

NEWARK PLANT

PIGMENT COLOR RESEARCH REPORTS

JUNE - 1935

N36969

# PIGMENT COLOR RESEARCH REPORTS

JUNE - 1935

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PIGMENT COLOR RESEARCH REPORT

PIGMENT GREEN B PULP GT-68-P

SUBMITTED BY: E. J. Hrus  
APPROVED BY: *V. Chalupsky*

223.71  
FILE: ~~MISC.~~ TONERS  
DATE: ~~JUNE~~ - 1935

INTRODUCTION

Production on this color was low during most of the month, two batches being made to complete an order for 5000 lbs. of pulp for paper stock. However, two more batches have been scheduled and will be reported next month.

SUMMARY & CONCLUSIONS

Of the three batches awaiting paper test since last month, one (Lot 43799) has been reported unsatisfactory for paper by the Paper Laboratory and has been transferred to rubber stock. The other two (Lots 43730 and 43836) have been shipped as satisfactory for paper.

The two batches made last month but on which no report was available (Lots 43980 and 44043) have tested satisfactorily and have been shipped for paper stock.

The two batches made and reported this month (Lots 44224 and 44266) have tested satisfactorily in rubber and now are awaiting paper test. If acceptable, they will be shipped to complete the order for 5000 lbs. of pulp for paper stock.

Yields on the last four batches made were satisfactory, averaging 96% of estimate and checking previous yield results.

A new CS formula based on present plant procedure has been written and coded CS-7904. It does not differ materially from the previous CS formula (CS-7731) except that caustic soda is used to replace soda ash in preparing the Cadmium - Turkey Red Oil soap.

Production on this color is being continued in the plant, two batches being scheduled to complete an order for 1500 lbs. dry for rubber stock.

A question has been raised as to how long GT-68-P can be stored without affecting its tinctorial properties. A satisfactory time limit has been set and tested by testing a six months old sample of a Semi-works lot against the original latex dispersion. Satisfactory results were secured in rubber and no evidence of decomposition was noted.

Production and shipments for the month of June are tabulated in Tables I and II respectively.

EXPERIMENTAL DETAILS

2.

TABLE I. N.B. 433, pages 138-143

GT-68-P Production for June

| Batch | Process      | Pulp Yield       |                        | Est. Dry. | Pulp Characteristics | Rubber Test vs Lot 13926 | Remarks                                           |
|-------|--------------|------------------|------------------------|-----------|----------------------|--------------------------|---------------------------------------------------|
|       |              | Ori- Sinal % Dry | After Re-working % Dry |           |                      |                          |                                                   |
| 43980 | check 41873  | 26.8             | 390                    | 26.8      | 367#                 | 380#                     | Soft pulp, breaks down OK- vvs clean              |
| 44043 | "            | 26.15            | 379                    | 26.2      | 287                  | 380                      | " OK- vvs blue                                    |
|       |              |                  |                        |           | 97-1/2# held in S.W. |                          |                                                   |
| 44224 | check CS7904 | 25.35            | 375                    | 25.15     | 367#                 | 380                      | " " vs strong OK for rubber. Awaiting paper test. |
| 44266 | "            | 25.85            | 362                    | 25.85     | 353                  | 380                      | " " " "                                           |

TABLE II.

GT-68-P Shipped during June

| Lot   | Rubber Test vs. Lot 13926 | Paper Test    |                  | Remarks and Disposition                                                                     |
|-------|---------------------------|---------------|------------------|---------------------------------------------------------------------------------------------|
|       |                           | vs. Lot 41873 | OK by paper lab. |                                                                                             |
| 43730 | 5% str- s.clean           |               | OK by paper lab. | OK for paper. Consumed in shipment for paper 1458# at 25.65% = 374# dry                     |
| 43836 | vvs str- vvs bl&cl.       | "             | "                | OK for paper. Consumed in shipment for paper 1451# at 25.5% = 370# dry                      |
| 43980 | OK - vvs clean            | "             | "                | OK for paper. Consumed in shipment for paper 1369# at 26.8% = 367# dry                      |
| 44043 | OK - vvs blue             | "             | "                | OK for paper. 97-1/2# dry held in SW for CS-7906. Remainder consumed in shipment for paper. |
|       |                           |               |                  | Paper shipment: 1094# at 26.2% = 287# dry                                                   |

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PIGMENT COLOR RESEARCH REPORT

PIGMENT GREEN B FOR PAPER COATING AND DYEING

SUBMITTED BY:  
APPROVED BY:

*Alfred Siegel-*  
*Smith*

223.71  
FILE: ~~MISC.~~ TONERS  
DATE: JUNE - 1935

INTRODUCTION

The development of a water dispersible Pigment Green B powder for paper coating and dyeing has been completed in the laboratory, and two semi-works charges have been made.

SUMMARY & CONCLUSIONS

While the first semi-works charge is not satisfactory, the second batch is equal to the laboratory tentative standard in dispersion and tinctorial properties. This batch of GL-7906-D, SW-7105 is from 15 to 20 percent stronger and appreciably brighter than standard GT-68-P paste as judged by paper dyeing tests. SW-7105 is much stronger, yellower and appreciably brighter than the corresponding untreated paste and standard GT-68-P, as judged by paper coating tests.

EXPERIMENTAL DETAILS

Notebook 460, expts. 37 and 42, pages 154 and 174 respectively.

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PIGMENT COLOR RESEARCH REPORT

RUBBER COLORS

SUBMITTED BY: *A. Stratton*

APPROVED BY: *June E*

172  
FILE: RUBBER COLORS

DATE: JUNE - 1935

INTRODUCTION:

The work has been continued on this problem during the past month with emphasis on the Victoria Blue R - P.T.A. for rubber and some study of the use of Diglycol Stearate and possible substitutes with a view of seeking patent protection. The improvement of Ca Lithol for rubber has been dropped for the present in view of a separate study being started on that type of color.

SUMMARY & CONCLUSIONS:

The May report discussed six colors which had been submitted to the Rubber Laboratory for evaluation and approval. These colors have been examined and approved and are now ready for sale as follows:

CS-7664 - RL-407-D - Extended Ba Lithol - Du Pont Rubber Red TXE  
CS-7665 - RL-408-D - Extended Ca Lithol - Du Pont Rubber Red SXE  
CS-7836 - RP-409-D - Ext. Ba Lake Red C - Du Pont Rubber Red BAE  
CS-7789 - GP-399-D - Extended GT-347-D - Du Pont Rubber Green EGE  
CS-7863 - GP-400-D - Extended GT-354-D - Du Pont Rubber Green PTE  
CS-7854 - GM-401-D - (Naphthol Yellow) - Du Pont Rubber Green IE  
(Brilliant Blue E) Lake

Ca Lithol -

The only work on this color during the month was a series to determine the effect of adding non-volatile oils to the mineral spirits in the treatment on the colloid mill. Cottonseed oil and Soya Lecithin were tried as well as a solid water insoluble material, Lauryl Glycol. In no case was any substantial improvement obtained over the mineral spirits treated control. When 10% or over of either of the oils was used a marked decrease in dispersion resulted.

Victoria Blue R - P.T.A. - Several variables have been run on the CS-7736 method as originally used with this dye but nothing has developed to suggest any change in this formula which gives a strong lake which is, however, redder than Blue YD.

The use of Lithosol Blue 6G as a toning dye did not give sufficient greenness. By mixing Victoria Pure Blue B0 (two-thirds) and Victoria Blue R (one-third) a close approximation to Blue YD in shade was obtained but the parchment bleed persists even in the color containing all Blue R. There is thus raised a legitimate question as to whether the dye is responsible for this bleed.

The formula used in preparing the base for Blue YD was tried out and gives a much greener shade which is, however, considerably weaker than desired. It is felt that this formula has some points of merit and it probably deserves a small amount of study in an effort to overcome the weakness.

Thioflavine P.T.A. - Some time ago such a color was prepared and, tho rather unattractive, it has been considered as a companion color to our new line of Green P.T.A. colors for rubber. A large sample was prepared and will be set up as a CS and submitted to the rubber laboratory for evaluation.

Quinoline Yellow P - Toners of this color were prepared and milled into rubber directly from the pulps to give results almost identical to Yellow QBD including its good light fastness. When dried out these colors are extremely hard and useless. It appears that the Alumina Hydrate necessary for good texture is harmful to the light fastness.

Some study has been made of the treated P.T.A. formula used in rubber colors with a view to seeking Patent protection. The following rather clearly defined conclusions may be drawn on CS-7790 (RT-387-D). This formula was selected because it has seemed to give more clear cut evidence than some of the others even tho it has not been given actual application.

1. Either Gardinol, Blanc Fixe or Diglycol Stearate when used alone gives some slight improvement over the P.T.A. toner.
2. Combinations of any two gives further improvement.
3. Use of all three is necessary for optimum results.
4. Diglycol Stearate can be added either to the P.T.A. before strike or to the slurry after striking with  $\text{BaCl}_2$ .
5. Dry Blanc Fixe can be substituted for precipitated Blanc Fixe in CS-7790 with equal results.
6. Dry Blanc Fixe when used thus may be added either to the dye solution before strike or to the toner slurry after strike.
7. Any amount of Diglycol Stearate from 0.5% to 20% shows a pronounced effect but the optimum lies between 2% and 5%.

A study of substitutes for Diglycol Stearate has been commenced and there are indications that a number of somewhat similar materials, such as Diglycol Oleate, Triethanolamine Stearate and Cleate and perhaps even Para Soap and Na Stearate and Cleate may be effective. This study will be more fully reported when it is completed.

EXPERIMENTAL DETAILS: See Notebook #461, pp. 92-127

461-29 - To vary Disodium Phosphate in Victoria Blue R P.T.A. for rubber.

There was nothing in the series to indicate a change in the formula in use (similar to CS-7736).

461-30 - This series was designed to give a greener shade of the Victoria Blue R - P.T.A. by increasing the ratio of  $\text{Na}_2\text{MoO}_4$  to  $\text{Na}_2\text{WO}_4$ . There is nothing in the series that would encourage the use of such a method of getting reener shades. However, an error in calculation resulted in using the wrong amounts of the two substances and the results are, therefore, not conclusive.

461-31 - In this series from 2% to 10% of Lithosol Blue 6G was substituted for corresponding amounts of Victoria Blue R. There is some increase in greenness with the higher amounts of Lithosol Blue 6G but it is very slight in rubber and there is definite weakness in rubout. The method is not feasible.

461-32 - This series on Ca Lithol was run to determine the effect of Cottonseed Oil, Soya Lecithin and Lauryl Glycol when added to mineral spirits and then passed thru the colloid mill with a Ca Lithol. 5% Cottonseed Oil, 2% and 5% Soya Lecithin and 5% Lauryl Glycol give products which disperse in rubber almost identically with the control (mineral spirits alone). Any superiority is too slight to be significant. On the other hand, larger amounts of Cottonseed Oil and Soya Lecithin are definitely harmful.

There appears to be no advantage in the use of a non-volatile oil with the mineral spirits.

461-33 - Victoria Pure Blue BO and Victoria Blue R when used as mixed dyes in the 31A method cover the desired range of shade, giving a close match to Blue YD with one-third Blue R and two-thirds Pure Blue BO. However, none of these colors show the desired freedom from bleeding into parchment paper that is shown by Blue YD. It appears doubtful whether the dyestuff is responsible for the bleeding but more likely that it is the method of strike.

461-34 - A large sample of Thioflavine P.T.A. was made up and it is planned to set it up as a CS and submit it to the Rubber Laboratory as a possible rubber color. It is a non-migrating yellow but rather unattractive in shade.

461-35 - Toners of Quinoline Yellow P were prepared by the method used by the Dye Works in preparing the base for Yellow QBB. When the pulp is milled directly into rubber very satisfactory matches to Yellow QBD were obtained and exhibit the same good light fastness. It is, therefore, probable that the presence of Alumina Hydrate in the lake is harmful to the light fastness. Attempts to dry these pulps either as is or after passing thru the colloid mill with mineral spirits gave very hard products which do not disperse in rubber.

461-36 - This was a rather comprehensive series on the use of diglycol stearate with various combinations of Gardinol and Blanc Fixe in RT-357-D (Rhodamine 6GDN toner)

The following conclusions are very clearly defined.

1. Either one of the three treatments when used alone gives some slight improvement.
2. Combinations of any two gives further improvement.
3. Use of all three is necessary for the optimum results.
4. Diglycol Stearate can be added either to the P.T.A. before strike or to the slurry after striking with  $\text{BaCl}_2$ .

461-37 - The Dye Works procedure for Blue YD base (Victoria Blue R - P.T.A.) was tried together with modifications such as the use of Gardinol and the substitution of sulfuric acid for hydrochloric acid. The products are greener than Blue YD and when treated for use in rubber (Blanc Fixe and Diglycol Stearate) are fairly close in strength though somewhat dirty. The formula has certain inherent deficiencies (volume of dye solution too small - disodium phosphate too high) but it does seem to have some merit and should be studied further.

461-38 - A comprehensive comparison of dry Blanc Fixe with precipitated Blanc Fixe in the CS-7790 procedure.

1. Dry Blanc Fixe can be substituted for precipitated Blanc Fixe in the CS-7790 procedure with substantially equal results.

2. It may be added either to the dye solution before strike or to the toner slurry after strike.

3. When Gardinol is not present dry Blanc Fixe must be added to the dye solution before strike to obtain satisfactory incorporation.

4. As in previous series the optimum results are obtained only when Gardinol, Blanc Fixe and Diglycol Stearate are all present.

461-39 - A study of the amount of Diglycol Stearate necessary for optimum results.

0.5% shows a powerful effect in improving dispersion in rubber but the optimum appears to lie between 2% and 5% Diglycol Stearate. More than 5% or less than 2% appear less desirable tho much better than none at all. It may be possible to reduce the amount used in our existing formulas with no loss in properties.

461-40 - The following study of substitutes for Diglycol Stearate was made with the results as indicated.

A - Untreated control - rather poor dispersion.

B - Control with Diglycol Stearate (5%) - Slightly weaker than CS-7790.

C - 5% Glycol Monostearate - better than A - substantially equal to B.

D - 5% Glyceryl Monorincinoleate - slightly better than A - weaker than B.

E - 5% Emulphor A - very slightly better than A - weaker than B

F - 5% Diglycol Oleate - better than A - substantially equal to B.

G - 5% Triethanolamine Stearate - better than A - equal to B

H - 5% Triethanolamine Oleate - better than A - substantially equal to B.

PIGMENT COLOR RESEARCH REPORTCALCIUM TONER LITHOSOL RED 2B, RT-7853-D & EXTENDED TONER RL-7909DSUBMITTED BY: E. J. Heas  
APPROVED BY: V. Chalupski222.24  
FILE: MISC. TONERS  
DATE: JUNE - 1935INTRODUCTION

Work was again started in the Semi-works on RT-7853-D upon receiving a new lot of dye. Six batches were made checking variables used in previous production. At present the Semi-works is attempting to produce dark and blue material but have so far been unsuccessful in attaining this result. Two batches of extended toner were made to check the laboratory formula 447-17C. This formula has been coded CS-7909.

SUMMARY & CONCLUSIONS

The first two batches were made on the standard CS-7853 formulation using the original lot of dye (Lot 1) and the new lot of dye (Lot 2) respectively. The first batch which was made on a formula exactly checking CS-7853 was practically equal in tinctorial properties to CS-7853. The new lot of dye, however, gave a product much lighter in top than the CS number but otherwise satisfactory.

Doubling the size of the batch, using Lot 2 of the dye showed practically no effect on tinctorial properties checking previous results.

Doubling the dye volume before striking (as in CS-7745) but otherwise checking CS-7853 had practically no effect on the product.

Striking at 105°F (as in CS-7745) but otherwise checking CS-7853 gave light and dirty results versus the control batch and very light, slightly weak, yellow and dirty results versus CS-7853.

A batch made cutting the dye volume before strike by 25% gave practically check results to the control batch and light results versus CS-7853.

None of these variables have produced a product superior to CS-7853, and no variable has been discovered as yet which will give dark top.

The quality of the Lithosol Red 2B dye seems to be the obvious variable affecting the production of dark top-tone, blue tint material. The CS-7853 formulation has given the darkest top-tone results to date but it remains a trifle light in top as compared with the original laboratory prepared sample CS-7745. All variations of the CS-7853 formulation so far attempted have in the main given lighter and yellower results.

Work on this toner is being continued in the Semi-works on a new lot of dye.

Results are tabulated in Table I.

2.

The first batch of <sup>RM</sup>RI-7909<sup>0</sup> was made using the laboratory standard (447-17C) toner and gloss white base proportions (45% toner - 55% base). The toner from which this batch was made (SW-7070) ground out light, v.s. weak and v.s. yellow versus CS-7853. The lake did not check the laboratory standard being s. light and muddy, s. weak and v.v.s. yellow and dirty in tint versus 447-17C.

The second batch was made using proportions of 49% toner and 51% base to secure a stronger product. The toner control rubbed out light, weak, and yellow versus CS-7853 but the lake gave satisfactory results being v.v.s. dull, s. strong, and v.v.s. yellow and dirty versus 447-17C.

Yields on these lakes were low averaging 90% of estimate.

Results are tabulated in Table II.

## EXPERIMENTAL DETAILS

3.

TABLE I.  
RT-7853-D

N.B. 455, pages 22-27

| SW Lot | Dye Lot | Temp. of Strike | Rubout Results versus CS-7853 |          |          | Yield Est. lump | Remarks                                            |
|--------|---------|-----------------|-------------------------------|----------|----------|-----------------|----------------------------------------------------|
|        |         |                 | Massstone                     | Drawdown | Strength | Tint            |                                                    |
| 7063   | 1       | 360 gal. 75°F   | vvs lt, brt                   | vs yel.  | vvs wk.  | vvs clean       | 45 47 Check CS-7853 .1 mol                         |
| 7068   | 2       | "               | s.lt.                         | "        | "        | vs yel.         | " " As 7063 using Lot 2 of dye.                    |
| 7070   | 2       | 720 gal         | light                         | vs blue  | vs weak  | "               | As 7068 except 2 times the size .2 mol             |
| 7082   | 2       | 1440 gal.       | "                             | vs weak  | "        | "               | As 7070 except double strike volume .2 mol         |
| 7086   | 2       | 720 gal. 105°F  | "                             | blue     | s.weak   | yel & drty      | 90 93 As 7070 except strike at 105°F .2 mol        |
| 7088   | 2       | 540 gal. 75°F   | "                             | s.blue   | vs weak  | vs yellow       | 90 93 As 7070 except cut strike volume 35%. .2 mol |

TABLE II.

N.B. 430, pages 136-138

RL-7909-D

## Toner Base Proportions

| SW Lot | Type Base                      | Toner Base % | Rubout Results versus 447-17C |                      |              | Yield Est. lump | Remarks                           |
|--------|--------------------------------|--------------|-------------------------------|----------------------|--------------|-----------------|-----------------------------------|
|        |                                |              | Massstone                     | Drawdown             | Strength     | Tint            |                                   |
| 7077   | Gloss white 50% Hydrate-50% BF | 45           | 55                            | s.lt & muddy vvs bl. | s.weak       | vvs yel & drty  | 50# 46# Toner slurry from SW-7070 |
| 7095   | "                              | 49           | 51                            | vvs dull             | vs bl, s.str | str.            | " " 92 82                         |

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PIGMENT COLOR RESEARCH REPORTCALCIUM LITHOL TONER RT-379-D

SUBMITTED BY: *E. J. Hess*  
 APPROVED BY: *W. Chalupski*

222.11  
 FILE: LITHOLS  
 DATE: JUNE - 1935

INTRODUCTION

Two batches of this color are reported this month with two more batches in process, reports on which are not available. Light and yellow material was desired to be used for shading purposes.

SUMMARY & CONCLUSIONS

Both batches reported are satisfactory for shading purposes. The first batch, made to check batch 41501, gave dark, strong, yellow and clean material checking previous results.

In order to secure light material the TOBW in the second batch was cut from 35% to 15%, otherwise checking the 41501 formula. This resulted in satisfactory light, yellow, and strong material.

Yields show improvement over previous manufacture averaging 101-1/2% of estimate as compared with 94% the average yield of five previous batches.

Results are tabulated in Table I.

EXPERIMENTAL DETAILS

TABLE I. N.B. 433, pages 182-183

|       |     | RT-379-D |     |      |       |       |       | Grind rubout results |       |              |           | Re-   |      |
|-------|-----|----------|-----|------|-------|-------|-------|----------------------|-------|--------------|-----------|-------|------|
|       |     | TOB      |     | TOBW |       | N-7   |       | N-5                  |       | vs. standard |           | marks |      |
| Batch | Lot | Amt.     | Lot | Amt. | in BN | diazo | Mass. | Draw.                | Str.  | Tint         | Yield     | Est.  | Lump |
| 44181 | 147 | 65%      | 29  | 35%  | 82    | 75    | dk    | vs str               | s.str | vs yl        | 410       | 409   |      |
|       |     |          |     |      |       |       |       |                      |       | cl.          | 1 mol     |       |      |
|       |     |          |     |      |       |       |       |                      |       |              | modified  |       |      |
|       |     |          |     |      |       |       |       |                      |       |              | 41501.    |       |      |
| 44217 | 147 | 85%      | 29  | 15%  | 82    | 75    | lt    | vs yel               | "     | yel          | 410       | 424   |      |
|       |     |          |     |      |       |       |       |                      |       |              | 1 mol. As |       |      |
|       |     |          |     |      |       |       |       |                      |       |              | 44181 ex- |       |      |
|       |     |          |     |      |       |       |       |                      |       |              | cept cut  |       |      |
|       |     |          |     |      |       |       |       |                      |       |              | TOBW.     |       |      |

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PIGMENT COLOR RESEARCH REPORT

BARIUM LITHOLS - RT-364-D

SUBMITTED BY: *G. D. Reisinger*  
APPROVED BY: *V. Chalupka*

222.11  
FILE: ~~LITHOL REDS~~  
DATE: JUNE - 1935

INTRODUCTION:

Production of this lithol was continued in the plant with the manufacture of lighter masstone material for shading. Four batches were made.

SUMMARY & CONCLUSIONS:

A reduction in Para Soap of about 25% was used to lighten the masstone. The lower alkalinity of coupling now being used prevented the extremely yellow tint previously obtained with the former variable. An accidental prolonging of the time of addition of caustic soda for coupling gave a product that was close to standard on control but somewhat weak on grind. A check run was also weak but this material served to make a 1500 lb. mix for stock.

Two batches with rapid addition of caustic soda were then made and gave better strength. They finished equal in depth to standard and altho slightly yellow in tint were C.K. for shipment.

EXPERIMENTAL DETAILS:

Notebook #385 - p. 152

- 44164 - 1 mol charge. 32# Para Soap. 55# Caustic Soda in 200 gals. added in 25 min. for coupling.  
Otherwise like 43913.  
Vs. RT-364-D - vvs light; vs yel; s. weak; vs yellow & dirty.
- 44202 - Check 44164  
Vs. RT-364-D - s. light; vs yellow; weak; vs yel. dirty.
- 44331 - Check 44164 but caustic soda added in standard manner.  
55# in 60 gals. added in 3 - 5 minutes.  
VS. RT-364-D - vs light & muddy; vs yel; vvs str; vs yel.  
(slurry control). Mixed with 44352 to be made uniform.
- 44352 - Check 44331, but only 0.75 mol charge.  
Mix of two batches.  
Vs. RT-364-D - vvs muddy; vs yel; 2 1/2 str; s. yellow.

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PIGMENT COLOR RESEARCH REPORT

LIGHT FAST GREENS - G-389-D

SUBMITTED BY: *G.S. Reidinger*  
APPROVED BY: *V. Chalupski*

214  
FILE: ~~CHROME GREENS~~  
DATE: JUNE - 1935

INTRODUCTION:

Production of this line of greens was not great this month and little attention was given it by the Development Section. No difficulties were experienced by the Plant Staff.

SUMMARY & CONCLUSIONS:

The only variation made was in bichromate-sulphate ratio for the purpose of controlling oliveness of masstone. The tendency towards blue undertone and tint still persists but doubtless can be corrected. One suggestion is a lower strike temperature.

A mix of G-389-D showed a darkening of masstone on the dry rubout not observed on previous mixes. A mix of G-392-D was satisfactory.

The installation of the 300 gal. vat and other equipment for making up copper hydroxide was completed and put into use. The vat is also useful for dissolving alum and sodium sulphate.

EXPERIMENTAL DETAILS:

See Plant Control Books.

35-498 14

PIGMENT COLOR RESEARCH REPORT

LIGHT FAST MILORI GREEN  
CS-7664 - CS-7889

SUBMITTED BY:  
APPROVED BY:

*J. J. P. Mousman*  
*W. Chalupka*

214  
FILE: ~~CHROME GREENS~~  
DATE: JUNE - 1935

INTRODUCTION:

Four batches of these greens were made in the plant during the month. A study of the process variables of the colors is also being carried on in the semi-works, results, however, not being available at this time.

SUMMARY & CONCLUSIONS:

The first plant batch was made in a 4000 gallon vat with a 10% cut in volume because of the high strike volume of the color. On the next two batches, a cut of 35% in volume was made inadvertently, the first containing an increased amount of acid in the base, and the second one an intermediate amount of acid with a small quantity of sodium sulfate included in the bichromate. These two batches were combined and gave a product slightly light and v.s. olive in masstone and yellow in undertone and tint. The foregoing batches altho intended for the light shade, were shaded to the medium depth because of the redness of the yellow. The last batch was struck at standard volume with an intermediate amount of nitric acid in the base. The temperature of strike was 70° F instead of 75° F as was the case in the other three batches, giving a product very slightly light and olive in masstone. Progress in this color has been unavoidably held up but favorable results are expected in the near future.

This color is being studied at the present time in the semi-works and the results of such work will be presented next month.

EXPERIMENTAL DETAILS: See Notebook 437 pp. 141

| Batch No. | Code   | Object                                                                                                | Standard          | Masstone        | Undertone | 3tren. | Time   |
|-----------|--------|-------------------------------------------------------------------------------------------------------|-------------------|-----------------|-----------|--------|--------|
| 44041     | G-7889 | Check 43960 but increase nitric acid from 60# to 66# and decrease strike volume 10%                   | G-317-D           | s.lt.& bl.      | yellow    |        |        |
| 44163     | G-7764 | Check 44041 but increase nitric acid to 68# (Cut of 35% in volume made accidentally).                 | Consumed in 44193 |                 |           |        |        |
| 44193     | G-7889 | Check 44163 but use 66# nitric acid 6# sodium sulfate in bichromate. (Cut of 35% in volume as before) | G-317-D           | s. lt. vs olive | s. yellow | O.K.   | yel    |
|           |        | Check SW-6808 on a 2 mol charge                                                                       |                   | vs lt. & olive  | vs yel.   | O.K.   | vs yel |

PIGMENT COLOR RESEARCH REPORTCHROME GREENS - G-209-D

SUBMITTED BY: *A. S. Reisinger*  
APPROVED BY: *V. Chalupski*

FILE: *214* ~~CHROME GREENS~~  
DATE: JUNE - 1935

INTRODUCTION:

This shade of Green required some attention during the month due to production of blue, chalky material on the standard formula. This required use of considerable amounts of the olive line of greens with resulting dullness of masstone.

SUMMARY & CONCLUSIONS:

A check run on a previous batch in which a higher amount of bichromate was employed was olive and slightly changeable. However, by adding caustic soda to the bichromate on this formula a product only v.s. lighter and bluer than standard was obtained. This is within shading limits.

An intermediate amount of alkali was insufficient and a red yellow was obtained which was not shaded.

Use of the above formula was also made to make G-208-D. At this shade the product is too olive altho not changeable.

EXPERIMENTAL DETAILS:

Plant Control Book.

- 44213 - Std. formula # Bichromate; # Caustic Soda.  
Vs. G-209-D - dark; v. blue & chalky; blue.
- 44257 - 595# Bichromate; No Caustic Soda.  
Vs. G-209-D - olive, s. changeable; blue.
- 44290 - 595# Bichromate; 10# Caustic Soda.  
Vs. G-209-D - vs lt & blue; s. clean; O.K; clean.
- 44317 - 595# Bichromate; 5# Caustic Soda  
Yellow was red vs. Control. Not shaded.

35-200 27

PIGMENT COLOR RESEARCH REPORT

STUDY OF Y-180-D

SUBMITTED BY: *L.C. Hornung*  
APPROVED BY: *sub.*

211-1  
FILE: ~~CHROME~~ YELLOW  
DATE: JUNE - 1935

INTRODUCTION:

The problem of preparing a Y-180-D of improved lithographic breakdown resistance has been resumed during the past month. See Service to Research Request 246. Satisfactory material has been prepared but the pigment appears sensitive to washing and drying conditions and further laboratory work is necessary to stabilize the process.

SUMMARY & CONCLUSION:

The improved Y-309-D process CS-7903 now being studied in the semi-works and plant has been revised to give a product similar to Y-180-D. It has been found that the addition of a small amount of nitric acid to the lead nitrate solution before the strike, while it gives a very slight reduction in light fastness, gives a stronger, greener pigment. An increase in the strike temperature lightens the masstone. Heating after the strike and the use of salt in the strike solution are essential to obtain a bright, clean masstone. Adding salt after the strike reddens the masstone very slightly.

It has been found possible to revise the Y-180-D process to obtain products good in lithographic breakdown and close tinctorially to Y-180-D. The process is somewhat unstable and considerable additional work is necessary. It was found that reducing the soda ash caused the color to "flop" but if the sodium sulphate added after the strike was omitted the pigment was stable to washing. Alum and bicarbonate are added after washing to improve the lithographic breakdown resistance.

EXPERIMENTAL DETAILS:      See Notebook 453.

Exp. 53 - Effect of heating after the strike and of omitting salt after the strike on a new Y-180-D process.

Results - Heating is necessary to obtain a clean masstone. Salt produces a slightly red product.

Exp. 56 - Effect of increasing strike temperature and of adding nitric acid to the lead nitrate.

Results - Both changes produce a slightly lighter pigment.

Exp. 59 - Study of use of salt in the strike solution and of nitric acid in the lead nitrate.

Results - Salt in the strike solution is necessary to obtain a clean masstone. Nitric acid in the lead nitrate gives a slightly dirtier, slightly stronger pigment.

Exp. 60 - Revision of the standard Y-180-D process to give satisfactory material from the standpoint of lithographic breakdown.

35-201 18

PIGMENT COLOR RESEARCH REPORT

STUDY OF LEAD CYANAMIDE

SUBMITTED BY: *L. C. Homing*  
APPROVED BY:

20.4  
FILE: ~~CHROME~~ YELLOW  
DATE: JUNE - 1935

INTRODUCTION:

A request was received from Philadelphia for a pound sample of lead cyanamide. Some difficulty was encountered in duplicating the R. & H. laboratory material and it was necessary to make a brief investigation of the process. A pigment superior in strength and appearance to the R. & H. product has been prepared.

SUMMARY & CONCLUSION:

In an investigation of the R. & H. process for the preparation of lead cyanamide it was found that the precipitant balance, quantity of ammonia used, and amount of washing all influence the final product. Using approximately the optimum conditions a considerable improvement in strength and appearance over the R. & H. material was obtained.

The original R. & H. samples of lead cyanamide were light and very weak versus both Y-232-D and Y-305-D. It has been found that in general as the strength of a pigment increases its depth decreases. In the case of lead cyanamide it appeared that a product equal in strength to a Chrome Yellow would be extremely light. It has been found, however, that both an increase in depth and strength of lead cyanamide can be obtained. It may be possible, therefore, to prepare lead cyanamide equal in depth and strength to Y-232-D and Y-315-D.

EXPERIMENTAL DETAILS:

See Notebook #453.

Experiment 54 - Contaminated with H<sub>2</sub>S - discarded.

Exp. 55, 58 - Effect of washing lead cyanamide and of increasing ammonia.

Results - Too much or too little washing results in a dirty color. Increasing the ammonia results in a flat color.

Exp. 62 - Preparation of a pound sample for Philadelphia.

Results - Altho somewhat inferior to the best of the 58 series the material was superior to the R. & H. sample D-1980. Material satisfactory for Philadelphia.

35-202 19

PIGMENT COLOR RESEARCH REPORT

EXCELSIOR YELLOW Y-7903-D

SUBMITTED BY:  
APPROVED BY:

*J. de O. Masuara*  
*W. Chalupski*

211.1  
FILE: ~~CHROME~~ YELLOW  
DATE: JUNE - 1935

INTRODUCTION:

The work this month on this color was a continuation of last month's study in an effort to obtain greener masstone.

SUMMARY & CONCLUSIONS:

Two batches were made during the month, both being variations on a previous plant batch, namely Lot 43917. In the first a cut of 25% was made in the amount of soda ash added after the strike. The product was similar to control being very very slightly redder with v.s. superior light fastness. Against Y-309-D standard, however, the color was red in masstone and tint. The second batch was made with an increase of 1/3 in the amount of soda ash, giving a v.s. dark and red masstone and a strong red undertone and tint against Y-309-D standard. The two batches were very similar tinctorially. Work is being continued on this color.

A previous batch of this yellow was tested during the month against a sample of United's Lemon Yellow 40-3451 (C-37281) both in rubout and in brushout corresponding to Muralo specifications. In rubout our yellow was much cleaner and slightly redder than the competitive sample with superior light fastness. In brushout the colors were practically identical tinctorially, the Y-7903-D having much superior light fastness.

EXPERIMENTAL DETAILS: See Notebook 448, p. 133-4

| Batch | Object                                   | Std.            | Masstone           | Undertone    | Strength | Tint       | Lt.Fast.    |
|-------|------------------------------------------|-----------------|--------------------|--------------|----------|------------|-------------|
| 44179 | chk. 43917 but decrease Soda Ash 10%     | Y-309 Lot 43917 | red, chgbl vvs red | red vvs red  | -- O.K.  | -- vvs red | vs better   |
| 44262 | chk. 43917 but increase Soda Ash 33-1/3% | Y-309-D         | vs dk & red        | red & strong | str.     | red        | O.K.        |
| 43917 | Rubout                                   | C-37281         | cl. sl. red        | s str. & red | O.K.     | Cl.        | Much better |
|       | Brushout                                 | C-37281         | --                 | --           | =        | =          | Much better |

PIGMENT COLOR RESEARCH REPORTMEDIUM YELLOW Y-359-D

SUBMITTED BY:  
APPROVED BY: *W. Chalupka*

2111  
FILE: ~~CHROME~~ YELLOW  
DATE: JUNE - 1935

INTRODUCTION

Production of Y-359-D was continued in the plant under supervision of the development section. Standardization of this medium yellow in pulp form (Y-78-P) and the special water dispersion standard (Y-366-D), was also studied. Work was continued, both in study of variables and in purification of lead nitrate liquor; the latter is covered in a separate report.

A standard has not yet been selected for the printing ink type, Y-385-D, but all of the batches tested to date have been satisfactory in lithographic resistance.

Standard mixes were made for Y-359-D, Y-366-D, and Y-385-D.

SUMMARY & CONCLUSIONS

The Y-359-D formula consists in a reverse precipitation of lead nitrate into a dilute solution of sodium chromate, there being a 5 or 10 percent excess of the latter. The variables studied since this process was taken to the plant have been: - amount of chromate excess; time and temperature of strike; addition of hydrochloric acid to the strike; addition of salt to the strike in various amounts. None of these variables are very powerful, and in some cases the effects are questionable.

A study of the washing of this yellow has also been made (see report on Press Washing of Chrome Yellows).

The larger chromate excess (10%) appears to give a very slight improvement in cleanness of masstone, and possibly some improvement in lightfastness. The higher chromate, however, appears to give poor dispersion in water when brushed out.

A longer time of strike, and use of a spray in precipitation, gives a cleaner masstone, reduction in strength, and some improvement in lightfastness. An improvement in lithographic resistance is also found.

The effect of the temperature of strike has not been clearly defined in the plant, probably passing thru an optimum point.

Addition of small amounts of hydrochloric acid to the strike (2-5 lbs. per mol) gives a redder cleaner masstone, and weaker and redder tint, with some improvement in lightfastness.

It was first thought that addition of salt gave an improvement in masstone and lightfastness, but study in the plant has indicated that the salt has little or no effect on tinctorial properties, and apparently adversely affects lithographic resistance.

It must be realized that these variables are not at all independent, as most of them are methods of influencing crystal structure. Thus, a change in speed of washing may have a different effect on a yellow made with salt than one made without it.

During the month, a number of batches were made with a 5% chromate excess (10% had previously been used). All of these were fairly satisfactory as Y-359-D. Co-precipitation of a small amount of sulphate showed no great effect. Strike temperatures of 70° and 90°F were tried; differences were not noticeable in the yellows thus made.

One batch made with a 10% chromate excess was quite green and dirty, but this was probably due to some other variable, possibly quality of the lead nitrate liquor.

It was observed that one of the plant batches showed better dispersion as Y-366-D, in water brushout than other batches and the present standard Y-366-D. A number of batches made to check this showed the same improvement, and a new standard is contemplated (lot 14955).

#### EXPERIMENTAL DETAILS

| <u>Batch</u> | <u>date</u> | <u>chromate</u> | <u>strike temp.</u> | <u>litho. break.</u> |                               |
|--------------|-------------|-----------------|---------------------|----------------------|-------------------------------|
| 44178        | 6/11        | 785             | 70°                 | 5:40                 | vs green; strong; green       |
| 44253        | 6/16        | "               | 90                  | OK                   | vs grn & drty; str; clean     |
| 44279-80     | 6/18        | "               | 70                  | OK                   | vs fl. & chgble; str; vs grn. |
| 44281        | 6/18        | * *             | 90                  | OK                   | vs red flat; vs str; vs grn.  |
| 44303        | 6/20        | 824             | 90                  | OK                   | grn & drty; s. strong; green  |

\* 44281 had 25 lbs. of sodium sulphate added to the chromate.  
None had NaCl or HCl.  
All struck in 60 minutes.

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PIGMENT COLOR RESEARCH REPORT

METAL PROTECTIVE PIGMENTS

SUBMITTED BY: *L. C. Homming*  
APPROVED BY: *me*

143.5  
FILE: ~~CHROME ORANGE~~  
DATE: JUNE - 1935

INTRODUCTION:

The study of Metal Protective Pigments, a cooperative study with the Experimental Station has been continued during the past month. A sample of basic lead chromate of reduced raw material cost and of increased lead oxide content has been prepared for a study at the Experimental Station.

SUMMARY & CONCLUSIONS:

One phase of the work at Newark on metal protective pigments has been the preparation of pigments of high lead oxide content and low manufacturing cost as possible substitutes for red lead. It has been found that an orange pigment of the approximate composition  $3\text{PbO} \cdot 2\text{PbCrO}_4 \cdot \text{PbCl}_2$  can be prepared by the addition of hydrochloric acid and sodium bichromate to litharge. This product has been submitted to the Experimental Station for examination.

EXPERIMENTAL DETAILS:

See Notebook #421.

Experiment 57 - Study of the addition of sodium bichromate to  $5\text{PbO} \cdot \text{PbCl}_2$ .

Results - The bichromate is taken up apparently with the formation of a mixed crystal of lead chromate, lead chloride and lead oxide.

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PIGMENT COLOR RESEARCH REPORT

PURIFICATION OF LEAD NITRATE LIQUOR

SUBMITTED BY:

APPROVED BY:

*J. J. Dill*  
*Chalupski*

12/1-1

FILE: ~~LEAD & LEAD MTIS.~~

DATE: JUNE - 1935

INTRODUCTION:

The work begun in April of the current year on plant purification of lead nitrate liquor was continued this month, six batches being put thru the purifying process, to test the efficacy of changes in equipment and conditions. One batch was purified in the semi-works.

SUMMARY & CONCLUSIONS:

Six plant purifications were attempted during the month none of which reached the desired end point, namely a negative test for copper with ammonia. Three batches were heated to 160° F at the start of the purification, two of them being run with a small decrease in lead surface due to a strip of lead being cut from the sheet on either side of the mixer to improve the agitation by eliminating an eddy, which tended to loosen the copper deposit.

Grasselli lead acetate sludge was used in all cases one barrel being used in the first purification and two in each of the others. The contents of this sludge seems to vary, as some of the batches behaved in an abnormal manner. This abnormality may be due to some of the sludge being pumped over into the purification vat. Work will be done in the near future to eliminate this condition.

One purification was tried with a marked increase in acidity, the pH being reduced to 2.5. Since there was a deficiency of lead surface the results are inconclusive. The liquor was allowed to stand overnight in the vat with no agitation, the pH increasing from 2.8 to 4.6 during this time at the end of which there was still a slight test for copper. It appears that a pH between 4.8 and 5.0 is the optimum degree of acidity for the purification.

One batch was purified in the semi-works, care being taken to assure the absence of any sludge in the purification vat. With 7.75 square feet of lead per hundred pounds of lead nitrate a practically negative test for copper was obtained in three and one half hours, other conditions, except for agitation, checking those in the plant.

The lead surface will be increased in the plant equipment in the near future and with possible minor changes in agitation successful purifications are expected.

EXPERIMENTAL DETAILS:

|                                                        | #5    | #6    | #7    | #8    | #9    | #10   |
|--------------------------------------------------------|-------|-------|-------|-------|-------|-------|
| Gallons of Liquor                                      | 2010  | 1810  | 2300  | 1960  | 2300  | 2400  |
| Specific Gravity                                       | 1.160 | 1.210 | 1.169 | 1.224 | 1.187 | 1.179 |
| #Pb(NO <sub>3</sub> ) <sub>2</sub> 100%                | 3200  | 3750  | 3800  | 4410  | 4260  | 4250  |
| Sq. ft. of lead immersed                               | 259   | 234   | 297   | 234   | 258   | 269   |
| " " " " per 100# PbNO <sub>3</sub> ) <sub>2</sub> 100% | 8.1   | 6.23  | 7.65  | 5.3   | 6.29  | 6.35  |
| Copper test before purification                        | sl.   | str.  | sl.   | str.  | str.  | str.  |
| Copper test after purification                         | vvs   | sl.   | vvs   | sl.   | med.  | med.  |
| pH before Purification                                 | 5.1   | 4.9   | 5.0   | 4.7   | 4.4   | 4.7   |
| adjusted pH before purification                        | 4.8   | 2.5   | 4.8   | --    | --    | --    |
| pH after purification                                  | 5.0   | 4.6   | 5.0   | 4.9   | 4.5   | 4.9   |
| HNO <sub>3</sub> 100% added before purification        | 20    | 50    | 30    | 0     | 0     | 0     |
| " " " during "                                         | 10    | 0     | 28    | 0     | 0     | 0     |
| " " " after "                                          | 5     | 0     | 10    | 15    | 25    | 21    |
| Temperature before purification                        | 140   | 140   | 160   | 160   | 160   | 140   |
| Temperature after purification                         | 130   | 125   | 135   | 135   | 125   | 125   |
| Time of purification - hrs.                            | 3.5   | 23*   | 5.5   | 4.5   | 8     | 6     |

\*16.5 hrs. without agitation.

35-206  
25

PIGMENT COLOR RESEARCH REPORT

DRY DISPERSED COLORS

SUBMITTED BY: *L.C. Homing*  
APPROVED BY: *ame*

160  
WATER COLORS  
FILE: ~~DRY DISPERS. COIS.~~  
DATE: JUNE - 1935

INTRODUCTION:

The study of the use of volatile mineral oils for the preparation of dry dispersed colors of improved texture was concluded during the past month. No indication was obtained that this treatment is a useful method of improving the texture of our dry dispersed colors.

SUMMARY & CONCLUSION:

During the previous month a study was made of the treatment of various inorganic dry dispersed colors with volatile mineral oils. No improvement was obtained. During the past month a study of the effect of treating various organic colors with volatile mineral oils was made. Of five organic colors tested an improvement in dispersion was obtained in only one case, that of YE-308-D. This pigment is much worse in texture than any other dry dispersed color tested. It seems probable that a mineral oil treatment will be desirable only with very hard pigments whose texture cannot easily be improved by other methods.

Two of the dry dispersed colors tested during the past month were GE-353-D and GE-358-D, which are P.T.A. lakes similar to RE-325-D. An old standard sample of GE-353-D which had not been micro-pulverized showed very poor dispersion. A new micropulverized standard showed good dispersion. Control strikes of GE-353-D and GE-358-D showed good dispersion. In view of the soft texture of P.T.A. pigments it is probable that these pigments can be prepared equal in dispersion to RE-325-D and other dry dispersed pigments without oil treatments.

Of the remaining three dry dispersed colors studied, RE-360-D, RE-351-D, and YE-308-D, one, RE-360-D, appears to require very little improvement. The control, the oil treated samples, and the standard sample of RE-360-D appeared good in dispersion. In the case of RE-351-D the standard was poor in dispersion while both the control and oil treated samples were good in dispersion. In this case better grinding or an improvement in operating conditions would probably result in a satisfactory color.

Standard YE-308-D is very poor in dispersion as is the laboratory prepared material. Treatment with mineral oil in a colloid mill is without effect but adding an emulsion of mineral oil produced an improvement in texture. The greatest improvement was obtained with a kerosene emulsion. Better grinding using the high speed micropulverizer in the semi-works produced a decided improvement in texture. YE-308-D with good dispersion can probably be obtained thru the use of a kerosene emulsion or by a revision of the present process.

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EXPERIMENTAL DETAILS:

See Notebook #466.

Exp. 7 - Treatment of RE-351-D with emulsions of various volatile mineral oils and with volatile mineral oils in the colloid mill.

Results - All were equal in dispersion to the control which was superior to RE-351-D standard.

Exp. 8 - Treatment of YE-308-D with volatile mineral oils as in Exp. 7.

Results - The emulsion treated pigment was superior to the control but this was poor partly because thru an error it was given coarse grinding.

Exp. 9, 10 - Treatment of GE-353-D and GE-358-D as in Exp. 7.

Results. - The oil treatments did not improve the dispersion over the control but the controls were slightly better than the standard.

Exp. 11 - Treatment of RE-360-D as per Exp. 7.

Results - Standard RE-360-D, the control sample, and the treated samples were all equal in dispersion.

Exp. 12 - Effect of degree of grinding on YE-308-D and YE-308-D treated with a varnoline emulsion.

Results - Improvement in grinding produces a bigger improvement in dispersion than the use of a varnoline emulsion but in each case the treated material is somewhat superior in dispersion to the untreated material.

35-207  
27

PIGMENT COLOR RESEARCH REPORT

DISPERSION STUDIES ON PHOSPHOTUNGSTIC ACID TONERS AND THE PREPARATION  
OF LAKES

SUBMITTED BY: *Agnes Sigel*  
APPROVED BY: *and*

223.21  
WATER COLORS

FILE: ~~W1387-TARRE~~  
DATE: JUNE - 1935

INTRODUCTION

The preparation of color lakes from water-dispersible phosphotungstic acid toners (Halopont type) for use in oil and water systems has been investigated in a preliminary way.

SUMMARY & CONCLUSIONS

Dispersible PTA toner pigments are appreciably stronger and brighter than the corresponding untreated toner paste as judged by paper coating tests. The dispersible toners are satisfactory as starting materials for the preparation of lakes and as paper coating pigments but are unsatisfactory for use in oil systems.

Alumina hydrate lakes made from the Halopont type pigments are satisfactory for paper coating in which case there is obtained increased strength and brightness compared with lakes made from the corresponding untreated paste. The former, however, give weaker products than the latter in oil systems as judged by lithographic ink tests of both dry and flushed pigments.

EXPERIMENTAL DETAILS

Notebook 460, expts. 16 & 21, pages 64 & 84 respectively.

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PIGMENT COLOR RESEARCH REPORT

DISPERSION STUDIES ON VAT DYES AND THE PREPARATION OF LAKES

SUBMITTED BY: *Alfred Siegel*  
APPROVED BY: *W. C. C. C.*

223.6  
VAT DYE PIGMENTS  
FILE: KISC--LAKES  
DATE: JUNE- 1935

INTRODUCTION

While the results of the work this month are still insufficient to draw any general conclusions concerning the magnitude of this problem, they have, however, narrowed the problem on blues to the Ponsol type of vat dyes. Studies this month were expanded to include Ponsol Blue BF, Ponsol Violet AR and several Sulfanthrene Blue vat dyes.

SUMMARY & CONCLUSIONS

The results to date on the preparation of lakes from vat dye pastes, and dispersible grains and powders, indicate that the tinctorial and to some extent the physical properties of the lakes are dependent upon the physical form of the dye. Since it is generally believed that all vat dyes are crystalline, it appears logical that the size of the crystals or aggregates, which is the determining factor in the dispersion of the dye, is the property which apparently determines the tinctorial property of the color lake. Ponsol Blue GZ crude paste, for example, gives much stronger lakes than the more poorly dispersed double paste, and the dispersible powders result in lakes of no improvement over the crude paste. Ponsol Blue BF dispersible grains result in lakes of no improvement over the well dispersed BF double paste. On the other hand, Ponsol Blue GD dispersible grains and Ponsol Jade Green Supra dispersible powder yield lakes of greatly improved tinctorial properties compared with those of the corresponding poorly dispersed double pastes. In order to obtain a complete picture of this problem and make ultimate comparisons, it is essential to use crude paste of all the brands of dyes mentioned above.

The form of the dye alone is not the only factor which influences the tinctorial and physical properties of the lakes. The laking procedure plays an important role, the differences obtained by varying the procedure apparently being due to variation in the particle or aggregate size of the precipitated dye. For example, a well dispersed dye added to preformed alumina hydrate gives in some cases better tinctorial properties than the lake prepared by adding the dye to the alum and subsequently striking with soda ash. In the case of the latter the dye apparently is coagulated, which tends toward poorer dispersion and increased aggregate size.

Practically all the alumina hydrate lakes of the vat dyes, including the Ponsols, Sulfanthrene Blue R, G, 2B D and 4G and sulfonated Ponsol Blue R, are soft in texture and grind well in lithographic varnish. The corresponding flushed inks of these lakes are in practically all cases much stronger and in many cases much cleaner and brighter than the inks from the dry pigments. This may be owing to the texture of the dry pigment, but it appears more likely that the decreased strength of the dry pigments is the result of cementation (reagglomeration) of the dye upon drying. The preparation of soft dry vat dye lakes by flushing with mineral oils of both volatile and non-volatile types, as is being done on pigments at Newark, might be the answer to this problem.

Ponsol Blue BF is a much redder and less expensive dye than Ponsol Blue GD and GZ. These three brands of dye are practically similar in lightfastness as judged by fade-o-meter tests. The BF quality is worthy of consideration as a less expensive and redder raw material than Ponsol Blue GZ for BP-121-D.

Alumina Hydrate lakes of Sulfanthrene Blues R, G, 2BD and 4G pastes are very poor in lightfastness compared with the lakes of the Ponsol dyes, and the former possess no merit as fast to light pigments. Sulfanthrene Blue 2 BD and 4G alone are of sufficient brightness to be of interest, but while these colors are brighter than the Ponsols in the printing of cotton, they are much duller than the latter when prepared into lakes. The grain form of the Sulfanthrenes dispersed very poorly and resulted in lakes inferior to those from the paste, in tinctorial properties.

The preparation of lakes from resin size dispersible Ponsol vat dyes possesses merit as judged from orientation studies.

#### EXPERIMENTAL DETAILS

- Ponsol Blue GD and BF paste and grains - alumina hydrate and blanc fixe lakes. Expt. 31, page 124, N.B. 460.
- Alumina Hydrate Lakes of Sulfanthrene Blue R, G, 2 BD and 4G paste and grains. Expt. 33, page 134, N.B. 460.
- Alumina Hydrate Lakes of Ponsol Violet AR paste and Grains. Expt. 35, page 146, N.B. 460.
- Alumina Hydrate Lakes of Sulfonated Ponsol Blue R. Expt. 38, page 156, N.B. 460.

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PIGMENT COLOR RESEARCH REPORT

PIGMENTS FROM VAT DYES

SUBMITTED BY: *Supermarket*  
APPROVED BY: *A. V. Buzgola*

223.6  
~~VAT DYE PLE.~~  
FILE: ~~MISC. LAKES~~  
DATE: JUNE - 1935

INTRODUCTION:

Preliminary work on the possible use of vat dyes in the pigment field was started.

A systematic study of BP-121-D was begun.

SUMMARY & CONCLUSIONS:

The dye content in BP-121-D was increased from 13 to 60% without any appreciable differences when rubbed out in lithographic varnish on an equal toner basis. From 60 to 95% there was a slight gradual weakening in tinctorial power and a corresponding increase in hardness of texture. Alum (20%) alone affected a possible filtration due possibly to a coagulation of the dye altho the product was very hard and weak.

The substitution of washed aluminum hydrate base for the freshly precipitated hydrate gave a slightly better product.

Mineral spirits plus colloid milling prior to laking showed no apparent advantages. Perhaps this might have been due to the small percentage of dye and the large percentage of aluminum hydrate which, by itself, cannot be greatly improved. Therefore, this treatment on one of the higher % dye lakes might give a greater improvement.

An evaluation was made between Ponsol Blue GZ double paste (BP-121-D, the dispersible grain dyes, and mineral spirits plus colloid milling. It was found that a lake prepared from Ponsol Blue GDS dye grains was weak and red. However, this result is not conclusive with respect to the merit of the dispersible grain dyes since two different types of dyes are involved.

The mineral spirit and colloid milling treatment of vat dye toner gave weak tinctorial strength and hard texture. Filtering the color prior to the treatment was practically impossible and had to be dried out as is.

EXPERIMENTAL DETAILS:

Notebook 470 (pp. 8 - 26).

Series 470-1 - evaluated the results obtained from BP-121-D, dispersible grain dyes, and mineral spirits with colloid milling treatment.

Lakes prepared from Ponsol Blue GDS grains was approximately 20% weaker and redder versus BP-121-D, Ponsol Blue GZ double paste. However, these results are not conclusive with respect to the merit of the dispersible dye grains since two different types of dyes were involved.

Mineral spirits and colloid mill treatment gave weak results. Filtering the color following the treatment was practically impossible and had to be dried out as is.

Slurrying the Ponsol Blue GZ paste at 40° C instead of at the boil gave slightly weaker results.

Series 479-2-6-7 - studied the effects of increasing the dye content in BP-121-D from 13%, the regular amount, to 95%. It was found that from 13% to 60% there was practically no differences when rubbed out in varnish driers on an equal dye basis, from 60% to 80% there was a slight decrease in the tinctorial power, from 80 to 95% there was a greater decrease in the tinctorial power and a corresponding increase in hardness of texture.

The mere addition of alum appeared to coagulate the dye and made filtration possible altho it was very slow. The resulting product was hard and weak versus BP-121-D.

Series 470-3 - treated the dye in BP-121-D with mineral spirits, diglycol stearate, and colloid milling prior to laking. Only slight improvements were obtained from this treatment, altho this may have been due to the small amount of the dye and the large amount of hydrate, which, by itself, cannot be greatly improved in regards to texture.

Series 470-4 - substituted washed hydrate base for the freshly precipitated base in BP-121-D. Slight improvements were obtained from the hydrate base.

Series 470-5 - increased the dye content in 470-1C, dispersible dye grain formula from 13% to 48%. At the high percentage filtration became very difficult, possibly due to the large percentage of dispersing medium in the grains. Dried out they were apparently equal when rubbed out on an equal dye basis.

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PIGMENT COLOR RESEARCH REPORT

PIGMENTS IN OIL

SUBMITTED BY: *H.C. McWhining*  
APPROVED BY: *amc*

160  
FILE: ~~PIGMENTS IN OIL~~  
DATE: JUNE - 1935

INTRODUCTION:

The study of "super-dispersible" pigments (easy mixing and grinding in ink vehicles) was resumed in the laboratory. During the month plant slurries of B-66-D (unwashed), RT-279-D, and BT-125-D were treated with different amounts of Dibutyl phthalate for the purpose of making an orientation study. With this same purpose in mind these three colors were treated with small amounts of Varnoline and Nujol. The latter two of the above mentioned slurries were also treated with #0 Lithographic Transparent Varnish, using a 50-50 ratio.

At the time of this report the treated samples have all been ground in the 8" laboratory Mikro Pulverizer at 3500 R.P.M. (B-66-D and RT-379-D were ground thru a 1/16 mesh screen, and for BT-125-D a 1/4 mesh screen was used.

The evaluation study which is now being made is still too incomplete to draw any definite conclusions.

EXPERIMENTAL DETAILS:                      Notebook 451.

451-18 - Treatment of B-66-D (unwashed slurry from plant batch #44149) was treated in the laboratory with approximately 3%, 10% and 20% dibutyl phthalate (based on 100% treated product), and 10% of both Nujol and Varnoline. These samples were funnel washed acid free and dried in the electric oven for forty-eight hours at 140° F. The dried products were Mikro Pulverized at 3500 R.P.M. thru a 1/16 mesh screen. Samples from each have been sent to #2 Research Laboratory for evaluation.

451-20 - In this experiment a plant slurry of RT-379-D (lot 44181) was treated following the same course of study as in 451-18 series, also treating a portion with #0 Transparent Lithographic Varnish.

451-21 - Semi-works material from batch SW-7118 of BT-125-D was treated in the laboratory, using same course of study as in exp. 451-20, except grind thru a 1/4 mesh screen instead of 1/16 mesh.

It was observed that 20% of dibutyl phthalate "balled up" in the mill, while a 3% and 10% treatment was taken up very well by the pigment.

The yield study of these treatments are tabulated below.

Exp. 451-18

B-66-D

|     | Dibutyl<br>Phthalate | Varnoline | Nujol | Gms.of<br>Color | Est.<br>Yield | Yield<br>Obtained | % Pigment |
|-----|----------------------|-----------|-------|-----------------|---------------|-------------------|-----------|
| 18A |                      |           |       | 104             | 104           | 104               | 100.0     |
| 18B | 2.7%                 |           |       | 101             | 104           | 104               | 97.3      |
| 18C | 9.6%                 |           |       | 94              | 104           | 104               | 90.4      |
| 18D | 19.4%                |           |       | 84              | 104           | 102.5             | 80.8      |
| 18E |                      | 9.7%      |       | 46.5            | 51.5          | 48                | 90.3      |
| 18F |                      |           | 9.7   | 46.5            | 51.5          | 50                | 90.3      |
| 18G |                      |           |       | 18.5            | 18.5          | 18.5              | 100.0     |

A - Control (thru mill)

G - Control (not thru mill)

Exp. 451-20

|     |                             |     |      |      |     |    |       |
|-----|-----------------------------|-----|------|------|-----|----|-------|
| 20A |                             |     |      | 74   | 74  | 74 | 100.0 |
| 20B |                             |     |      | 74   | 74  | 73 | 100.0 |
| 20C | 2.8%                        |     |      | 71.9 | 74  | 73 | 97.2  |
| 20D | 9.5%                        |     |      | 67   | 74  | 73 | 90.5  |
| 20E | 19.9%                       |     |      | 60   | 74  | 73 | 81.1  |
| 20F |                             | 9.5 |      | 67   | 74  | 67 | 90.5  |
| 20G |                             |     | 9.5% | 67   | 74  | 73 | 90.5  |
| 20H | 50 gms #0 Trans.Litho.Varn. |     |      | 53   | 103 | 99 | 51.5  |

A - Control (not thru mill) B - Control (thru mill)

Exp. 451-21

|     |                              |      |      |      |    |      |       |
|-----|------------------------------|------|------|------|----|------|-------|
| 21A |                              |      |      | 71   | 71 | 71   | 100.0 |
| 21B |                              |      |      | 71   | 71 | 71.5 | 100.0 |
| 21C | 2.9%                         |      |      | 68.9 | 71 | 71   | 97.1  |
| 21D | 9.9%                         |      |      | 64   | 71 | 71   | 90.1  |
| 21F |                              | 9.9% |      | 64   | 71 | 67   | 90.1  |
| 21G |                              |      | 9.9% | 64   | 71 | 71   | 90.1  |
| 21H | 48 gms. #0 Trans.Litho.Varn. |      |      | 47   | 95 | 91   | 49.5  |

A - Control (not thru mill)

B - Control (thru mill)

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PIGMENT COLOR RESEARCH REPORT

"FLUSHED COLORS"

SUBMITTED BY: *P.D. East*  
APPROVED BY: *amc*

161  
FILE: ~~PIGMENT-OIL-MIXTURES~~  
DATE: JUNE - 1935

INTRODUCTION

New work was started this month in an attempt to "flush" or transfer colors from a water phase to an oil phase in the strike vat without going thru the pressing or filtering operation.

The fundamental idea consists of introducing the oil into some stage of the strike and under such conditions, either with or without "assisting" agents, as to cause the precipitate and the oil to coalesce into small particles or pellets which will settle into such a dense mass that they can be transferred from the strike vat directly into a mixer and subsequently worked into an ink relatively free of water, as is normally done when a press cake is worked with oil in the mixer, i.e. the orthodox flushing operation. By so doing, the pressing operation may be eliminated.

The work so far has been confined to Barium Lithol Toners, except for one orientation run on a PTA toner.

SUMMARY & CONCLUSIONS

In the first orientation work on Lithols, lithographic varnish was introduced into the soda salt before the strike. It was completely taken up and absorbed by the pigment but, while it did cause the precipitate to settle more densely, the precipitate was not sufficiently dense to permit the transfer to a mixer. The precipitates were found to filter readily and flush readily upon mixing. (The back rolls of the ink mill were used as a mixer thru out all the work this month as no mixer was available small enough to handle the quantities involved.)

The same results were obtained when the litho varnish was introduced into a PTA immediately after the strike and during the boiling development.

Boiling a barium lithol of the RT-364-D type was found to give better initial settling.

Ethyl Naphthenate and Mineral Spirits acting as "assisting" agents in a boiling development were found to give better and more dense initial settling. The latter appeared to have little effect on the settling of the 150°F development.

The desired pellet stage was finally obtained and converted into an ink, but continued stirring of the precipitate in the presence of more or less varnish was essential to its formation.

By applying the stirring technique it was found that any boiled barium lithol of the RT-364-D type could be reduced to the pellet stage, apparently regardless of the point in the strike at which the

varnish was introduced. It was also found that RT-364-D developed at 150°F could be stirred into the pellet stage even from full flood volume. In some cases it was necessary to continue the stirring for considerable length of time. In general it was found that the very dense initial precipitates, formed during the striking and developing operations, were most easily reduced to the pellet stage.

Very little effort was made to control the tinctorial properties in the work to date. However, it appears that the presence of varnish during the development of RT-364-D seems to hinder its tinctorial development, and it may be necessary to work out new conditions in order to obtain any given standard of color.

#### EXPERIMENTAL DETAILS

Notebook No. 469

Series 469-1. Color: RT-364-D Lithol Red. To study settling effect caused by presence of various amounts of lithographic varnish in the development. No settling at all at 150°F development. Re-heated to a boil after which settling was obtained.

Series 469-2. Color: Lithol Red RT-364-D. Repeated Series 469-1 developing at a boil instead of 150°F. Density of settling is in direct proportion to amount of varnish present.

Series 469-3. Color: PTA, GT-347-D. To study settling effect of lithographic varnish added to concentrated plant slurry and heating to boil. A slight increase in density of settling over control in proportion to the amount of varnish added.

The series was filtered off, and the press cakes flushed into inks which were worked practically free of moisture on the ink mill.

Series 469-4. Color: RT-402-D. Similar to Series 469-2. Varnish increased the density of settling in proportion to the amount added, but none were dense enough to transfer to a mixer for a flushing operation.

Series 469-5. Color: RT-364-D. To study the effect on the settling of various "assisting" agents with a boiling development in the presence of 29% of varnish; also to study the coalescing effect of continued agitation after adding additional varnish.

Ethol Naphthenate increased the density of settling distinctly.

Continued agitation with the additional varnish present caused all strikes to transfer from the water phase into the oil phase including the control which was developed without any varnish present. B (varnish only), E (Sodium Naphthenate) and F (Ethyl Naphthenate) were the only strikes which made the transfer by going thru a uniform small pellet stage. Ethyl Naphthenate not only promoted good settling but also accelerated the formation of the pellet stage.

All samples finished up into ink form readily on the mill but required 8 or 9 passes with a 110°F mill temperature in order to bring the moisture down comparable to that in an ink made from a dry color.

Series 469-6. Color: RT-364-D. An attempt to duplicate the 5B effect on a 150°F development with a varnish variable and, after obtaining negative results, a study of effect of continued agitation with 116% and several "assisting" agents.

The first part of the experiment appeared to be negative after 4-1/2 hours stirring. Agents were added to all but 6A. 17 hours further stirring converted 16A into the pellet stage. Sodium Naphthenate and Ethyl Naphthenate accelerated the formation of the pellet stage, while Petroleum Sodium Soap #1 prevented the uniform pellet formation. Tinctorially, varnish present in the development appears to inhibit the proper development at 150°F.

Series 469-7. Color: RT-364-D. To study the effect of Mineral Spirits and temperature of development. Boiling unquestionably accelerates the settling and the formation of the pellet stage. Mineral Spirits gives still further acceleration on a boiling development but has little action on 150°F development except to stop "up" settling.

Series 469-8. Color: RT-364-D. Study of varnish variable in the development at 150°F and time of stirring; first without any additional varnish and finally with all the varnish added. No settling effect with 90% or less varnish even on long stirring. With 120% of varnish it stirred completely into ink form probably going thru the pellet stage. After the additional varnish was added, all went thru the pellet stage with continued stirring.

Tinctorially the varnish again inhibited the full development of the color.

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PIGMENT COLOR RESEARCH REPORT

IMPROVEMENTS IN P. T. A. PIGMENTS

SUBMITTED BY: *L.C. Homing*  
APPROVED BY: *W.E.B.*

223.21  
FILE: ~~P.T.A. PIGMENTS~~  
DATE: JUNE - 1935

INTRODUCTION:

A brief investigation has been made of the effect of waste sulphuric acid from  $TiO_2$  manufacture, and of a mixture of rare earth sulphates on the P.T.A. of Victoria Pure Blue B0. See letter of A.M.E. to J.E.B. 5/15/35. No improvement has been obtained.

SUMMARY & CONCLUSION:

The use of rare earth sulphates from  $TiO_2$  manufacture in the preparation of a P.T.A. of Victoria Pure Blue B0 produces an improvement in strength accompanied by a marked decrease in light fastness. Waste sulphuric acid from  $TiO_2$  manufacture when used in place of plant sulphuric acid produces a slight decrease in strength accompanied by a slight decrease in light fastness. Neither material appears worthy of further study.

EXPERIMENTAL DETAILS:

See Notebook 426.

Exp. 426-60 - Use of waste sulphuric acid from  $TiO_2$  manufacture and rare earth sulphates in a P.T.A. of Victoria Pure Blue B0.

Results - See Summary and Conclusion.

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PIGMENT COLOR RESEARCH REPORT

BT-125-D

SUBMITTED BY: *E. J. Hess*  
APPROVED BY: *V. Chalupski*

223,21  
FILE: ~~RTA~~ PIGMENTS  
DATE: JUNE - 1935

INTRODUCTION

Production was resumed in the Semi-Works during the month on the improved BT-125-D, SW-6940 type color. SW-6940 has been set up as a temporary standard on this color. Three batches were made and grind results are available on all.

SUMMARY & CONCLUSIONS

All three batches made this month were made on the standard SW-6940 formulation, reverse strike method, because of the tendency of the direct strike batches to grind out weak as had been reported last month.

In the case of the first batch made, however, a result was secured checking the results of the direct strike method. The vat control sample of this batch was equal in strength to the temporary standard SW-6940 but ground out weaker. On checking the vat control against the SW-6940 vat control, weak results were again secured thus showing that all production on this color loses considerable strength on grinding. On investigation, it was found that in all the weak batches a new lot of dye had been used. This dye had given check results to the dye used in SW-6940 by raw material test.

By increasing the amount of dye used by 3% and using the SW-6940 formulation a product testing OK strength and v.s. clean versus SW-6940 was secured.

Using the increased dye and cutting the dye volume by 50% showed no effect.

From these results it would appear that the direct strike method could be checked once more using the increased dye because of the possibility that the dye was responsible for the weak results. This direct strike method is easier to handle in plant production, and permits the manufacture of larger size batches.

Results are tabulated in Table I.

EXPERIMENTAL DETAILS

2.

TABLE I N.B. 408, pages 91-95

| SW Lot | Formula                                               | DYE     |          | Rubout Results versus SW-6940 |                            |         | Yields          |           | Remarks |
|--------|-------------------------------------------------------|---------|----------|-------------------------------|----------------------------|---------|-----------------|-----------|---------|
|        |                                                       | Lot     | 100% Wt. | Massstone                     | Drawdown                   | Str.    | Tint            | Est. Lump |         |
| 7118   | Check SW-6940<br>Reverse strike                       | RMC-783 | 5.25#    | - -                           | vs clean<br>vvs low finish | s.weak  | s.red           | 10#       | 8#      |
| 7120   | As 7118 except in-crease dye 3%                       | "       | 5.4#     | - -                           | vs clean                   | vvs str | vs cl.          | "         | 10#     |
| 7128   | As 7120 except wut dye volume 50% (157 - 78-1/2 gal+) | "       | "        | - -                           | "                          | OK      | vs cl.<br>& gr. | "         | "       |

1# dry to  
Research lab.

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PIGMENT COLOR RESEARCH REPORT

BT-122-D

SUBMITTED BY: *E. J. Hess*  
APPROVED BY: *V. Chalupski*

223, 21  
FILE: ~~PTA~~ PIGMENTS  
DATE: JUNE - 1935

INTRODUCTION

Included in this month's report is one batch of the new non-bleeding BT-122-D type color outstanding from last month. Work has been discontinued on this type color for the time being, and entire BT-122-D production for the month consisted of strong regular BT-122D batches for shading material. Grind rubouts are available on three batches with two more batches in process which will be reported next month.

SUMMARY & CONCLUSIONS

The non-bleeding BT-122-D was made on the standard laboratory formula with an increase of 7-1/2% in dye in an effort to secure a stronger product. Results were weak versus standard BT-122-D with a noticeable varnish bleed. The batch was transferred as sub-standard BT-122-D. A new CS number has been drawn up on this non-bleeding type color, with a mix of three Semi-works batches made on the standard laboratory formula set up as the CS sample. The straight mix of the three colors has been coded CS-7922 while a mix of CS-7922 with 5% Diphenyl guanidine has been coded CS-7923. Ink mill evaluation and rubouts will be reported on this new CS next month.

Three batches of regular BT-122-D are reported this month checking an old SW formulation, SW-6292. All three batches were strong versus the BT-122-D standard and were suitable for shading material. A satisfactory 160 lb. mix has been made using these three batches successfully consuming approximately 70 lbs. of weak sub-standard material.

Results are tabulated in Table I.

EXPERIMENTAL DETAILS

Table I. N.B. 408, pages 68-72

| SW<br>Lot | Formula                                                       | D Y E          |              | Rubout Results vs. BT122 Std |                 |                       |        | Yield |         | Re-<br>marks                  |
|-----------|---------------------------------------------------------------|----------------|--------------|------------------------------|-----------------|-----------------------|--------|-------|---------|-------------------------------|
|           |                                                               | Lot            | 100%<br>Amt. | Mass-<br>tone                | Draw.           | Str.                  | Tint   | Est.  | Lump    |                               |
| 7066      | Check CS7922 RMD-<br>except 7-1/2% 139<br>increase in<br>dye. |                | 8.6#         | --                           | cl,grn,<br>weak | wk.<br>str.varn.bleed | --     | 22#   | 22-1/2# | non-<br>bleed-<br>ing<br>type |
| 7085      | Check SW-<br>6292                                             | RMD-<br>384 #2 | 12.15        | -                            | vs cl.          | str.                  | vs red | 30    | 30      |                               |
| 7089      | Check 7085                                                    | "              | "            | --                           | "               | "                     | "      | "     | 30-1/2# |                               |
| 7142      | "                                                             | RMD-<br>384 #1 | "            | --                           | "               | "                     | "      | "     | 29      |                               |

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PIGMENT COLOR RESEARCH REPORT

TOLUIDINE REDS, RT-232-D, RT-200-D, RT-349-D

SUBMITTED BY: *A. D. Reisinger*  
APPROVED BY: *V. Chalupski*

221.31  
FILE: TOLUIDINE REDS  
DATE: JUNE - 1935

INTRODUCTION:

Observation of plant operation of Toluidine formulas was continued this month. Two batches of RT-200-D and RT-232-D and three of RT-349-D were made.

A study of the process was taken up in the Semi-Works. Drying conditions and some of the ordinary variables were investigated using RT-232-D and RT-386-D formulas.

SUMMARY & CONCLUSIONS:

Plant production of RT-232-D is in somewhat more satisfactory condition. Sufficient strength is now obtained by drying in the Proctor & Schwartz Dryer at 140° F with 30% humidity. A batch made on RT-87-F formula (Std. RT-232-D) appeared to be equal to the modification described last month in which Mono Acid L is employed. Both were v.s. muddy in masstone.

On RT-200-D a 44% reduction in coupling volume gave a product approaching standard being sl. lighter and yellower. A variation tried by the plant in which Para Soap, more bicarbonate and a slightly lower coupling temperature were used, was still lighter, yellower and stronger as would be expected.

An RT-200-D Mix was fairly close to standard by rubout but weak by rubber test. The weakness is ascribed to the use of Mono Acid L.

On RT-349-D a dark product of good strength and tint was obtained by a slight modification of last month's formula. A further change - reduction in amounts of Para Soap and bicarbonate - gave a lighter, stronger product contrary to the usual tendency of these variables. Results on an increase in sodium acetate were inconclusive due to errors in weighing and in operation.

Drying studies were conducted in the Semi-Works on RT-232-D and RT-386-D. Results based on rubout of lump samples from the dryer are summarized below. On grind samples the differences were similar but less pronounced in the case of RT-232-D, while for RT-386-D the reverse is true, i.e. differences which were marked on lump samples were negligible on grind samples.

Type of Dryer - The Semi-Works Electric Dryer and the Proctor & Schwartz Dryer gave equal results at 140° F. Humidity was not controlled.

Temperature - on material pulled when dry at temperature of 175° F as compared to 140° F, gave a product v.s. chalky and flat in masstone and very slightly weak and blue in tint.

Under-drying - Pulling color very slightly damp gave a slightly yellower and stronger product.

Over-drying - Leaving color in the dryer for 24 hrs. to 44 hrs. after it reached dryness had practically no effect at a temperature

of 140° F. However at 175° F, RT-232-D became slightly blue and weak and RT-386-D definitely weaker. This is an instance in which RT-386-D showed comparatively less change on final grind, overdrying causing some blueness but not any weakness.

Humidity - Controlled humidity (140° F with 40% humidity) showed no improvement over regular drying at the same temperature.

Type of Color - RT-386-D appears to be more sensitive to drying conditions than RT-232-D. It also changes in grinding.

A report on a study of other variations of the formula will be made next month.

EXPERIMENTAL DETAILS:

Plant Notebook 335 & 473

| Batch             | Variation                                                                                                                                                                             | Dryer Masstone | Undertone | Strength | Tint    | Lump Weight |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------|----------|---------|-------------|
| RT-200-D<br>44184 | Like 43910 except reduce P&S vol. from 2400 to 1350 g. 104-1400F                                                                                                                      | s. lt.         | vs yel.   | vs str.  | s. yel. | 297         |
| 44203             | Like 43910 but add 2# Para Soap use 84# Bicarbonate. Couple at 90° F                                                                                                                  | light          | s. yel.   | str.     | yel.    | 323         |
| RT-349-D<br>44226 | 4 oz. Mono Acid L; 64# B Bicarbonate. No Para Soap after coupling                                                                                                                     | dk. vs flat    | vvs yel.  | vvs str  | vvs yel | 309         |
| 44233             | 1# Para Soap in coupling 60# Bi-carbonate                                                                                                                                             | s. lt. vs flat | yellow    | str.     | yel.    | 312         |
| 44286             | Like 43837 except omit Para Soap after coupling & increase sodium acetate from 170 to 210#<br>Due to error in weighing MNPT and consequent diazo excess results have no significance. | dark muddy     | yellow    |          |         | 327         |
| RT-232-D<br>44166 | Check 43978, nitrite excess stronger                                                                                                                                                  | vs lt. & muddy | s. yel.   | str.     | yel.    | 281         |
| 44107             | RT-87-P - reslurried washed & dried. Formula= RT-232 Std. & muddy                                                                                                                     | vs lt. & muddy | s. yel.   | s. str.  | yel.    | 296         |

Semi-Works - Notebook 455. An 0.25 mol charge each of RT-232-D and RT-386-D was made. Press cakes were split and dried as indicated below. Humidity was not controlled.

| S. W.            | Dryer                 | Temperature | Hours | Condition of Lump | Grainings<br>are<br>recorded<br>in<br>N.B. 455 |
|------------------|-----------------------|-------------|-------|-------------------|------------------------------------------------|
| RT-232-D<br>7098 | Electric              | 140         | 22    | v.s. damp         |                                                |
| 7099             | "                     | "           | 26    | dry               |                                                |
| 7100             | "                     | "           | 70    | overdried         |                                                |
| 7101             | Proctor &<br>Schwartz | "           | 26    | dry               |                                                |
| 7102             | "                     | 175         | 16½   | dry               |                                                |
| 7103             | "                     | "           | 40½   | overdried         |                                                |
| RT-386-D<br>7111 | Electric              | 140         | 18½   | s. damp           |                                                |
| 7112             | "                     | "           | 26    | dry               |                                                |
| 7113             | "                     | "           | 64    | overdry           |                                                |
| 7114             | Proctor &<br>Schwartz | "           | 26    | dry               |                                                |
| 7115             | "                     | 175         | 19    | dry               |                                                |
| 7116             | "                     | "           | 43    | overdried         |                                                |

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PIGMENT COLOR RESEARCH REPORT

DUOL CARMINE, RT-281-D

SUBMITTED BY: *A. D. Reidinger*  
APPROVED BY: *V. Chalupski*

222.21  
FILE: ~~LITHOL RUBINE~~  
DATE: JUNE - 1935

INTRODUCTION:

In order to obtain light, strong material for shading RT-281-D, a batch was made in the plant on a modification of the formula designated as CS-7314. Another batch was made on a formula representing an average of CS-7314 and RT-281-D.

SUMMARY & CONCLUSIONS:

Both batches were lighter and slightly strong vs. RT-281-D. CS-7314 which employs the lowest amount of rosin was stronger, but only vvs yellow in tint. The yield was considerably lower than standard formula. The intermediate formula in which more rosin was used was yellower than standard with more normal yield.

EXPERIMENTAL DETAILS: Notebook #385, p. 26.

- 44239 - As in CS-7314 - 12# B Rosin; 35# I Rosin - Yield - 279.  
Vs. RT-281-D - light; vs blue; strong; vvs yellow (Bldg.#10 Rubout).
- 44269 - Used 40# B Rosin; 30# I Rosin - Yield - 350.  
Vs. RT-281-D - s. light; vs yellow; s. strong; yellow (Bldg.#10 Rubout).
- 44269 - vs. 44239 - dark; s. yellow; vs weak; vs yellow.

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PIGMENT COLOR RESEARCH REPORT

RT-242-D

SUBMITTED BY: E. J. Hess  
APPROVED BY: C. Chalupski

222.111  
FILE: ~~DUOLS~~  
DATE: JUNE 1935.

INTRODUCTION

Plant production was continued during the month in an effort to produce light, yellow, low bronze material for shading purposes. A total of six batches were made.

SUMMARY AND CONCLUSIONS

The first batch was made to check the last previous batch (44732) except for a small increase in the alkalinity of the coupling. Results checked those of the previous batch, the material being light, blue and weak versus the standard. A drying study (including drying in the Hurrigan dryer, the brick dryers, and thick and thin cake drying in the laboratory Freas dryer) made on this batch showed no apparent change produced by these different methods of drying.

The next batch was made to check the first except that the soda salt was struck at a boil instead of at 175°F. This batch also gave light, blue and weak results versus the standard.

Because of these constantly recurring blue and weak results it was determined to sacrifice low bronze for increased yellowness and strength. Therefore in the third batch a 70%-30% mixture of I and B Wood rosins was used instead of the 40%-60% mixture that had been used in the previous three batches. This variation resulted in a product v.s. bright in top, O.K. in strength, and v.s. blue in tint and only v.s. bronzy versus RT-242-D standard.

The next three batches were made to check this last batch except that all I Wood Rosin was substituted for the I and B Rosin mixture. The first of these batches was quite satisfactory being v.s. dark in top, v.s. strong, s. yellow and clean and s. bronzy versus the RT-242-D standard. The next two batches did not quite check this batch the first being s. light, a grade strong and v.s. yellow, s. clean versus the standard and the second being light, v.s. weak and v.s. blue, s. dirty versus the RT-242-D standard.

This last formula, which has given the best results up to the present, does not differ materially from the RT-283-D standard formulation the only variables being a two pound cut in the caustic soda used in the Beta Naphthol solution (102<sup>1</sup>/<sub>2</sub>-100<sup>1</sup>/<sub>2</sub>) and the addition of eight pounds of sodium phosphate to the Beta Naphthol solution before coupling.

A 5000 pound mix has been satisfactorily completed which consumes all six of these batches together with another 1000 pounds of sub-standard material. Results on this mix versus the standard are v.v.s. dark, v.v.s. yellow - 3% strong, s. yellow, bronzy.

Results on this month's production are tabulated in Table I.

Results on the mix are tabulated in Table II.

EXPERIMENTAL DETAILS

TABLE I.

N.B. 433, pages 155-158

RT-242-D

| Batch          | TOB | N-7  | Amt. | Rosin | Amt.  | Rubout                             | Results                 | Yield   | Remarks                                                |
|----------------|-----|------|------|-------|-------|------------------------------------|-------------------------|---------|--------------------------------------------------------|
| lot            | BN  | I    | B    | N-6   | vs    | RT-242-D                           | Std.                    |         |                                                        |
|                |     |      |      | mass. | draw. | strength                           | tint                    | Est.    | Lump                                                   |
| 44130          | 147 | 100# | 60#  | 90#   | 8#    | lt.br.                             | bl.                     | -       | bl. 645 540 check-43732<br>note-N-7var.                |
| 44131          | 147 | 100# | 60#  | 90#   | 8#    | lt.muddy                           | bl.                     | -       | bl. 645 494 check 44130 ex-<br>cept strike at<br>boil. |
| 44140          | 147 | 100# | 105# | 45#   | 8#    | O.K.v.s.brt.                       | v.s. v.s. v.s. v.s.     | 645 607 | check 44131<br>note rosin<br>variation.                |
|                |     |      |      |       |       | (v.s.lt.) v.s.                     | bl. str, bl.<br>(s.bl.) |         |                                                        |
|                |     |      |      |       |       | bronzy                             |                         |         |                                                        |
| 44141          | 147 | 100# | 150# | -     | 8#    | v.s.dk.v.v.s.                      | v.s.st. s.yell.         | 645 627 | check 44131<br>note rosin<br>variation                 |
|                |     |      |      |       |       | (v.s.lt.) bl.                      | clean                   |         |                                                        |
|                |     |      |      |       |       | (v.s.yel.)                         | (v.s.yel)               |         |                                                        |
|                |     |      |      |       |       | s.bronzy                           |                         |         |                                                        |
| 44267          | 147 | 100# | 150# | -     | 8#    | s.lt. v.s.bl.                      | tr. v.v.s.              | 645 629 | check                                                  |
|                |     |      |      |       |       | (s.lt.muddy) (v.s.bl)              | str. yel.               |         | 44141                                                  |
|                |     |      |      |       |       | bronzy (v.s.str)                   | s.cl.                   |         |                                                        |
|                |     |      |      |       |       |                                    | (sl.bl.)                |         |                                                        |
| 44287          | 147 | 100# | 150# | -     | 8#    | lt. bl.                            | v.v.s.wk. v.s.bl.       | 645 656 | check                                                  |
|                |     |      |      |       |       | (s.bl.) (v.s.wk)                   | s.dirty                 |         | 44141                                                  |
|                |     |      |      |       |       | (lt.) s.bronzy                     | (sl.bl)                 |         |                                                        |
| 44141 vs 44140 |     |      |      |       |       | v.v.s.dk. - s.yel. - O.K.-s.       | yellow and clean        |         |                                                        |
| 44267 vs 44141 |     |      |      |       |       | light, - v.s.bl. - tr. wk.-v.s.bl. |                         |         |                                                        |

TABLE II

| Mix   | Components                          | Wt.   | Rubout   | vs                              | RT-242-D | Std. |
|-------|-------------------------------------|-------|----------|---------------------------------|----------|------|
|       |                                     |       | Mass.    | draw-                           |          |      |
| 14934 | 44287-650#, 44267-605#, 44140-600#  | 5,267 | v.v.sdk. | v.s.yell.                       |          |      |
|       |                                     |       |          | bronzy                          |          |      |
|       |                                     |       |          | Tint - s.yellow - O.K. to ship. |          |      |
| 14935 | 44141-620#, 44203-595#, 44131-490#. |       |          |                                 |          |      |
| 14936 | 43356-590# 43201-257#, Bl. Fix 260# |       |          |                                 |          |      |

Note: Parenthetical rubout results in Table I are control laboratory readings.

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PIGMENT COLOR RESEARCH REPORT

ALKALI BLUE TONER

SUBMITTED BY: *S. H. H. H.*  
APPROVED BY: *A. B. B. B.*

223  
FILE: ~~MISC. TONERS~~  
DATE: JUNE - 1935

INTRODUCTION:

Work on the improvement of the texture and tinctorial power of dry alkali blue toner was carried out.

SUMMARY & CONCLUSION:

Due to the apparent hard texture and weak tinctorial properties of dried out Alkali Blue pulp improvements were tried by colloid milling, colloid milling plus mineral spirits, and mineral spirits with diglycol stearate plus colloid milling. Improvements in texture and tinctorial power were obtained by the above treatments. The results obtained by mineral spirits plus colloid milling gave results approximately 24% stronger than the dried out toner but inferior to the flushed out pulp while the addition of 10% diglycol stearate to the mineral spirits before colloid milling gave a further increased improvement in texture and strength, 307-53C, only approximately 6% weaker than the flushed out pulp.

Therefore, it appears evident that the colloid milling with mineral spirits plus diglycol stearate gave a decided improvement in texture and tinctorial power.

EXPERIMENTAL DETAILS:

See Notebook 307. Series 52, 53 pp. 158-162.

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PIGMENT COLOR RESEARCH REPORT

MAROON TONER - RT-354-D

SUBMITTED BY: *A. S. Reininger*  
APPROVED BY: *V. Chalupski*

222.22  
FILE: ~~LAKE BORDO-B~~  
~~MAROONS~~  
DATE: JUNE - 1935

INTRODUCTION:

Further work was done in the plant in order to increase brightness of this Lacquer Maroon. The slight brownness on recent shipments was the cause of a complaint by Valentine & Company.

One batch was also made in the Semi-Works to prepare a small amount of standard material for this customer.

SUMMARY & CONCLUSIONS:

With a slight reduction in amount of excess B.O.N., an exact match for standard (vvs brighter) was obtained in the plant. The formula was otherwise regular except that it is now a practice to have all the B.O.N. (total 192#) in the coupling instead of adding the excess after coupling.

Splitting the B.O.N. as in standard formula gave a slightly lighter product.

A dark product with good brightness was given by a further reduction in excess B.O.N. together with a cut in alkalinity of coupling.

The depth obtained by use of extra B.O.N. is accompanied by brownness as in the case of addition of Pigment Green B and greater brightness will probably be secured with reduction of the excess B.O.N.

Yields on this series were abnormally low. No reason is known for this but three conjectures are (1) the change in B.O.N. excess, (2) loss in pressing or (3) excessive washing.

The Semi-Works charge, made on standard formula was slightly darker than RT-354-D on lacquer but was equal in brightness. This was used to fill the order of Valentine & Company but was rejected on account of the depth.

Some press cake from a plant batch was dried in the Semi-Works Electric Dryer and compared to material dried in the Plant Proctor & Schwartz Dryer at 165° F 30% humidity. The former was slightly darker and brighter than the plant material on a lump sample tested in lacquer but only vvs darker on the final grind. The difference in effect of these drying conditions is negligible.

EXPERIMENTAL DETAILS: Notebook #356, p. 136.

44076 - Standard formula (.9 mol) except  
(1) reduce total B.O.N. from 200 to 192# and (2) reduce  
caustic soda in coupling from 136 to 134#.  
All of B.O.N. used in coupling. T.O.B.W. Lot 29.  
Lacquer Test - vvs bright. Yield 443#

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- 2 -

- 44096 - 132# Caustic Soda and 180# B.O.N. in coupling.  
1.5# Caustic Soda and 6# B.O.N. after coupling.  
Alkalinity of coupling kept very low.  
Lacquer Test - Dark. Yield 488#
- 44117 - 132# Caustic Soda and 180# B.O.N. in coupling.  
2# Caustic Soda and 12# B.O.N. after coupling.  
Lacquer Test - s. light. Yield 520#
- 14809 - Press cake from 44076 dried in Semi-Works.  
Lacquer Test - vvs dark.
- SW-7080 - 0.2 mol charge. Standard formula. N.B. 351, p. 48.  
Lacquer Test - s. dark. Yield - 115#.

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PIGMENT COLOR RESEARCH REPORT

PIGMENT RUBINE G - RT-359-D

SUBMITTED BY: *A. Brizzola*  
APPROVED BY: *Jim E.*

222.23  
FILE: ~~MISC. TONERS~~  
DATE: JUNE- 1935

INTRODUCTION

Work was continued on this problem for the purpose of determining the cause of bronze in RT-359-D and possible means of eliminating the objectionable bronze.

SUMMARY & CONCLUSIONS

Tests were made on various shipments of para-chlor-aniline-meta sulfonic acid, including lot 12 RMD-436, lot 13 RMD-436, lot 14 RMD-390. These lots were compared with lot 12 RMD-239 which had been the laboratory standard. From the results, lot 12 RMD-436 and lot 13 RMD-436 seemed satisfactory. Accordingly, lot 12 RMD-436 was selected as the new laboratory standard for future studies. Lot 14 RMD-390 gave a slightly duller masstone but was otherwise satisfactory.

The RT-359-D formula is apparently quite sensitive to slight variations in the balance between PCAMSA and BON. The use of paste PCAMSA requires frequent and careful checkup of the moisture content. Therefore it was thought advisable to dry the PCAMSA for laboratory use. This was done without any detrimental effect upon the pigment.

Dissolving PCAMSA in ammonia instead of caustic soda made the masstone darker and decreased the bronze and made the tint bluer.

Increasing the excess acid in the diazo made very little difference.

The use of all soda ash in the coupling increased the depth of masstone slightly and decreased the bronze.

The addition of sodium acetate to the coupling had a negligible effect.

Coupling at 25°C instead of 5°C made very little difference tinctorially.

Striking at temperatures lower than 75°C and subsequently developing to 75°C, tended to give darker masstones, less bronze and bluer tints.

The effect of incomplete washing of the color was checked several times, i.e. lower bronze.

Baking the dry color at 100°C again gave a distinct improvement in bronze, i.e. lower bronze.

It was found that flooding of the pigment slurry was beneficial to a slight degree.

Last month's report included a list of variables which were found to give brighter colors with less bronze. These variables were combined in one formula, 463-20C, and compared with standard RT-359-D formula. The results showed 463-20C to be superior; it was brighter in masstone, possessed less bronze, was slightly stronger than the product made by the standard formula. However, without baking of the dry color, 463-20C is still bronzier in printing tone finish than standard RT-359-D, but lighter and brighter in masstone.

#### EXPERIMENTAL DETAILS

Notebook No. 463

Series 463-17 tried dissolving PCAMSA in ammonium hydroxide instead of sodium hydroxide.

The use of ammonia to dissolve the PCAMSA caused the masstone to become darker, diminished the bronze slightly and made the tint bluer.

Series 463-18 studied the effect of using all soda ash in the coupling, of using sodium acetate in the coupling, of using a greater excess of hydrochloric acid in the diazo and of not washing the finished pigment.

All soda ash gave a darker masstone with less bronze than the control, but was fairly close to standard in depth. Sodium acetate was without much effect. A greater excess of acid in the diazo seemed to make the masstone brighter. No washing gave distinctly less bronze.

Series 463-19 tested lot 13 of PCAMSA for laboratory use, also determined effect of drying PCAMSA paste.

From the results it was decided that lot 13 was satisfactory for laboratory use. It was also evident from the results that drying of the PCAMSA at 60°C was not harmful.

Series 463-20 combined the more promising variables uncovered in previous studies in one process and compared it with formula RT-359-D and 463-7A.

463-7A differed from RT-359-D in that it contained no para soap. The formula, 463-20C, which consisted of the promising variables, differed from standard in that it contained all soda ash in the coupling, was coupled slower, struck at a slightly lower temperature, contained less para soap, eliminated the sodium sulfite, had a higher strike volume, and was not washed.

463-7A gave a slightly brighter masstone and had less bronze than standard formula. 463-20C gave a brighter masstone, less bronze, and gave slightly more strength than standard formula.

Series 463-21 studied effect on 463-20C formula of

- coupling at 25°C
- using a greater excess of hydrochloric acid in the diazo
- striking at a lower temperature and subsequently developing.

Nothing of promise was obtained.

Series 463-22 studied the effect of flooding versus no flooding of the finished pigment slurry; also effect of increasing time of development after the strike.

Flooding seemed to brighten the masstone slightly and to give slightly more strength. Decreasing or increasing the time of development made practically no difference.

Series 463-23 were tests on lots 12 and 14 of PCAMSA in 463-20C formula.

RMD-436 lot 12 gave a satisfactory check for the control.  
RMD-390 lot 14 was slightly dull in masstone.

Series 463-24 varied the temperature of strike in 463-20C from 25° to 75°C.

Decrease in temperature of strike gave darker masstones, less bronze and bluer tints.

Allowing the finished slurry to stand overnight before filtration apparently gave no improvement.

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PIGMENT COLOR RESEARCH REPORT

PIGMENT RUBINE TONER \* RT-359-D

SUBMITTED BY: *A.D. Reidinger*  
APPROVED BY: *A. Chalupski*

222.23  
FILE: ~~FIG. RUBINE G~~  
DATE: JUNE - 1935

INTRODUCTION:

Production of this toner was continued in the Semi-Works along the same lines as were followed in previous months. Five batches were coupled, two of which were split for study of variables, making seven in all.

SUMMARY & CONCLUSIONS:

Using Lot 13 of p-chloraniline-m-sulphonic acid on the modified formula described last month, material close to standard was obtained except for the usual muddy masstone.

Replacing the full amount of Para Soap caused very slight dirtiness of masstone and yellowness of tint. This effect of para soap was observed to a greater extent on a batch in which it was omitted from the strike but added to the color before pressing. The treated part was distinctly muddy and yellow.

Much of the material being dried in the humidified dryer is too light and yellow for regular production but suitable for shading. A lower humidity or lower strike temperature should correct this.

Humidification after drying in ordinary dryer did not show any advantage over drying under humidified conditions immediately.

Tripling the amount of sodium sulfite had no beneficial effect.

Striking the strontium nitrate thru a sprinkler instead of thru a single line did not appear to be helpful. The finished product was quite light and yellow but ~~further drying in the laboratory.~~

A mix of this month's production and ~~30%~~ of S.S.S. is being lined up.

EXPERIMENTAL DETAILS: Notebook 351, p. 100

- SW-7069 - Check SW-7060 but use P.C.A.M.S.A. Lot 13.  
Dried in P. & S. Dryer at 140° F 40% humidity  
Vs. RT-359-D - muddy; vsyellow & weak; O.K; vs yellow
- SW-7078 - One half of SW-7069 press cake.  
Dried in Electric Dryer at 140-150° F.  
Then humidified in & P. & S. Dryer at 95° F.  
Vs. RT-359-D - vs dark, muddy; vvs yellow; O.K; vvs blue.
- SW-7079 - Like 7069 (1/2 charge) but use standard amount of Para Soap.  
Alkalinity of coupling stronger.  
Vs. RT-359-D - muddy; vs yellow; vvsweak; s. yellow vvs dirty.

55

- SW-7087 - Like 7079 but use 3X amount of sodium sulfite.  
Dried as in SW-7078.  
Vs. RT-359-D - s. lt. muddy; s. yel. & bronzy; O.K; s. yellow
- SW-7091 - Like 7069 (1/2 charge) but omit Para Soap.  
Vs. RT-359-D - s. lt. muddy; s. yellow; vs weak; s. yellow.
- SW-7093 - One half of SW-7091 struck slurry.  
Added 0.75# Para Soap.  
Vs. RT-359-D - light, muddy; yellow; O.K; yellow  
Vs. SW-7091 - v.s. lt. muddy; vs yellow; vs str; yellow-s.bronzy
- SW-7094 - Like 7069 (1/2 charge) except strike strontium nitrate thru a  
sprinkler.  
Vs. RT-359-D - light, yellow; O.K; yellow - v. bronzy.

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PIGMENT COLOR RESEARCH REPORT

DU PONT PIGMENT SCARLET DYE - RL-211-D

SUBMITTED BY: *G. D. Reidinger*  
APPROVED BY: *V. C. Chalky*

222.41  
FILE: ~~PIGMENT SCARLET~~  
DATE: JUNE - 1935

INTRODUCTION:

A series of four batches of RL-211-D were made in the Semi-Works to test a trial shipment of Pigment Scarlet from the Dye Works and to try the use of the Colloid Mill for pulping Kadox.

SUMMARY & CONCLUSIONS:

The Du Pont Dye, Lot #1, gave products slightly light and dull in masstone but of equal strength and tint, compared to dye made in our plant. Compared to RL-211-D Standard, the same masstone relation existed but the strength was slightly greater. Texture and lithographic water bleed were satisfactory. Yields were normal.

While the light masstone given by the dye is desireable, the muddiness would need to be eliminated for production of standard material.

The product obtained by pulping Kadox in the Colloid Mill was darker and brighter but weaker than the control. Texture was noticeably better on a lump sample but not so greatly different on the final grind.

EXPERIMENTAL DETAILS:

Notebook #430 p. 190.

All batches were 1/10 of Standard formula in size.  
42# 100% Dye was used instead of 45#.

- SW-7126 - Plant Dye Lot 44050. Yield - 107#. Vs. RL-211-D - s. yel. cast; s. str; s. str; O.K.
- SW-7131 - Du Pont Dye Lot 1 - RMD-490. Yield 108#. Vs. RL-211-D - s. light & muddy; s. strong; s. strong; O.K.
- SW-7135 - Du Pont Dye Lot 1 - RMD-490 - Yield 103#. Vs. RL-211-D - s. light & muddy; s. strong; s. strong; O.K.
- SW-7145 - Check SW-7126, but pulp Kadox by passing it twice thru the Semi-Works Colloid Mill. Yield 104#. Vs. RL-211-D - dark, s. brt; vs str; C.K. vvs blue.

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PIGMENT COLOR RESEARCH REPORT

DISPERSED CLAY COLORS, GE-363-D, GE-364-D, GE-405-D

SUBMITTED BY: *A. D. Reidingen*  
APPROVED BY: *V. Chalupsh*

171-1  
FILE: ~~WATER COLORS~~  
DATE: JUNE - 1935

INTRODUCTION:

This report covers experimental work done in the plant during May and June on GE-363-D and GE-364-D in addition to production in the Semi-Works of two batches of CS-7905, GE-363-D of improved flinting for Louis de Jonge, coded GE-405-D.

SUMMARY & CONCLUSIONS:

GE-363-D - Substitution of Thioflavine TCN for Auramine gave a blue, clean product similar to that obtained in the Semi-Works in February. The tendency to become dirty in tint on drying as shown by rubout test was corrected by Hurricane Drying at 140 - 150° F. With two batches of this type it was possible to blend off all the yellow, dirty substantard.

GE-364-D - The method of pulping the clay by running thru a centrifugal pump was returned to as use of an electric mixer was unsatisfactory from an operating point of view. A slow rate (500# Clay thru the pump in 20 min. to 1 hour) gives satisfactory dispersion. As in GE-363-D use of low temperature drying was necessary to avoid dirtiness of tint in the finished color especially when tested by rubout.

Neutralization of the color after striking was tried by the plant staff and found to give cleaner tints as indicated by former laboratory work on this color. The pH of the struck color which is sometimes as high as 7.9 is adjusted to 7.0 by addition of acetic acid.

Efforts are now being made to obtain bluer tints by addition of other dye such as Lithosol Blue 6G.

In the Semi-Works a blend of two batches of CS-7905 gave a tinctorial match for GE-3 63-D. Some of the clay is replaced with talc to give improved flinting. This property will be tested by the customer (Louis de Jonge).

EXPERIMENTAL DETAILS:

Plant Notebook 318, p. 38

500# batches were made. Clay was pulped by passing thru

Centrifugal pump.

GE-363-D

| Batch  | Variation                                                                                                        | Masst.           | Undert. | Strength | Tint           | Brushout                                |
|--------|------------------------------------------------------------------------------------------------------------------|------------------|---------|----------|----------------|-----------------------------------------|
| 43868  | Subs. Thioflavine TCN for Auramine. Based on SW-6778                                                             | s. bl            | vs bl   | vs weak  | vs yel & dirty | bl & cl; OK cl, s. bl.                  |
| 44100  | Check 43868 but dry in Hurricane (140° F instead of Brick Dryer (160° F))                                        | s lt & cl        | bl & cl | O.K      | cl.            |                                         |
| 44185  | Chk 44100 but run clay slowly thru pump (1 hr instd. of 20 min) Made in new vat - improved agitation             | lt               | yel     | O.K      | vs yel         |                                         |
| 44057  | Std. formula-Clay run thru pump in 15 min.                                                                       | vs dk            | dirty   | O.K.     | dirty          | vs dk; 2% str; vvs yel.                 |
| 44167  | Like last but make in new vat. Dried in P & S Dryer instead of Brick Dryer                                       | vs lt            | yel     | vs wk    | yel            |                                         |
| 44204  | Like last but adjust pH after strike to neutral point (7.2)                                                      | Mixed with 44219 |         |          |                |                                         |
| 44219  | Like last but add 1/2# Lithos. Blue 6G to dye for bluer prod.                                                    | s red            | clean   | O.K.     | vs yel clean   |                                         |
| SW7122 | Semi-Works N.B. 309, p. 161 CS-7905 - 3/20th of Std. form. except subst. Thioflavine TCN for 40% of the Auramine | s lt             | yel.    |          |                | (vs. GE-363-D) yel; vs str; v yel & cl. |
| SW7132 | 0.862 x SW-7122 except use Victoria Green Auramine For bluer product                                             | dark             | blue    | s str    | blue           |                                         |

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PIGMENT COLOR RESEARCH REPORT

MISCELLANEOUS LAKES & TONERS

SUBMITTED BY: *Alfred Siegel*  
APPROVED BY: *W. E.*

220  
FILE: ~~MISC. LAKES~~  
DATE: JUNE - 1935

INTRODUCTION

Investigations have been carried out on Red Toner CS-7779 with the object of preparing a deeper masstone product.

Orientation experiments on the preparation of dry color lakes from water dispersible Pigment Green B have resulted in products of considerable merit.

SUMMARY & CONCLUSIONS

A systematic study has been started on the preparation of a deeper masstone CS-7779 (Strontium toner of 4 chlor aniline 2 sulfonic acid → beta oxynaphthoic acid.) Several variations in the dye and laking procedure did not result in the desired product; however, the introduction of a small quantity of rosin in the laking results in an appreciably deeper product without decreasing the strength. Substantial quantities of rosin are not desirable owing to a considerable reduction in the strength of the product.

A very close match to Scarlet Lake RL-10-D has been obtained by tinting CS-7779 with a trace of Duol Red Deep RT-284-D. The resulting lake is somewhat lighter than RL-10-D in toptone but very much faster to light in both shade and tint.

Further studies on the preparation of a deeper masstone pigment, excluding the use of rosin, are proposed; however, it appears that the desired product can be obtained by the less difficult route of mixing small quantities of Duol Red RT-284-D, Duol Carmine RT-281-D or Maroon Toner RT-363-D with CS-7779.

The preparation of alumina hydrate lakes from water-dispersible Pigment Green B has resulted in soft texture products which in lithographic varnish and rubber are much stronger, cleaner and brighter than a lake prepared from standard GT-68-P paste. These new lakes when dry milled into rubber are practically equal to latex dispersed Green FRD in brightness, and 20% stronger, judged on an equal 100% pigment content basis. This new product apparently is the answer to the problem of preparing a dry Pigment Green B for use in rubber, in which the Du Pont Rubber Laboratory is interested. The application of this new green lake for printing inks and paints appears worthy of some consideration.

Water dispersible Pigment Green B is not absorbed by alumina hydrate. In order to precipitate the pigment it is necessary to break the colloid with sodium chloride or barium chloride which salts out the soluble sodium resinate in the case of the salt, and reacts with the sodium resinate to form insoluble barium resinate in the case of the barium chloride. In this manner the pigment is precipitated in an apparently very finely divided form in the presence of the substratum.

EXPERIMENTAL DETAILS

Expt. 32, page 130, N.B. 460

Study of effect of alkalinity of coupling on the lake.  
" " increased acidity of diazotization.

Expt. 34, page 140, N.B. 460

Preparation of CS-7779 by modified RT-281-D procedure  
using rosin soap 30%. Study of the effect of high volume of dye,  
acid and alkaline development on the lake.

Expt. 36, page 150, N.B. 460

Study effect of omission of para soap, volume of dye  
and 7.5 percent rosin, on the lake.

Expt. 28, page 114, N.B. 460

Preparation of Alumina Hydrate lakes of Pigment Green B

GT-68-P paste

GL-7906-D lab. 460-22F

Lithographic ink, rubber and paper coating tests.

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PIGMENT COLOR RESEARCH REPORT

PIGMENTS FROM SULFANTHRENE PINK SV (FF):  
EVALUATION OF PRODUCTS

SUBMITTED BY:  
APPROVED BY:

*C. B. Beck*  
*A. E. E. E. E.*

223.6  
FILE: ~~MISC. LAKES~~  
DATE: JUNE- 1935

OBJECT OF THE INVESTIGATION

This investigation was undertaken in an attempt to obtain optimum pigment value from the dye and to compare the pigment in properties and money value with existing products.

PERIOD COVERED BY REPORT

June 3 to June 21, 1935.

HISTORICAL BACKGROUND

The paste of this vat dye finds a limited place in the wallpaper trade. Since it is a standard product made for textile use, it was decided to gather sufficient data to determine whether it should merit greater stress in the pigment field.

SUMMARY & CONCLUSIONS

Sulfanthrene Pink SV pigments appear in general to show no merit over less expensive products now on the market.

The toner (made by drying the paste dye) exhibits as much strength as a lake when compared on an equal dye content.

Treatment of the paste with Mineral spirits produces a product in no way superior to the control.

PATENT SITUATION

No patent situation is involved.

EXPERIMENTAL RESULTS

A - Pigments from Sulfanthrene Pink Dye

Sulfanthrene Pink SV Paste Lot 9 was treated as follows:

- (a) Dried at 140°F
- (b) Colloid milled with Mineral Spirits and dried at 140°F.
- (c) Laked as follows:
  - 54 g. Alum dissolved at boil in 180 cc water.
  - Diluted with cold water to 900 cc.
  - 134 Sulfanthrene Pink SV paste (13.6 solids) brought to boil in 340 cc water. Added to alum solution through a 60 mesh screen.
  - 27 g. Soda Ash dissolved in 180 cc water at boil.
  - Added to above in 10 minutes. Stirred 1 hour.
  - Flooded. One water drawn. Filtered. Washed sulfate free. Dried at 140°F.

When these three pigments were compared in ink on an equal dye content, there was practically no difference in shade or strength.

B - Evaluation of Sulfanthrene Pink Toner (82B) vs. known standards.

The following table gives the reading of Sulfanthrene Pink

Toner vs. the pigments listed when rubbed up in varnish drier

|            |                                                              | <u>S u l f a n t h r e n e</u> |          |                | <u>P i n k</u> |            |
|------------|--------------------------------------------------------------|--------------------------------|----------|----------------|----------------|------------|
|            |                                                              |                                |          |                | Lightfast-     |            |
|            |                                                              |                                |          |                | ness of        |            |
|            |                                                              |                                |          |                | tint           |            |
|            |                                                              |                                |          |                | Fadeometer     |            |
| Krebs Code | Material                                                     | Price<br>per<br>lb.            | Masstone | Tint           | Oil<br>Bleed   | 175 hours  |
| RT-277-D   | Excelsior Red<br>(An Algol red<br>purchased<br>from General) | \$8.25                         | brown    | v.yellow       | sl.sup.        | v.s.infer. |
| CS-7853    | Permanent Red<br>2B (Ca)                                     | 1.65                           | dk,brown | yel,50%<br>wk. | equal          | equal      |
| RT-359-D   | Pigment Rubine<br>G (Sr)                                     | 2.25                           | v.dk,brn | bl,dirty       | "              | "          |
| RT-357-D   | Rhodamine 6GDN<br>(PTA)                                      | 3.50                           | v.light  | yel,dirty      | "              | v.s.super. |

As will be seen from the above table, Sulfanthrene Pink is inferior tinctorially to the pigments noted. and is not superior in light-fastness. Excelsior Red has found so little use, largely because of price, that it has been withdrawn from Krebs active standards. Sulfanthrene Pink Paste containing 13.5% solids sells for \$1.34 per lb. The toner selling price would thus be \$9.90 per lb. A competing sample (C#36006) identified as Sulfanthrene Pink was received by Krebs from Acme Printing Ink Company. Rubout showed it to be weak (41.67 to 100) vs. our toner. Its selling price is \$5.50 per lb. or \$13.20 per lb. on the same color strength as the laboratory sample of toner.

In wallpaper work, a little Sulfanthrene Pink is used, but it is not superior in properties to Rhodamine 6 GDN phosphotungstic acid and is of course much more expensive.

The chance of this color being used in quantity by dry color manufacturers appears quite remote. It is dependent on great improvement in tinctorial properties, which has not become evident in a small amount of preliminary work and on a price adjustment of such proportions as to be most improbable.

EXPERIMENTAL DETAILS

See Notebook J.L. 1740, pages 82, 87, 88.

25-226 63

PIGMENT COLOR RESEARCH REPORT

MAROON LAKE RP-261-D

SUBMITTED BY: *H. Imami & N. Rothman*

APPROVED BY: *W. Chalupski*

223.52  
FILE: MISC. LAKES

DATE: JUNE - 1935.

INTRODUCTION

Four semi-works batches were made in an effort to produce strong and blue material, after several weak and yellow batches had been made in the plant.

One batch was made in the plant before making the semi-works runs, and one after, under semi-works supervision.

SUMMARY & CONCLUSIONS

Three semi-works batches were made on standard formula (130#), omitting the clarification of the dye solution. One double charge (260#) was made on the same formula, the grind of which was v.s. weak and v.s. yellow against the other semi-works material.

One plant batch, 2-1/2 times standard formula, except increased dye 35%, was hard in texture, and therefore weak compared with standard. The poor quality of this material may be due to standing over the week-end in a press, since a vat control sample was v.v.s. dark and v.v.s. blue against standard.

The other plant batch (3-3/4 times standard formula) was slightly strong and yellow compared to standard.

All semi-works material was dried in the Preas electric oven at 140°F. The plant batches were dried in the Hurricane dryer at 140°F.

Batch size appears to have an effect on quality in that large batches tend to go weak and yellow compared with smaller batches.

EXPERIMENTAL DETAILS

Semi-works N.B. #298, p. 194.

SW-7109 Standard formula except omit clarification

Dye used RMD-477

Grind vs. std. dk, str, str. & blue

SW-7119. Check SW-7109

Same dye.

Grind vs. std. - dk, str, str. & blue

SW-7121. Check SW-7109

Same dye.

Grind vs. std. - s.dk, s.str., str. & blue

SW-7123. Two times SW-7109

Grind vs. std. - v.v.s.dk, v.s.str., s.str. & s.blue

Plant N.B. 318, p. 196

44145 - 2-1/2 times standard formula omitting dye clarification and increasing dye 35%.

Dye used - RMD-404

Grind vs. std. - v.s.lt, s.yellow, wk. & hard

44330 - 3-3/4 times standard formula

Dye used - same as in SW-7109

Grind vs. std. - OK; yellow; s.strong; yellow

35-227 65

PIGMENT COLOR RESEARCH REPORT

PEACOCK BLUE LAKE BL-151-D

SUBMITTED BY: E. J. Hers  
APPROVED BY: C. Chalupski

22-3.12  
FILE: ~~MISC.~~ LAKES  
DATE: JUNE - 1935

INTRODUCTION

Semi-works production of weak material for shading purposes has been continued during the month, a total of four batches being reported. Quality continues fairly satisfactory.

SUMMARY & CONCLUSIONS

These four batches including two batches outstanding from last month were all made to check SW-7044. These batches varied from the standard BL-151-D formulation only in that the amount of dye is decreased to secure weak material for shading purposes, and a 10% decrease in Soda ash in the base is made to secure an ink lower in body. All four batches gave weak and v.s. clean results with yields satisfactory.

The last two of these batches (SW-7081 and 7084) have been used in a satisfactory BL-151-D mix (weight - 565 lbs.)

Production on this weak shading material will be transferred to the plant next month.

Results tabulated in Table I.

EXPERIMENTAL DETAILS

N.B. 430, pages 50-52

TABLE I.

BL-151-D

| Batch | D Y E<br>Amt. Lot | Type Base                                     | Drying Time                        | Mass.               | Rubout Results vs. BL-151-D Std. |      |          | Yield      |
|-------|-------------------|-----------------------------------------------|------------------------------------|---------------------|----------------------------------|------|----------|------------|
|       |                   |                                               |                                    |                     | Draw.                            | Str. | Tint     |            |
| 7064  | 4                 | RMD-222<br>10% cut in<br>N-3 in base.<br>V.W. | 48 hrs. P&S dryer<br>140°F - 40% H | lt.<br>vs heavy ink | weak                             | weak | vs clean | 48#<br>45# |
| 7065  | 4                 | "                                             | Check 8W7064                       | "                   | "                                | "    | "        | " 47       |
| 7081  | 4                 | "                                             | 38 hrs. P&S dryer<br>140°F - 40% H | "                   | "                                | "    | clean    | " 50       |
| 7084  | 4                 | "                                             | 48 hrs. P&S dryer<br>140°F - 40% H | "                   | "                                | "    | "        | " 47       |

PIGMENT COLOR RESEARCH REPORTSEMI-WORKS PRODUCTIONSUBMITTED BY: *Harry Amos*APPROVED BY: *W. Chalupski*FILE: *GR-200*

DATE: JUNE-1935

INTRODUCTION

82 batches of 23 different colors were made. These included 19 batches of RT-232-D, 6 batches of RT-386-D, 3 batches of RT-7853D, 4 batches RP-261-D, 5 batches BT-122-D, and 5 batches G-7764-D Light Fast Milori.

SUMMARY

RT-232-D, Toluidine Red - 19 batches were made in a study of drying conditions and of variations of the process for the purpose of correcting weakness in this product.

RT-386-D, Toluidine Red. Six part batches were made in a study of drying conditions.

RT-359-D, Pigment Rubine Toner. Three batches were made in continuation of this problem.

RT-354-D, Maroon Toner. Three batches were made, one for standard dry color and two in pulp form, RT-130-P, for Parlin.

RT-126-P, Maroon Toner Pulp. One batch of RT-297-D in pulp form was made for Parlin.

RT-7853-D, Permanent Red 2B. Three batches were made in continuation of this development problem.

RL-7909-D, Permanent Red 2B Lake. One batch was extended.

RL-7836-D, Lake Red C for Rubber. One batch was made to consume Lake Red CLM Paste on hand.

RP-261-D, Maroon Lake. Four batches were made to obtain super quality material and to check the formula.

RE-6857-D, Ext. Pigment Rubine. One batch was made for production.

RL-211-D, Pigment Scarlet Lake. Three batches were made in a trial of Du Pont Dye. One batch was made to try use of Colloid Mill for pulping Kadox.

RE-343-D, Dry Dispersed Lake. One batch was made to fill an order.

BT-122-D, Methyl Violet PTA. Five batches were made in production of strong shading material.

BE-114-D and BE-149-D, Dry dispersed lakes. Two batches of each were made for stock.

G-7764-D, Light Fast Milori Green. Five batches were made in further study of this formula.

G-7891-D, Dark Shade of CS-7764. Three batches were made to improve the stability of this shade.

GE-363-D, Improved flinting lake. Two batches were made to supply this special product, CS-7905 to a customer.

GP-399-D, Rubber Color. Two batches were made completing development work on this color CS-7789.

GL-7906-D, Treated Pigment Green. Two batches were made using rosin size treatment.

BL-151-D, Peacock Blue. One batch of shading material was made.

Five pulp grinds and three mixes were made in the Research Semi-Works for the plant during June, 1935.

| <u>Grinding</u>   | <u>Charge</u> | <u>Batches</u> | <u>lbs. 100%</u> |
|-------------------|---------------|----------------|------------------|
| Green Toner Pulps | 730-s         | 2              | 711              |
| Red "             | "             | 1              | 72               |
| CP Yellow Pulps   | "             | 2              | 870              |
|                   |               | <u>5</u>       | <u>1653</u>      |

Mixing

|                |       |          |            |
|----------------|-------|----------|------------|
| Red Toner      | 751-s | 1        | 110        |
| CP Green       | 755-s | 1        | 230        |
| Blue PTA Toner | 751-s | <u>1</u> | <u>154</u> |
|                |       | <u>3</u> | <u>494</u> |

## #10 BUILDING PRODUCTION REPORT FOR JUNE 1935

| SW                               | Batch     | Code | lbs.<br>Struck | lbs.<br>Pack. | %<br>Yield | SW   | Batch                            | Code | lbs.<br>Struck | lbs.<br>Pack. | %<br>Yield |
|----------------------------------|-----------|------|----------------|---------------|------------|------|----------------------------------|------|----------------|---------------|------------|
| 7078                             | RT-359-D  | "    | 30             | 26            | 86.7       | 7113 | RT-386-D                         | "    | 11             | 11            |            |
| 79                               | "         | "    | 30             | 32            | 106.7      | 14   | "                                | "    | 10             | 10            |            |
| 80                               | RT-354-D  | "    | 109            | 115           | 105.5      | 15   | "                                | "    | 9              | 9             |            |
| 81                               | RL-151-D  | "    | 48             | 50            | 104.2      | 16   | "                                | "    | 12             | 12            |            |
| 7082                             | RT-7853-D | "    | 90             | 89            | 98.9       | 7117 | RT-126-P                         | "    | 12             | 12            | 100.0      |
| 83                               | RE-6857-D | "    | 2247           | 2294          | 101.7      | 18   | RT-125-D                         | "    | 8              | 8             | 80.0       |
| 84                               | RL-151-D  | "    | 48             | 47            | 97.9       | 19   | RP-261-D                         | "    | 130            | 134           | 103.1      |
| 85                               | RT-122-D  | "    | 30             | 30            | 100.0      | 20   | BT-125-D                         | "    | 10             | 10            | 100.0      |
| 86                               | RT-7853-D | "    | 90             | 92            | 102.2      | 21   | RP-261-D                         | "    | 130            | 139           | 106.9      |
| 7087                             | RT-359-D  | "    | 30             | 34            | 113.4      | 7122 | GE-363-D                         | "    | 300            | 288           | 96.0       |
| 88                               | RT-7853-D | "    | 90             | 93            | 103.3      | 23   | RP-261-D                         | "    | 260            | 290           | 115.0      |
| 89                               | RT-122-D  | "    | 30             | 30            | 100.0      | 24   | G-7764-D                         | "    | 80             | 82            | 102.5      |
| 90                               | RM-301-D  | "    | 93             | 105           | 112.0      | 25   | "                                | "    | 87             | 83            | 95.4       |
| 91                               | RT-359-D  | "    | 15             | 15            | 100.0      | 26   | RL-211-D                         | "    | 107            | 107           | 100.0      |
| 7092                             | GP-399-D  | "    | 90             | 85            | 94.5       | 7127 | RT-232-D                         | "    | 75             | 19            | 100.0      |
| 93                               | RT-359-D  | "    | 15             | 14            | 93.3       | 28   | BT-135-D                         | "    | 10             | 10            | 100.0      |
| 94                               | "         | "    | 30             | 30            | 100.0      | 29   | RT-232-D                         | "    | 18             | 18            |            |
| 95                               | RL-7909-D | "    | 100            | 104           | 104.0      | 30   | "                                | "    | 75             | 76            | 101.3      |
| 96                               | GP-399-D  | "    | 90             | 89            | 101.1      | 31   | RL-211-D                         | "    | 107            | 108           | 100.9      |
| 7097                             | RT-232-D  | "    | 75             |               |            | 7132 | GE-363-D                         | "    | 358            | 254           | 95.9       |
| 98                               | "         | "    |                | 11            |            | 33   | BE-114-D                         | "    | 645            | 591           | 91.7       |
| 99                               | "         | "    |                | 21            |            | 34   | G-7764-D                         | "    | 160            | 162           | 101.3      |
| 7100                             | "         | "    |                | 12            |            | 35   | RL-211-D                         | "    | 107            | 103           | 96.3       |
| 01                               | "         | "    |                | 10            |            | 36   | RT-232-D                         | "    | 75             | 74            | 98.7       |
| 02                               | "         | "    |                | 10            |            | 7137 | "                                | "    | 17             | 17            |            |
| 03                               | "         | "    |                | 10            |            | 38   | "                                | "    | 21             | 21            |            |
| 04                               | BE-114-D  | "    | 645            | 547           | 84.7       | 39   | BE-149-D                         | "    | 312            | 308           | 98.7       |
| 05                               | GL-7906-D | "    | 12             | 11            | 91.6       | 40   | G-7764-D                         | "    | 160            | 153           | 95.7       |
| 06                               | "         | "    | 12             | 10            | 83.3       | 41   | RT-382-D                         | "    | 75             | 75            | 100.0      |
| 7107                             | RT-7873-D | "    | 97             | 100           | 103.1      | 7142 | BT-122-D                         | "    | 30             | 29            | 96.7       |
| 08                               | BE-149-D  | "    | 900            | 898           | 99.7       | 43   | RT-232-D                         | "    | 75             | 39            |            |
| 09                               | RL-261-D  | "    | 130            | 135           | 103.8      | 44   | RT-7836-D                        | "    | 108            | 112           | 103.7      |
| 10                               | RT-386-D  | "    | 76             |               |            | 45   | RL-211-D                         | "    | 107            | 104           | 97.2       |
| 11                               | "         | "    |                | 11            |            | 46   | RT-232-D                         | "    | 160            | 33            |            |
| 7112                             | "         | "    |                | 12            |            | 7147 | G-7764-D                         | "    | 160            | 160           | 100.0      |
| Purification of Lead Nitrate Liq |           |      |                |               |            |      |                                  |      |                |               |            |
| 55                               | RT-232-D  | "    | 75             | 76            | 101.1      | 54   | RT-354-D                         | "    | 54             | 54            | 100.0      |
| 56                               | G-7891-D  | "    | 8              | 8             | 100.0      | 55   | Purification of Lead Nitrate Liq |      |                |               |            |
| 7157                             | "         | "    | 10             | 10            | 100.0      | 56   | G-7891-D                         | "    | 8              | 8             | 100.0      |
| 58                               | "         | "    | 8              | 8             | 100.0      | 57   | "                                | "    | 10             | 10            | 100.0      |
| 59                               | RE-343-D  | "    | 672            | 651           | 96.9       | 58   | "                                | "    | 8              | 8             | 100.0      |
| 60                               | RT-232-D  | "    | 75             | 75            | 100.0      | 59   | RE-343-D                         | "    | 672            | 651           | 96.9       |
| Totals                           |           |      |                |               |            |      |                                  |      |                |               |            |
|                                  |           |      |                |               |            |      |                                  |      |                | 9978          | 97.7       |

SUMMARY OF #10 BLDG. PRODUCTION REPORT FOR JUNE, 1935

| <u>No.</u><br><u>Batches</u> | <u>Code</u> | <u>lbs.</u><br><u>Struck</u> | <u>lbs.</u><br><u>Pack.</u> | <u>%</u><br><u>Yield</u> |
|------------------------------|-------------|------------------------------|-----------------------------|--------------------------|
| 19                           | RT-232-D    | 750                          | 747                         | 99.6                     |
| 6                            | RT-359-D    | 150                          | 151                         | 100.1                    |
| 3                            | RT-354-D    | 217                          | 223                         | 102.7                    |
| 1                            | RT-126-P    | 12                           | 12                          | 100.0                    |
| 3                            | RT-7853-D   | 270                          | 274                         | 101.4                    |
| 6                            | RT-386-D    | 76                           | 75                          | 98.7                     |
| 1                            | RT-7836-D   | 108                          | 112                         | 103.7                    |
| 4                            | RP-261-D    | 650                          | 598                         | 92.0                     |
| 1                            | RE-6857-D   | 2247                         | 2294                        | 97.6                     |
| 1                            | RM-301-D    | 93                           | 105                         | 113.0                    |
| 1                            | RT-7873-D   | 97                           | 100                         | 103.1                    |
| 4                            | RL-211-D    | 428                          | 422                         | 98.7                     |
| 1                            | RE-343-D    | 672                          | 651                         | 96.9                     |
| 1                            | RL-7909-D   | 100                          | 104                         | 104.0                    |
| 5                            | BT-122-D    | 150                          | 148                         | 98.7                     |
| 2                            | BE-114-D    | 1290                         | 1138                        | 88.3                     |
| 2                            | BE-149-D    | 1212                         | 1198                        | 98.8                     |
| 5                            | G-7764-D    | 647                          | 640                         | 98.9                     |
| 3                            | G-7891-D    | 26                           | 26                          | 100.0                    |
| 2                            | GE-363-D    | 558                          | 542                         | 97.1                     |
| 2                            | GP-399-D    | 180                          | 174                         | 96.3                     |
| 2                            | GL-7906-D   | 24                           | 21                          | 87.5                     |
| 1                            | BL-151-D    | 48                           | 50                          | 104.8                    |
|                              |             | 10083                        | 9978                        | 97.1                     |

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MATERIAL TRANSFERRED DURING JUNE 1935 FROM RESEARCH SEMI-WORKS

| Lot                    | GR-200 | COLOR CODE | Lbs. | Group  | Cost Unit | Total Cost |
|------------------------|--------|------------|------|--------|-----------|------------|
| 4127                   | 1      | RT-354-D   | 115  | 2      | 112.66    |            |
| 4160                   | 1      | RT-130-P   | 63   | 100% 1 | 112.29    |            |
| 4162                   | 1      | "          | 61   | " 1    |           |            |
| 4134                   | 1      | RT-359-D   | 514  | 1      | 133.42    |            |
| 4148                   | 1      | GL-7906-D  | 21   | 1      | 31.97     |            |
| 4123                   | 4      | GY-345-D   | 17   | 2      | 9.75      |            |
| 4125                   | 4      | G-7194     | 34   | 2      | 18.78     |            |
| <del>4139</del><br>455 | 5      | B-63-D     | 243  | 2      | 26.25     |            |
| <del>4140</del>        | 5      | B-57-D     | 23   | 2      | 26.81     |            |
| 4129                   | 6      | RE-6857-D  | 2294 | 2      | 11.37     |            |
| 4135                   | 6      | RE-114-D   | 547  | 1      | 15.28     |            |
| 4136                   | 6      | RE-149-D   | 898  | 2      | 15.55     |            |
| 4150                   | 6      | "          | 308  | 2      |           |            |
| 4149                   | 6      | RE-114-D   | 591  | 2      | 13.28     |            |
| 4141                   | 6      | RP-301-D   | 105  | 2      | 73.97     |            |
| 4146                   | 6      | GE-363-D   | 288  | 2      | 9.25      |            |
| 4147                   | 6      | "          | 254  | 2      |           |            |
| 4142                   | 10     | RP-261-D   | 133  | 2      | 92.98     |            |
| 4143                   | 10     | "          | 134  | 2      |           |            |
| 4144                   | 10     | "          | 137  | 2      |           |            |
| 4145                   | 10     | "          | 290  | 2      |           |            |
| 4156                   | 11     | RL-211-D   | 110  | 2      | 43.60     |            |
| 4157                   | 11     | "          | 107  | 2      |           |            |
| 4158                   | 11     | "          | 110  | 2      |           |            |
| 4159                   | 11     | "          | 110  | 2      |           |            |
| 4130                   | 11     | BL-151-D   | 45   | 2      | 43.50     |            |
| 4131                   | 11     | "          | 47   | 2      |           |            |
| 4132                   | 11     | "          | 50   | 2      |           |            |
| 4133                   | 11     | "          | 37   | 2      |           |            |
| 4006                   | 25     | GT-337-D   | 9    | 1      | 190.53    |            |
| 4084                   | 25     | BT-125-D   | 44   | 2      | 271.84    |            |
| 4137                   | 25     | BT-122-D   | 48   | 2      | 140.71    |            |
| 4153                   | 25     | "          | 29   | 2      |           |            |
| 4161                   | 25     | "          | 23   | 2      |           |            |
| 4140                   | 12     | RT-129-P   | 5    | 1      | 190.91    |            |
| 4151                   | 127    | BT-122-D   | 30   | 2      | 140.71    |            |
| 4152                   | 127    | "          | 31   | 2      |           |            |
| 4128                   | 136    | RT-7873-D  | 541  | 1      | 53.51     |            |

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## RECAPITULATION

Colors Transferred from Semi-works in June, 1935.

|                    |                  |
|--------------------|------------------|
| Toners             | 724 <sup>#</sup> |
| Yellows            | 17               |
| Greens             | 34               |
| Blues              | 276              |
| "RE" Lakes         | 5180             |
| "RP" "             | 799              |
| "RL" "             | 624              |
| PTA Toners         | 214              |
| Toner Pulps        | 112              |
| Maroon Toner Pulps | <u>5</u>         |
| Total              | 7985             |

MATERIAL IN PROCESS AS OF JULY 1, 1955 - RESEARCH SEMI-WORKS #10 BLDG.

| 1           |             | 2           |             | 3           |             | 6           |                        |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|------------------------|
| <u>Code</u> | <u>lbs.</u> | <u>Code</u> | <u>lbs.</u> | <u>Code</u> | <u>lbs.</u> | <u>Code</u> | <u>lbs.</u>            |
| RT-359-D    | 300         | GX-380-D    | 56          | Y-305-D     | 100         | RE-343-D    | 650                    |
| RT-386-D    | 70          |             |             | Y-309-D     | 100         |             |                        |
| RT-232-D    | 725         |             |             | Y-328-D     | 425         |             |                        |
| RT-7801-D   | 31          |             |             | Y-359-D     | 300         |             |                        |
|             |             |             |             | Y-202-D     | 25          |             |                        |
| 25          |             | 115         |             | 129         |             | 136         |                        |
| BT-125-D    | 36          | RT-7853-D   | 420         | GX-309-D    | 377         | RT-7875-D   | 97                     |
| BT-7923-D   | 68          | RL-7909-D   | 125         |             |             |             |                        |
| BT-122-D    | 60          | RT-7745-D   | 70          |             |             |             |                        |
| 125         |             | 132         |             |             |             |             |                        |
| RP-409-D    | 108         | G-7764-D    | 600         |             |             |             |                        |
| GP-399-D    | 260         |             |             |             |             |             |                        |
|             |             |             |             |             |             |             | <u>Total lbs. 5003</u> |

