (1) new, (2) repaint in poor condition. This group will compare both undercoaters and top coats formulated with basic silicate white lead.

3. SWP Gloss White versus SWP Fume Resisting White. Type of house required - (1) clean location, (2) dirty location. This group will compare regular SWP with Rex 456, both over Rex 450 and self-primed. Relative cleansing properties as well as long term durability are the chief interests.

4. TiO_2 Dirt Retention Study. Type of house required - (1) clean location, (2) dirty location. This group will involve study of dirt collection and erosion as opposed factors in the selection of titanium oxides for exterior whites.

5. SWP Tints. Type of house required - normal repaint, in good condition. This group will compare tint base formulations based on (a) leaded zinc oxide, (b) pure zinc oxide, and (c) 2140 dry rutile titanium calcium versus non-chalking rutile TiO_2.

6. Vehicle study. Type of house required - normal, in (a) clean location, and (b) dirty location. Over Rex 450 undercoat. This group will compare several types of bodied oils in SWP including (310) bodied linseed, (48) 50/50/20 linseed/soya/tung, and (5321) P.E. soya ester.

Comments and suggestions for additions are invited.

Samples of petroleum drying oils were submitted by the Sinclair Refining Company for examination by the Resin Research, the Varnish-Resin Laboratory, and Paint Research. The work done by this department involved a comparison of Sinclair oils 126-88 and 126-90 with raw and heat bodied linseed oils in SWP. The results of our tests indicated that the Sinclair oils are too slow in drying for this type of formulation. All paints made with them maintained a bad tack for over a week. The Resin Research Department also reported these oils slow in drying and rather poor in odor.

#97 - Cont.

The Varnish-Resin Laboratory prepared two - 25 gallon phenolic and Pentalyn A varnishes using the Sinclair oils. The varnishes were reported to be slow in drying and brittle in film characteristics.

The Varnish-Resin Laboratory submitted CTV 7127, a P.E. soya ester based on Aliphat 54 B which was compared with High Polymer Oil AV-1125 and (510) in SWP.

	AV 1125	CTV 7127
Viscosity	57" - 65"	60"
Color	9 - 11	14"
Acid Value	5 - 8	2.9
Sp. Gr.	.945 - .948	-

Batches of SWP made with 19 gallons of each bodied oil compared as follows with (510) for general characteristics.

Batch	18 Gals. Bodied Oil	Viscosity - #3 Orifice Fresh	24 Hrs.	5 Days	Drying Set-to-touch	O'Nite
8 N	(510)	25.8"	30"	42"	7 hr. 30 min.	Very good
9 N	CTV 7127	18"	19"	21"	9 hr. 20 min.	Fair
10 N	AV 1125	21"	25.4"	28.8"	6 hr. 25 min.	Fair

- - -

Batch	Gloss	Flow	Color
8 N	Good	Good	Good
9 N	Good	Good -	Good -
10 N	Fair	Short	Good

CTV 7127 was better than AV 1123 in flow and gloss but inferior in drying and lower in body and brightness when pigmented.

#97 - Cont.

Panels prepared during the month for exposure included the following:

1. 13555-6 CS, CN and F. Chicago south and north vertical, and Florida south vertical. Conophor oil (supplied by Lewis Berger and Sons) versus linseed oil in SWP.

2. 13585-9 CS, CN and F. Chicago south and north vertical, and Florida south vertical. Comparisons of SWP 450 Undercoater and Gloss White systems, both at CH to SH grind. Since the paints were not satisfactory in all respects, this series will be repeated.

Exposures examined during the month included the following:

1. 8067-70 F, C. Extender Pyrax H.P. in Rex 300 Family Paint White of 1942 (lithopone type) and SWP Rex 471 of 1942. Pyrax H.P. is a mineral pyrophyllite from R. T. Vanderbilt, of flaky structure but with some abrasive particles. Florida Rex 300 tests were discontinued at 2 years, Florida Rex 471 tests at 3 years, and all Chicago tests at 5 years. Pyrax H.P. was slightly better than 20 L magnesium silicate in Florida, although showing more tendency toward surface flaking and uneven clean-up. In Chicago the performance throughout the entire exposure was about equal, with erosion developing slightly slower with 20 L.

2. On page 20 of the Report of Investigations for December, 1948, a progress report on exposures 9958-10025, du Pont cooperative series, was summarized. This was based on our exposures only, Chicago north and south vertical and Florida and Coffeyville south, at 3 years. We now have a report from du Pont on their exposures of the same paints. Their exposure times and locations are:

Wilmington, Delaware	45° south	3 years
" "	Vertical south	2 years
Miami, Florida	45° south	3 years
Chicago, Illinois	Vertical south	1-1/2 years
" "	" north	1-1/2 years

Some of the exposures are less than three years in duration, because du Pont originally put up bevel siding panels without the conventional lapping and later replaced them. We have essentially triplicate exposures of each paint at each location (primed with Rex 450 gray, primed with Rex 450 white and two coats self-primed), whereas they have tested only two coats self-primed. Including our comparison of bodied oil versus pre-war vehicle at each location, we have actually 24 comparisons of each formula as against du Pont's ten.

#97 - Cont.

2. (Cont.)

We can present here only the most important conclusions from our results, with comment on their agreement with ours. For most of the comparisons it is felt that the Wilmington vertical exposures, although only two years old and presenting no durability data at present, are the ones most likely to be of future value because of the geographical factors involved.

The paints which we provided are mainly orthodox variations of Rex 471 SWP Gloss White, testing BCWL and BSWL content, rutile versus anatase titanium and bodied oil versus pre-war vehicle types. Paints contributed by du Pont cover the same items of formulation, but less systematically, and include mechanically mixed lead-zinc and unusually high rutile titanium contents.

(a) Citing our over-all conclusions first, the bodied oil types are definitely superior in durability to pre-war, and somewhat better in appearance. No choice, on their tests, at Wilmington vertical or Chicago north or south. Full 3 years at Wilmington and Florida, 45° south (least acceptable conditions) confirm both these conclusions.

(b) du Pont's paints, especially with high rutile content, slightly more durable, but dirtier and show yellow cast. Contradicted by their Wilmington vertical exposures, which show a history of almost identical "slight" or "very slight" dirt and yellow stain for all paints involved. Their other locations tend to confirm our results, but results on durability are not conclusive.

(c) Supplementary white lead increases durability somewhat. Mr. Singleton, of the du Pont Philadelphia laboratory, states the "tentative conclusion" that the rate of failure is essentially equal in all the cases testing BCWL against no supplementary lead. However, since the Wilmington vertical tests show no durability data at present, we feel that our conclusion is preferable.

One of the most interesting points of the whole study is the complete "follow-through" on our 14% BCWL formula and "no lead carbonate" formula (essentially Ti-Sil) as against du Pont's lead formula (17.6% BCWL) and their "no lead carbonate" formula, the latter being 10% higher in extender than ours. Of the 24 possible comparisons of our two formulas, 16 show definitely poorer durability of the "no lead carbonate" type, plus 3 or 4 which

#97 - Cont.

2. (c) Cont.

show equivalence (little failure having occurred), while practically all agree on equivalent dirt collection. du Pont's ten comparisons show the "no lead carbonate" paints slightly cleaner, but only four show significant durability results, rating both equally poor. Switching to du Pont's paints with and without lead carbonate, our 12 comparisons are less decisive statistically, but the "no lead carbonate" paint showed all the most obvious instances of poor durability. Dirt collection history runs almost exactly alike. du Pont's five exposures clearly indicate greater dirt with no lead carbonate, one of two cases reported rates the carbonate formula most durable, the other case rates both poor.

(d) Our paints specifically compare 14% BCWL, 14% BSWL and 7% of each. The durability results on our exposures are quite evenly divided, with BCWL having a slight edge and the blend being poorer than either in several cases. There is little choice as to dirt. The du Pont exposures show no choice at all in the pre-war type formula, but indicate in the bodied oil group that BSWL may fail somewhat faster than the others but has a possible advantage as to clean-up.

3. 10288-10350 F, C and 10547-10579 F, C. These groups test Trimbrite and Fume Resistant Whites and tints. The former group has been exposed 5 years at Chicago and essentially 2-1/2 years at Florida, the latter 55 months at Chicago and 24 months at Florida. The series is quite complex and mimeographed copies of the report have been distributed and further copies are available. Hence we will present here only brief highlights of the results.

Most of the tests are on both cedar bevel siding and 8" x 24" white pine, both types being exposed vertical south, with the cedar also on north exposure. Further, many of the tests are both over Rex 450 Undercoater and self-primed.

(a) Trimbrite Whites. These are all experimental and may be considered to carry 53% zinc oxide, 25 - 28% extender and 40% titanium dioxide, the particular pigments being varied. The vehicle, unless otherwise specified, uses 13 gallons of (4103) alkyd and one gallon of phenyl mercuric naphthenate solution. The group in which zinc oxides are varied are uniformly good, with XX-503 having a slight edge over XX-50 and ZZZ-33.

#97 - Cont.

5. (a) Cont.

A special, T 509, submitted from Cleveland, using only 3.5% zinc oxide as Kadox, 51% Microne Talc and 62% R 610 titanium oxide with Dowicide 6 and a special oleoresinous vehicle, was unsatisfactory in early stages due to mildew, and later showed bad checking and cracking. The group in which extenders and titanium are varied (the alkyd content also being cut in half) shows 1989-20 F-R 200 as better than 2188-R 200 or 2188-Titanox AA anatase. All R-200 panels have a persistent yellow cast and tendency toward dirt, while anatase, though clean, is definitely too free chalking for Chicago exposure. A segment of this group also shows that less than one gallon of phenyl mercuric naphthenate is not effective against mildew and even one gallon is far from a sure preventive.

(b) Fume Resistant Whites and Related Formulas. These are similar to the first group except for the use of Ti-Bar and a straight oleoresinous vehicle without fungicide. In this group there are two regular Rex 456 Fume Resisting Gloss Whites of 3-24-45 and 9-24-45, the latter being slightly higher in extender, lower in Ti-Bar and using 50/50 rutile/anatase as against straight rutile. The straight rutile results in some yellow cast, but this formula is definitely better in general durability. A second group compares Rex 610 Gas and Fume Resisting Whites of 1-31-39 and 4-30-40, both essentially 60/20/20% XX-50 zinc oxide/magnesium silicate/titanium. The later formula, with 2030 titanium (semi-nonchalking) is more durable than the other with 1403, but it does not prevent the heavy erosion which makes this group very poor at Chicago. A group called "Trim and Trellis Whites," using 412 dry leaded zinc and generally similar to Rex 471, compares 15 gallons of (4100) alkyd against (4880)E. Both showed up well in both durability and appearance, with the alkyd having a slight edge.

(c) Miscellaneous. Other formulas tested include (a) regular Rex 471's, pre-war, bodied oil and high anatase "post-war" formulas and (b) tints on both SWP and fume resisting formulas. The Rex 471 samples rate generally better than the foregoing in durability and are surpassed in appearance only by the best of the special types. The (b) group of tests shows that fume-resisting tints are entirely practical. One using 2140 extended titanium is excellent in durability, while Gilders Whiting seems to help in both durability and appearance as against 20 L.

#97 - Cont.

Lacquer Exposures

A clear lacquer produced by the Cleveland Chemical Company, Grover, North Carolina was compared with three of our own materials - T91 C 2, T82 C 12 and T75 C 10 for exterior durability. The submitted lacquer was compared with T91 C 2 and T82 C 12 on steel and aluminum and T82 C 12 and T75 C 10 on maple panels. The Lacquer Department did not recommend our lacquers for exterior exposure on wood. However, the T82 C 12 and T75 C 10 were applied on maple in order to have some yardstick in evaluating the Cleveland Chemical Company lacquer.

After 10 weeks' exposure at 45° in Miami the Cleveland Chemical Company lacquer appeared equal in durability to T91 C 2 and definitely better than T82 C 12 when applied on steel. When applied on aluminum, the T91 C 2 was superior to the submitted lacquer and much better than T82 C 12. When applied on wood the submitted lacquer was slightly better in general appearance than T82 C 12 or T75 C10. T91 C 2 was not exposed on wood, but based on the good performance on steel and aluminum, it is quite likely that T91 C 2 would also be superior on wood to the Cleveland Chemical Company sample.

#97 - Cont.

Panels 7195 - 7208 C, F were examined after five years' exposure vertical south in Florida on cedar bevel siding. All are in relatively good condition and will have to be exposed further to try to get greater differences in film condition. Chicago panels are being discontinued at 64 months, however, because of advanced erosion. The tests are based on Rex 471 SWP Gloss White of 1-22-43 (earliest oil conservation type, all R-200 titanium), and compare 3, 5, 7 and 10% each of 1779 dry - 325 mesh water ground mica from Kraft Chemical Company, CW 1581 dry - Mineralite and 2264 dry - Alsibronz micas. All are slightly to definitely better in durability than the regular guide at Florida, with Mineralite perhaps slightly best and Alsibronz least helpful. At Chicago, there seems to be no choice among the three, and Mineralite does not show up particularly well. The 7% and 10% additions seem definitely more helpful than the lesser amounts. A sample of Pittsburgh's Sunproof White which was reproduced on the basis of an analysis made in Cleveland, was also tested. This carried Lehigh #635 leaded zinc, 50/50 rutile/anatase titanium, 3% 1779 mica and a vehicle quite similar to ours. This formula was good in durability at Florida, but somewhat dirtier; at Chicago it performed about the same as others with 3% mica.

Panels 7374-9 C, F, Cof. were examined after 65 months' exposure at Chicago north and south vertical, 65 months at Coffeyville south and 48 months in Florida south. The panels compare several titanium dioxides and titanium calciums in SWP Gloss White, in most cases as used in certain regular formulas, both pre-war and bodied oil vehicle types. Considerable detail has been presented in the current report, March 28, 1949, and a previous report, December 20, 1945, and space does not permit discussion of the several formula changes and the results at all four locations. Briefly, considering early dirt collection history as very important, the tests and their results are:

(a) Pre-war. Rex 471 of 4-8-42, all 1403 anatase, shows up poorest of the entire series in film durability, but has the best record for clean-up. It is essentially the only one to rate "poor" appearence due to film failure. Rex 471 of 10-13-42, very similar but TiO_2 all 2173 rutile, was dirtier during the first 30 months but acceptably clean in later stages; though more durable than the 1403 sample, it shows more failure than the bodied oil counterparts, as in (b).

(b) Bodied oil. Rex 471 of 1-22-43 compares directly with that of 10-13-42, as both use all 2173. The formula of 1-22-43 rates as one of the best of the entire series except in early dirt collection and the presence of a yellow cast. Rex 471 of 8-16-43, using 185 pounds of 2140 dry Titanox RC and 55 pounds of 1403, plus two variations, one using 2132 RC HT and the other using 50/50% 2140/2132 in place of the 2140, all have a poor dirt history, also uneven or spotty clean-up, but are relatively good in durability. The few failure differences indicate a probable inferiority on the part of 2132 dry.

#97 - SWP 471

The factory has been asked to make a 100 gallon batch of SWP 471 on the latest formula using Nytal CW 2747 as a replacement for 20 dry. This batch is being made to determine if a satisfactory paint can be made without grinding the Nytal. The Nytal 300 is to be stirred into the paste when it is reduced. If the small batch appears to be satisfactory in gloss and other properties a larger batch will be made on the Premier mill.

The Varnish-Resin Laboratory submitted CTV 7099, a P.E. soya ester based on Aliphat 54 B which was compared with High Polymer Oil AV-1125 and linseed (310) in SWP. CTV 7099 had a body of Z_4 +, an acid value of 8.2 and a color of 15 - 14. The SWP's carrying the usual 19 gallons of bodied oil compared as follows:

		Viscosity #5 Orifice			Drying Properties			
Batch	Bodied Oil Used	Fresh	3 Days	5 Days	Set-to-touch	O'Nite	Color	Gloss
894 M	(310)	18.4"	25.2"	25.4"	7 hr. 15 min.	Good	Good	Good
895 M	CTV 7099	26"	35.2"	35.2"	6 hr. 10 min.	Good-	Sl. yellow	Good-
896 M	AV 1125	17.6"	21.2"	21"	6 hr. 10 min.	Very good	Good	Good-

Panels 13488 - 95 CS, CN and F were prepared for exposure south and north vertical Chicago and south vertical Florida. The paints compare Sierra Talc Fibrene C-400 as an extender in SWP versus 20 dry magnesium silicate, 1989 dry Micronized Talc and 2203 dry Carbola Talc.

Panels 13496 - 505 CS, CN and F were prepared for exposure as above, comparing batches of SWP Gloss White containing (3316) as it was made in Chicago, Cleveland and Oakland, and as made by a solvent process. Special oils include ADM's 65-1 oil and safflower oils, and an all-linseed paint as a guide. Sicca Soya Paint Company's Sta-Par paint was also included.

Panels 13542 CS and CN were prepared for exposure south and north vertical at Chicago to determine whether Versene added to house paint would help in controlling nail head rusting.

#97 - Cont.

Panels prepared for exposure during the month include:

1. 13428-34 CS, CN. To check the suggestion received from the Northern Regional Laboratory that CaO ground into house paints would improve drying. Three types of vehicles were used: (1) all linseed; (2) 60% linseed, 32% soya and 8% tung, (3) 92% soya, 8% tung. No improvement was found in set-to-touch time and through drying was somewhat slower, except for slightly faster set with vehicle (3). Exposures Chicago south and north vertical. See page 22, Monthly Report for August, 1948.

2. 13450-61 CS, CN, F. Exposures of institutional house paints sent in for survey in August, 1948. Exposures Chicago south and north vertical, Florida south vertical.

5. 13462-5 CS, CN. Comparison of 60 pounds basic carbonate white lead in SWP versus 60 pounds lead linoleate, to observe effects on durability, especially erosion. Chicago south and north vertical.

Series of house paint exposures examined during the month included the following:

8669-80 F. 36 months Florida vertical south. Comparison of "three hundred" series of bodied linseed oils versus "five hundred" series, using larger amounts of lower bodied oils, decreasing as the body increases. Substantially equal performance, indicating considerable latitude in selection of bodied oils.

#97 - Cont.

Batch	Inert	Oil	Viscosity - #3 Fresh	Viscosity - #3 24 Hrs.	Brushing When Fresh	Flow	Gloss
856 M	2203-2201	19 gals. (510) 29-3/8 gals. (2)	28"	40.2"	Standard	Good	Good
857 M	" "	19 gals. AV 1101 29-3/8 gals. (2)	16.8	17.6	Quite free	Good-	Sl. low
858 M	" "	19 gals. AV 1101 29-3/8 gals. AV 1100	36.6	42.4	Sticky	Very good	Very good
859 M	" "	19 gals. CTV 7086 29-3/8 gals. (2)	19	20.4	Good	Sl. short	Sl. low
840 M	" "	19 gals. CTV 7086 29-3/8 gals. CTV 7085	44	44.2	Sticky	Short	Low
841 M	" "	19 gals. CTV 7082 29-3/8 gals. (2)	25	28	Good	Sl. short	Sl. low
842 M	" "	19 gals. CTV 7080 29-3/8 gals. CTV 7082	51	54.4	OK	Short	Low
858 M	Martin-Senour 20 Dry	19 gals. (510) 29-3/8 gals. (2)	32	52.4	Standard	Sl. short	Sl. low
859 M	"	19 gals. AV 1101 6 " (798) 23-3/8 gals. (2)	27	26.4	Good	"	Low
860 M	"	19 gals. AV 1101 29-3/8 gals. AV 1100	65	75	Sticky	Short	"
861 M	"	19 gals. CTV 7086 6 " (798) 23-3/8 gals. (2)	32	50.2	Good	Sl. short	"
862 M	"	19 gals. CTV 7086 29-3/8 gals. CTV 7085	54	54.6	Sticky	Short	"
863 M	"	19 gals. CTV 7082 6 gals. (798) 23-3/8 gals. (2)	34	38.6	Sl. sticky	Sl. short	"
864 M	"	19 gals. CTV 7082 29-3/8 gals. CTV 7080	50	57	Sticky	Short	"
865 M	"	19 gals. CTV 7086 29-3/8 g.CTV 7090	45 + 1/4 cup	55	"	"	"

#97 - SWP 471

The Varnish-Resin Laboratory has submitted five P.E. esters based on Plastolein DD and Aliphat 34 B, for evaluation in SWP, and comparison with Dr. Hunn's P.E. soya esters AV 1100 and 1101. The characteristics of the Varnish-Resin esters are as follows:

CTV	Fatty Acids	Viscosity	Acid Value	Color	Time
7080	Plastolein DD	D	6.4	11	9 hours
7082	" "	Z_2	6.5	14	25 "
7085	Aliphat 34 B	G	6.9	11-12	4 "
7086	" "	Z_2	4.5	13-14	18 "
7090	" "	D +	8.3	11-12	-

Experimental batches of SWP made with these esters were not satisfactory for flow or gloss and somewhat yellow in appearance. P.E. soya esters AV 1100 and AV 1101 in general were somewhat superior to the Plastolein or Aliphat esters in these respects, but none equalled the all linseed vehicle SWP in all around performance. When the vehicle was entirely P.E. esters the brushing was sticky in all cases, although with AV 1100 plus AV 1101 flow and gloss were on the high side. The Varnish-Resin Laboratory will repeat CTV 7086 in an effort to increase the body, reduce the acid value and improve flow characteristics.

Some trouble also has been encountered with high viscosities when 20 dry is used. Paints made with 2205 and 2201 dries have lower bodies and better flow and gloss regardless of which vehicle is used.

Chart follows.

The
ALL ALUMINUM "MIDGET LOUVER"

2, 2½ & 4 inches in diameter

THE ANSWER TO MANY OF YOUR
VENTILATING PROBLEMS

ROOFERS

BUILDERS

PAINTERS

INSULATORS

TERMITE CONTROL COMPANIES

Use them - -

- - Flat roofs

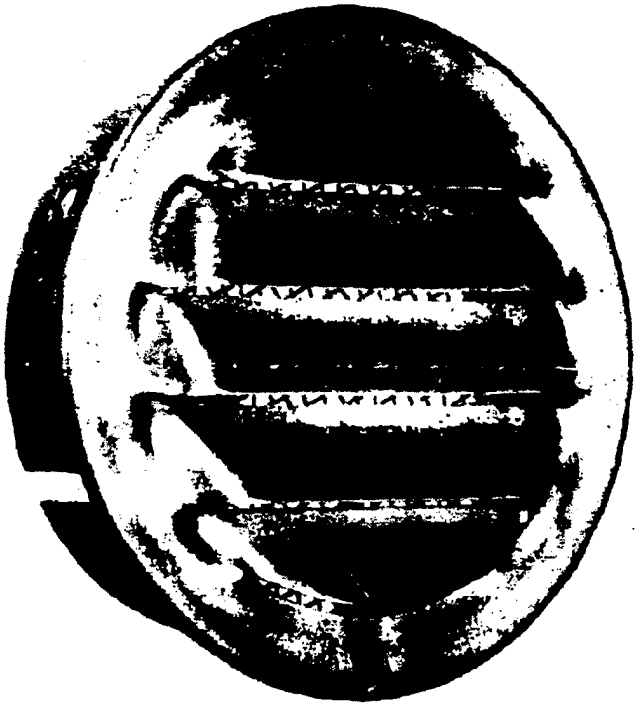
- - Eaves and Soffit

- - Unexcavated areas

- - Sidewalls

- - Gable Ends

Many other uses.



PATENT PENDING

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0007-SWP-044471

Some of the new constructions using sheet metal for an exterior finish over conventional materials rely principally on ventilation to the weather to carry off excess moisture. This is very practical and has only a minor effect in increasing the heat losses from the house.

Condensation in attics is essentially the same as condensation within the walls. Moisture may migrate out through the plaster or interior finish of the walls and then rise through openings to the attic. Sometimes the moisture originates in the basement and migrates up through the walls to the underside of the roof. It is not uncommon to find icicles forming from protruding nails or metal and, when the warm sun strikes the roof, to have water spots form on the ceilings of top-story rooms. It is important in this case, as always, to recognize the source of the vapor. Often all that is required is to adequately ventilate the attic. Two or more louvers, with a total area of at least 1/300 of the attic floor area and placed at opposite ends of the attic, are usually sufficient. A vapor barrier effectively applied to the warm side of the ceiling will help materially. Weather stripping may be added to the doors closing the entrance to the attic. This will prevent air currents from carrying moisture to the attic from the lower part of the house.

If the attic is to be used for living quarters, insulation can be added between the rafters and a vapor barrier installed on the warm lower surface. A space of several inches should be left between the insulation and the roof boards. This space should be vented to the outside at the ridge and in some cases venting at the eaves will be helpful. All rafter spaces can vent into the space above the collar beams and in turn out through screened louvers at the gable ends.

Flat roofs may be treated similarly but circulation will be less positive. A vapor barrier is recommended and, perhaps, a fan will be required to provide more positive circulation.

It is rather difficult to alter the cooking, bathing, and laundering habits of a family, and perhaps the potted plants must stay. Some alteration to the building may be necessary to reduce the humidity and control the moisture. Basements, and crawl spaces in unexcavated areas, should be checked to see if they are sources of humidity. The walls may appear dry in a warm basement only because the heat evaporates the water before it comes to the surface. The invisible vapor then works its way through the house to the trouble area. Basement walls can be painted with paints having low water-vapor transmission rates. Condensation frequently occurs on basement walls and floors during the summer months. This is caused by the humid atmosphere coming in contact with the cold masonry.

The ground surface under crawl spaces can be covered with asphalt roofing to reduce the amount of water evaporated. The only requirements are that the ground be fairly even and the roofing should lap four inches at the joints. Cement or caulking for the edges of the roofing is unnecessary in most cases.

Where reducing the humidity proves to be impractical, there are other things you can do. Condensation on windows can be controlled readily by the use of storm sash. The addition of the outer sash raises the temperature of the inner glass surface, and reduces the likelihood of condensation. While the storm sash should fit neatly, they should not be too tight. Provision for ventilation from the outside to the space between the glass should be made in cases where condensation, usually frost, collects on the inside surface of the outer sash. Holes at top and bottom of the sash will often help to accomplish this.

Where condensation is observed or suspected inside the walls, some treatment must be given to reduce the flow of vapor to the trouble area. You notice water, caused by condensation, dripping from the wall during a thaw after a cold snap. Paint may blister or peel from the siding. These symptoms usually show first on the northern exposure of the house where the walls are colder. A very effective barrier to the flow of vapor is several coats of high-gloss oil paint on plaster. A finish coat of low-gloss paint or wallpaper may then be used over the high-gloss paint serving as a barrier. Proper ventilation of the wall will reduce humidity within the wall. One-inch holes, one in each running foot of wall, at the top and bottom of the cold air space in a cavity wall, venting to the outside of the house will prevent considerable condensation troubles.

Regulate the Flow of Vapor. In new construction, where the remedies are not so limited, a barrier to the passage of vapor may be placed within the wall, somewhere near the warm surface. Most good insulations are supplied with excellent vapor barriers attached to the warm surfaces. Careful consideration should be given these barriers at the time of installation. They should be neatly applied and protected from rupture. New as well as reconditioned construction should also avoid the use of vapor-tight papers and felts as sheathing papers. Sheathing paper is intended to shed liquid water, but it should not impede the passage of vapor. In fact, a vapor barrier applied between sheathing and siding would be a misapplied vapor barrier and could be the source of serious trouble.

Modern conveniences are big contributors to excessive humidity since they encourage the use of more water more frequently. More frequent laundering and bathing increase humidity. Cooking and heating with unvented fuel burning equipment also contribute moisture. In some cases, moisture may come from the ground through unvented crawl spaces or from basements. Potted plants and similar trimmings add some moisture to the air. Respiration by human beings and animal pets, along with evaporation from the skin, contribute humidity. The sources of humidity are many. Some homes are adding to the difficulties by the use of humidifiers in some rooms.

Recognize the Source of Humidity. Houses are being built tightly in an attempt to effect a better appearance and fuel savings. This is made possible by a better understanding of the properties of materials. The reduction in openings and crevices reduces the infiltration of relatively dry outside air. This reduces the sweeping action which carries moisture out of the house. For economic reasons there is a tendency to build houses smaller. More efficient use of space increases the number of occupants per cubic foot of volume.

In one test made recently, a wall was constructed with studs, sheathing, building paper and clapboard siding on the outside; 1" insulation without vapor barrier, an air space, and an inside wall finish of 3/8" gypsum board on the inside. The temperature on the inside of the wall was kept at 70° F. and the relative humidity at 38%. The outside of the wall was kept at 0° F. These conditions were maintained for a period of four weeks. At the end of that period we found a great deal of moisture on the sheathing boards between each stud.

A similar wall was then constructed in exactly the same way except that aluminum foil, an excellent vapor barrier, was installed before the interior wall covering was installed. The same temperature and humidity conditions were maintained for this wall for a similar period of time, and at the end of the time, no accumulation of moisture was present. While the test conditions were moderately accelerated, they were not considered unduly severe. The results are mute evidence of the need for vapor control.

For a while it was thought that the water always came from the outside of the house. But it has been proved that this is not so, and the information is spreading so that most people now know that the difficulty comes from inside the house.

Reduce the Humidity. There are several very effective remedies which can be used to overcome condensation troubles, the particular remedy to be used depending on the location of the trouble. No alterations to the building will be necessary if the humidity inside the house can be reduced sufficiently. This is the same as removing the vapor before enough of it accumulates to condense on your windows or walls. Humidity may be reduced in several ways. The major sources of humidity should be removed. Certainly any humidifying trays should be drained. Large amounts of laundry should be dried out-of-doors or in well-ventilated space. If the humidity condition is very bad, it may be necessary to ventilate the house with a controlled amount of air from outside the house.

IS YOUR HOUSE ALL WET?

E. R. Queer and E. R. McLaughlin

Copied from "The American Home", November, 1947, pp. 41-42.

Water as an Enemy. The following article was written especially for THE AMERICAN HOME by Professor E. R. Queer and Assistant Professor E. R. McLaughlin of the Engineering Experiment Station of the Pennsylvania State College. The Engineering Experiment Station has been co-operating for the past several years with the National Housing Agency in research experimentation on this and many other subjects that beset the homeowner. They have assembled technical data on the performance of new materials and new methods of construction suitable for use in obtaining structurally adequate, satisfactory, durable, and livable homes. The homeowner who has to cope with sweating walls and windows will find here the very latest findings on what steps to take to end condensation. -- The Editors.

Water is an enemy of many building materials, and that is one reason why the roof of a house is designed to shed rain and the exterior walls to protect the house from the elements. These simple precautions were sufficient in days past because they also served their purpose in protecting the occupants of America's homes from rain, sleet, and other vagaries of weather. However, in more recent years the quest for a more comfortable dwelling, and one that could be heated economically, brought certain additions in conventional construction. These additions included insulation in the walls, weather stripping around doors and windows, caulking material in all cracks and crevices, and storm sash. Along with the comfort and economy that these changes brought, came, in numerous cases, trouble. The reason for this moisture trouble was that one aspect of all these improvements had been overlooked. A tight house had reduced the transfer of heat from the inside out, but water vapor still roamed at random inside and, in many cases, the improvement aggravated condition.

All gases diffuse rapidly and tend to fill the space enclosing them completely. Water vapor, like other gases, enjoys this property. Then when enough moisture collects in a given area, it will condense on any cold surfaces of the room or inside the walls of the house. This condensation first appears as tiny droplets and later begins to run down the walls or other surfece in the form of water. The droplets have suggested the term "sweating." If the moisture concentration is high enough, this condensation can occur at any normal temperature.

As long as houses were built large and were not too tightly constructed the water vapor concentration or "humidity" inside did not rise to a dangerous point. During the heating season, when the humidity was low outside, enough moisture-laden air from the inside would escape through cracks and crevices or through the walls themselves to keep the indoor humidity at a low level.

SWP Paint Research Project

Chicago #6 Paint Research

Cleveland

Dr. J. C. Weaver

March 22, 1949

Moisture Condensation in Dwellings

J C Weaver MAR 28 1949

The attached article which appeared in "The American Home" in November, 1947 was called to our attention by the New Jersey Zinc Sales Company. It is a rather capable and practical handling of the problem of moisture in dwellings as it influences paint performance.

In connection with the venting of moisture, as discussed in the fourth paragraph on page 5, we would like to call your attention to the aluminum "Midget Louver" which is offered by the Midget Louver Company, 6 - 8 Wall Street, Norwalk, Connecticut. A reproduction of the first page of their brochure is attached.

M. Taylor Loe

MVL:MBH

Director of Paint Research

SWP Undercoater - Rex 450 (Formula 12-29-48)
Using CTV 7066-CV 49 50/30/20 Closed Kettle *4

Characteristics Suspending Agent	Batch No.	Viscosities Fresh	O'Nite	5 Days	10 Days	15 Days	30 Days	60 Days
547 Dry + (12)W	772 M	24"	30.6"	31"				
(12)W	773 M	22	24.8	26.4				
None	774 M	19	21.8	25.4				
547 Dry	775 M	20.4	22	25.6				
1826 Dry	776 M	20.6	25.6	27.2				
CW (2343)	777 M	23.6	26	26.6				
2270 Dry	778 M	17.2	18	18.6				
(12)W with BW 103	779 M	[illegible]	41	44.6				
(12)W + 1826 Dry	780 M	20.4	24.4	27.6				

SWP Gloss White - Rex 471 - Card No. 51
Using CTV 7066-CV 49 50/30/20 Closed Kettle *4

Characteristics Suspending Agent	Batch No.	Viscosities Fresh	O'Nite	5 Days	10 Days	15 Days	30 Days	60 Days
(12)W + 547	781 M	35.8"	43"	50"				
(12)W	782 M	34	42	42				
None	783 M	25	36.6	42.4				
547 Dry	784 M	27.6	39	44.4				
1826 Dry	785 M	26	34	41.8				
CW (2343)	786 M	36.8	39.8	45				
2270 Dry	787 M	27.4	29.6	32.2				
Paints 723 M, 752 M 770 M and 788 M are made with (310) and (12)W	788 M	37.6	43	52 +				
(12)W + 1826 Dry	789 M	35.2	41.6	46				

*4 - CTV 7066 - Top Heat 550° F.
CV 49 - 50/30/20 — No fatty acids used in making this oil.
Small closed kettle
Body - H
A. V. - 9.0
Color - 6

(3)

SWP Undercoater - Rex 450 (Formula 12-29-48)
Using CTV 7065-CV 49-All Linseed Closed Kettle *3

Characteristics Suspending Agent	Batch No.	Viscosities Fresh	3 Days	5 Days	10 Days	15 Days	30 Days	60 Days
547 Dry + (12)W	754 M	21.8"	26"	24.2"	23.4"			
(12)W	755 M	18.8	22.4	21.8	20.4			
None	756 M	16.2	18.6	19.8	19.6			
547 Dry	757 M	21	22.6	23	24			
1826 Dry	758 M	16.6	19.2	20	20.6			
CW (2343)	759 M	19	20.8	20	20.4			
2270 Dry	760 M	15.8	17	17	17			
(12)W with BW 103	761 M	21	30	32	34.6			
(12)W + 1826 Dry	762 M	19.5	27.6	27.8	30			

SWP Gloss White - Rex 471 - Card No. 51
Using CTV 7065-CV 49-All Linseed Closed Kettle *3
Viscosities

Characteristics Suspending Agent	Batch No.	Fresh	O'Nite	3 Days	10 Days	15 Days	30 Days	60 Days
(12)W + 547	763 M	35.2"	42"	40.8"	48.6"			
(12)W	764 M	35	36	39	43			
None	765 M	24	30.4	36	40			
547 Dry	766 M	26	31	35	41.4			
1826 Dry	767 M	30	34.2	37	43.6			
CW (2343)	768 M	33.2	34.8	37	41			
2270 Dry	769 M	27	28	30	31.4			
Paints 723 M, 752 M 770 M and 788 M are made with (310) and (12)W	770 M	33.6	47	46	59			
(12)W + 1826 Dry	771 M	31.2	38	39	50			

*3 - CTV 7065 - Top heat 550° F.
CV 49 - All Linseed
Small closed kettle
Body - G
A. V. - 9
Color - 9-10

No fatty acids used in making this oil.

(2)

SWP Undercoater - Rex 450 (Formula 12-29-48)
Using (48) Large Closed Kettle *2

Characteristics		Viscosities					
Suspending Agent	Batch No.	Fresh	O'Nite	5 Days	10 Days	15 Days	30 Days	60 Days
547 Dry + (12)W	731 M	27"	25.2"	24"	27"	27.2"		
(12)W	732 M	20	21.2	21.4	20.2	21		
None	733 M	19	20	18.4	18.6	21		
547 Dry	734 M	25	21	19.6	20	20.6		
1826 Dry	735 M	19	19.6	19.8	21	21.6		
CW (2343)	736 M	20	20.2	20	19.2	20.6		
2270 Dry	737 M	17.2	18.2	16.8	16	16.8		
(12)W with BW 103	738 M	22.4	29	34	40.8	44		
(12)W + 1826 Dry	739 M	20	22.2	22	23.2	22.4		

SWP Gloss White - Rex 471 - Card No. 51
Using (48) Large Closed Kettle *2

Characteristics		Viscosities						
Suspending Agent	Batch No.	Fresh	O'Nite	2 Days	6 Days	9 Days	15 Days	30 Days	60 Days
(12)W + 547	745 M	39"	39.8"	41"	39"	39"	37"		
(12)W	746 M	28	33.2	35	34	33.4	31.2		
None	747 M	23	23.8	27.6	33	30.4	30.6		
547 Dry	748 M	27	33.6	33	34.2	34.6	33		
1826 Dry	749 M	29	29.6	32	34	34.2	36.8		
CW (2343)	750 M	31.2	31	32	32.2	32	32.8		
2270 Dry	751 M	26	25	26.4	27	25.4	25.4		
Paints 723 M, 752 M 770 M and 788 M are made with (310) and (12)W	752 M	37.4	50.6	63 +	63 +	60 + 1/8 cup	50 + 1/4 cup		
(12)W + 1826 Dry	753 M	35.4	36	45.4	55 +	54 +	64		

*2 - CV 49 Base (Closed Kettle)

Body - 58-1/2" G-H
A. V. - 5.4

No fatty acids were used in making this oil.

Examinations of old samples of house paint made with Lecithin have shown satisfactory suspension properties and no apparent effect on drying.

These data are given you at this point for your information. We will be glad to receive any comments from your analysis and we will see to it that you are kept informed of further progress.

M. Taylor Lee

[redacted]

Director of Paint Research

cc [redacted]

SWP Undercoater - Rex 450 (Formula 12-29-48)
Using (48) Small Open Kettle *1

Characteristics	Batch	Viscosities						
Suspending Agent	No.	Fresh	3 Days	5 Days	10 Days	15 Days	30 Days	60 Days
547 Dry + (12)W	707 M	25"	39"	40"	41"	41"		
(12)W	708 M	20	24	25.2	24	23.8		
None	709 M	16	22	23.2	25	24		
547 Dry	710 M	25	26.2	26	26	26.6		
1826 Dry	711 M	20	24	24	25.2	25		
CW (2343)	712 M	21	23.8	23	23.4	22.4		
2270 Dry	713 M	16.4	18	16.6	17	17.4		
(12)W with BW 103	714 M	23	37	39.4	41.2	41.2		
(12)W + 1826 Dry	715 M	23	31	30.2	29.2	32		

SWP Gloss White - Rex 471 - Card No. 51
Using (48) Small Open Kettle *1

Characteristics	Batch	Viscosities						
Suspending Agent	No.	Fresh	O'Nite	3 Days	10 Days	15 Days	30 Days	60 Days
(12)W + 547	716 M	48"	48"	50" +	53" +	56"		
(12)W	717 M	43	53.8	51 +	52 +	50		
None	718 M	29.3	39	49	47 +	50		
547 Dry	719 M	44	47.6	45 +	45 +	52.6		
1826 Dry	720 M	34	42	49	45 +	52.6		
CW (2343)	721 M	39	45.4	45	44	42.6		
2270 Dry	722 M	26.4	31	33	35.8	34.4		
Paints 723 M, 752 M 770 M and 788 M are made with (310) and (12)W	723 M	29	37	39	39	36		
(12)W + 1826 Dry	724 M	46	55 +	53 +	54 +	51		

*1 - (48) 50/30/20 (Open Kettle)

Body - 52" G-H
A. V.- 9.6
Color - 9

No fatty acids were used in making this oil.

J. C. Weaver

Chicago #4 — Paint Research

Cleveland — February 18, 1949

A. B. Hall — SWP

We have continued our work to investigate the difficulties [illegible] due to afterbody in SWP Gloss White and Undercoater, discussed at the meetings of the Trade Sales Technical Board. We are [illegible] tabulating data on variations of both the Gloss White and Undercoater which [illegible] has varied the (48)'s used and also the [illegible] suspending agents. You will note that space is left for the [illegible] of additional data obtained on further storage of the samples. This information will be forwarded to you when accumulated.

Mr. [illegible] has suggested the possibilities of water contributing to afterbodying tendencies of house paint. To investigate this [illegible] we assembled raw materials for the entire original series [illegible]. The pigments, including [illegible] pigments and extenders, [illegible] shallow trays at 250° F. for several hours. The vehicles [illegible] with calcium chloride by [illegible] for several hours [illegible] and then letting the desiccant settle out over [illegible] evidently such precautions did not establish anhydrous conditions [illegible] certainly would equal or reduce the composite moisture content [illegible] points below normal [illegible]. The formulas were then ground [illegible] no water present, either [illegible] from actual water added [illegible] 18%, and then suspension agents added as shown.

[illegible] propose to draw conclusions at this point. It is interesting [illegible] to note that the (48) #2 made in the large closed bottle [illegible] tendency to produce high body than is true of (48) #1 made in [illegible] open bottle. This may be due in part to the lower acid value [illegible] all-linseed SWV [illegible] 40 with an acid value of 9 [illegible] than #1. SWV [illegible] 40 (48) #4 made in the closed [illegible] with an acid value of 8 shows the same tendency toward high [illegible]

In [illegible] instances the complete removal of water has resulted in [illegible] conditions, but these changes are not sufficient to [illegible] this - 2270 [illegible] difficulty. In practically every instance Lead- [illegible] always [illegible] produced the lowest initial viscosity and has [illegible] the period of [illegible] viscosity at lower and acceptable limits over [illegible] to date.

JCWeaver FEB 21 1949

0007-SWP-044482

0007-SWP-000113852

#97 - SWP 471

Considerable work has been under way to determine the reason for the progressive increase in viscosity of SWP and 450 Undercoater. Test paints have been made covering a large number of variations in pigmentation, type of bodied oil, suspending agents, etc. To date we have been unable to identify any one component responsible for the after-body tendencies of these formulas. At the present time it appears that six pounds of lecithin - 2270 dry without water produces the lowest initial viscosity and shows the least tendency to body in both Rex 450 and Rex 471 formulations. This work will be continued.

Further studies have been made of the use of P. E. soya esters AV 1100 and AV 1101 in SWP Gloss White, tints and 450 Undercoater. Three formulas were developed using 50% of the oils as P. E. soya esters. Arrangements were made with the factory to make 50 gallon batches for house tests this spring. Alternate formulations were also developed to use Nytal 300 - 1989 dry, 2201 - 1989 dry and 2203 dry as alternates for 20 dry. Work is now under way to set up similar formulas using P. E. soya esters as 40% of the total oil.

The Resin Research Department submitted a number of bodied oils made by the Eckey process and two made by the direct process. The bodied oils initially submitted were checked for drying as clear films using the following drier content: 0.346% Pb, 0.014% Mn and 0.018% Co. In the clear films the Eckey oils set-to-touch in approximately half the time required for similar oils made by the direct process. However, when the oils were used in SWP for the bodied oil portion of the formula the margin in drying was not evident. Actually in the Colonial Yellow, the Eckey 65/35 oils (RC 0810 and RC 0837) were slower in drying than the direct process oil, RC 1347. The various paints are to be exposed at Chicago north and south on cedar siding. A close check will be made on gloss and dirt collection tendencies during the exposure cycle.

A study of the drying characteristics of various SWP formulations has been completed with the RCI Drying Recorder. Results are of interest in that the comparative performance of pre-war vs. current SWP is demonstrated as well as the effect of pigment composition. The tests are as follows:

#97 - Cont.

Paint No.		Description	Tear Point	Break Point
OJ 596 M	Rex 471	Pre-war formula of 4-8-42.	490 min.	840 min.
RB 2395	Rex 471	Card 49, using 412 dry leaded zinc plus basic carbonate white lead.	550 "	550 "
RB 2472	Rex 471	Card 50, using 412 dry leaded zinc.	460 "	620 "
RB 2436	Rex 471	Card 50, using 414/511 leaded zincs.	430 "	760 "
RB 2457	Rex 471	Card 50, using 414/18 for " "	520 "	760 "
RB 2473	Rex 471	Experimental, using 1410 dry leaded zinc.	500 "	710 "
RB 2433 R	Rex 436	Card 13 SWP Fume Resisting White	450 "	650 "

The improved through-dry properties of the bodied oil formula are evidenced by the proximity of the tear and break points. These data also illustrate the slower drying properties of the paints formulated with 414 dry leaded zinc.

Cold weather drying of lead vs. non-lead containing paints shows drying rate to be proportional under adverse as well as good conditions.

Room Drying Conditions - 75° F.	Tear Point	Break Point
Rex 471, card 49, containing 412 dry + 60 pounds 18 dry	5 hours	7-1/4 hours
Rex 436, card 13 - SWP Fume Resisting White (lead-free)	6-3/4 hours	8-1/4 hours
Cold Weather Drying - 50° F.		
Rex 471	14-1/4 hours	16 hours
Rex 436	20-1/4 hours	20-3/4 hours

In addition to the data reported in December, the factory has now completed 11 additional batches of SWP Gloss White made with Nytal 300 on the 3-roll mill. These batches were checked for grind, viscosity and production rate. The average production rate for SWP made on the 3-roll mill for the past six months is 239 gallons per hour. The production on SWP made with Nytal 300 (CW 2747) on the 3-roll mill up to January 14, 1949 ran as follows:

#97 - Cont.

Date	Size	Gals./Hr.	Grind	T. Wt.	A. Wt.	Viscosity #3
1-3-49	1500 gals.	375	2 H	14.81	14.73	27"
1-5	1500 "	333.3	2 H	"	14.67	32"
1-6	1800 "	312.8	1 H	"	14.60	30"
1-6	1500 "	300	2 H	14.68	14.76	30"
1-10	1800 "	288	2 H	14.61	14.69	30"
1-10	1500 "	333.3	2 H	"	14.61	28"
1-11	1800 "	248.2	2 H	"	14.69	26"
1-12	1500 "	250	2 H	"	14.72	26"
1-13	1800 "	288	2 H	"	14.75	26"
1-14	1500 "	315.7	2 H	"	14.75	29"
1-14	1800 "	300	2 H	"	14.78	28"

Average production rate - 304 gals./hr.

Based on the above batches, Nytal 300 grinds 27.2% faster than the average production for the past six months.

Panels 13378 - 407 CS, CN and F were prepared for exposure south and north vertical in Chicago and south vertical in Florida. The paints were described in detail on pages 11 - 15 of the October, 1948 report. The oils used in the paints were a group of 65% soybean/35% tung oil combinations prepared by Resin Research. This set of panels includes whites and Colonial Yellow tints which dried at 40 - 50° F. to check the effects of adverse drying conditions on dirt collection. The set will be repeated this summer under good drying conditions.

Panels 13361-9 CS, CN, K and F were prepared for exposure south and north vertical in Chicago and south vertical in Coffeyville and Florida. The paints were described on page 22 of the July, 1948 report. They evaluate Myvoil 2 which is a molecularly distilled soybean oil.

#97 - Cont.

Panels 13322-30 C and F were prepared for exposure at 45° south in Chicago and Florida. This is a test of clear lacquers including a special containing a solvent-plasticizer which was submitted by M. C. Hardin. It is supposed to improve the durability of clear lacquers.

The following sets of panels were examined during the month:

1. 10945-57. 24 months at Florida, vertical south, with consideration also being given to the Chicago exposures at 21 months, north and south. These tests are on cedar beveled siding, primed with Rex 450 Undercoater. Four bodied soyas were used to replace linseed (48) in both SWP Gloss White and Cream: (a) Bis soya air-blown, (b) soya bodied using SO_2, (c) catalyst-bodied soya, and (d) 80/20% (1273)/(140) (soya/CWO). As reported previously at about 14 months, there is essentially no difference due to any of these oils as regards dirt or tint-retention. Sample (d) might have a slight edge in general appearance factors, with (b) and (c) very slightly more dirty in some cases. However, there is noticeable failure at Florida at two years, and all the special oils show more checking than the regular, (d) again having a very slight edge over (a), (b) and (c). At Chicago the tests all look clean and good except for dirt on the tints on north exposure. There is no failure except incipient erosion, which seems to be slightly worse with (d) than the others. The series also includes Rex 471 formulas using regular oils and testing 100% 2173 dry versus 50/50% 2173/1403 versus 100% 1403 (basic formula for the oil tests). These tests show the characteristic trends toward good durability but yellowness and dirt due to rutile and good clean-up but more chalk and erosion due to anatase.

2. Panels 10997-11004 F. Examined after two years' exposure vertical south at Florida. These are tests of low p.v.c. house paints, exposed on cedar siding both as two coats self-primed and primed with Rex 450 Undercoater, regular Rex 471 being used as a guide paint. Titanium Pigment Corporation's EX-4508, which uses a pigmentation of 168 pounds each of 1403 TiO_2 and 2295 zinc oxide and 224 pounds of 18 dry SCWL, with a limed oil vehicle, was the formula tested. Variations consisted of three samples of limed oil made by the Varnish Research Department. As compared to Rex 471, the specials are slightly to definitely poorer as regards checking and cracking; their appearance is good due to general whiteness and cleanness, but they seem to hold noticeable mildew, while Rex 471 does not. There is little to choose among the three limed oils, CVR-599-1, CVR-600 and CVR-602, although the CVR-600 seems unusually poor in the test using Rex 450. The CVR materials are simply three attempts to match T. P. Co.'s limed oil VM-2182M7, using (44) and (320); CVR-599-1 was the least satisfactory, being low in acid value and body, while CVR-602 was very close to the desired characteristics.

#97 - Cont.

3. Exposures 11572-11610 F and C. Examined after 18 months at Florida and 20 months at Chicago, vertical south. These are old versus proposed new formulations for institutional second quality house paints. Considerable time was spent on the examination and on writing a progress report, which emphasizes the Florida exposures and is a final report as far as they are concerned. Since it is impossible to present all significant details of formulation or results here, we expect to have copies of the report available for all who are interested. For instance, complete cost figures as of the time the tests were put out and as of the present will be in the progress report. The panels are all cedar beveled siding, prepared as 2-coat self-primed work with one pint of (2) per gallon added to the first coat.

   (a) Rex 300 S-W Family Paint of 1-5-45 is the basic outside white formula, using 150 pounds of 412, 270 pounds of 2152 and 300 pounds of asbestine. All formulas, unless otherwise specified, use a 100% linseed vehicle, usually (2)-(48). Variations of the Rex 300 formula include the use of 1271 and of 1405 anatase titanium pigments for part of the 2152, of 566 calcium carbonate for 20 L and of increased 412 (to 275 pounds). At 18 months Florida, the guide (basic) formula is "average," with considerable microscopic failure and quite serious dirt which is largely mildew. 1271 and 1405 give not only a cleaner film, but slightly better durability; however, Chicago results show increased erosion due to their use. 566 seems to allow more dirt at Florida, and at both locations seems to result in slightly more failure. The increase in 412 decreases mildew growth, with no other appreciable effect so far at either location.

   (b) Other whites tested are, briefly: (1) Lucas Sultana (old), 500 pounds lithopone, 150 pounds 412, 265 pounds 20 L vs. a revision as of 8-21-44 using 245 pounds 414, 215 pounds 18, 50 pounds 2269, 420 pounds 20 dry and 19 gallons of (2310)F fish oil. The lithopone type is very poor in all respects at both locations, while the newer type is better but shows a heavy checking at Florida, very likely due to the fish oil. (2) Lucas Dura-Mix, an MS-130 type made on a formula of 9-10-42, is extremely bad as to mildew and tends to erode at Chicago, although it is far from clean. (3) Central A-1 high in 2140 and containing some gypsum, is similar to Dura-Mix at Florida and is dirtiest of all at Chicago.

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3. (c) S-W Family Paint Tint Base of 7-8-42 is the basis of several proposed formulations. It is high in leaded zinc, with 20 L and 1194 whiting as extenders and carrying 14 gallons of (629) long oil rosin varnish. These tints are more difficult to evaluate because of the combination of dirt and fading effects at the two locations (also there are two shades, Colonial Yellow and Westchester Gray), but the most noticeable results are, briefly: (1) considerable improvement in durability due to elimination of (629) and replacement with bodied oil, (2) the same due to changing to approximately 1/3 412, 1/3 2140 and 1/3 20 L, (3) better color but possibly poorer durability due to use of 566, and (4) reduction in dirt due to 2203 and to 1194 (separately) as inerts, although 2203 seems to hinder durability.

(d) Other tints tested, briefly:

(1) Sultana, with lithopone. Very dirty (mildew) and failing seriously.

(2) Lucas, MS-150 type. Good color, but very dirty and showing bad checking at Florida as well as erosion at Chicago.

(3) Central A-1, same as above but tinted. Very bad in both fading and dirt, although failing less than (1) and (2).

(4) SWP Tint Base of 6-26-44. Very good film, but quite dirty and not outstanding in tint retention.