AN

INDUSTRIAL HYGIENE SURVEY

OF THE KENSINGTON PLANT

OF THE SHERWIN WILLIAMS COMPANY

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PARTICIPANTS:

Representing
The Sherwin Williams Company
Cleveland, Ohio

Mr. C. A. Martin, President
Mr. H. J. Hain, Vice President
Mr. E. E. Ware, Executive Research Director

Representing
The Kensington Plant

W. S. Stevens, General Superintendent
J. Errington, Assistant to General Superintendent
G. R. Hess, Medical Director
S. L. Winslow, Safety Director
R. B. Persons, Safety Engineer

Representing
The Industrial Health Conservancy Laboratories

Carey P. McCord, M.D.
William N. Witheridge, M.S.
Ira Wilson, M.D.
William Fredrick, D.Sc.
Muril Hyler, Technician
Herbert Walworth, Chem. Eng.
Gordon Harrold, Ph.D.
Lucille Richards, Secretary
Marjorie Slater, Secretary

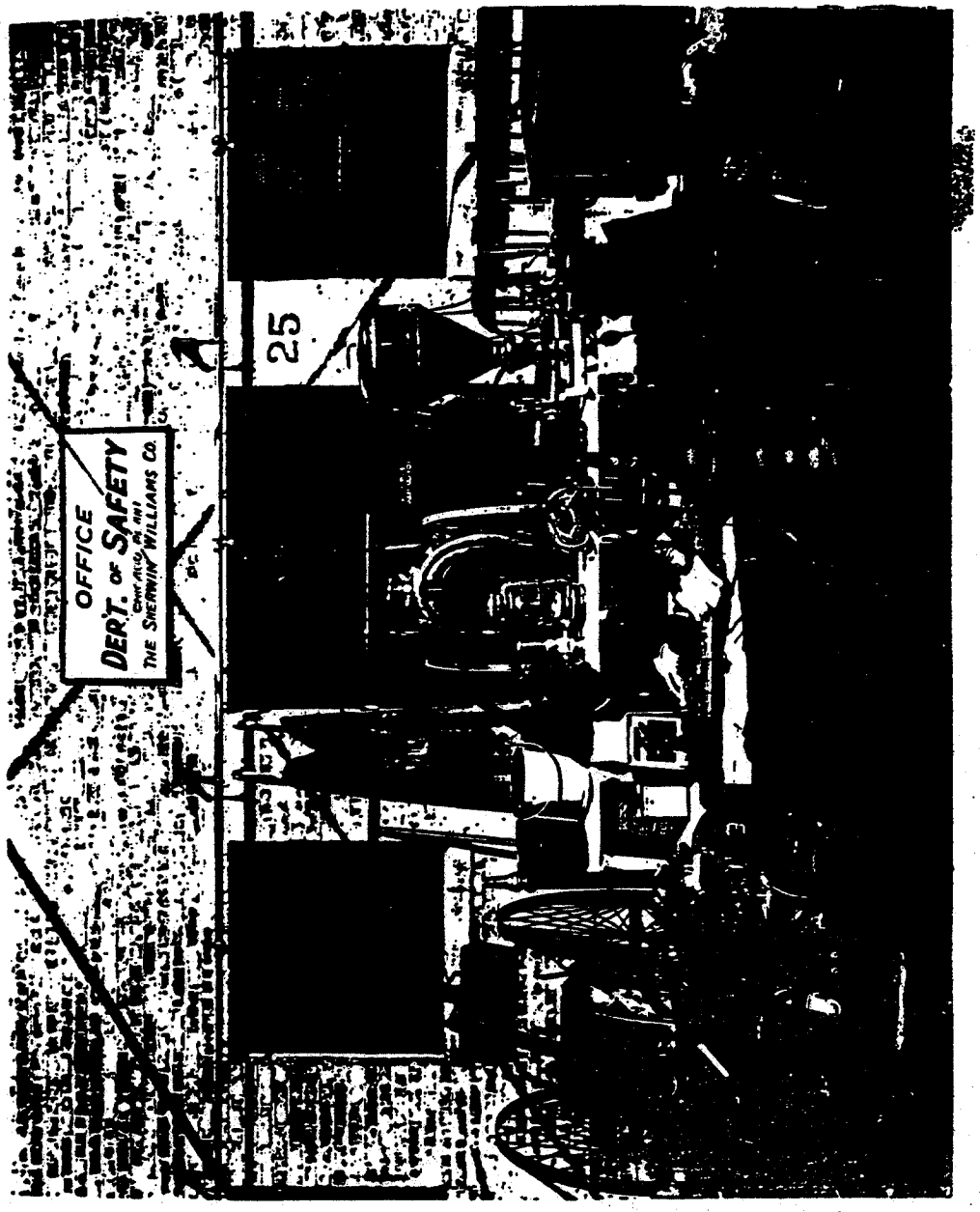
Period of Investigation--September 1, 1937 to November 15, 1937

REPORT PREPARED BY THE INDUSTRIAL HEALTH CONSERVANCY LABORATORIES

10 Peterboro, Detroit, Michigan

THIS IS VOLUME II OF A THREE VOLUME REPORT

THIS IS A CONFIDENTIAL REPORT



Fire Equipment and Equipment for Human Protection Constitute Essential Safeguarding Items in Chemical Manufacturing Plants

EXECUTIVE DEPARTMENT
101 PROSPECT AVE., N. W.
CLEVELAND

GENERAL PLANT DESCRIPTION

Plant #2 of the Sherwin Williams Company is located at Kensington, in South Chicago, Illinois. This plant represents the largest of the entire series of operations of the Sherwin Williams Company. In fact, this establishment may not be regarded as a single plant, but an aggregation of several plants, many of which carry out activities little related to others. This plant occupies approximately 35 acres and on this acreage there are located 130 chief buildings. Outstanding in the divisions of work in this plant are Tin Can Manufacture, White Lead (Dutch and "Quick" processes), Coal Tar, Paint and Varnish, Lacquer, Dry Color, Chemical Products and the Allied Research Laboratories. In addition to these primary divisions, this plant is characterized by high developed organization for such activities as plant maintenance, receiving and storage, salvage, yard work, plant protection, engineering services, power plant activities, and employment, safety and medical services. The district sales office is also located at this plant.

Unlike most paint manufacturing establishments, this plant to a large extent is engaged in the manufacture of basic materials with which materials the usual and ordinary paint plant starts their operations. Thus, this Kensington Plant manufactures its own lithopone, its own dry colors, its own organic pigments and dyes, its own red lead, lead oxides, its own metallic containers, etc.

The photostat copy (Vol. 1) showing in perspective the buildings and general layout of this plant, represents many types of construction and buildings of highly different ages. Of all buildings now in use, the eldest is represented by that building first occupied by the Calumet Paint Company, built in 1888. This building, which no longer may be regarded as modern, is still utilized in its entirety for paint production. Although serving, at the present time, a useful function in the operations of the present plant, in full measure it stands as a monument to Mr. G. A. Martin, now the President of The Sherwin Williams Company and the organizer and developer of the Calumet Paint Company and other related enterprises.

Apart from the manufacture of finished wares by this plant, large volumes of its output are shipped to other units of The Sherwin Williams Company for use in their manufacturing procedures. To this extent, the Kensington Plant may be regarded as the basic manufacturing unit of the Company's entire system. It is not to be inferred that every raw material used in divers plants is created in this Kensington Plant, but it is clearly true that more intermediates and raw materials are shipped from this plant than from any other.

The carrying out of the work of this plant requires the services of approximately 1700 employees. This total number, while preponderantly white Americans, includes a fair number of negroes, Mexicans, Poles and Italians. Supervising the work of this large number of employees and guiding the activities of the entire plant, are the following local officers: Mr. W. S. Stevens, General Manager, Mr. J. Errington, Assistant to Mr. Stevens, Dr. N. E. Van Stone, in charge of manufacturing, and Dr. C. D. Holley, in charge of the Allied Research Laboratories.

Quite apart from production units in this plant, other activities are devoted to the protection and well being of the Company's employees. A highly developed Medical Department renders medical services under the direction of Dr. G. R. Hess. The Safety Department, headed by Mr. S. L. Winslow, is continually concerned in the elimination or control of every possible exposure threatening the physical well being of all employees. The Employment Division is supervised by Mr. R. A. Sloan, who also operates the several plant cafeterias. In general, this plant, as is equally true for The Sherwin Williams Company in its entirety has been governed by a policy of outstanding interest in its workers. At all times it is realized that the trade processes and practices of this type of manufacturing establishment theoretically provide many more exposures than is true for industry in general. On this account, it has long been necessary that the Company create within its operations a full measure of mechanical protection and at the same time to exercise outstanding concern in and supervision of its employees to the end that no unfavorable

experiences may arise. The results of this policy of protection is reflected in many years of operation without disaster and is further reflected in this very survey, which indicates the spirit of this plant and The Sherwin Williams Company, seeking thoroughly to safeguard and protect its workers.

The Sherwin Williams "Code of Principles" is as follows:

1. To win on our merits.
2. To be the best and largest concern of the kind in the world.
3. To be broad and liberal as well as aggressive in our policy and methods.
4. To take a pride in our institution.
5. To be loyal to the company and to each other.
6. To foster good fellowship among ourselves and to take pleasure as well as profit out of our work.
7. To strive constantly for the improvement and advancement of the business and ourselves.
8. To be considerate, polite and courteous in all our dealings within and without the company.
9. To be high toned in everything everywhere.
10. To grow in knowledge and character as well as in size.

S. L. WINSLOW

Safety Department

DRY COLOR FACTORY

The Dry Color Factory is located in Buildings 110, 11, 12, 13 and 14, and also the adjacent buildings 128, 130 and 594. These are all two and three stories in height, and in general are of brick exterior with wooden interior construction. The first floor in all buildings is concrete and also the second floor of Building 594.

The principal buildings, Nos. 110 to 114 inclusive are 60 feet wide and extend from Kensington Avenue through to 115th Street, a distance of approximately 450 feet. The total floor area of the department is 80,000 square feet.

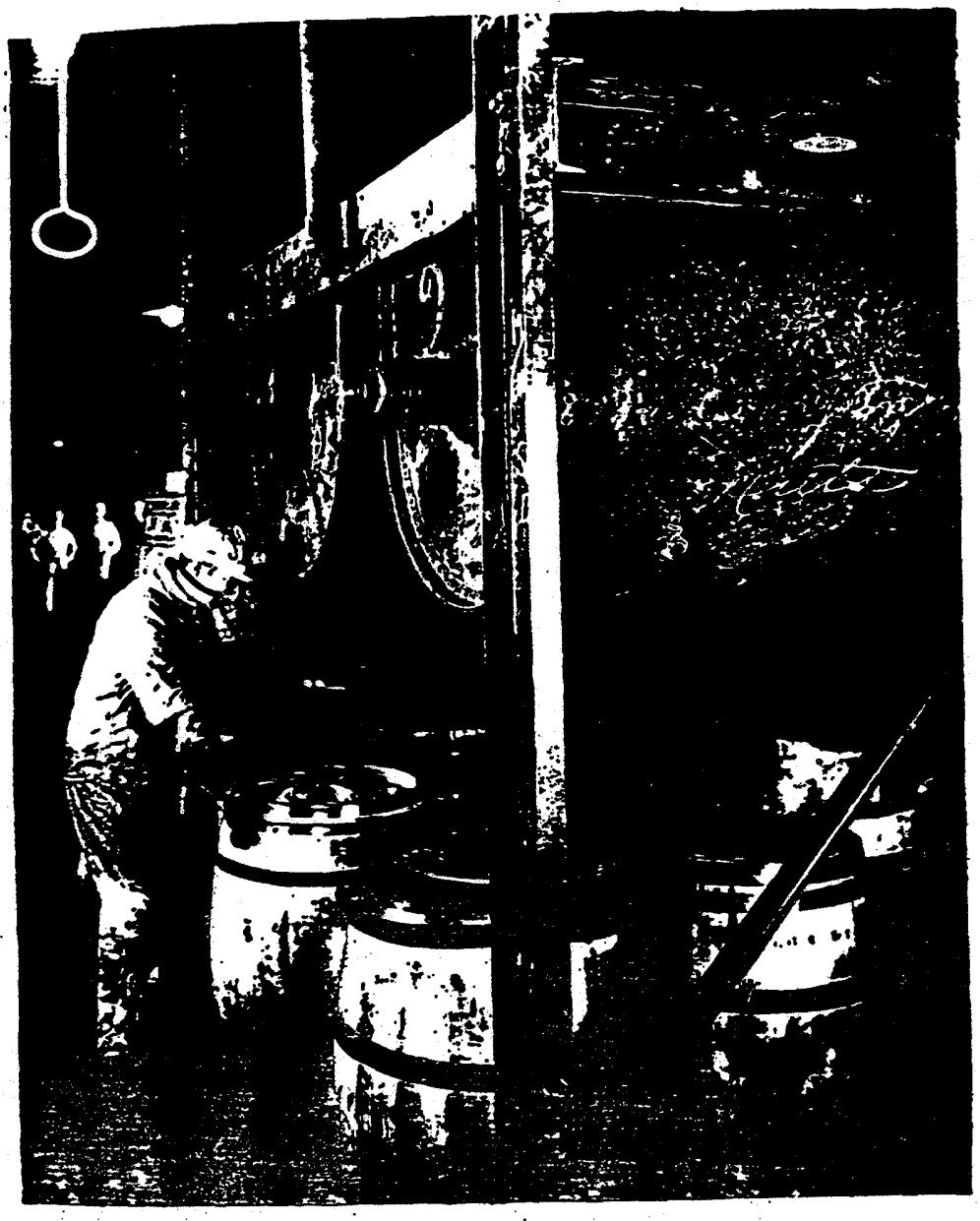
In addition to the above buildings, the Dry Color Department is at this time taking over the basement, first, second and fourth floors of the new Utility Building, No. 115 (floor space approximately 18,000 square feet) and also the basement, first, second and third floors of the old Paris Green Buildings, 119 and 124 (floor space approximately 12,000 square feet).

The total number of employees in the department is 106. Of these, 32 are on the monthly payroll and 74 on the hourly and piece work roll. (Hours, see separate report Walter Wurtman).

Only one colored man is employed in the factory. Nine of the men are foreign born, seventeen are Mexicans and one is Chinese. A large percentage of the men have more than five years service and nearly all of the foreign born are now naturalised citizens. In general the quality of the labor is well above the average.

Of the employees on the monthly roll, 17 are graduate chemists and chemical engineers, five of whom have Ph.D. degrees and 2 their Master's degree. All the others are high school graduates, two being bookkeepers and one a stenographer.

The operations of the department cover the production of pigment colors as dry powders, water pulps and dispersed or "flushed" bases in oils and varnishes. The output of the department for the year 1936-37 was 8,605,000 pounds, of which 5,570,000 pounds was as dry color, 194,000 as water pulps (dry basis), and2,800,000 as dispersed colors in oil and



Dr. Color Blending. If This Photograph Were Made in Color, it would Show This Workman Liberally Coated, on Garments and Skin, with Pigment Material, thus Indicating the Close Contact Provided with Dangerous Materials.

varnish (pulp basis).

All the colors manufactured are produced by precipitation or couplings, referred to in general as "Striking".

After the formation of the color, the subsequent operations for Dry Colors are in general the same, i.e. washing, filtering, drying, grinding, (pulverizing), blending, and finishing (packing and shipping).

However, for water pulps, the water presscakes from the filter presses are pulped in dough mixers, brought to a uniform dry content, and filled out into water tight barrels for shipping.

Similarly for dispersed colors in oil and varnish the water presscakes from the filter presses are diverted from the drying operation. In this case they go into dough mixers which are steam-jacketed and equipped with vacuum covers. The color is treated to produce a preference for oil or varnish, and the water "broken out" under atmospheric pressure. This removes the bulk of the water, the remainder being taken out under vacuum with heat. The colors in oil or varnish thus obtained are then blended to standard shade, and where necessary are clarified by passing them over a high speed 3-roller mill, after which they are filled out in five and ten gallon kits or thirty gallon steel drums.

Both inorganic and organic colors are produced. The inorganic colors are principally chrome yellows and oranges (lead chromates), zinc yellow, chrome greens (mixture of chrome yellow and iron blue) and iron or Prussian blues. The organic colors are couplings of coal-tar intermediates, known as toners, and precipitations of dyestuffs on bases of aluminum hydrate and blanc fixe, known as lakes. The principal organic colors produced are para red toners, toluidine red toners, fire red toners, permanent orange toners, hansa yellow toners, alizarine lakes, scarlet lakes and maroon lakes.

M. B. DOTY

Supplemental Information Supplied by Mr. Wurtman:

The "Striking Floor" is operated on one shift, with one or two men coming two or three hours later than the main crew, in order to finish any batches that extend over the eight hour period.

The Press-room is run along the same lines as the Striking Floor.

The Mill Room and Pulp Room are run in two shifts, a day

shift and an afternoon and evening shift.

The Oil Pulp Mill is operated in three shifts. Two of these men are rotated; the third man likes the 3rd shift.

There are two men on general work in the Press Room and Striking floor on the night shift, one man from 3:00 P. M. to 11:30 P. M., the other from 11:00 P. M. to 7:30 A. M.

In our Press-room there are ten men unloading presses. These men are paid on a piece rate basis. The men work in pairs and are paid $1.50 per press; this is divided between the two of them.

These are year around operations and none are seasonal.

W. WURTMAN M.B.DOTY

CHEMICAL PRODUCTS DEPARTMENT

Location: Buildings 500, 500A, 500B, 501, 502, 503, 504, 505, 506, 507, 507B, 509, 511, 515-2, 514, 516 and 528. All floors except where otherwise designated.

Type of Buildings: Buildings vary from the chemical type, clear openings from the first floor to the roof, to regular mill type, mill type of building predominates.

Area of Buildings: Department comprises roughly 100,000 square feet of floor space.

Number Men Employed: Approximately 175, all white with the exception of a few Mexicans.

General Nature of Operations:

Sulphonations, Aminations, Chlorinations, Nitrations, Acetylations, Fusions, Reductions, Phenylations, Oxidations, Condensations—in general the whole field of organic chemical operations.

Type of Equipment Used:

Sulphonators, nitrators, reaction tubs, chlorinators, autoclaves, saponifiers, hydrolizers, filter presses, ink mills, etc.

Type of Goods Manufactured:

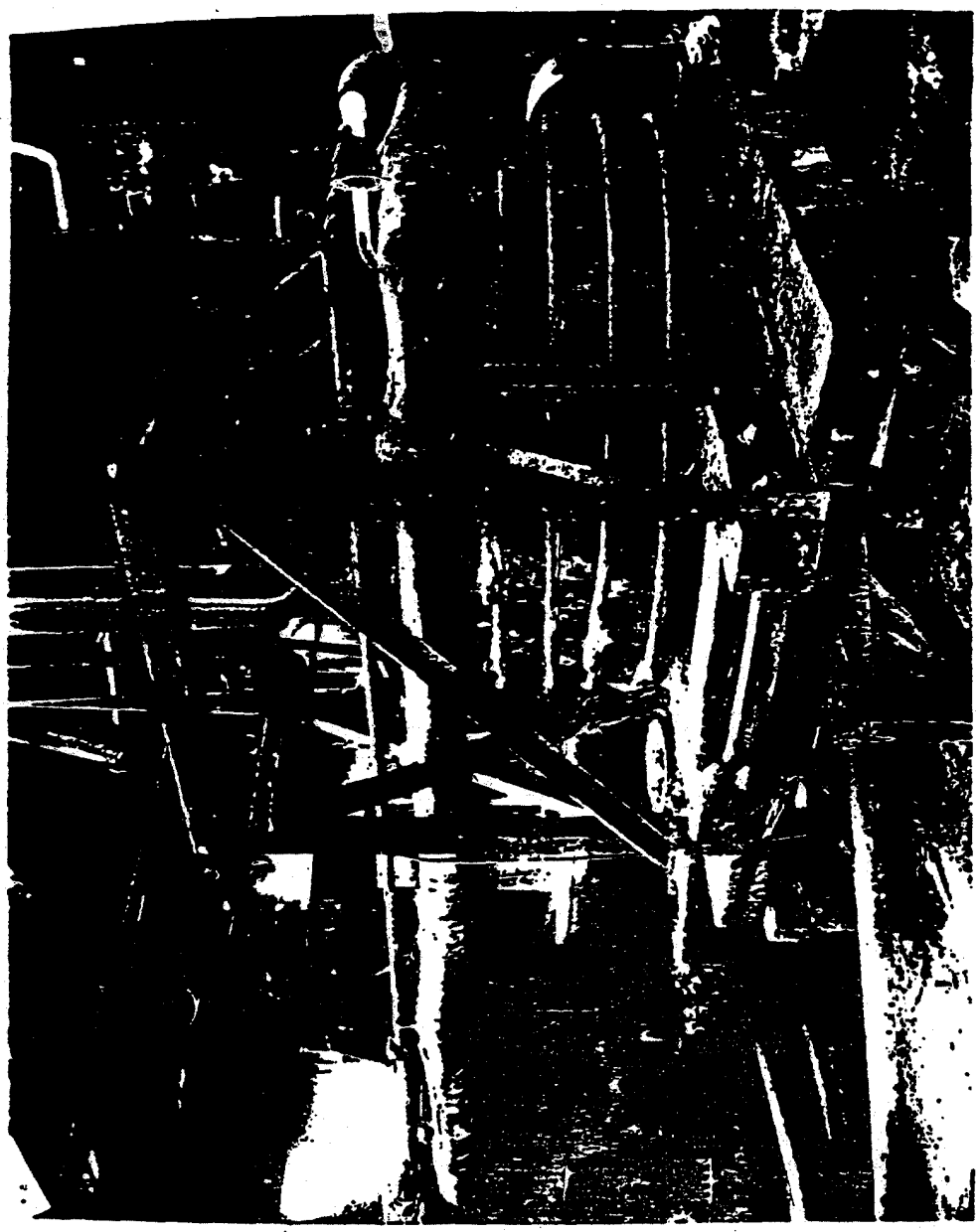
Organic Intermediates and Organic Dyestuffs. Principal ones are naphthalene, beta naphthol, sulphonated beta naphthols, naphthalene sulphonic acids, naphthylamine sulphonic acids, chlor toluidine sulphonic acid, meta nitro paratoluidine, para phenylen diamine, benzoyl peroxide, acetanilid, acettoluid, nitroso beta naphthol and beta oxy naphthoic acid.

Fuchsine, alkali blue and azo colors, such as lithol red, Lake Red C, Lithol Rubine, etc., Pigment Green B, and Tungstated basic colors.

Principal Raw Materials Used:

Those of organic nature, naphthalene, toluene, aniline, nitrobenzene, orthotoluidine, ortho-nitro-toluene, benzoyl chloride, acetic acid, formaldehyde, methyl violet, victoria blue, paranitraniline and paratoluidine.

Those of inorganic nature—barium chloride, sodium nitrite, calcium chloride, sodium chloride, hydrated lime, caustic soda, sodium bicarbonate, molybdic acid, nitric acid, sulphuric acid, lead acetate, nitric acid and sodium nitrate.



Tobias Acid Manufacture. Extensive Congestion of Operations Increases the Probability of Exposure and Multiplies the Difficulties of General Cleanliness and Orderliness.

HYGIENIC HAZARDS:

Beta Naphthol Department, Building 500, 500A, 500B and 501.

Crude naphthalene is refined; naphthalene is sulphonated and treated with molten caustic to fuse off the sulphonic acid group, the resultant beta naphthol is isolated and vacuum distilled, and chipped or ground.

Naphthalene is handled in large quantities in this department as is beta naphthol. Neither of these items have ever shown any indication of being a serious health hazard. Sulphur Dioxide is produced as a by-product. This has never caused any serious trouble. Concentrated sulphuric acid and molten caustic are handled. The vapors from the caustic soda fusions probably constitute one of the greatest health hazards in the department. These fumes, as well as the other fumes, are thrown into the air, and, of course, in this way create a more or less general health hazard.

Acetanilid Department, Building 502.

Aniline and paratoluidine respectively are treated with glacial acetic acid to form the corresponding acetyl compound. The crude acetanilid is chipped; the acettoluid is treated with water, and filtered and dried.

Aniline and paratoluidine, both of which are very toxic, are handled in this department. At times there are some acetanilid and acettoluid fumes. These have never caused any noticeable trouble, although they may be a very definite hazard. Glacial acetic acid is also handled and at times is present as a vapor in the air.

Toluidine M Department, Building 506.

Acettoluid, treated with nitric acid, subsequently treated with caustic to form meta-nitro-paratoluidine.

Acettoluid is the principal organic raw material used along with 45° nitric acid. At times there is a small amount of fume of nitric acid and there is a possibility, during the saponification and grinding, that vapors or dust may be present from meta-nitro-paratoluidine. This probably exerts a toxic effect on the system, although in over 20 years manufacturing experience, we have never had any trouble.

Azo Dye Department, Buildings 503, 504, 505 and 506.

Xylidine, tobias acid, paratoluidine, meta sulphonic acid, parachlor-metanilic acid, chlor toluidine sulphonic acid are diazotized with nitrous acid coupled with either the alkaline solution of beta naphthol or beta oxy naphthoic acid, subsequent colors are converted either with the sodium, barium, calcium, strontium, magnesium, or manganese salts. Colors are dried, ground and blended.

Small amounts of xylidine, large amounts of beta naphthol and tobias acid are handled in this department. Xylidine is definitely toxic. The other two items have never caused any trouble. Tobias acid is sulphonated beta naphthylamine and one would be led to think from its structure that it might be an unsuspected hazard. The most serious hazard in the department unquestionably is that of dust from the finished colors. This situation has been pretty thoroughly gone into and a requisition will be presented to the Management sometime this fall for the necessary changes to eliminate this condition. A small amount of lead acetate is used in the department and a considerable amount of barium chloride. A large portion of the colors are in the form of a barium salt. Another organic compound that is used that may be toxic is beta oxy naphthoic acid. During the diazotization of the amino compound, nitrous acid is formed by the addition of sodium nitrite to an ice cold hydrochloric acid solution. There is a possibility at times of some nitrous oxide fumes.

R Salt Department, Building 505.

Beta naphthol is sulphonated with sulphuric acid to form disulphonic acid. This material is kept in paste form.

Tobias Acid Department, Buildings 511, 514, 554.

Beta naphthol is sulphonated, then treated with ammonia and sodium bisulphite under pressure, subsequently purified and isolated. Material is dried and ground. Chlor toluidine sulphonic acid and toluol is sulphonated, then chlorinated, then nitrated, then reduced with iron and hydrochloric acid. This material is not dried.

Paraphenylene Diamine—paranitraniline reduced iron and hydrochloric acid dried down in the crude form then vacuum distilled.

There are several hazards in this department. During the manufacture of Tobias Acid, a considerable amount of sulphuric dioxide is formed as a by-product and this gas is present in the air at times. Tobias acid itself may or may not be a hazard. It has never given us any trouble. Quantities of ammonia in the air at times, but this has never given us any trouble.

Chlor Toluidine Meta Sulphonic Acid is also made in this department.

Toluol—there is a possibility of some fumes from toluol at times, which is chlorinated by the action of sodium chloride and hydrochloric acid and there is a possibility at times of a small amount of chlorine in the air. Later in the process, there is a possibility of hydrogen chloride being in the air and in the building itself; there is always some ammonium chloride formed in the atmosphere.

Paraphenylene Diamine is manufactured in this department from paranitraniline. Both of these items are a health hazard.

Fuchsine Department, Buildings 516, 528.

Aniline, nitrobenzene, formaldehyde and iron chloride are heated up to a reacting temperature. A complex condensation and oxidation take place to form triaminotriphenyl methane. Large excess of oil used is recovered and the product purified. This product is then treated further with aniline to form triphenyl pararosaniline. This material is then sulphonated and handled in paste form.

Fuchsine made from aniline, nitrobenzene and formaldehyde, all of which are very definitely toxic. The Fuchsine Department probably has the greater number of health hazards in the Chemical Products Department. It is necessary to handle these materials hot. It is necessary that we recover a large amount of excess aniline oil and nitrobenzene that is used. Fuchsine has never shown any indication of being toxic, although it may be.

Tungstate Victoria Blue and Tungstate Methyl Violet are also manufactured. There is a possibility, in the grinding, that there is some dust from these products.

Alkali Blue, which is triphenyl pararosaniline, is also manu-

factured. There is a possibility of some dust from this product.

L. R. MAY
Superintendent.

ADDITIONAL INTERMEDIATE REPORT FOR HYGIENIC SURVEY

Chemical Products Dept.

A detail of the intermediate steps of the processes carried on in the Chemical Products Department is listed below:

Beta Naphthol Department:

Naphthalene is sulphonated in the beta position—a very small amount of isomeric alpha sulphonic acid is formed during the reaction. This Naphthalene Beta Sulphonic Acid is fused with sodium hydroxide to split off the sulphonic acid group to form Beta Hydroxy Naphthalene. During the reaction, of course, sodium sulphite is formed by double decomposition.

Acetanilid Department:

There are no intermediate products made in this department other than the main products, namely Acetanilid and Acettoluid.

Toluidine M. Department:

Acettoluid treated with nitric acid forms Meta Nitro Acettoluid. This in turn is heated with aqueous sodium hydroxide to split off the Acetyl group whereby the basic compound Meta Nitro Paratoluidine is formed.

AzoDye Department:

In the manufacture of Graphic Reds, Tobias Acid (2, Naphthylamine 1, Sulphonic Acid) is treated in aqueous suspension with nitrous acid to form the corresponding diazo Naphthalene Sulphonic Acid. This is coupled with sodium salt of Beta Naphthol to form the dyestuff.

In the manufacture of Lake Red C (2) Chlor (5) DiazoToluene (4)-Sulphonic Acid is formed as an intermediate compound, prior to coupling with Beta Naphthol to form the dyestuff.

In the manufacture of Lithol Rubine, diazo compound from Paratoluidine Meta Sulphonic Acid is formed as the intermediate compound before coupling with Beta Oxy Naphthoic Acid.

In the manufacture of Scarlet 2RR, corresponding diazo

compound is Meta Xylidine, formed as the intermediate compound before coupling with R Salt (2 Naphthol 3,6 Disulphonic Acid).

Formation of Solfast Red. The same compound as shown in Lake Red C is formed as the intermediate compound before coupling with Beta Oxy Naphthoic Acid.

Formation of Pigment Green B. Nitroso Beta Naphthol is formed as the intermediate compound before converting to the iron salt, which is the color.

R Salt Department:

No intermediate compound is made in this department except the final product.

Tobias Acid Department:

Manufacture of Tobias Acid, Beta Naphthol is sulphonated in the (1) position to form 2 Naphthol, 1 Sulphonic Acid. This is subsequently converted to the 2 Naphthylamine 1 Sulphonic Acid with ammonia.

Formation of Chlor Toluidine Sulphonic Acid. Toluene is sulphonated in para position. This compound is not isolated. It is then chlorinated in the alpha position to form OrthoChlor Paratoluene Sulphonic Acid. This material is isolated. This compound is nitrated in the (5) position to form the Ortho Chlor Meta Nitro Toluene Para Sulphonic Acid. This compound is then reduced to Ortho Chlor Meta Toluidine Para Sulphonic Acid.

Manufacture of paraphenylendiamine. There are no intermediate products formed.

Fuchsine Department:

In the manufacture of Fuchsine, Aniline is first converted to anyydro formaldehyde aniline which is isolated. This in turn is converted without isolation to the di amido diphenyl methane. This material is heated up with the excess of Aniline NitroBenzene and with ferrous chloride as a catalyst to go through a very complex oxidation and condensation to form Fuchsine and other by-products, exact constitutions of which are not known. They are practically all insoluble and are thrown out. Fuchsine after purification is converted from hydrochloride to the base and this compound is treated with aniline and benzoic acid as a catalyst to form mono di or triphenyl pararosaniline. This compound is then

sulphonated to form corresponding sulphonic acid.

L. E. MAY
Superintendent, Chemical Products.

Supplemental Information:

There is no piece work in the Chemical Products Department. In the Beta Department, there are three shifts, the work is not seasonal and the men do not rotate. This is also true for the Fuchsine Department. In the Azo Dye Department, the work is seasonal, there are two shifts and the men are rotated. The Tobias Acid and Acetanilid Departments are arranged similarly to the Beta Department, there being no rotation of men. There is only one shift in the R Salt Department. This work is continuous and men are not rotated. In the toluidine M department, there are three shifts, work is continuous and the men do not rotate.

LITHOPONE PLANT

The lithopone group comprises four manufacturing buildings and the wash house on the southwest corner of the white lead yard. This plant has only two end products, lithopone of various grades and cadmium metal.

Lithopone as sold is a fine white powder with an analysis of about 70% barium sulfate and 30% zinc sulfide. Cadmium is a white metal used in plating and automobile bearings.

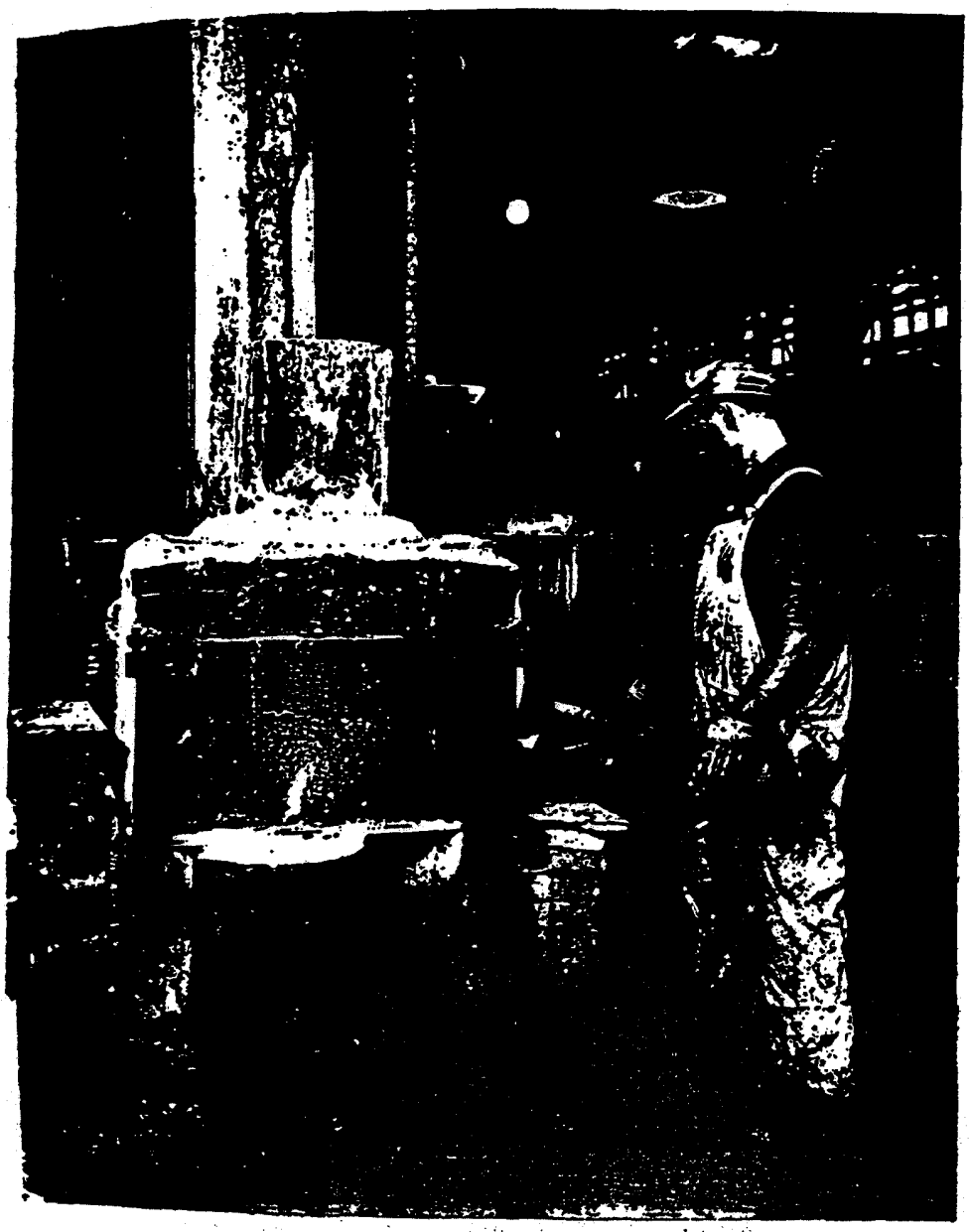
Raw Materials

The raw materials used in making lithopone are barium sulfate, coke, coal, partially dehydrated zinc sulfate from our Coffeyville Plant (55% zinc) and in small amounts, common salt, aluminum sulfate, fatty acids, amber soap chips, phthalic anhydride, turkey red oil, gum arabic and triethanolamine.

The barytes ore is about 94% barium sulphate. It is stored in the yard and as far as I know is perfectly inert and involves no industrial hazard except when it is dry and dusty as a dust hazard, whatever that hazard might be. I have seen rather extensive operations in the barytes fields and know of no occupational disease hazard such as is associated with certain other ore.

Black Ash

The lithopone process is started in building 208, which is called the black ash building. It is one story high, 51' wide and 190' long. The ore is crushed fine and mixed with a certain proportion of coke and stored in an elevated hopper. Hazard if any, dust. We try to operate with damp material. This fine mass is fed into a long tube furnace and the barium sulphate is reduced by the action of the glowing coke to barium sulfide, BaS. Heat in this reaction is maintained by a powdered coal burner. The barium sulfide, called black ash, comes out the end of the tube furnace red hot and is elevated to a bin, drawn by hand into cars and taken to the leaching department. It is dark brown or black when cooled.



Metallic Cadmium Recovery Associated with Zinc Sulfate Manipulation. This Operation, Involving The Handling of a Substance Many Times as Toxic as Lead, Is Carried out under Makeshift Conditions and in the Absence of Any Adequate Protection.

Black ash is an active chemical and is especially active as a depilatory. It is water soluble and quite highly caustic and like most barium salts is poisonous if imbibed. In our Chicago Plant, we handle considerable amounts of this material by hand and have no serious trouble. We are, however, figuring on reducing the whole thing to a highly mechanized operation similar to our Coffeyville Plant and when this is done, nothing will be handled by hand and very little labor will be involved. Our building is high and in my opinion the most disagreeable and dangerous job in the place is that of the feeder man over the tube who must work in what fumes there are. This job will probably be done away with this fall by mechanical changes.

Leaching Department

North of the black ash building, the black ash is delivered into a number of leaching tanks where the barium sulfide is extracted with water. This building is 15'6" wide and 150' long. Ventilation is none too good; practically all work is hand handling but the insoluble residue which is thrown out of the tanks after all the water soluble barium sulfide is extracted is rather harmless and moist so that no industrial hazard is encountered. The barium sulfide liquor is handled by pumps into storage tanks. The hazards in connection with this job are handling rather dusty barium sulfide into the leaching tanks and breathing a steamy atmosphere which can carry small amounts of barium sulfide in the familiar manner of leaching and boiling rooms. We are planning to mechanize this job.

Zinc Liquor

The zinc liquor building #209, which is a two-story building, no basement, 75'5" inside diameter by 35'8", is north of the main lithopone building and has a one-story ante-room 57' long and 29' wide, lying north of the main building for storing and dissolving zinc sulfate.

We received four to six cars per week of partially dehydrated zinc sulfate from Coffeyville. This material is loose in the cars and

fairly dusty. It is unloaded by hand in wheel barrows. We wet it down to keep the dust down. We throw it into dissolving tubs by hand and the solution is pumped to the main liquor building.

Completely dehydrated zinc sulfate is a very active chemical, causing a high degree of irritation to the mucous membranes, fairly rapid absorption in the blood stream and chronic irritation with ulcerated sores, etc. when handled. For that reason we maintain our degree of hydration at about a mole and a half or 55% zinc, which is a very much less active chemical. This precaution and wetting down the material, together with cautious handling, makes our experience in handling quite good. We intend to provide better ventilation in the dissolving room this fall if possible. Zinc liquor is pumped over to the tank system in the first floor of the zinc liquor building; first oxidized to remove iron, manganese, etc., filter pressed in wooden filter presses, returned to the tank system, is subjected to reduction with zinc dust to remove the cadmium, etc. It is then filter pressed and pumped to the top floor of building 210, the main lithopone building.

When zinc dust is added to the zinc sulfate liquor, the cadmium is precipitated. This cadmium zinc sludge is dissolved in sulfuric acid in tanks on the second floor of the zinc liquor building and the precipitated cadmium sponge pressed out and melted into cadmium metal in a special furnace which is also on the second floor of the zinc liquor building. Industrial hazards are not great in this cadmium work and we have never had any trouble. Burns from the furnace and sometimes small splashes from the caustic soda employed causes minor troubles.

Main Lithopone Building

The main lithopone building #210 is a three-story brick, steel and concrete building, no basement. The floors are all 98x154', the long side being along the road, east and west. On the top or third floor, the barium liquor from the black ash and zinc sulfate liquor from the zinc sulfate building are mixed together, forming a white precipitate. The result is a wet mixture of barium sulfate and zinc sulfide. From here on the story becomes quite complicated, as we filter press and dry the slurry twice, calcine it in the two rotary furnaces on the third floor

after the first filtration and drying and grinding it as wet slurry in the ball mills on the second floor, and separate the heavy particles out in the Pachuca tanks in the southeast corner of the second floor and store in the equalizer tanks along the walls of the second floor of this building. In these equalizer tanks, we also add various chemicals such as turkey red oil, etc. to make what we call special lithopones. The material is filter pressed and dried once more and ground in the large Raymond mills that extend from the first to the second floor building. It is packed in paper bags holding fifty pounds.

I consider there is no industrial hakard in handling lithopone wet in any of our processes. Also in handling it dry, there is apparently very little industrial hazard on account of the quite high stability of the compounds involved.

We stir up considerable dust which we try to keep under control. As a matter of general precaution, the dust should be abated as far as possible.

Water soluble barium compounds are not apt to be formed in our process once the barium sulfide is converted to barium sulfate.

Pulping Lithopone

West of the main lithopone building is a triangular shaped one-story building #255, which is about 52' on the south side, 11' on the north side, 98' on the west side and 86' on the east side. This building contains the cottom of a long upright tube with an agitator in it. We put lithopone slurry from the equalizing tanks in this tube and add a special vehicle. The so-called flushing or pulping reaction then occurs and the lithopone goes with the vehicle and the water is released and run off. The hazard here lies in handling the vehicle, which contains a considerable amount of mineral spirits. The resultant pulp lithopone is roller milled on the first floor and run into drums.

About 135 men are employed in the Lithopone Department, about an equal number of colored and white men.

C. E. DEEDS
Superintendent

WHITE LEAD DEPARTMENT

RED LEAD AND LITHARGE DEPARTMENTS

This unit is located in the southeast corner of the block between 115th Street and Kensington Avenue, Stephenson Avenue and the I. C. tracks. The group consists of three units of buildings described generally as follows:

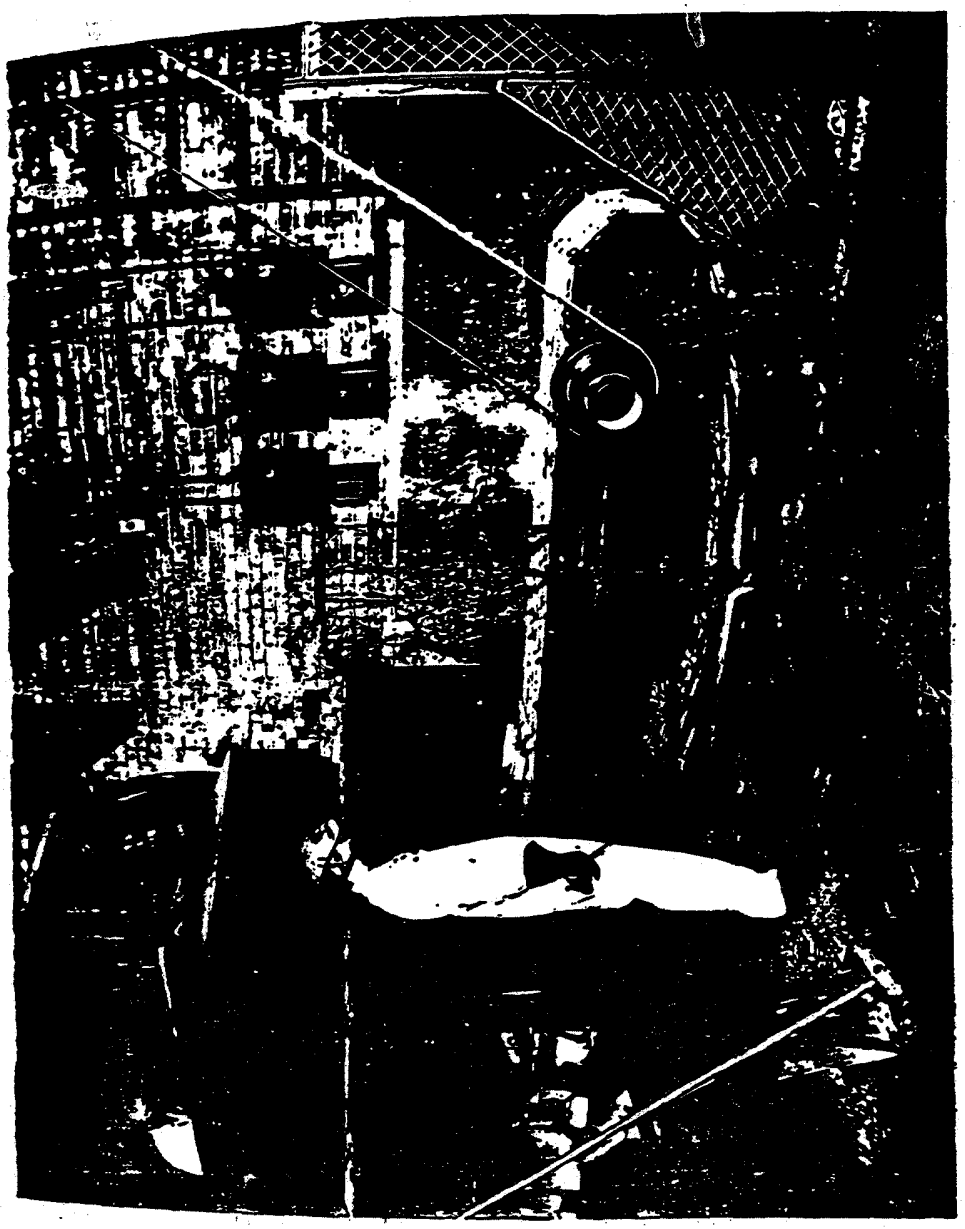
The westerly unit, known as the White Lead Stacks, comprises buildings 191, 215, 204, 201 and 206. These buildings are all interconnected under one continuous group.

The second unit comprises buildings 200, 202, 241, 240, 205, 220A, 220 and 207. This unit houses the White Lead Mill Building, the lithrage furnaces, the Quick Process lead plant and the transformer house.

The third unit consists of buildings 245 and 265, which house the boilers furnishing CO_2 for the Quick Process Plant and necessary fuel storage.

Commenting on the building detail, I would advise that building 191 houses the tan bark burners. This is simply a furnace properly equipped to feed spent tan bark over a grade where it is burned while the small amount of lead carbonate, metallic lead, etc. is recovered in the ash or as metallic lead.

Buildings 206, 201, 204 and 215 cover the twenty-five White Lead stacks and the necessary appurtenances for the handling and storage of various raw materials. The stacks are approximately twenty-five feet square and approximately twenty-five feet deep. The process consists of stacking metallic lead buckles in stone wear corrosion pots, the bottom of each of which is placed in about a pint of weak acetic acid. These pots are stacked close together in a tier over the whole area of the stack. These pots are then covered with a layer of boards on which is later placed about twelve inches of tan bark. In the center, a vent is provided for the escape of gas and steam. The succeeding tiers are placed one above another in this fashion until the stack of twelve tiers is completed. It is then left to corrode for a period of ninety to a hundred and twenty days, when the material is removed in reverse program.



Lead Buckle Casting is a Step in the Manufacture of White Lead by Dutch Process. If Temperatures are Maintained Sufficiently Low, Lead Exposures for Workmen are Negligible in this Operation

The metallic lead buckles have at this time been almost completely converted into basic lead carbonate. This reaction is due to progressive conversion of the metallic lead through the oxide, hydroxide, basic lead acetate, basic lead carbonate. When the material is recovered from the corroding pots, it is dumped into crane buckets where it is handled to the scale, thence dumped into beater which removed uncorroded metallic lead, is then delivered to conveyor which conveys it to the milling unit.

The hazards involved in this end of the business are so far as I can see simply those ordinarily recognized as lead hazards. All proper precautions are taken by operators in these departments to protect themselves from lead dust and lead contamination. They are required to pass weekly inspection by our Medical Department, to take necessary baths to safeguard their health. We are required by law to furnish certain minimum bathing, locker and lunchroom facilities for these men. The facilities provided are housed in Building 202. This building when first provided furnished the proper facilities, but it has been sadly outgrown and it is imperative that we provide new facilities, greatly enlarged, to satisfactorily comply with legal and health requirements. We have had under consideration for the past year various estimates to meet this requirement, none of which, however, have been considered satisfactory. The question is still under consideration and it is hoped that we may in the near future get satisfactory plans approved.

The crude carbonate delivered from the stacks is received in Building 200, where it passes through a series of rollers, crushers and screens wherein further separation of metallic lead is effected. From this building it is delivered into Building 200, 4th floor, where it goes into a gravity system involving wet grinding, where further metallic lead separation is effected. From here it goes to storage tubs on the fourth floor.

It is later passed over screens to remove tan bark and returned to process tubs where it is concentrated before being passed either to filter presses or to the pulper. Material for drying is pumped through

filter presses on the third floor, east end, and is taken from the presses and placed on trays, unloaded in trucks, and passed through a tunnel drier. After drying, it is unloaded at the west end, dumped into a hopper over the grinding mill. From the grinding mill, it is dropped into a filling machine hopper on the first floor, where it is packed into barrels for shipment.

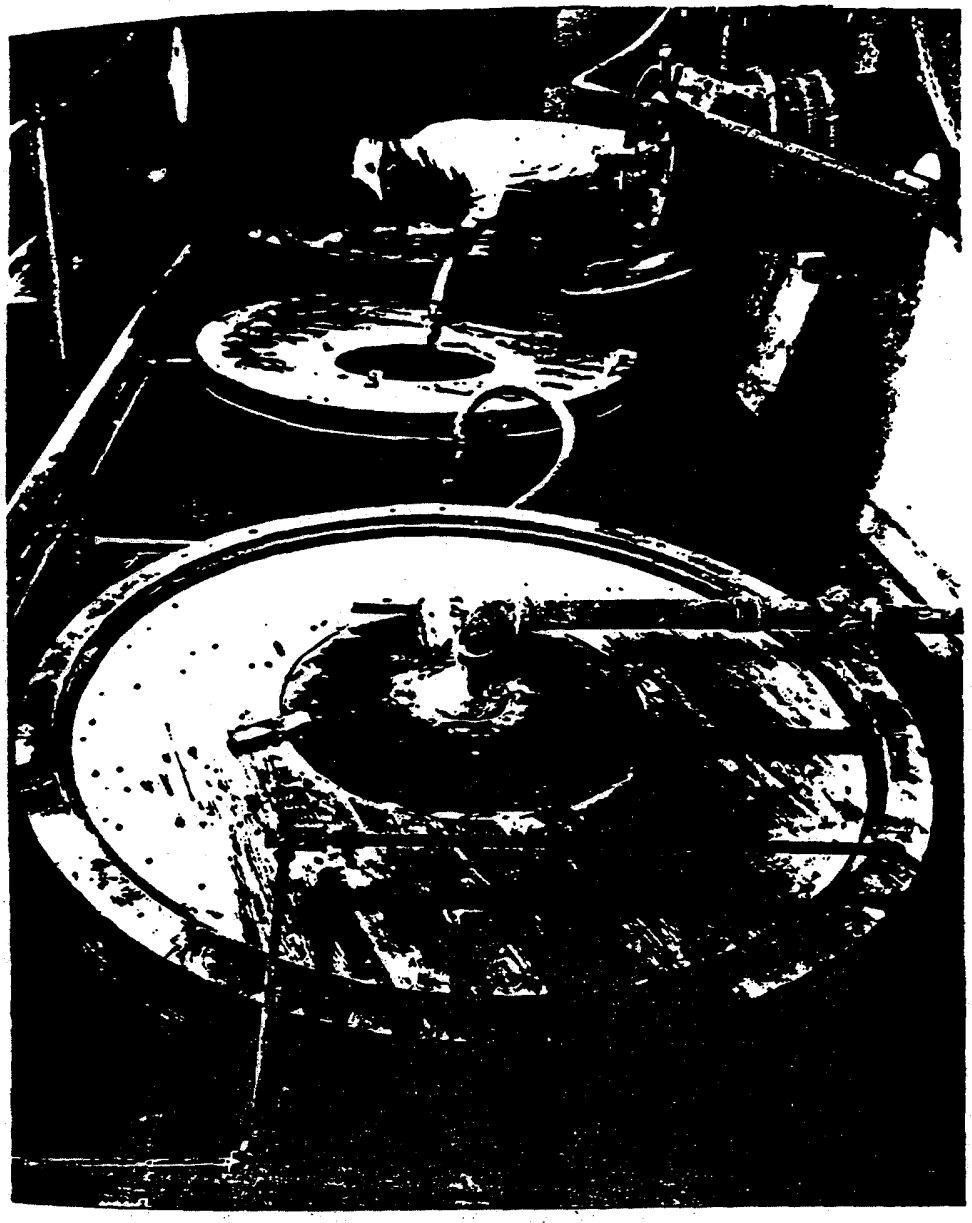
Material which is going through the process as paste is piped direct to the pulpers on the second floor, where the water is practically all separated by the addition and agitation of necessary quantities of linseed oil. After proper pulping, the material is passed to the grinding stones or roll mills from which it is passed either to our pulp storage tanks or to finished packages for shipping.

Practically all the hazards involved in this part of the process are those due either to lead dust or lead contamination. Operators in dust exposures all wear proper masks of the latest accepted type. All are supposed to take baths as necessary, and all are subject to weekly inspections by the Medical Department. There is one serious dust hazard in this Building 200, which should be corrected. I will refer to that later under the subject of Litharge Manufacture. Dust counts have not been made in this building to my knowledge, and it might be interesting to find just what the conditions are after proper test is made.

Building 220 houses the Quick Process corroding cylinders. This building consists of a basement and a first floor carrying two tiers of balconies. The main floor is one large open, high space, necessary for the operation of the cylinders and its mechanical equipment for the handling of blue lead into the cylinders and the finished material out of it.

Building 220A is a three-story building at the west end of Building 220, housing the mechanical equipment necessary, first to prepare pig lead for introduction into the cylinders and later to provide intermediate and final treatment of the lead after it has been corroded in the blue side and white side cylinders. The process in simple words is as follows:

Pig lead is carried by conveyors to lead melting kettles on the



Manufacture of White Lead by Quick Process May Provide Exposures to Lead, Acetic Acid, Carbon Dioxide, etc.

third floor of Building 220A. From molten condition, it is passed through a jet with steam which divides the material into very fine, granular condition known as "blue lead". Certain quantities of this blue lead are loaded into blue side cylinders, of which there are thirty-nine in operation. To each cylinder is connected a supply of CO_2 gas at one end and a vent for spent gases at the other end. These cylinders are slowly revolved at the rate of about four revolutions an hour. At proper intervals, contents are sprayed with mixture of water and acetic acid. During all the time of operation, certain supply of CO_2 gas is passed into the cylinder. At the end of seven days this charge of blue lead has been gradually converted to basic lead carbonate, amounting to about 80% conversion. At the end of this time, the cylinder material is carried into conveyors in 220A building, where it is ground and returned then to cylinders on the white side, of which there are thirty-five.

Here the material is treated with further dilute acid, water and carbon dioxide gas, and at the end of further seven days, this material is almost completely converted to basic lead carbonate. It is then returned to conveyors in Building 220A, where it is crushed. The uncorroded lead separated from it is put through a screen to take out more impurities and is finally delivered in suspended condition to the top floor of Building 200. At this point it is submitted to the same process of use as was previously explained of the Old Dutch lead carbonate. It is either mixed or used straight as the trade at any particular time may require.

In the operation of this process, we have the same type of hazard that is involved in the Old Dutch process. The same facilities for protection are provided, and in general, our inspection and precautionary measures keep us practically free of any serious trouble. There are one or two places in Building 220A and 220 that should be investigated for dust count. Considerable improvement has been made to 220A during the past year.

Another hazard which I think should be corrected is the system for removal of fumes from the corroding cylinders. The old vent stacks have been in use ever since the plant started, and they are about ready to collapse. They are in such condition that repairs can hardly be made. The only proper cure is a new system which can be provided approximately gas proof. The present operations require building 220 kept open almost continuously from the outside to provide decent working conditions. Leakage of CO_2 gas in the room requires it. It is my opinion that a sanitary gas removal system should be provided so that it will not be necessary to keep this building open, particularly in the winter time when it is desirable to have heat.

Building 207 houses power transformers for the plant in general. This is attached to Building 220, but it is never entered by our operators and is considered as part of the mechanical or power department.

Buildings 205 and 241 house our Lithrage and Red Lead furnaces. These are a single story, brick and steel construction. Building 240 is a four story mill building operated in connection with the furnaces where Lithrge and Red Lead are ground for use. Building 241 houses four furnaces which are fired by mixed gas. These furnaces each consist of a cast iron pan ten feet in diameter by a foot deep, equipped with agitator device and heated by ten or twelve burners on either side of the pan near the arch of the furnaces. They are operated at temperatures from 900-1200°F. They are charged with pig lead, litharge or with lead carbonate, according to the final product desired, and their cycle of operation requires from ten to forty hours to complete the process.

Building 205 is a building of the same type as 241, in which there are housed three furnaces, nos. 5, 6, and 7, which are of exactly the same type as those in 241, except that they are fired by coal, delivered into the furnaces on each side of the pan.

The hazard involved in the operation of these furnaces is that of lead dust or oxide dusts. The principal hazard is in Building

240, where the handling and grinding of the finished oxide is done. Our system has been recently checked over, and the most of our hazards are quite satisfactorily covered. Dust counts may reveal that ideal conditions are not yet secured, but it may prove that ideal conditions are too expensive to maintain in view of the little trouble we have had in regard to dust in the past. The recent inspections of the Illinois Factory Inspectors have prompted us to make a great many improvements and I think in general now our operations conditions are considered by them satisfactory. We will be interested in the report of actual dust counts that may be made in this locality.

One of the most serious dust exposures which we have is involved in the transfer of crude lead carbonate to the Lithrage or Red Lead furnaces for the manufacture of red lead. It is necessary to use lead carbonate finely ground as a raw material in the production of our highest grade of red lead in order to secure the proper density, fineness, purity, etc. As the system is now operated, crude carbonate is taken from a conveyor on the fourth floor at the west end of Building 200 and is dropped into a small storage tank to the first floor. From here it is dropped into buckets with no provision for the control of dust. In taking the material into drums from the hopper, a great deal of dust is caused which is blown into all departments if there happens to be a wind at the time the work is going on. After a certain number of drums are filled, they are carried in open trucks to the elevator and carried up and stored on the second floor. From here they are again picked up and carried from Building 200 across the bridge to the second floor of Building 240, where they are dumped into a conveyor to be carried to the Stroud Mill on the first floor for grinding. At the point where these drums are dumped, there is no provision for dust collection. After the material is ground, it is passed through a conveyor passing over four furnaces in Building 241, any one of which can be loaded at will.

This system cannot be corrected for its dust hazard without some considerable expense. We have now under consideration by the

Engineering Department an estimate covering the installation of conveyor to carry the crude carbonate from the fourth floor of Building 200 to an auxiliary storage on the third floor, then in weighed amounts, through a closed system, comprising a mill, which will grind and deliver direct to the present conveyor over the furnaces. This will be a closed system and dust collecting system and should eliminate all of the heavy dust. This system will cost $5,000 or $6,000 and while desirable even as an operating improvement, it may be considered absolutely essential as a dust prevention proposition.

The other small unit referred to, comprising Buildings 245 and 265, houses, in building 245, two alternately operated boilers under which are coke fires producing CO_2 gas for use in the Quick Process Product. This is a simple building, housing boiler, and there is no particular hazard involved, except, perhaps a dust hazard in handling coke. Building 265 is a coke shed into which coke is unloaded direct from cars.

The number of employees in this department approximate twenty in the Oxide Department, twenty five in the Quick Process White Lead Department, and seventy in the stacks and milling departments. Of these in the Quick Process Plant, there are 11 Americans, fourteen foreigh born, including twelve Mexicans. In the Litharge Department, there are 12 colored, 1 Mexican, and 7 white Americans. In the White Lead stacks and milling department, the employees are divided into 24 colored, 34 Americans and 9 foreign born.

J. B. BINGHAM

White Lead Department.

Information on shifts, rotation, etc. of employees of Pigment Products Department:

White Lead Department, Stacks:

In this department, there is one shift, no rotation of men and the work is not seasonal. Fifteen men are on piece work with two extra men for filling in an emergency. Of these nine men are used in setting tiers and three are used in drawing tiers and are paid per tier set or drawn. Two men on piece work unload cars of lead, coal, coke and tan bark. On the bark they are paid per car, on the others paid per ton. Two other men (extra) when not on piece work are given hourly rates.

Old Dutch Mill:

There is also one shift in this department, continuous employment and no rotation of the men. Four men are on piece work, three on pulverizing dry lead, paid per truck basis, and one man packing dry lead, paid per barrel packed.

Quick Process:

Three shifts are operated in this department, but the work is continuous and there is no rotation of the men. Three men are employed on a piece work basis, dumping cylinders, paid per cylinder.

Red Lead and Litharge:

There are three shifts in this department also, no piece work, work is continuous, no rotation of men.

Lithopone:

There are also three shifts in this department; work is continuous and there is no rotation of employees. Three men on piece work unload crude zinc sulfate and are paid per ton basis. Eight regular and 1 extra man employed in crude pressing, 6 men on piece work, finishing pressing, both crude and finishing paid per press basis. Six men are employed packing lithopone on piece work basis and are paid per ton. Raw materials as received are paid per ton as to kind, ore, coal and coke.

PAINT MANUFACTURING DEPARTMENTS

"A" Department

Location:	Building 21, first floor, approximately 6,000 sq. ft., brick.
Men:	33, white, foreign born 4.
Operation:	Manufacturing and filling paint products.
Manufactures:	Exterior paints, shading colors and specialties.
Raw Materials:	See attached report.
Machinery:	30" Burr stone mills Ball mills Automatic Filling Equipment Centrifuge

"B" Department

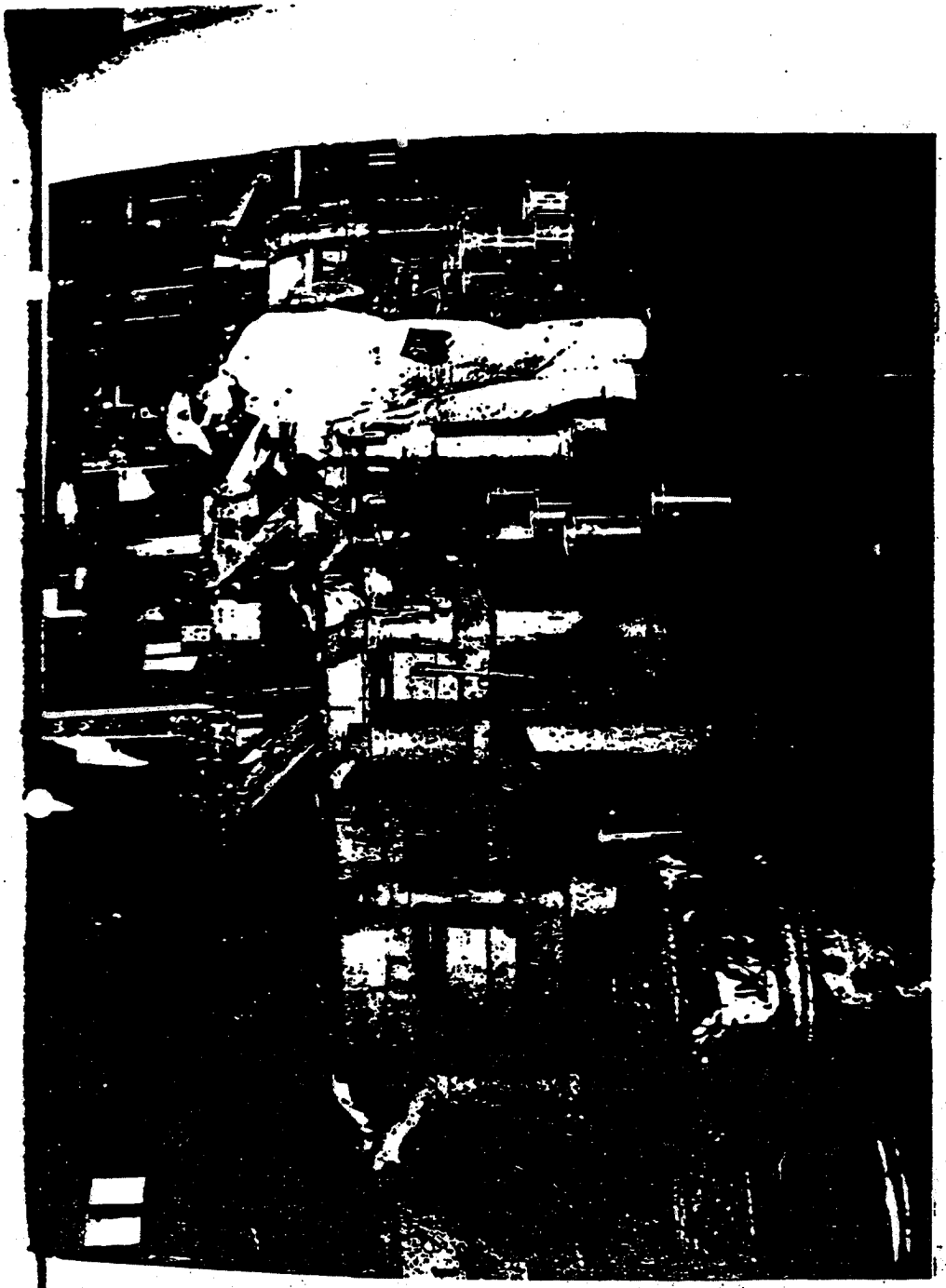
Location:	Building 18, first and second floors, approximately 6000 sq. ft., brick.
Men	38 white, 7 foreign born.
Operation:	Manufacturing and filling paint products.
Manufacture	Exterior and interior paints
Raw Material:	See attached report.
Machinery:	30" Burr Stone Mills Premier Mill Automatic Filling Equipment.

"C" Department

Location:	Building 21, 2nd floor, approximately 6000 sq. ft., brick.
Men:	18 white, foreign born 5.
Operation:	Manufacturing and filling of paint products.
Manufacture:	Specialty goods (Small Order Department)
Raw Material:	See attached report.
Machinery:	Ball Mills 21" Burr Stone Mills 3 Roll Mill

"D" Department

Location:	Building 21, 3rd floor, approximately 6,000 sq. ft., brick.
Men:	16 white, foreign born 8.
Operation:	Manufacturing and filling of enamel finishes.
Manufacture	Exterior and interior enamels
Raw Material:	See attached report.
Machinery:	21" Burr Stones Centrifuges Automatic Equipment



Stone Mill Grinding of Paints. After Admixture of Lead and Other Harmful Paint Ingredients, with Liquid Vehic'es, Possible Harmful Exposures are Greatly Reduced

"F" Department

Location:	Building 25, 1,2,3,4th floors. Approximately 3,000 sq. ft. each. Brick.
Men:	35 white, foreign born 17.
Operation:	Manufacturing and filling of enamels and paints.
Manufacture:	Exterior paints and interior; also enamels.
Raw Material:	See attached report.
Machinery:	21" Tandem Burr Stone Mills Pebble Mills Roller Mills Premier Mills Automatic Filling Equipment

GENERAL REMARKS

Relative to dust, whenever dry pigment is incorporated with liquid, there is a dust present. To minimise the amount present, we use covers over mixers when mixing light gravity pigments. Cases where lead carbonates, red leads and the like are mixed, respirators are supplied. In dressing mill stones, there is a dust present, but this has been eliminated by the introduction of a special suction machine which accumulates this dust in an air tight receptacle. Occasionally, when cleaning paint tanks, there are odors and gases present, but these are eliminated by leaving the tank covers off and blowing in fresh air for a period of time.

The only noise present is due to machinery which drives mills, agitators, etc. and every effort is made to keep this at a minimum, especially when installing new equipment.

W. A. MILLER

Supt. Chicago Paint and Varnish Departments.

VARNISH MANUFACTURING DEPARTMENT

1)	Location:	North central part of plant (115th Street between Stephenson and Doty Aves.) Bldg. #59, brick and concrete, 1 floor Bldg. #58, brick and concrete and wood--4½ floors. Bldg. #57, brick and concrete, 1 floor. Bldg. #27, corrugated tin and concrete, 1 floor. Yard C, concrete flooring, total sq. ft. of floor space, 56,000 sq. ft.
2)	Men	18 employees, all white, foreign born, 5.
3)	Operation:	Heating, thinning and filtering varnishes and japans.
4)	Manufacture	Varnish and japans.
5)	Raw Material	Natural and synthetic resins and gums Vegetable and sardine oils Coal tar solvents Lead manganese and cobalt driers Phthalic anhydride Gilsonite Pitch
6)	Machinery	Varnish kettles, agitators and pumps.
7)	General	Dust, gases, vapors and odors are all present and some noise.
8)	Objectionable Working Conditions:	Objectionable working conditions have been and are remedied as much as possible.
9)	Complaints:	Objections to gases and vapors are heard on heavy air-mucky days.
10)	Remarks:	Working conditions are being bettered continually and are of the best possible for this type of manufacture.

Varnish Filling Department

Location:	Bldg. #55, 1 floor, approximately 4,000 sq. ft. occupied, brick and concrete.
Men:	12, white, all american citizens, foreign born 5.
Operation:	Filling varnishes, thinners and stains into cans and drums.
Machinery:	Blending tanks Filling machines Scales Labeling machines
General:	There is no dust, no vapors and only a slight odor of petroleum distillate or turpentine.
Complaints:	No complaints have been made by employees as to working conditions.

Varnish Stacks. The Making of Varnish From Synthetic Gums Such as Phthalic Anhydride May be Definitely Irritating, but not Direfully Dangerous. Stack Action Extensively Frees Workmen from Irritant Vapors

Varnish Filtering

Location:	Building #56, 2nd floor approximately 1,550 sq. ft. occupied. Brick and concrete.
Men:	2, white, U.S. citizens, American
Operation:	Filtering varnishes through plate presses.
Machinery:	Steam pumps, filter presses, filter tanks.
General:	There are some vapors in this department, but they are drawn out of the room by a suction fan in the wall.
Complaints:	None.

Oil Blowing

Location:	Buildings #41 and 42, 1 floor, approximately 900 sq. ft. occupied.
Men:	3, white, U.S. citizens, foreign born, 2.
Operation:	Blowing air into tanks filled with oils, under heat.
Machinery:	Tanks equipped with steam and air coils, blowers, pumps.
General:	There are no vapors as they are drawn out by suction through a large stack.
Complaints:	The vapors from the operation are taken from the tanks by fans through a stack. They are then distributed into the atmosphere and at times are very objectionable as they cause the eyes to smart.

Storage Department

Location:	Buildings 51 and 52, 1 floor. Buildings 17, 4th floor, 1 floor. Building 55, 2nd, 3rd and 4th floor, 3 floors. Building 58, 2nd floor, 1 floor Approximately 20,000 sq. ft. occupied.
Men:	2, white, U.S. citizens, foreign born, 1.
Operation:	Varnishes manufactured are stored in tanks for aging and drawn off by gravity flow to the varnish filling and paint departments.
Equipment:	Storage Tanks
General	There is a slight amount of vapor present in buildings 55, 17 and 58, when tanks are filled but none in buildings 51 and 52 as the tanks are closed tight and the liquid covered with CO_2 gas.
Complaints:	When cleaning tanks there is a strong vapor that smarts the eyes and intoxicates. This is in nearly all cases overcome by injecting an air jet in the tank before entering.

Flat Varnish Department

Location:	Building 58, 2nd floor Approximately 1800 sq. ft. occupied. Brick with wooden floor.
Men:	1, white, U.S. citizen, american.
Operation:	Grinding varnish and flatting agents in ball mills.
Machinery:	Ball mills, mixing tanks, agitators.
General:	No dust, vapors, or odors present.
Complaints:	None.

W. A. MILLER
Paint, Varnish and Lacquer Departments

"E" DEPARTMENT

Shellac, Spirit Varnishes, Etc. Dept.

Location - Bldg. # 9 - 1 Floor
Brick Walls and Concrete Floors
Bldg. # 10 - 1 Floor
Brick and Concrete Walls and Concrete Floors
Bldg. # 11 - 1-1/2 Floors
Concrete Walls and Concrete Floors
Bldg. # 12 - 1 Floor
Concrete Walls and Concrete Floor

Men - 16 - White - Foreign Born, 3.

Operation - Mixing, Heating, Filtering and Filling Packages

Manufacture - Paint and Varnish Removers
Waxes
Metal Polish
Wood Polish
Spirit, Water and Oil Stains
Shingle Stains
Gold Paint
Aluminum Paint
Cold Cut Spirit Varnish
Shellac

Raw Material - Petroleum Solvents
Waxes
Coal Tar Solvents
Bronze O Aluminum and Gold
Natural and Synthetic Gums
Shellac - Orange and White
Alcohol

Machinery - Mixing Tanks - Plain and Steam Jacketed
Agitators
Pumps - Steam and Electric
Filter Press
Filling Machines
Scales

General - Little dust present when gum cust are made. Gases, vapors and odors are present byt there are two wall suction fans in this Department. Noises from machinery only, gears, agitators, etc.

Complaints - None

W. A. MILLER
Superintendent PV&L Dept.

Supplemental Information:

Dept.	No. Shifts	Seasonal	Rotation	Piece Work
A	1,2,3	Yes	Yes	None
B	1,2	Yes	Yes	Tank Cleaning
C	1,2,3	Yes	Yes	None
D	1			None
F	1,2,3	Yes	Yes	None
H	1,2	Yes	Yes	None
Varnish	1,2	Yes	Yes	None

The only piece work system which we have in the Paint Department is in the "B" Department and is represented by tank cleaning. This of course is only done periodically when tanks need cleaning and a set rate for the tanks has been established.

W. A. MILLER

J. SPIEK

Supt. Chicago P.V. & L. Depts.

LACQUER DEPARTMENT

The buildings devoted to lacquer manufacture are 510, 521, 547, 512, 544, 546, 527, 570, 522, 525, 524, 525, and 517.

The raw materials used in this department have been presented in detail in a separate compilation together with the quantities consumed in one 12-month period. Nitrocellulose of various types is stored in a series of small buildings, 522 and 525. The nitrocellulose as received and manipulated is wetted with denatured alcohol, the denaturant being methanol, 5%.

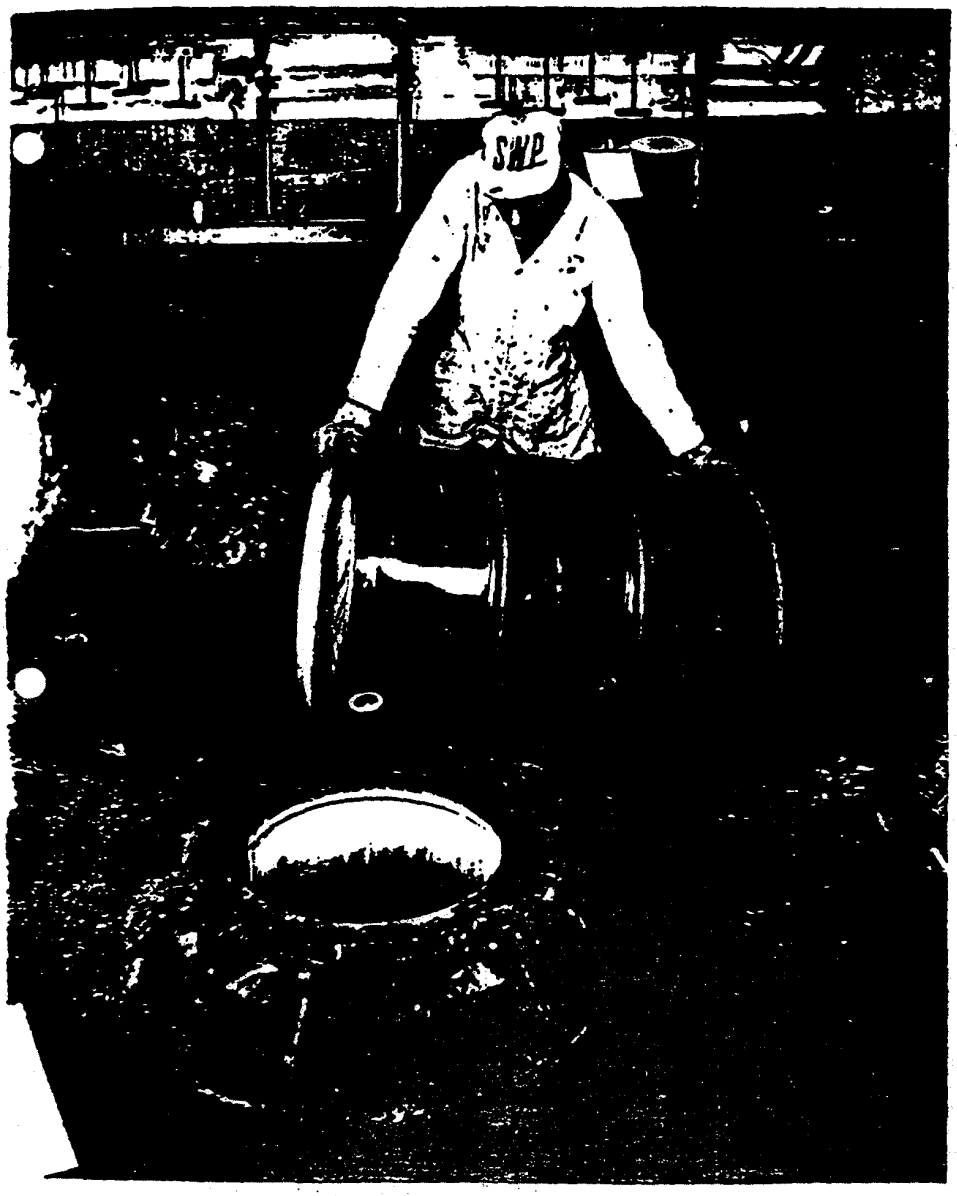
The nitrocellulose is cut in various cubicles, 2, 3 and 4, adjacent to Building 544. The chief solvents for the nitrocellulose are delivered through pipe systems with the exception of benzol, which, because of the small quantity consumed, is delivered from drums as required.

The offices and the laboratories of the Department are located in Building 547.

In Building 510, a variety of products are made, some of which involve the use of substances other than those entering common varieties of lacquers. Small quantities of siliceous materials and other dusty materials are here employed. Ball mills are utilized in the operations of this building. One section of this building is devoted to the mixing and rolling of lacquer chips. A variety of colored chips are produced, which in turn involve the use of varied pigmented materials.

Building 517 is devoted to drum cleaning of lacquer drums. This work is done entirely by hand without the use of heat, the cleaning medium being spent thinner of varying constituency. In one very small lean-to, Building 570, adjoining Building 510, panel boards used in testing experimental work are cleaned.

The chief difficulty from the point of view of health protection for workers in this entire department is related to the fact that the department's output is several times that for which the space was designed. Over and Over doubling of output has taken place until there exists at the present time practically no more uncrowded space. All space is utilized and



Nitrocellulose "Cutting" Tanks. The Occasional Use of Benzol Through Open Operation in this Department is Undesirable in the Absence of Definite Protection.

and most space is highly congested. Building 510 is of ancient construction, cleaned only with difficulty and here the operations have more or less gotten out of hand so far as general sanitation is concerned.

The chief potential exposures connected with raw materials are from toluol, benzol, thinner, methyl alcohol, other alcohols, acetone, various ketones, etc. Drum cleaning as now carried out is regarded as undesirable. In general, the work in this department would be much improved in many respects, including worker protection, by the provision of increased space without corresponding expectancy of increased production.

COAL TAR DEPARTMENT

This department is the only part of the plant south of Kensington Avenue and west of the Pullman track. This plant consists of a number of storage tanks for liquid raw materials and finished products, a battery of coal tar kettle stills, and one unit of manufacturing buildings identified as numbers 451, 452, 450 and 475. These buildings are more or less of a temporary type construction, being built on a concrete foundation about four feet above the general ground level, of timber with corrugated iron siding and composition roof. The buildings are poorly heated and in general have very poor natural lighting.

In this group of buildings is housed most of our manufacturing, filling and finishing facilities for the department. The group of buildings measure about fifty feet East and West and about eighty feet North and South.

Elevators serve the ground level outside to first and second floor levels. The elevator itself is in good condition, with approved means of control of operating hazards.

Toilet and bath facilities are provided in the northwest corner of the second floor, both for male and female employees. The provisions for female employees are adequate, but for male employees the facilities are somewhat inadequate and should be enlarged.

South of the battery of stills is a corrugated iron covered fire room. This is not provided with any means of heating and is simply a shelter and protection for still operators firing the still.

Our only other building on the premises is the old boiler house which is now under reconstruction to house a new benzol distillation. This building will be of frame construction, covered with corrugated metal. It will two stories high.

There are employed in the Coal Tar Department, usually, from twenty-to twenty-five employees, which includes two women labelers. Most of our employees have been in the employ of the company for many years, five foreign born, the remainder white. The operating force in general, both in supervision and operation, are a very responsible

Coal Tar Division. Introduction of Asbestos Fibre to Roofing Type of Paints. Asbestos Dust is Harmful and Danger Exists in Proportion to the Dust Concentration in the Atmosphere and the Duration of Work

and reliable group. I think the department as a whole has the best long time record for no lost-time accidents in this plant.

This plant was originally built for purposes of distilling coal tar into three simple oil fractions, and a pitch residue which was later cut back into a black tar paint. For various economic reasons, this distillation program was discontinued several years ago. We now buy pitch from other tar refiners, which is delivered to us hot in tankcars. This we transfer from the tankcar to our manufacturing kettles and cut it back while still hot with solvents to produce the same paint that we formerly produced. This process requires all of the old equipment, but we do not have to use the stills to distill off the volatile part of the coal tar, as we once did.

In our general line of roofing paints and products, we buy as raw materials the following: Coal tar and water gas tar pitch, asphalts of various types, coal tar and petroleum solvents, asbestos fibre and some inert mineral fillers. No particular health hazards have appeared of serious nature in our seventeen years experience with these materials. Theoretically there is always some hazard involved with various coal tar distillates, but barring benzol, no great amount of objection is generally made. Most of the liquid coal tar distillates we handle are practically devoid of benzol. Most of the hazards involved in this process are accidental in nature, such as fire, spills, etc.

Your preliminary inspection of a few days ago called attention to a hazard in handling asbestos. Until now we had not considered this exposure of sufficient duration to constitute any particular health hazard to anybody, but at your suggestion we are now insisting that men who dump this material into batches should at that time wear respirators.

Another line of our products manufactured in this department is disinfectants, fly sprays, etc. Our disinfectants are roughly covered in two classes, first crude products provided by the solution of cresol bearing coal tar oils in a cheap soap base, such as a rosin soap. These products generally consist of about 15% anhydrous soap, 10% water, 15-20% crude tar acids and the balance inert coal tar hydrocarbons. The raw materials used in this process are tar acid oils, cresylic acids of

various qualities, rosin, vegetable oils, caustic soda and caustic potash.

The handling of cresols involves some little hazard, but in our 17 years' experience, we have never had any difficulty with it. Oils or acids which carry a high content of phenol involve a certain poison hazard. We limit all our raw materials to 5% phenol content, which is maximum limit established in the Federal Caustic Poison Act as being safe. I know of no other hazards here. In the manufacture of fly sprays, we use no poisonous raw materials.

Another product which we have manufactured, but have lately discontinued, is Kiltik, which is an arsenical cattle dip. This material contains approximately 20% arsenic in solution, 10% cresylic acid, the balance soap and water. Since this manufacture has been discontinued and transferred to Bound Brook, we do not have this arsenic hazard any longer.

We are now installing a steam distillation unit for rectification of benzol spirits. This equipment is housed in the old boiler room, which is being suitably rebuilt. The equipment consists of a steam still connected to a 24 plate column and deflamator on the top of which the gases are passed through a condensor, thence to closed receivers, thence by gravity to outside storage tanks. This system will be gas tight, operating under atmospheric pressure, and when in good operating condition should constitute no hazard to the operators. We will produce benzol generally of the quality of motor benzol, or 90° benzol. Our raw material for this process is coal tar light oil, purchased from coke ovens who recover it as a by product. The material consists generally of about 50% benzol, the balance xylol, toluol and indeterminate hydrocarbons. Our process will consist in washing this crude light oil first with sulphuric acid and soda to remove certain unsaturated impurities. This operation will be carried on in a 5000 gallon lead lined tank located south of the building. After the washing is completed, the washed, crude material will be pumped into the still where it will be run until all of the benzol is removed and the balance will then be pumped back into our storage tanks where it can be used as crude light oil.

The refined benzol will be carried in two 10,000 gallon storage tanks south of the building, from where it will be taken for sale or consumption. We expect to use none of the material at the Coal Tar Plant.

Our machinery equipment at the Tar Plant, what we have, is in good operating condition and satisfactorily guarded against accidents. We have no particular complaints to make about the presence of dusts, acids, vapors, noise or odors, although the inexperienced might find the location odoriferous. To our experienced operators this does not appear to be an objection and there is some basis for the argument that a certain amount of vapor from coal tar bases may be beneficial to health rather than otherwise.

My main objection to working conditions in this plant is that we do not have enough room for the amount of work we have to do. We handle considerable tonnage in this plant, carrying it from raw materials all the way through to loading on cars and trucks for shipment. This, of course, is mainly a strain on the nervous system, trying to do work with insufficient equipment.

The above remarks may cover generally the operations of the department, and I trust that any details not covered to your satisfaction can be clarified on later inspections.

J. B. BINGHAM
Superintendent

Supplemental Information:

There are three shifts in the Coal Tar Department, with no rotation of men on the various shifts. No piece work is carried out here. The work is not seasonal.

TIN CAN PLANT

1. Location—Corner 115th Street and Cottage Grove Avenue.

2. Building #244.

3. Reinforced concrete construction, 2 floors and basement (also 3rd floor 40 x 100 lunchroom and women's restroom) approx. 84,000 sq. ft. floor area.

4. Productions: Tin Cans for paint, varnish and allied products.

5. Raw Materials—Tin Plate
   Terne Plate
   Solder and sealing compounds
   Bail wire

6. Expense Materials—Solder Fluxes and lubricating oils.
   Manufactured gas.
   Packing cases fiber and wood.

7. Equipment

Receiving Dept.	Electric and Hand Lift Trucks.
Mfg. Dept.	Tin Slitters, body forming, and soldering machines, flangers, end seamers, testers, dryers, conveyors, for the assembly of finished cans. Presses for stamping tops, bottoms, covers and trimmings. Sealing compound applying and drying machines.
Mech. Dept.	Machine Shop tools, lathes, grinders, drill presses, shapers, milling machine, saws, heat treating furnaces, portable tools.
Elevators	Electric 1 4000# 1 6000#
Transmission	Motors, direct and motors to line shaft with belts.
Miscellaneous	Gas mixing machine and piping for soldering and drying. Air compressors and vacuum pumps. Air pressure blowers for cooling fume exhaust blowers. Scrap baling. Sprinkler system, wet.

8. Health and Comfort Provisions—Washrooms, toilets on 2nd floor, both men and women.
   Women's locker room, washroom on 3rd floor.
   Some lockers scattered Mach. Shop, 1st floor, and basement.
   Luncheon, 3rd floor.
   Office washrooms and lockers 1st floor near office.

9. Employees—172

Men	Production, etc.	62	
	Mechanical	17	
	Office and Supv.	5	84
Women	Production	84	
	Office	4	172

10. Health — All records of accidents, illness and time lost thereby are maintained by Dr. Hess.

J. L. Cunningham

TIN CAN DEPARTMENT

The Tin Can Plant is located at the corner of 115th Street and Cottage Grove Avenue. It is known as Building #244.

The building is reinforced concrete construction throughout, having a basement, first and second floors; also a third floor section 40' x 100'. The area in all is approximately 84,000 square feet.

This Department employs 172 people, 88 women and 84 men. Of this number approximately ten are employed in offices, the remainder on production.

Operations carried on at the Can Plant are the manufacture of paint and varnish cans made of tin plate, with some of terne plate. The operations consist of receiving and storing raw materials, stamping of tops, bottoms, covers; slitting bodies; forming, soldering and assembling bodies and parts for finished tin cans; packing, storing, loading and shipping of finished cans in cartons or wooden crates.

Raw materials utilized are tin plate, terne plate, solder, sealing compound, ball wire.

Machinery and equipment in use are as follows:

Receiving Department: Electric and Hand Lift Trucks.

Manufacturing Department: Tin Slitters, body forming and soldering machine flangers, end seamers, testers, dryers, conveyors for the assembly of finished cans.
Presses for stamping tops, bottoms, covers and trimmings.
Sealing compound applying and drying machines.
Mechanical Department. Machine Shop tools, lathes, grinders, drill presses, shapers, milling machine, saws, heat treating furnaces, portable tools.

Elevators: Electric, one 4000#, one 6000#.

Transmission Motors, direct and motors to line shaft with belts.

Miscellaneous: Gas mixing machine and piping for soldering and drying. Air compressors and vacuum pumps. Air pressure blowers for cooling solder fume exhaust blowers.

In general, the Tin Can Department is a clean place to work, comparatively free from dust. The only gases we have would be from solder melting pots and dryers evaporating water after testing. There are no objectionable odors.

We have considerable noise from stamping presses and machinery operating on concrete floors.

The nature of the work of this department is clean, rather well organized and orderly. Only possibly objectionable working condition would be overcrowded conditions.

At the present time we are not aware of any complaints by workers relative to health, comfort or safety. We have a committee which meets periodically and these features are all subject to discussion.

Work conditions in the Tin Can Department are above the average, if we take as our criterion the number who quit or leave our employ.

J. L. CUNNINGHAM

Manager

Supplemental Information:

The work schedule in the Tin Can Department is eight hours per day, forty hours per week, one shift. It is only very seldom that for two or three weeks in the spring we operate a few people at a night shift of eight hours. There would not likely be any rotation on this temporary night shift.

We have 112 employees on piece work. Piece work is paid for operating and tending machines, most of which are automatic; for assorting, packing storing and loading cans; unloading and delivering tin plate. This is straight piece work.

The production is recorded by register or tonnage. The daily pay of any employee is always equal or greater than his day rate.

J. L. CUNNINGHAM

Container Manufacture for Paints and Other Coatings.
Automatic Soldering Operation. Hoods on Right Are
Too High for Effective Removal of Lead Vapors

TURPENTINE

Location: Building 509-A, three stories with a total floor space of approximately 5,000 sq. ft.

Men: 5 White, American.

Operation: Distillation and subsequent washing of crude turpentine (3088) of which we process approximately 20,000 gallons, per month. The only other operation is the preparation of the washing solution. This is done in an open tank.

Raw Material:

(59)	Liquid Chlorine,	5500 lbs.
1375	Hydrated Lime	7000 lbs.
(16)	Concentrated Sulphuric Acid,	200 lbs.
1951	Ammonium Chloride,	600 lbs.
560	Calcium Chloride	550 lbs.
505	Flake Caustic Soda	50-500 lbs.

Equipment: Still
Receivers
Washing Tank

General: Relative to odors, the crude turpentine is quite objectionable, since it contains many malodorous organic sulphur compounds of unknown composition. However, this material is processed in a closed system, the vented gases being passed through an absorption unit to render them odorless; hence the building is practically free from odor. Chlorine is always a potential source of gas and odor. In the routine procedure that is followed, no chlorine escapes into the air; however, at intermittent intervals while repairing lines or changing cylinders, it sometimes happens that some chlorine does escape. Gas masks are always at hand in case the necessity arises for their usage. Dust is present only at the time the lime is dumped. Respirators are worn during this short period. The only noise is that due to the mechanism driving the agitators in the washer. This is somewhat objectionable, but steps taken to alleviate it have not been successful.

Remarks: Employees have been thoroughly appraised of all health menaces existing and have been instructed how to avoid them.

W. A. MILLER

Supt. Paint, Varnish and Lacquer Departments.

ACETIC ACID

Location:	Building 508, 2 floors, approximately 1200 sq. ft. total area.
Men:	4 White, foreign born-2.
Operation:	Filling and shipping acetic acid (695) in suitable containers. Since acid of various strengths is sold, the concentrated acid is reduced in the storage tanks with water to the required strength. In conjunction with the above, it is necessary to repair containers used in shipping, and this is also done in this building.
Equipment:	Storage Tanks.
General:	A certain amount of dust and noise is usually present, due to the fact that packages are repaired in this building as noted above.
Complaints:	The only objectionable odor is that obtained when filling the glacial acid and it is especially so to the uninitiated, but those who have worked in it for some time become inured.

W. A. MILLER

Supt. Paint, Varnish and Lacquer Departments.

RECEIVING AND STORES OR RAW MATERIAL STOCKKEEPING

DEPARTMENT

Superintendent: S. J. Van Cley
General Foreman: O. E. Schepman
Sub-Foreman: W. E. Nicholas (in chg. Rec. Platform)
Sub-Foreman: F. Taylor (in chg. Yard Work
Sub-Foreman: T. Raatjes (in chg. East Side Receiving)

There are 58 workmen in this department at the present time, employed in various sections as follows:

West Side Receiving and Stores: 22
East Side Receiving and Stores: 15
Receiving Platform: 6
Yards: 9
Crane: 1
Coal Handling: 7

Most of our workmen are of foreign birth, coming from the southern part of Europe.

The West Side men unload all materials received for the Paint and Varnish Departments, storing these materials in Buildings 17, 19 and 58. Certain materials stored outside are unloaded in our White Lead Yard.

These men make deliveries of these materials to the Paint and Varnish Departments, A, B, C, D, F, H and Varnish.

The majority of these materials are packed in paper bags, burlap bags, barrels, drums and crates.

We handle such a large variety that it is impossible to list all of them, but the principal ones are lithopones, leaded zinc oxides, talc, iron oxides, barytes, rosins, gums, shellacs and cans.

This group also unloads and delivers such materials as are required by our Coal Tar Department.

Our East Side men unload all materials received for the Dry Color, Chemical Products and Lacquer Departments. Deliveries are made to the various units within these departments.

The same as for the Paint and Varnish, the majority of these materials are packed in paper or burlap bags or barrels, carboys, casks or drums.

Principal materials handled for the Dry Color are litharge, dry lead, zinc oxides, ammonium sulphate and others of a similar nature.

Principal materials used by the Chemical Products Department are soda ash, caustic soda, sodium nitrite, sodium bisulphite, acids in carboys and others similar.

Some of the lacquer materials are nitrocellulose cottons, gums, dry earth paints, etc. Most lacquer liquids are received by tank cars, these being toluol, xylol, butyl alcohol, alcohol and acetates.

A small quantity of hydrochloric acid is filled into carboys by one of our men and these carboys are delivered to the Dry Color Department.

To our Receiving Platform, all LCL shipments are directed from where they are distributed to those departments for which they are intended. A small office is maintained on this platform to take care of the clerical work involved.

Our yard men keep the plant clean and orderly by the removal of rubbish, cinders, black ash sludge, varnish sludge and skin paints, and by sweeping platforms, raking up the yards, tracks, etc. They also work on the trucks handling the interdepartmental transfer of materials.

Coal is transferred from storage into the furances by means of small industrial cars, the coal being filled into the cars by means of a chute or else by shovelling. The cars are then pushed along a track to an elevator, which raises them to the top of the furnaces where they are emptied automatically.

The office for this department is on the 2nd floor of Building 19 in the northeast corner where 10 people have desk space.

S. J. VAN CLAY
Superintendent

Supplemental Information Submitted by Mr. Van Clay:

On regular raw material receiving and distribution, we only have one shift with one extra man working the late afternoon and early night on miscellaneous deliveries into the P&V Manufacturing Departments.

For handling coal, we have three shifts and the men are rotated every two weeks.

At the present time, we have 29 men working on a piecework plan. This piecework of ours carries a price per ton for various materials and for various sections of the plant. Practically all of our car unloading and deliveries from stock to the Manufacturing Departments are on the piecework basis.

With our widespread of materials and also locations, the piecework system is worked out by gangs rather than individually. In other words, at the present time a gang of 15 men handles the unloading and delivery at the Paint and Varnish and Coal Tar Departments and the total earnings for the day are divided equally among all of them. On the East side of the plant we have at the present a gang of 14 who work in the same way.

S. J. VAN CLAY

MECHANICAL DEPARTMENT

The Mechanical Department is located principally on the first floor of Building No. 19, covering an area of approximately 5,760 square feet; in addition to this, a Blacksmith and Welding shop in Building No. 23[illegible], 26 feet x 30 feet, having an approximately area of 780 square feet; and Building No. 127, 16 feet x 32 feet, which is occupied by the labor crew, having an area of approximately 512 square feet; the washroom and locker room in Building No. 93 occupies an area of approximately 1,800 square feet.

The Mechanical Department employs approximately 115 Union men belonging to the Chicago Building Trades Council; 26 laborers working in the herd and in various departments as required; 5 non-union men who are employed in checking meters, controlling steam throughout the plant, and other duties.

The setup on these men is as follows:

	Union	Non-Union	Foreign Born	Native Born
Electricians	14		4	10
Millwrights	47		25	22
Machinists	15		7	8
Laborers		26	19	7
Bricklayers	5		5	
Fitters	36	5	7	34
Totals	115	51	65	81

The duties of the Mechanical Department employees take in every operating department of the plant, where they are faced with the usual hazards and danger encountered by the regular employees of that department. When working in the department, the welders are working with acetylene gas and oxygen; electricians come in contact with fumes from solder and soldering flux used in making electrical connections; the man operating the pipe machine handles thread cutting compound; and the usual greases and lubricating oils are encountered by the machinists, pipe fitters, electricians and millwrights.

The lubricating oils used in the Department are as follows:

Cosmolubric oil - on DeLaval separators

Mesaba cylinder oil - on pumps

#600-W oil - in the Dry Color Department

Super # 600-W oil - for roller mills, Bldg. # 25

D.T.E. heavy medium oil - on speed reducers and motors

Mobiloil "A", 30 viscosity - on coal crane

" "B", 60 viscosity - on roller mills, Bldg. # 528

" "AF" 40 viscosity - on coal crane (summer)

" "A" Arctic special, 10 viscosity - on coal crane (winter)

" Arctic, 20 viscosity - on coal crane motor

Neats foot oil, 20% pure - for belt dressing

Polarine oil, light, 10 viscosity - on vacuum pumps

" " medium, 30 viscosity - on vacuum pumps

Red Engine oil - for general lubrication

Texas oil, SAE 50 viscosity - for gear motors

Transformer oil - for electrical transformers

Thuban oil, 110 viscosity - for geared motors

Superla # 57 cup grease - for general greasing

Houghton absorbed oil grease - for DeLaval separators

Keystone grease # 45 - for ball mills

Texaco Crater compound - for gears and cable greasing

Marfak grease - for White Lead Department

Lubritosgen solvent - penetrating oil

Acids in bottles (glass):

Nitric C. P. - for Chemical Laboratories

Hydrochloric C. P. for Chemical Laboratories

Sulphuric C. P. - for Chemical Laboratories

Ammonia Hydroxide C. P. - for Chemical Laboratories

#421 C&B lubricant sticks for Merco-Nordstrom plug valves Swain lubricant sticks for tight and loose pulleys

The Mechanical Department men work 40 hours per week (8 hours per day, 5 days per week).

The equipment in the Mechanical Department consists of seven metal and wood working tools, consisting of lathes, drill presses, shaper, metal saws, pipe threading and cutting machines, wood band saw, bench planer, and cross-cutting and ripping saws.

Working objections in the Mechanical Department are similar to those found throughout other departments, where the men are employed on various mechanical jobs.

The Drafting room and Engineering office is on the fourth floor of Building No. 19 and occupies approximately 1,500 square feet, and employs 15 draftsmen and engineers, 2 clerks and 2 stenographers. These men at times come in contact with the ordinary hazards encountered by other employees in the various departments, when they are called to these departments temporarily for special work.

The Power House is enclosed in a building of 13,000 square feet and is operated by a chief engineer of the Power House, and 5 Union engineers, 8 non-union firemen, ash wheelers, janitors, etc. 7 of these are foreign born and 6 are natives.

The Power House men work 40 hours per week. The Power House operates continuously 24 hours per day. Coal is used for fuel. The men encounter the ordinary lubricating oils, as previously mentioned, and in addition to this, boiler compound used in the treatment of feed water.

The Power House equipment consists of 7 water tube boilers with mechanical stokers, 2 air compressors, boiler feed pumps, fire pumps, and the necessary auxiliary equipment.

Conditions in the Power House approximate the working conditions in Power Plants built 30 years ago, and cannot be considered modern.

The principal objections made by workers in both the Power House and the Mechanical Department have been due to cramped quarters in washrooms, which have been remedied, and in the Power Plant, lack of modern facilities for the handling of coal and ashes.

The Mechanical Storeroom occupies an area of approximately 5,000 square feet in Building No. 19, first floor; two storage sheds, No. 199 and 219, each having an area of approximately 2,700 square feet; and a storage yard about 80 x 300 feet, having an area of 24,000 square feet; for the storage of unused equipment.

The Mechanical Storeroom employs 4 men engaged in distributing mechanical supplies for maintenance and construction work to the Mechanical

Department, and service supplies for the Operating Departments throughout the plant.

In general, the Mechanical Storeroom carries in stock iron, steel, hardware, pipe, conduit, electric wire, belting, overalls, cotton gloves, shoes, caps, lubricating oils, lumber, filter cloth and other fabrics.

Working conditions in the Mechanical Storeroom are much better than the general working conditions around the plant.

There are no colored employees in the Mechanical Department, Engineering Department, Power House or Mechanical Storeroom.

R. D. McIntosh
Superintendent

Supplemental Information Submitted by Mr. McIntosh:

In the Power House there are three shifts, of eight hours each; the day shift consists of one Power House Chief, who stands no regular shift, one shift engineer, one fireman, two ash wheelers, one boiler helper and one janitor; on the afternoon shift from 4 to 12 P.M. one licensed shift engineer and one fireman; on the night shift from 12 midnight to 8:00 A. M. one licensed shift engineer and one fireman.

There are men also employed in handling coal from the coal storage yard through the Power House. These men are under the supervision of Mr. Van Clay and belong to the Receiving and Stores Department. These men are operated in three shifts; two men from 4 to 11:00 P. M., two men from 11:30 P. M. to 6:30 A. M. and three men from 7:00 A. M. to 3:30 P. M.

Ordinarily the men in the Power House working on shifts do not rotate their shifts, but it is necessary to rotate the men in order to give each man one day off per week. Occasionally it is necessary to put a man on temporarily from some other department, or hire an extra man.

In handling the coal, the men are rotated when necessary by calling in one or two men temporarily from the Receiving and Stores Department to take their places. For further details on the rotation of these men, consult Mr. Van Clay.

In the Mechanical Department, we have three steam men on shifts, these men are rotated by taking an extra man out of the Mechanical Department

crew when necessary. One machinist is operated on the second shift from 4 to 11:30 P. M. There are three Class "B" electricians, who look after general maintenance in the plant, each man working eight hours per day, forty hours per week. In order to perform continuously, it is necessary for one of the other electricians to fill in on the days that one of these men are off. These men are not ordinarily rotated on the shift.

There is no piece work in the Mechanical Department or the Power House.

R. D. MC INTOSH
Superintendent, Mechanical Department

OUTLINE OF THE DEPARTMENT OF STOCKS AND DISTRIBUTION

prepared for

THE HEALTH SURVEY

INTRODUCTION

The Department of Stocks and Distribution at the Kensington Plant performs the general functions of labeling, casing and finishing of all stocks of the Paint and Varnish and Lacquer Departments; the stocking of other goods of other factories and plants, the control of those inventories, the packing and handling of all shipments, and the actual shipping, both clerical and labor, of all goods shipped from Plant #2 (Kensington).

NUMBER OF EMPLOYEES

There are 55 monthly employees on the Stocks and Distribution Department payroll, all of whom are concentrated in three offices, Shipping, General Stock and Lacquer Stock, with the exception of four foremen supervising crews on the various floors.

The number of male monthly employees is 35 and the number of female monthly employees is 18.

All monthly employees are white and no nationality is predominate, all born in this country. There is no preponderance of any nationality by descent among the monthly employees.

The number of hourly male employees on the payroll is 155 and the number of females 16. The largest single nationality represented is Italian with a fair sprinkling of Dutch and some Poles. The average intelligence of the hourly employees for a Department which has no trade or general skilled labor is I believe rather high.

AREA

The Stocks and Distribution Department at Plant #2 is scattered over a wide area. For the Paint and Varnish, three large buildings, four stories high, are completely occupied and half of another, totalling approximately 65,000 square feet of space, including platforms. The age of these buildings is between 20 and 30 years. The buildings are of brick construction with wooden floors. These are buildings 12A, 13, 14 and 15.

In the Lacquer Department group, there are three, three-story buildings, of which this department occupies 1½ floors of one building, three floors of another and two floors of a third. The first two buildings are approximately 10 years old. The last building is at least 20 years old. The buildings are of brick construction with wooden floors.

Approximately 70,000 square feet of space is rented from the Pullman Company at 104th Street and Erickson Avenue for storage and shipping purposes. This space is made up of three long buildings, most of which have wooden floors and five lean-to's, which have, in the main, wooden floors. The entire storage at 104th Street is one story in height.

FUNCTIONS

The Stocks and Distribution Department is broken up by functions into four rough divisions, clerical, finishing, stock and order and shipping.

The clerical work is performed in three offices—the General Stock office, which is the control office for the entire department and is located in building 15-5, the Lacquer stock office which has the control of stocks in the Lacquer Department and is located in building 515-5, and the Shipping Department, which does all the paper work in connection with shipments leaving the Plant. No female help is employed in the Shipping Department. In the Lacquer Stock office, there are three women and three men. The General Stock office is composed of 14 men and 16 women.

The nature of the clerical work in all three offices is extremely erratic, following as it does very closely upon orders and production. In general, the work starts in the morning at an even rate with the tempo increasing rapidly until 11:30, when most every shipment must be in the Shipping Room. After lunch, at about 12:45, the pace drops back from the high period of between 10:30 and 11:30 but increases very rapidly until after the paper work on afternoon shipments

is completed around 4:30. Nerve strain is a large factor and during the heavy season which occurs in the Spring and early Summer months, the common "cold" is a disturbing factor. I believe there is some connection between this and the strain of the rush season. This was particularly so before the present General Stock Office was enlarged (October, 1936) to allow a greater spacing of desks and better ventilation.

The function of the Finishing Department, (Lacquer and Paint and Varnish), is that of labeling, casing and marking for stock or shipment all materials completed by the factory on orders which have been placed by the General Stock Department. The labeling is of two kinds—automatic and hand. For automatic labeling the labeling machine is used and in construction does not present serious accident hazards. Casing is done when the material comes out of the labeling machines and is done by men who lift the packages into solid fibre containers. In the past there has been a great deal of use of heavy trucks to transport material from the factory filling rooms to the sealing units. This is gradually being done away with by the use of additional conveying machines. The sizes which are filled and labeled by machine run from 1/4 pints to one gallon containers. Five gallon containers and drums are filled by hand and the five gallon cans are labeled by hand. The hand labeling is done almost entirely by female labor. Shellac and Special Paste are used for the labeling. The lifting of filled five gallon containers is done by men.

After the goods have been labeled, it is delivered by automatic conveyor to a sealing unit which automatically seals the cartons and delivers them on roller conveyors to the Stock and Order Department. The sealing machinery is automatic and as far as is known, has been made safe for operation.

In this entire Stocks and Distribution Department, there is little or no opportunity that we know of for occupational diseases, as the goods filled are all in liquid or paste form and are delivered

to our employees in a sealed can.

The function of the Stock and Order Department is to take materials from the Finishing Department, convey them to stock and fill orders as received. The conveying is done by means of hand trucks, the weight on which is usually approximately 1500 to 2000 pounds. Material going into stock in the Paint and Varnish is delivered on hand trucks by means of an elevator to the different floor levels from whence it is pulled to the various stock locations and the material is stacked. In the Lacquer Department, automatic conveyor delivers filled cases to any floor in the building, therefore elevators are not used except for five gallon containers and miscellaneous loads.

The filling of orders is in the main as follows: Broken lot items are packed from bins into cartons--full case items are filled from their stock locations from the different floors, trucked over to a chute which carries both miscellaneous cartons and full cartons to the Shipping Room floor. This manner of filling is handled the same at both the Lacquer and the Paint and Varnish. At 104th Street only full cases are filled, but as the building is approximately 900 feet long, a small Industrial Electric Truck with Trailers is used to pull the truck loads from the various locations to the shipping door on the south end of the building. A Baker Industrial Electric Tuck is used. It is also used to unload carloads of stock from Kensington to the 104th Street warehouse. This is a new piece of equipment on which we have not yet determined the exact value, although from studies to date it would indicate considerable value over hand trucking. The function of the Stock and Order Department in the Lacquer and Paint and Varnish ends when the goods are delivered on the Shipping Room floor.

The Shipping Department (excluding clerical work), has the responsibility of picking up material from the floor and loading it on motor trucks or into cars. This is accomplished by means of two wheel hand trucks operated by truckers who report to a checker for goods to be loaded into carload equipment. Most of the carloading is done by crews on a piece work basis. Miscellaneous LCL business is done by truckers and checkers on an hourly rate.

Warehouses--104th Street and 108th Street (Pullman)

The Company occupies a large area of floor space at 104th Street in the Pullman Company property, and a smaller space at 108th Street. These are used for warehousing of a variety of bulk packaged finished products, chiefly. Some raw materials such as terne plate are housed at 104th Street. Most of the stock consists of bagged lithopone, insecticides, packaged paint and varnish, barreled dry colors, et cetera. Some stocks of carbon black and litharge are kept. A considerable stock of white lead is handled.

The buildings are old type warehouses, without heat or hot water except in the small office where two small electric units are in use. Daylighting is adequate. No hot water is available; toilets and washrooms are not up to standard. The one in the 108th Street warehouse is dirty and out of order part of the time, constituting an unpleasant situation. No showers are available.

White lead is handled by four men at a time in wooden barrels from which there is seepage. Six carloads have been handled in a period of twenty days. The men are said to wear respirators while at work with this and litharge, which is handled in steel drums which also leak slightly. They are said to be instructed as to hygienic measures against lead. No lead disease is known by attendants. There is said to be considerable dust during handling, and some is noted around the storage places.

Lead arsenates, as well as other arsenates, are handled in the insecticides in large quantities. Much of this stock is in paper packages which break easily. Some open containers of this material are seen.

Dry chromates and many other dry colors are handled in wooden barrels at the 108th Street unit to the amount of about 20 tons a month. The work is chiefly done by one man and sometimes

BATES NUMBER 0007-SWP-000030335 NOT USED
IN THE NYC PRODUCTION

a helper. Seventeen men are employed at the 104th Street unit.

Hydrogen Sulphide

"Lime Sulfur," a trade product conteining calcium polysulfides along with other ingredients, is handled and stored among the arsenical insecticides at 104th Street. A marked odor of hydrogen sulfide is noted and is said to be present especially during the handling of these materials. The packages are paper bags placed in metal drums. Under fortuitous circumstances hydrogen sulfide in dangerous amounts may be involved.

Exposures:

1. White lead and litharge.
2. Arsenicals (lead, calcium, etc.)
3. Chromates
4. Sanitary defects in toilets.

Addenda

The absence of showers or hot water probably discourages thorough washing, and prevents bathing after handling toxic materials. Lunches are eaten in the office. Hot coffee is made there by the men. Water fountains are of approved type, supervised by the Medical Department of the Pullman Company.

See special section devoted to Lead Blood Examinations.

Waste Disposal

All waste is hauled to a common dump on the large vacant Property south of the Plant where it is burned. A variety of materials find their way here, including garbage, waste paper and wood, tin cans, scrapings, et cetera. The whole enterprise is supervised by the Yard Gang foreman who has one man devoting his whole time to disposal at the dump. Waste is hauled there in steel drums and either dumped or burned in the drum itself, which is later re-used. Of course, these drums often contain toxic materials such as lead compounds, solvents, or chromium compounds.

Salvage wood such as boxes and barrels are saved for employes to carry home for kindling, but these are selected by the foreman and burned if any question exists as to their containing known toxic substances.

One dweller near the dump is permitted to retrieve what she can from the waste. No others are permitted to do so.

Attention is paid to avoiding creating an unnecessary nuisance from smoke by burning chiefly at night and while a breeze blows toward the lake and away from the residence district.

Exposures:

1. Possible lead or other fumes and dust inhaled, ingested, or contacted by the handlers.

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Handlers of Waste Materials Occasionally May
Be Definitely Exposed to Injurious Substances

NEIGHBORING FACTORIES

On rare occasions, the workers at any one plant are damaged more by exposures from nearby plants than from their own work places. Dust, gases, vapors may be wafted across intervening spaces. Nearby noise may constitute definite disturbances, chemical rays, such as from arc welding, may bring about injury to eyes. On this account, this survey has considered these possibilities and records the following.

Only two plants are in the immediate neighborhood, the large Pullman Plant on the North and the Kensington Steel Company on the Southwest.

At the Pullman Plant, operations are limited to general car repair and these operations are approximately one block away. The most noticeable of operations is that of sandblasting. Although much dust is produced, it is sufficiently diluted as to constitute no hazard to silicosis to Sherwin Williams workers. It is conceived that the presence of this sand in the atmosphere may serve some detrimental purpose to the purity of products and particularly dyes. At the rear of the Pullman Plant, and in reasonably close proximity to the Sherwin Williams Plant, frequent and large fires burn up the waste created in the Pullman Plant. It is not known that any direct exposures are created by this process.

Manganese steel castings constitute the chief product of the Kensington Steel Plant, located across the street from the Lithopone Plant. Manganese is a well known toxic material, but its use in this neighborhood plant is not known to provide any undesirable condition for the Sherwin William workers.

The Pullman Railroad daily or nightly operates garbage or waste trains through the plant area of the Sherwin Williams Company. This leads to the appearance of myriads of flies about the Sherwin Williams properties, the assumpting being that these flies leave the garbage trains in the course of switching operations adjacent to the plant, or else these flies in part originate from the dumped garbage on the Pullman properties, approximately one mile away. Some garbage or effete material falls off

of over-loaded cars along the right away, leading to odors and the necessity for clean-up work on the part of this plant's yard crew. This is more extensively discussed in another section devoted to cafeterias, which should be read. In general, it is felt that the conditions described constitute a nuisance and that betterment should be had as the result of appropriate complaints.

It is the intent of this small section to make no claims that the workers of this plant are damaged by operations in any nearby factories.

GENERAL FACTORY OFFICE

This office is identified as the General Factory Office, where by far the major part of office work relating to all local manufacturing plants is performed. Some of the major activities are accounting, costs, payrolls, timekeeping, billing, handling vendors' and transportation invoices, social security, statistics and everything else relating to manufacturing and distributing activities. We also audit and supervise office work elsewhere performed in the manufacturing departments, besides inaugurating and maintaining all factory systems.

The staff numbers around 50 persons of which roughly 1/5 is male and 2/5 female. It is comprised of a goodly number of different nationalities and different religious creeds. Great care is exerted in selecting staff for this office (and other offices when required), one of the specific requirements being "good health".

Types of work performed are mainly accounting, clerical, comptometry, stenography and typing. Machine operators are all female. The supervisory staff is mainly one chief accountant and six chief clerks.

The office is located on 2nd floor Building 110 and occupies 2,542 square feet of floor space, which we realize is far too small, and we are completing plans to move into larger quarters. The girls' toilet room occupies 240 square feet, restroom 225 square feet, which we realize is entirely inadequate, and plans have been in process and are now being perfected for adequate conveniences. There are two toilets and two washbowls. The men have shared washroom facilities with the laboratory men in Building 111, which, by the way, is now torn down, and we are all getting along as best we can until being located in new quarters for which plans are being perfected.

The staff on the whole is efficient and healthy. Many work through a whole year without time off for illness. The average loss in time due to illness is perhaps 1½ days a person a year. Some years it has been as low as one day a person a year, the highest around 1¾ to 2 days when a single individual has had a serious illness lasting several weeks. Seeming-

ly less time was lost due to illness in the years of depression than in normal times. The majority are members of the company's Benefit Association, whereby, by paying small monthly dues, liberal weekly benefit is granted, plus lump sum at death. Most of the staff perhaps own their own homes or live in parents' own home. Many having autos fail to have coverage for damage insurance.

At times fumes from the laboratory underneath and from a couple plants have been noticed, but not enough to inconvenience anybody. There are no fire or other hazards around, and this office has an independent exit to the street readily accessible. Ventilation in the office could be better, and the location, 2nd floor, right underneath the roof, makes it very warm in the summer. Heat in the winter is plentiful. Lighting is satisfactory.

Office hours are from 8:30 A. M. to 5:00 P. M., 45 minutes off for lunch, Monday to Friday, inclusive, figuring 38 3/4 hours weekly. Girls are allowed 15 minutes rest period in the morning and afternoon.

A person steadily employed six months prior to July 1st gets one week's vacation with pay; if engaged 12 months prior to July 1st, two weeks are granted; managers and superintendents three weeks, higher elevated personage four weeks.

New quarters for the staff of this office are contemplated which will give the staff 3,650 square feet of floor space; girls rest and washroom 850 square feet; men's washroom 240 square feet.

A. M. SIMONSEN
Office Manager, Manufacturing Department

LUNCHROOMS

Including:

1. Tin Can Plant Lunchroom, third floor, Tin Can Plant.
2. General Office Lunchroom, on fourth floor of Building 15.
3. Utility Building Lunchroom, on second floor of Building 551.

History and Purpose

The General Office Lunchroom has been in operation for thirty years or more; the Tin Can Plant Lunchroom for about five years; the Utility Building Lunchroom since 1935. The purpose of these units is to foster pleasant relations among the employees and contribute to the development of an esprit de corps, as well as for the convenience of employees. The plant, of course, is now and has been even more in the past isolated from adequate food sources.

Personnel

Twenty three workers carry on the operation of the three units, including 22 women and 1 man, a janitor. One woman of this group is supervisor and an assistant for each unit is afforded. Several other persons devote some time and thought to the enterprise, including the Assistant to the General Manager, the Manager of the Employment Department, and the Purchasing Agent. No dietitian is employed.

Some women employees work only a few hours a day, but are paid about twice the prevailing wage for this class of labor and so can support themselves on shorter hours of work. The law is complied with in that no female worker is on duty more than eight hours per day. Employees are said to be "hand picked" by collaboration of those in supervisory charge of the units. Inexperienced girls are preferred because it has been found more satisfactory to train them as needed. Especial attention is paid to selection of a "high type" of girl with intelligence, alertness, courtesy—in other words "personality".

None except a routine physical examination is done on employment of women recruits. Attention is paid by the supervisor especially to cleanliness and neatness. Ability to keep neat under trying circumstances is looked for. Obvious lesions of the hands or other exposed areas are searched

In all Plants, the Provision of Wholesome Food at Low Costs for All Workers Serves As a Factor in the Health Conservation of Workers

for before and after employment.

Turnover of personnel is low because of good working conditions, adequate pay and careful selection.

Uniforms, two or three per week, are furnished to women employees, but are laundered by them.

Lockers and Washrooms

Lockers are provided in each unit, but more should be added to approach the ideal. From 2-3 girls share a lockers, and, while it is not a hardship, contributes to crowding and consequent slovenliness. Washrooms and toilet facilities are adequate.

Janitor and Waste Service

A full timemale janitor is provided for the General Office and Utility Building units, and a matron for the Tin Can Plant Unit, who cleans. Waste is removed by a garbage collector daily in steel drums.

Operation

Seven hundred patrons are served daily, five days a week, generally, except when the Tin Can Plant is shut down. Only lunch is served, from 11:30 A.M. to 12:45 P.M. An average of about seven to eight special meals are served at night for clubs of employees, college groups visiting, etc. In the fiscal year ending August 31, 1937, 141, 549 meals were served, an increase of about 26,000 over the previous year. Profits are not anticipated by the Company; the deficit, contrariwise, in the above mentioned year was considerable.

Buying of supplies is done by the Purchasing Department, subject to Company policy. Requisitions are submitted by the supervisor of the units, confirmed by the manager of the Employment Department and passed on to the Purchasing Department. Only high grades of foodstuffs are sought, even though this is more expensive in most instances. All foods are prepared in the units except pastry (other than pies) and bread. Pies are baked in the Utility Building Lunch Room in a modern oven. Meats and other major foods are prepared in the General Office Building Lunchroom and distributed to the other two. Serving is done from steam tables which keep the food hot efficiently. Attempt is made to estimate food requirements accurately and to cater to the particular tastes of the different

groups of patrons. For example, the General Office Building Unit uses less "heavy " foods than do the other units.

Staple and non-spoiling foods, such as canned goods, are bought in moderate quantities and stored in shelves.

Equipment, Housing and Sanitation

The two newer units are very well housed and so have less vermin and pest problems. The floor of the old unit is of wood with wide cracks, making it difficult to keep clean and presentable. It is scrubbed three times a week with soap and water and mopped as required at other times. Cupboards are metal lined to reduce rat trouble; rats are trapped as seen and are said to present no problem. Roaches are discouraged by poison used systematically around the walls and in corners.

Dishwashing is done in a suitable metal tub. A good grade of soap flakes is used to avoid dermatitis in the washer. "Linco", a chlorinated liquid, is used in strength of one cup to eight gallons on recommendation of the City Health Department, which makes periodic and surprise inspections.

An old type stove is in use in the General Office unit and its hood and ovens are exhausted by stack action to the roof. Gas is used for fuel. Modern coffee urns are used. Refrigeration is electric.

Ventilation is provided by rotary exhaust fans mounted in the windows.

Ping Pong tables are provided in two units.

Discussion

Transfer of the Utility Building Unit to Building 115, a new structure, is planned soon and this will provide more capacity for cooking of some foods which will relieve the General Office unit of some of this load.

Personal experience eating in these units leads only to praise of them. Food is excellent, served efficiently, amid surroundings congenial. The noise in the newer units might be mentioned as a source of annoyance, but probably not of much moment. It might be lessened by the use of a less resonant type of chair in future installations or using buffers on the chair legs. Use of soundproofing ceiling would help.

Following are the recommendations for eating facilities:

1) Because of the extensive exposures to dangerous materials in this plant, it should be the consistent policy to avoid the consumption of food by any person (some office workers possibly excepted) except in designated eating areas. It is conceived that the projected regulations of the factory inspection bureau of the state, operating under the new laws, will legally forbid the consumption of food in specified areas. In this plant, the need is not so much for cafeteria service as for space where workers may eat broughten lunches and still be apart from the exposures of their tasks.

2) In the Pigment Products Section, there is no cafeteria and only a much crowded and distinctly inadequate arrangement for the eating of broughten lunches. The recommendation is made that much more extensive space be provided where workmen may be able to wash their hands, in some instances change their attire, consume food brought in by them. At this time it is not felt that a cafeteria should purvey foods in this area, but at least some improvements are in order. It is possible that hot coffee and a few other items of food might be sent over from other units for sale purposes without the necessity for a full complement of cooking equipment.

No recommendation is made that any new building be erected or that these increased eating facilities be located at any point. It is understood that some plans are contemplated for a General Service Building in this area. If so, these plans for bettering the feeding facilities may be well made a part of the general scheme. These investigators are content themselves with the earnest recommendation that some changes be made and promptly.

3) The feeding unit in the Tin Can Plant is not well patronized and scarcely justifies its existence. If plans be made for the creation of a new building in the Pigment area, it is possible that this may be so located as to be readily available to Tin Can Department workers. In this event, the unit now in the Tin Can Building may be abandoned, if a detached building is erected for service purposes. There are many reasons for connecting this detached building with other buildings by

enclosed passages. The reason for this is that certain departments in the pigment area are hot operations. Going from hot areas to cold areas, such as is inevitable in winter, constitutes an outstanding exposure to pneumonia. For example, it is much more important that the furnace workers engaged in the manufacture of lead oxides should be provided a warm walkway to the service building than is true for the Tin Can Department, where with few exceptions there are no hot jobs.

4) In every eating unit in the plant, increased consideration should be given to the problem of bringing in the man who carries his lunch with him from his home. At the present time, the eating facilities foremostly serve offices, laboratory workers, foremen. The rank and file of workmen only to a limited extent patronize eating places. No workman is willing to eat his lunch, brought in a newspaper, along side of a more fortunate workman who feels that he is able to buy a .40¢lunch. On this account, adequate room should be set up in every eating place in which these workmen may feel at home and not embarrassed by the circumstances mentioned. It is noted that in the new building, now just about ready for occupancy, due consideration has been given to this problem, which should serve a very salutary purpose.

5) In the State of Illinois, insofar as known, no requirements are made for the special physical examination of food handlers. This is somewhat unusual over the country, since food handlers are prone more than other persons in the general environment to convey certain diseases to large numbers of persons. As noted in the body of this report, the food handlers in this plant are given only cursory physical examinations. It is now recommended that the occasional new employee in this division of the plant's work be subjected to a more extensive physical examination, including a Wasserman test. This examination should not be so extensive as to embrace vaginal tests nor examinations of stools. On the other hand, examination should be sufficiently elaborate as to eliminate the probabilities of food contamination by persons who are carriers of disease organisms, suffer from skin disease or who otherwise given evidences of capacity to convey diseases to other person. In addition, it is recommended that once each year all cafeteria employees be given a careful physical

examination with special reference to their freedom from the possibility of contaminating food and spreading diseases.

6) A peculiar problem arises in connection with food handling in this plant and to some extent all other plant activities. This is the problem of enormously large numbers of flies, which apparently enter the plant from garbage or waste trains which by chance are stopped in connection with switching immediately between two major portions of the plant lay-out. Trainloads of garbage or at least waste containing some food refuse are nightly brought out along the Pullman Railroad's main line, are stopped near the Company's properties and are switched over on to special tracks conveying this waste to nearby dumping grounds. Unfortunately, many of the cars are badly loaded so that much spillage takes place along the route traversed. Due to these two peculiar circumstances, hordes of flies are brought to this plant daily during the fly season and undoubtedly many millions more are hatched out on the nearby dumps. These dumps are so closely situated that flies very readily will cover the distance between this plant and their breeding grounds.

All food serving places and many offices are well equipped with suitable screening, but in spite of this fact flies are present in some places in uncounted hundreds. With every opening of the screen door, scores of flies may enter. The ordinary use of fly sprays and tanglefoot paper is not sufficient to remedy this summer problem. At the time of the preparation of this item, cold weather is beginning so that not until next year is it likely that this nuisance will again arise. Prior to that time, it is recommended that forceful letters be directed to Dr. Bundeson, of the Department of Health, and also to the Common Council. The very least that may be expected in the way of betterment is some improvement in the method of carloading so that spillage may not add to the offensiveness of the situation. It is possible that the Pullman Company may be caused to alter its rail route in order to avoid the nuisance being created for this large plant. Furthermore, some possibility exists that these cars may be sprayed with materials distasteful to flies so that they may not be hauled out of

the City into this section in large numbers. Furthermore, it is possible that improved methods in burying the waste on dump grounds may ameliorate the breeding situation.

All in all, it appears reasonable to maintain that the situation that has prevailed during the past season constitutes a definite nuisance, warranting forceful complaints against those responsible.

7) It is the desire of this section to recognize that the feeding facilities at this plant are of high order and that those persons in charge are doing an excellent job and continually are endeavoring to provide excellent food at low cost and to reach all classes of workers throughout the plant.

PERSONNEL AND EMPLOYMENT DEPARTMENT

This department occupies two rooms on the first floor of Building 551, with a small entrance hall used by both this department and the Medical Department, a total space of about 325 square feet.

It is the duty of this department to arrange for the employment of all the hourly help in the plant, keep complete records of the employees, see that the right type of employee is selected and placed on the job that they can best handle, arrange for the transfer of employees from one department to another as conditions require, and record all information needed for the proper record of each hourly employee. This office does not arrange for salaried help, except in rare instances, since this is taken care of by individual superintendents.

This office also assists the Medical Department in the handling of our Employees Welfare Association, acting as local secretary of the Association (see Medical Report). Mail is referred to this office for distribution to employees unknown in the Mailing Department.

The Employment Department tries to be of general service to all employees of the plant, assisting them in financial, domestic and general troubles that arise both in and out of the plant, and in and out of regular working hours.

All laundry (overalls, jackets, towels, etc.) and its repair is handled through this office. A sewing room is provided in Building 500A for the repair work.

The responsibility for janitor service of all girls' wash rooms in the plant (12 in number) rests with the Employment Department, also janitor service in the greater part of Building 551, except for the basement, which is cared for by Technical Service Department. Factory offices also receive janitor service through this office. In this connection, we employ five men who work 40 hours per week and one man who works for this department eight hours per week, spending the balance of his time (32 hours) in Receiving and Stores. For girls' rooms and sewing, we have one woman for forty hours per week and one that spends 26 in janitor service, balance of time, 14 hours,

in lunchroom (dishwashing).

This plant has three cafeterias, one located on the third floor of the Tin Can Plant, another on the second floor of Building 551 and a third on the fourth floor of Building 15. It is our duty to assist in the general operation of this service.

This office handles all inquiries, personal mail, or phone calls made from the outside to our factory help, acting as a "buffer" between the public and the plant employees.

The General Management desire that our salesmen know as much about the plant operations as possible and also that they invite friends of the company to visit this plant, as well as prospective customers. It is our duty to see that these visitors are properly greeted and shown the parts of the plant they are interested in, explain or have operations of the plant explained to them, also have them meet the department heads and other members of the plant in which they may be interested. Also, a number of universities bring their Chemical Engineering Classes here in order that they might be better acquainted with the physical arrangement of our chemical departments. The groups range from 25 to 75 students, usually spending the greater part of the day here, and in most cases luncheon is arranged for them in Building 15. We arrange for and store supplies for ball games, ping pong, cards, etc. used in the Recreation Rooms and general athletic activities.

We have in the Chicago Plant an Aid Association, known as the Sherwin Williams Employees Aid Association; the general function of this association is handled through this department under the guidance of Mr. J. Errington, President, it being the duty of the association to aid and assist any employee in the Chicago Plant who through no fault of his own is in difficulty either financial or otherwise. The funds are donated by general subscription. During the depression years, we aided our lesser fortunate fellow worker to the extent of several thousand dollars. During the last few years, this service has chiefly been used for the sick and distressed, also for old employees who are no longer able to work and former employees now on pension. In many cases money was loaned and repaid by

employees after returning to work.

All employees purchase orders for paints, mechanical storeroom supplies, overalls, coal, etc. are passed through our office. The orders for manufactured goods are checked to see that they are properly written up, that orders meet with the rules of the company and are passed to the Sales Department for filling. The orders for unmanufactured good are written up in this office and passed along for filling. The coal orders are placed by us direct with the source of supply, invoices for same passing through us to Billing Department. In general, this office is a "Service Department".

In the office we have one girl and two men, full time, two women janitors (one part time), six men full time and one part time, as outlined above. All are white, and 21 people in lunch service. The work is so divided in the lunchroom that some of the girls put in 2½ hours per day while others, more experienced, work as much as seven hours per day. One full time and one part time janitor are also employed in the lunchroom.

The total number of hourly employees is about 1500. Of this number there are 102 negroes, 57 Mexicans. It is rather difficult to give you the number of other nationalities, as they call themselves whatever their parents are before them, even though they may have been born in this country. There are approximately three hundred foreign born; also a small number of Polish, Russian, Scandinavian employees—in fact, almost every nation is represented.

The operation of this plant could be called seasonal, as it is the policy of the company to take inventory of both raw and finished goods the last day of each August. They naturally hold down the stocks as much as possible during July and August, this being the adjustment period, which seems to slow production, which makes the impression that the business is seasonal.

When it becomes necessary to reduce the volume of manufacturing and lay off hourly employees, the policy of the company has been to take in consideration the length of service, capability, and responsibility of the employee, and they are replaced on the same

basis.

Physical examination are not, as a rule, made when an employee has been off only a very short time. See Medical Report.

Labor turnover in the Chicago Plant is very small. The fact is that we are adding to our total number of employees rather than laying them off. It is the endeavor of the Employment Department to carefully select help which holds down the percentage of turnover. We have not, in the past, kept a record of this, but only recently started to keep this by months and we will have this information in a short time.

Absenteeism is being very closely watched by the management, and with the cooperation of the superintendents and foremen with medical and personnel departments, this condition is held down to a minimum, as follows:

The department head or foreman is requested by the management to send to the Medical Department each morning, by 10:00 A. M., a list of absentees in their department, showing, if possible, the reason the employee is not on the job. These reports are checked by the Medical or Personnel Department and when there seems to be any question about the employee's absence, they are visited by the doctor or a member of the personnel department to ascertain if conditions are as stated. Employees who for any reason are absent without permission are expected to report by phone or otherwise to the employment department as early as possible on the morning of their absence, advising in general why they failed to report for duty, and if, after receiving the report, the doctor or employment office are not satisfied, they take steps to verify the information. Employees knowing this are careful not to take advantage.

It is the duty of the Employment Department to try and select men that are best suited for the type of job that is to be filled, regardless of age or experience. This refers to factory general labor only. Salaried and technical men are of course selected for ability.

The greater portion of our hourly employees live within

walking distance of the plant, or at most a short street car ride from the plant.

Some of the features for the protecting of health of the employee are the use and supply by company of goggles, respirators, safety shoes, gloves, overalls, etc., when and where needed. Individual Superintendent's reports should cover this. Shower rooms are also provided.

The Sherwin-Williams Employee Credit Union was started in July, 1936, with a mere handful of members and has grown to date around 650 members and deposits of $33,000.00. The object is to create a fund whereby anyone on regular payroll may borrow money for "productive or provident" purposes. The borrower makes formal application for the loan; this is referred to the Credit Committee and if approved check will be issued to them, taking their personal note for the loan. Loans are made up to $50.00 on personal signatures. Larger amounts require security; co-signers are preferred. The Credit Committee reserves the right to ask for co-signers on small loans if they find the risk to be great. We have a large number of regular savers, as the main thought behind the Credit Union is to teach the employee to save a small amount each month and with this thought in mind the Sherwin Williams Company will make payroll deductions from the employees' checks and turn this amount over to the Credit Union for entry in the depositors' books, both in repayment of loans and for savings. The Company also provides office space and the greater part of the help needed to carry on the business of the Credit Union, but take no part in the running of same. This service has been found to be of advantage to a large number of our fellow workers, as it allows them to borrow money at a very low rate of interest (1% per month on unpaid balance). All loans can be repaid in full at any time.

The plant schedule is five days per week, Monday to Friday, inclusive, eight hours per day, but in some departments this is lengthened.

As noted previously, this Company operates three cafeterias, one in the Tin Can Department, one on the fourth floor of Building 16 and a third on the second floor of Building 551. These three cafeterias serve approximately 700 employees daily. It is the endeavor of the Company to serve the best lunch at the lowest possible cost. This service is provided for the employees without profit to the Sherwin Williams Company.

A few employees belong to the American Federation of Labor, that is electricians, steamfitters, machinists, carpenters or mill wrights. The remainder of the employees, for the most part, belong to The Sherwin Williams Employees Association, an organization independent of the Sherwin Williams Company.

The switchboard is located in Building 16, which is at the entrance of the general office. This service employs three regular girls and one relief operator. The board is in service from 8:00 A. M. to 5:15 P. M., Mondays to Fridays, inclusive, and from 8:30 to 12:00 noon on Saturdays.

SAFETY AND FIRE PROTECTION DEPARTMENT

General Description of Department for Dr. Carey P. McCord of the Industrial Health Conservancy Laboratories.

The Safety and Fire Protection Department office is located in Building 25. This building is 22' x 42', constructed of reinforced concrete roof and brick walls. The floor is concrete on a subgrade. The office occupies a space 12' x 12'; the balance of the building houses one of the 1500 gallons per minute fire pumps and a small shop for servicing the miscellaneous safety and fire protection equipment:

The Safety and Fire Protection Personnel consists of thirty-five men, made up of the following: 2 in a supervisory capacity, 1 office man, 1 foreman, 4 safety men, 25 watchmen, 1 special policeman and 1 janitor.

The activities of the Safety and Fire Protection Department are carried out by the above force, and the following brief paragraphs describe their duties:

The seven watchmen's rounds are covered during all shut down periods, nights, Saturdays, Sundays and holidays to protect the plant property against theft, fire or any other hazards.

To inspect periodically all safety and fire protection equipment.

To clean, paint and maintain all safety and fire protection equipment.

To recharge fire extinguishers annually or as they are used. This operation includes the few carbon tetrachloride type of extinguishers used in the plant.

To inspect and service all welding and other hazardous operations carried on in the plant.

To prepare fire reports and reports covering the losses by fire.

To cooperate with insurance company's inspectors and governmental inspectors which pertain to safety and fire protection.

The entire personnel of this department is drilled and trained to actively prevent fires and to fight fires if they occur. In addition to this, two fire squads, composed of the personnel outside of this department, are maintained and drilled monthly to fight fires. These two squads consist of one leader and seven men each. The men on night duty in this department are trained to be the fire fighting leaders to handle this activity outside regular working hours. In all events, the production forces are used in this fire fighting plan under the direction of these specially trained men.

This department is very much concerned about reducing the number of accidents and the number of fires which are occurring in the plant at present. Every effort is made to keep in touch with advanced methods and materials to assist with this work. Letters, posters and personal contact are used continuously to promote better results in this field.

Following is a general list of the safety and fire protection equipment in the plant. These are the common materials used for this work their functions are generally understood. This equipment is rigidly inspected and maintained by the department.

1 - 100,000 gallon water storage steel tank, on a 125' steel tower, maintains continuously static head on the fire protection mains.

1 - 425,000 gallon water storage tank, set on the ground, is maintained full of water for emergency protection.

2 - 1500 gallonper minute automatic fire pumps are connected into the fire mains for additional fire protection.

21 - fire hydrants, well distributed throughout the plant.

19 - hose houses containing necessary tools as well as hose.

57 - automatic sprinkler systems.

5000'- 2½" hose is maintained and tested periodically.

400'- 1½" hose

91 - fire axes

15 - fire blankets

57 - 2½ gallon soda and acid extinguishers

585 - 2½ gallon foam extinguishers

8 - 5 gallon foam extinguishers

2 - 25 gallon foam extinguishers

23 - 40 gallon foam extinguishers

1 - portable foam generator unit with two tons of foam powder on hand at all times.

1 - 40 gallon soda and acid extinguisher

27 - 1/4 gallon pyrene (carbon tetrachloride extinguishers)

33 - 5 gallon hand water pumps

27 - 2# CO_2 extinguishers

8 - 20# carbon dioxide extinguishers

1 - 50# carbon dioxide extinguisher

15 - 50# carbon dioxide cylinders connected to two automatic fire protection systems in the Lacquer Department.

6 - extension fire ladders

350 - sand pails

410 - water pails

12 - gas masks, the majority of which are equipped with all service cannisters

1 - Mine Safety Appliance hose mask unit to accommodate two operators.

1 - Mine Safety Appliance combustible gas indicator.

The underground fire mains are equipped with 49 post-indicator valves, controlling building fire protection systems and 25 section post-indicator valves for dividing and operating the system.

S. L. WINSLOW

Safety Department

Supplemental Information:

The Safety Department has 26 men who work on shifts. During the regular working week, Monday through Friday, they work two night shifts of eight hours each, and on Saturday, Sunday and holidays they work three eight hour shifts per day, each man, of course, only working forty hours per week.

These men are in the watching service and must cover the plant during the time described above. The employees on this work rotate their shifts by to week intervals.

There is no piece work payment in the Safety Department. All employees are paid either on the hourly or monthly roll as described in a previous report.

S. L. Winslow

The following several pages are excerpted from a report prepared by the Safety Department about September, 1956. In this report a number of recommendations are made, which in the main are laudable and justified. However, it is emphasized that this entire report and these recommendations, together with estimated costs represent the thought of the Safety Department in 1956. No less, this material is regarded as valuable, which thought has led to its inclusion here.

INFORMATION REGARDING THE SAFETY DEPARTMENT INCLUDES THE FOLLOWING LETTER SENT FROM THAT DEPARTMENT TO MR. W. S. STEVENS IN SEPTEMBER, 1936.

Per your instructions of August 25 that the Safety Department make a careful investigation of the Occupational Disease hazards - to which Superintendents May, Miller and Deeds specifically referred in their reports to you; Mr. Miller on July 16; Mr. May on July 15; Mr. Deeds on August 4:

In connection with Mr. Stephenson, I have made a survey of the departments to which reference has been made in the reports to ascertain just what the physical conditions were at this time; then, made a personal visit to the superintendents interested, and discussed with them at length the problems to which they had referred.

Then, a second physical survey was made, followed by a review of all the facts found and discussed with the superintendents and with Mr. McIntosh of the Engineering Department, with the view of ascertaining what could be done, or what should be done, and what it would roughly cost for accomplishment.

I think perhaps it would be well - before I give you my findings and recommendations with estimates - that you first consider some of the facts which I feel have considerable moment in connection with the problems discussed.

1. What has been done in our engineering design to forestall Occupational Disease possibilities?
2. Where do we stand in the light of the State Law pertaining to Occupational Disease hazards?
3. Are we giving our men a liberal break on Occupational Disease protection, as conditions are today?
4. Where do we stand with the citizens living around the plant and contacting it?
5. What can we do in a pattern of good common horse sense to meet these various situations as they exist, according to the superintendents and the Safety Department and in the future insure freedom from Occupational Disease hazards throughout the plant, and meet State pressure - should we not be able to obviate this specific menace?

Answering the first question: I found a complex situation here, in which there has not been enough preliminary engineering study, test work and proof of necessity.

There has been usually a compromise ground accepted rather than a guaranteed-result ground. This is often caused by delay of process, which at the time of conception is not sufficiently grounded in the minds of officials to permit a full swing, engineering study and subsequent deductions,

as well as a well-balanced estimate of possible expenditures - all of which indicates a need for better and more engineering thought on the subject, and the necessary time within which to do a satisfactory job.

Answering the second question: This is an important phase, as the State Legislature has recently passed a new bill on Occupational Disease hazards insofar as manufacturers are concerned, which supplants a bill that preceded it - recently declared unconstitutional. The new bill, I understand, is far more stringent in nature than its predecessor, and will force a definite change in plants not free from Occupational Disease hazards.

I have put in orders for copies of this new law from a number of points, but up to the present I have not received a copy. When I do, I shall give you a further report on the law.

In view of what is being done by the legislatures throughout the various states, and the general interest which is abroad through the Safety Council and many other organizations, it will become more and more imperative that manufacturers protect themselves by using every means possible to eliminate, as far as possible, Occupational Disease hazards.

Answering the third question: I feel that we are giving the men a good break if viewed from the average manufacturer's angle. We could do better, however, if the standard was raised although we would have sustained a greater expense in accomplishing it. Therefore, this third phase is one of relationship to what we consider good and sufficient.

Answering the fourth question: We know that we are hearing increased grumbling from the dwellers near and about the plant. We also know that when Doty Avenue is open to traffic, we shall not be permitted to fog this highway with fumes from chemical plants, which will - when atmospheric conditions are right and the wind is from the West - fog this highway to a point that could make it extremely dangerous for drivers.

The same deduction will apply to 115th Street, on which there will be heavy traffic flowing into Doty Avenue, when the latter is open; and fumes arising from the chemical group, with the wind from the south, will no doubt obscure the vision on 115th Street under certain conditions, to a point where we shall hear about it.

We also have obnoxious fumes in various degrees thrown off by our chemical processes. They shall, in time, have to be done away with in

some degree. Therefore, it is obvious that we shall meet a determined front by the citizenry hereabout and the highway officials, to clean up in a definite way.

REFERRING SPECIFICALLY TO THE SUPERINTENDENT'S REPORTS:

MR. W. A. MILLER, superintendent in charge of the P&V and Lacquer departments - Reference: July 16, 1956

1. Varnish Thinning. The corrections proposed by Messrs. Miller and McIntosh which consisted of the Spiral Coil, Water-cooled Covers (the same as used at Oakland, California, successfully), and a large Fan Duct System - are the approach to the trouble under consideration.

Estimated Cost Approximately ---------- $1,500.00

2. Mill Dressing. The dust collecting unit that is being used at present, is an improvement; and while - according to Mr. McIntosh - the machine has some faults and limitations, it does reduce the dust produced in the dressing of the mill stones and is about all that can be done in this specific case.

Estimated Cost Approximately---------- $ 100.00

3. Varnish Works. The meeting of the problem of fumes coming from kettle work is covered in Messrs. Miller and Snyder's general plan of attack and careful engineering, but this should be improved to a point of satisfaction as far as Occupational Disease hazards are concerned. However, I would suggest that the definite changes planned be most carefully engineered and fortified with dependable plans and specifications. There are many important phases in this problem which must be harmonized with whatever may be done ultimately with the proposed Synthetic Resin plant.

Mr. Miller, Dr. Synder, and Mr. McIntosh are necessarily forced to go slowly in any rigid planning at this time, awaiting a decision on the final Synthetic Resin plant plan. The changes which are contemplated at this time, are extended as far as they can go for the present; and the Engineering Department has them well outlined.

Estimated Cost Approximately ---------- $2,500.00

4. Base Lacquer. The situation of fume condition in the Base Lacquer Press Room is bad, and the present mechanics for handling it are not satisfactory. The fume situation is unfavorable from an Occupational Disease hazard viewpoint, especially. It is also a hazard from an explosive or fire standpoint.

Mr. Miller's thought on this situation is right; and in agreement with the Engineering Department, the Safety Department approves the general plan, which is a down-draft floor exhaust, with corresponding additions to the fresh air and heating area. Each press should have its own fume exhaust unit.

Estimated Cost Approximately----------$5,000.00

5. Turpentine Plant Fumes. These are the fumes about which the people living around theplant, and our employees in the plant, complain. However, Mr. Miller advises that they are now washing out this offending fume, but we understand that the wash water going into the sewers is still giving off obnoxious odors around Cottage Grove Avenue and 115th Street. This would indicate that something further is required.

No estimate on this; no plans available.

6. Chlorine Storage. The matter of Chlorine storage in the west end of Yard H, was thoroughly discussed with Mr. Miller; and in view of the attitude of the Factory Mutual Inspector - as evidenced by their report - the situation is of prime importance.

Mr. Miller agreed that a plan to put the chlorine cylinders in a concrete basement which could be flooded in case of fire is the best thing that can be done.

The plan to put this Chlorine storage on the lakefront is out of the question (this was an idea of the Factory Mutual representatives) because the chlorine would need to be transported from the storage location to the point of consumption - some 500 feet distance. This means that in the changing of cylinders at the storage point, air would get into the transfer line and destroy it.

Therefore, the present site will have to be used, if the Turpentine plant stays in Building 509A.

The Safety Department is agreeable to this plan and while I have not presented it to Mr. William Clark, Field Inspector of Factory Mutual, I am sure that he and his company will approve it, in view of the transmission trouble referred to.

To understand this trouble with the transmission line, one must understand that there is a definite rule with the manufacturers of Chlorine

that the user must always leave a definite pressure of Chlorine in the cylinders, in order that no air gets in and destroy them.

Estimated Cost for correction of storage in Yard H———————$4,800.00

7. Cotton Storage. This old subject was discussed with Mr. Miller and as he says, it can be met only in two ways.

First, we might build a basement to get the stock underground, in a position where it could be flooded with water. This calls for a large expenditure. Such an estimate was made a numberof years ago by the writer but did not meet favorably at that time. If it is to be reconsidered, necessary plans would have to be provided in order to submit a dependable estimate.

The other plan is to do as the DuPont Company does at its Chicago plant — keep the reserve stock out of the city and bring in each day the stock required for that day's production. Mr. Miller advised me that this is the way they operate under City instructions.

This cotton situation is before the Factory Mutual inspectors each time they check the plant, and they will no doubt refer to it regularly.

Pressure might also be exercised by the City when Doty Avenue is open, if they find the Company has large quantities of cotton stored close to such an important highway.

No estimate.

8. Blowing Fish Oil. Something will have to be done about the fumes arising from this operation.

Mr. Miller agrees, as does Mr. McIntosh that correction can be provided by increasing the character of sprays used. We all agreed to this.

Estimated Cost Approximately———————————————$ 600.00

9. Film Scrap. Factory Mutual complained about the storage of this stock. In fact, they consider it a very definite hazard.

We all agreed to this out of existing conditions and in discussing this phase with Mr. Miller he advises that if he had a metal cylinder open at one end as he plans to arrange it with vents, that it would be the nearest thing possible to reducing the hazard on this film stock to a minimum; because, if the film did flash n o damage would ensue.

Estimated Cost Approximately———————————————$ 500.00

MR. L. E. MAY - Reference: July 15, 1936.

In a review of Mr. May's report, the writer also discussed the various situations at length with Mr. H. J. Adams, Mr. May's engineer, who has been making extensive studies of the various troubles to which Mr. May refers. Mr. Adams has done a great deal of special work in this direction, and his ideas are well grounded on the various phases.

1. Azo Dye Department - Buildings 503, 504, and 505: This situation, as outlined by Mr. May is one that is hard to meet in any clearcut way, due to the type of buildings and the complete occupancy of these buildings with equipment, which practically means congestion.

However, after discussing the situation with Mr. McIntosh, I feel that with the general plans which the Engineering Department, Mr. May and Mr. Adams have worked out, we are all in agreement. Much work, however, will be required to get rid of the dust and fog; and careful planning, as well as liberal mediums, will have to be provided for, if we are to do the job right.

The work in these buildings on fog and dust, must all be laid out in complete plans, to be sure that we are right in what is to be done. Most of the fog or steam ducts will have to be of heavy copper or acid resisting material.

The dust equipment will need to be something on the Daracco order, to be efficient in reducing the Occupational Disease and explosion hazards.

Estimated Cost Approximately ---------- $7,000.00

2. Tobias Acid Department - Building 511: Mr. May's statements regarding Occupational Disease hazards have covered the situation, but itis a difficult job to square.

However, as he says, to simply remove the obnoxious fumes and vent them into the air, does not solve the problem. Mr. McIntosh thinks that a stack, sufficiently high to carry these fumes well above surrounding areas, might overcome the hazard by diffusion. This deduction, of course, is about right; as there can be no other system except one which would take these fumes and treat them so that they would be eliminated.

This would be a very costly system. However, Mr. May has some definite data in this respect. Accordingly, for the moment we arediscussing a high stack diffusion system.

Estimated Cost Approximately ---------- $10,000.00

5. Fuchsine Department--Building 516: We agree with what Mr. May has to say regarding occupational disease hazards in this department and realize that the building is so congested with equipment that it is impossible to make it a 100% job. If it becomes necessary to do this, the building should have in it only one-half its present equipment.

However, Mr. May's ideas as to the corrections that can be made are well balanced; especially his one idea to move the presses in the Anhydro Formaldehyde Aniline recovered from Aniline waters into a lean-to outside the present building.

Proper ventilation of the Fuchsine kettles should be provided. The big door on the East is not a sufficient answer, and the old ventilating system which has corroded out long since was not sufficiently large. Therefore, a new and adequate system should be provided on a sufficiently large scale to handle the fumes satisfactorily.

Estimated Cost Approximately ---------- $1,500.00

4. Bete Naphthol Department - Building 500: In reviewing Mr. May's statement regarding this department, we find that he needs relief here; and no doubt, occupational disease hazards are present.

The building is old and its roof is not equal to a snow load. It is poorly arranged, with improper ventilation of the fumes arising therein.

I have discussed with Mr. McIntosh this situation and I agree with him that to do this job right means a new roof structure and a proper ventilating system embodied therein.

Estimated Cost Approximately ---------- $15,000.00

MR. C. E. DEEDS - reference: August 4, 1936.

1. White Lead Department - Packing of Dry Lead. The arrangement of this equipment as it stands today, is an A-1 Occupational Disease hazard. When the production of the plant was not as great as it is at present, it would have been considered fair, but under existing conditions of maximum operations and output, it is bad. It should be generally and definitely improved, and it can be.

Estimated Cost Approximately ---------- $3,000.00

2. Litharge Plant. Here we have a similar condition as in Item #1, wherein the Occupational Disease hazard is rated A-1, and should be corrected generally as in the above case.

This should be most carefully engineered; and considerable study should be focused in this direction in order to do a complete and satisfactory job.

Estimated Cost Approximately ——————————————$7,500.00

3. Litharge and Red Lead Milling Department. This department, like items 1 and 2 is an A-1 occupational disease hazard and calls for a complete overhauling and improvement and will call for extremely careful and critical engineering, as it is a difficult job and strictly an engineering one.

There should be some advance test work done to determine the size of equipment and corrections to be made.

Estimated Cost Approximately ——————————————$15,000.00

4. Tan Bark Burner. I agree with Mr. Deeds' view of this situation. I also feel that a recovery of the lead dust would go a long way toward paying for the equipment, in addition to taking care of the occupational disease hazards.

This situation will require an induced draft, bag dust collecting system, which can be designed from some of the old equipment which the Company has at various points, or it can most certainly be made with a Daracco system, which would be very efficient.

Estimated Cost Approximately ——————————————$5,000.00

5. Black Ash Department. The situation in this department, as Mr. Deeds says, needs correction. I agree with him fully.

I find that there is an estimate of July 1, 1936, amounting to $61,729.00 for a complete changing of the raw material feeding arrangement which contemplates overcoming the occupational disease hazards in this area. This condition exists as the equipment stands today and it is the ground on which Mr. Deeds indicates that corrections will need to be made in some manner to reduce the occupational disease hazards to a satisfactory point.

Something should be done. This is an engineering problem and it must be done right, or a grievous mistake will be made.

Careful sketch studies and analyses should be made of dust counts and all the other factors which must necessarily be checked in order to develop the right kind of setup and to wipe out occupational disease hazards.

The heat from the tube must be properly met. It is very hard on the Feeder Attendant.

I agree that this department needs a cleanup and whether the plans proposed are right I cannot say, but the amount involved is sufficiently large to permit a real job if done. I am sure that occupational disease hazards can be readily reduced with the present setup, but it would involve the laying out of careful planning of cure.

The reel, screen and belt conveyors and elevators would have to be properly closed in and the dust they produce collected in a large, well balanced dust collecting system. However, as I have said before, it can be done only by a very carefully focused engineering study, in order to insure that whatever is put in will do the job.

Approximate Cost of Dust Prevention Equipment ——————$10,000.00

6. Lithopone Plant. There are a number of bad spots in this plant from an occupational disease hazard standpoint; the packer dust, the heat on the third floor and the dust at the calciners, also the handling of drhydrated zinc sulphate.

They are all straight engineering problems which can be met properly only by careful study, test, and preliminary layouts for definite proof as to equipment ability to the job satisfactorily. As I understand it, the plans for improvements in the Lithopone plant contemplate such corrections.

However, as I see the situation from the Safety Department's standpoint, to clean up the points we have in mind would cost:

Estimated Approximately ——————————————$10,000.00

FORWARDING THE ESTIMATED COSTS OF CORRECTIONS FOR DEPARTMENTS—AND TOTALS

Paint, Varnish and Lacquer Departments

Item No. 1	$1500.00
Item No. 2	100.00
Item No. 3	2500.00
Item No. 4	5000.00
Item No. 6	4800.00
Item No. 8	600.00
Item No. 9	500.00
	$15000.00

Chemical Products Departments

Item No. 1	7000.00
Item No. 2	10000.00
Item No. 3	1500.00
Item No. 4	15000.00
	$51500.00

Pigment Products Departments

Item No. 1	5000.00
Item No. 2	7500.00
Item No. 3	15000.00
Item No. 4	5000.00
Item No. 5	10000.00
Item No. 6	10000.00
	$50500.00

In the above Item No. 5, I have used the $10,000 figure as set up for strictly occupational disease hazards correction, which I assume is about the same in the Engineering Department's estimate of July 1, 1936, of $61,729.00, for the complete changes proposed for the Lithopone, Black Ash, and White Lead Departments.

FORWARDING THE TOTALS

Paint, Varnish and Lacquer Depts.	15000.00
Chemical Products Departments	51500.00
Pigment Products Departments	50500.00
GRAND TOTAL	$95000.00

THE MEDICAL DEPARTMENT

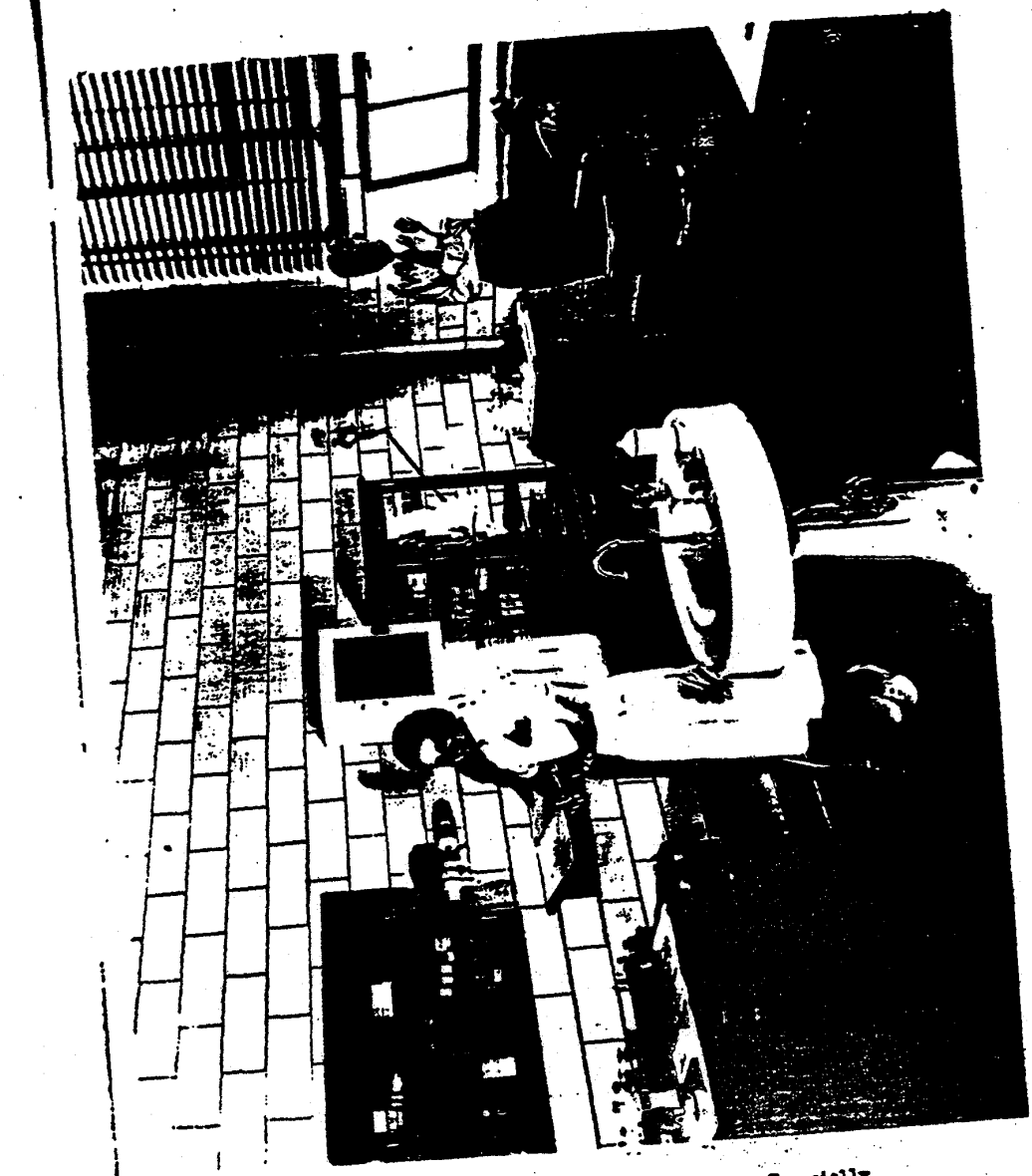
The Medical Department of the Chicago Plant of the Sherwin Williams Company is located on the first floor of the Allied Laboratories Building. It consists of a large general treatment room, one examining room, with toilet and shower, a small laboratory room and a private office for the physician. Adjoining this suite of rooms is located the employment and personnel department.

The staff of the Medical Department consists of one physician and a graduate nurse, who devote their full time to rendering medical and surgical service to employees within the plant. This service does not include medical or surgical care to employees whose medical or surgical needs have arisen outside of any relation to their place of employment. This matter will later be discussed in more detail.

The Medical Department is open five and one-half days a week, from Monday to Saturday noon. The hours are from 8:30 A. M. to 5:00 P. M. Each department of the plant has been provided with a first aid kit containing all necessary dressings and bandages, antiseptic solutions, ointments, a small bottle of aromatic spirits of ammonia and some aspirin. This has been found to serve adequately for the usual minor casualties arising during the closing hours of the medical department. However, should it be necessary to provide more for the patient, the Medical Department is accessible at all hours to the Night Superintendent in charge or to those under his supervision. Each department foreman is responsible for the upkeep of the first aid kits. The supplies as needed are furnished from the well kept stock of the Medical Department.

Scattered throughout the departments of the plant are stretchers on which a patient may be placed and carried to the medical office. It has been advised that patients injured by falls not be moved until the plant physician has been summoned, to ascertain the possibility of a fractured extremity or back injury in order to direct the movement of the patient.

A few pair of crutches are kept on hand in the Medical



High Type of Medical Services are Especially Desirable in Plants Manufacturing Chemicals

Department in order that they may be available if the occasion demands.

In the more serious cases that may arise out of office hours, the patient is removed to the local Roseland Community Hospital, about 1½ miles distant from the plant. If the case is ambulatory, he is transported to the hospital by some available automobile; otherwise, an ambulance is called. The plant physician is immediately called and informed of the accident. Upon his arrival at the hospital, he is first cared for by some member of the resident interne staff. Following this, the plant physician is called by the hospital, at which time the details of the extent of injury are given and if necessary further orders given. Should the injury require hospitalization, the patient is kept in the hospital; otherwise, after having received attention, he is either returned to work or taken to his home. If he is hospitalised and all needed care administered and the patient made comfortable, he is seen by the next morning and continued to be cared for by the plant physician. Should the injury be of the more serious nature, the plant physician goes to the hospital as soon as possible. Furthermore, the hospital has been instructed in cases of a more grave and serious nature to immediately call some member of the hospital staff who may more likely be able to reach the hospital before the plant physician. In reference to this latter mentioned matter, it has never been necessary to call in an outside associated physician, and but a few times has it become necessary to see the patient before morning, for all had been done in a satisfactory manner. This so-called hospital first aid care and hospitalization management has worked out very well, for by it the care, welfare and the comfort of the patient has been expedited other than left until the plant physician could be reached and able to get to the patient. Thus the element of waiting time for medical attention has been practically eliminated.

In severe cases, as for instance, the involvement of badly fractured more important bones of the body, these cases are referred to surgeons specialised in their respective fields for surgical management.

In my opinion, the judgment of this type of case is most important, for by so doing one feels the more likelihood of anciticipating the best end results. Even cases of the most stubborn dermatitis that are not amenable to ordinary treatment are referred to a reputable dermatologist. However, in cases of mild or severe lead intoxication, the writer feels that he is capable to manage the case.

Between 11,000 and 12,000 cases are seen in the Medical Department yearly. Prior to this current year, about 7000 were what we term "surgical cases", in which some form of dressing or instrumentation was used. The remaining cases are termed "medical cases", in which patients are treated by some medication in the dispensary, such as colds, headaches, some temporary gastro-intestinal disturbance, etc. A supply of ordinarily used pharmaceuticals are kept in stock, as is also antitetanic serum. In addition, a carbon dioxide inhalation apparatus and a tank of oxygen are kept on hand for resuscitation purposes. Up to this writing, its use has not been indicated.

The policy of the company and the writer is not to assume the responsibility in the follow up treatment of illnesses not occupational in origin or not plant liabilities. The incipient stages of these illnesses may be seen and detected in our medical department and are immediately sent home, if condition are so indicated and advised that their private physician be consulted. At some time during the stage of his or her illness and absenteeism, the writer may non-professionally call, particularly should the employee be a member of the Benefit Association, which will be discussed later in this report.

The pre-employment examination is made according to the salmon-colored 6 x 9 card herewith attached, which will be self-explanatory. This examination includes both men and women who work in the factory on the hourly payroll. The examination of women is not as detailed as that of the men. The men and women on the monthly payroll who work in offices are not examined.

There has been, up to this time, no routine physical examinations for employees already at work. The present staff would be entirely inadequate to attempt this procedure. There are, however, during the course of the year, many employees laid off from the various departments who sooner or later return and are subsequently re-examined upon their return; thus, a great number are re-examined once or even more times a year.

Inspection examinations are made at least once a month on all employees engaged in the manufacture of lead products. This examination does not include the routine examination of the blood, but is confined to the observance of objective signs indicative of plumbism. The signs looked for are for lead line of the gums, tremor of the tongue, lips and other muscles of the face, signs of anemia evidenced by the characteristic pallor of the face and mucous membranes of the mouth. By virtue of this contact and inspection of the employee, he thereby has the opportunity to relate any subjective symptoms that he may have. Should a further investigation be indicated, this employee is called into the Medical Department, where a further examination, including blood, is made.

The Martin-Senour Company employees, engaged in the manufacture of lead containing products, are given this same objective sign inspection examination once a month.

In briefly commenting on the needs of the Medical Department, the present staff is quite adequate to meet the demands under the present general routine, although at times they become very busy and various matters are delayed until time can be found to accomplish them. Should the practice of routine re-examinations be made on all present employees, or should blood and other laboratory work routinely be inaugurated, the present staff could not possibly take care of the situation. In my opinion, the carrying out of the two above mentioned routines would necessitate the services of a part time assistant physician and a full time laboratory

technician to thoroughly and efficiently carry out this program. Furthermore, should these above mentioned practices become routine, the present medical housing quarters would be much too small on account of the lack of sufficient examining rooms to carry out these examinations with any degree of expediency.

As to the possible needs within the plant, as viewed from a medical standpoint, it is the writer's opinion that there are locations in which hazardous dust concentrations and fumes exist that may have an influence on the men employed in those environs. Inasmuch as the present survey will cover this investigation, it is hoped that we may ascertain the existing facts and that remedial measures may be instituted.

As regards the workers who are obliged to wear respirators, goggles and other safety devices, I might suggest that a more careful supervision be made of these men to constantly remind them of the necessity to guard their own welfare, and that offenders be given some penalty compatible with the degree of their negligence.

MATTERS OF COMPENSATION

The Sherwin-Williams Company is a self-insurer, operating under and subject to the Workmen's Compensation Act, the Workmen's Occupational Disease Act and the Health and Safety Act of the State of Illinois. The provisions of these acts are specifically stated within their respective editions obtainable through the Industrial Commission of the State of Illinois at 205 West Wacker Drive, Chicago, Illinois. The provisions for the enforcement of these acts are invested with the Industrial Commission.

In the handling of compensable cases, a report of the accident is made on our form attached, #21 x 25 also on form #45, provided by the Industrial Commission. Should the disability run over two weeks, a partial compensation form, #45, is made out and payment due made to the employee, he signing the receipt for same. At the termination of his disability, the green form #55 is made out, according to the terms of the blank. If the case is that of an occupational disease, the pink form O.D. 45 is made out. All of the above mentioned blanks are made in triplicate, one copy being sent to the Commission, one to our

Insurance Department in Cleveland and one retained by the Medical Department. A weekly and daily record is kept of all sickness and accident cases on attached form 55x1, which is self-explanatory. Copies of same are attached.

The white and salmon colored, 6 x 9 cards, attached, are kept in the Medical Office for a more detailed account of any case.

The trend of our compensable accidents is injuries, particularly to the feet, hands and eyes, the former being more prevalent. However, in our no lost time accidents, the anatomical order of injury is hand, eye, head, feet, arms (excluding hand), legs (excluding feet) and trunk of body.

Our chief occupational disease is that of lead intoxication. The frequency of cases is not great. There have been but about 20 cases of bona fide lead intoxication during the past five years. Other occupational cases have been two of carbon tetrachloride intoxication, but this was due to an accident of a batch running over and splashing about the floor and one workman remaining about too long, inhaling the fumes. This incident will probably never occur again, as it was but an experimental procedure and the method of handling at that time incorrect.

The writer has observed a few cases of mild acute anilinism, evidenced by cyanosis of the lips and finger tips. A short removal has readily cleared up the effects of these fumes. There has been only one case that had any illness of any consequence and he had completely recovered in four days.

Occasionally, mild cases of dermatitis are seen, more on the hands, occasionally blotches on the arms, legs and feet. This condition has been of but very little consequence as protective measures such as protective skin creams and gloves are used in handling materials prone to cause skin irritation. We have had no dermatitis cases which have run into periods requiring the payment of compensation. I am inclined to believe that some of the cases of dermatitis seen are a part or wholly due to a ring worm infection, particularly those seen about the feet.

The cost of compensation for accidents do not have a very constant average—it may vary from $2500.00 to $10,000 a year, depending upon the number and severity of the cases. This figure includes all costs relative to the accidents, such as compensation, hospital, physicians, fees, lump sum settlements, etc.

The occupational diseases seen in order of their frequency are dermatitis (although mild and rarely troublesome), lead and vapors.

BENEFIT ASSOCIATION

The Benefit Association of the Sherwin Williams Company is a mutual benefit association amongst the employees of the organization. A copy of the constitution and by-laws is herewith attached, as is also an application blank for membership. The details of each of the above are contained within the printed matter.

Within a year's time, approximately $9000 is received as dues, deducted monthly from the pay checks of members. The yearly amount paid out to members will range from $6,000 to $7,000 for disabilities due either to illnesses or accidents. The resultant accumulative surplus is for the purpose of having funds sufficient to care for the additional benefits received in cases of death. The central office of the Benefit Association is located at the Cleveland Office of The Sherwin Williams Company. The local Benefit Association business of the Chicago plant is managed by the plant physician, benefit payments to employees being made through his office.

THE SHERWIN WILLIAMS EMPLOYEES AID ASSOCIATION

This is a Chicago plant organization, in which funds are voluntarily pledged by the employees for strictly charitable purposes to needy employees and their immediate dependents. The details of this organization may be best discussed by the Personnel Department. The organization is under the supervision and direction of Mr. James Errington, Assistant to Mr. W. S. Stevens, General Superintendent.

G. R. HESS, M. D.

The many medical forms furnished as a portion of this report are omitted because of lack of available space.

REVIEW OF 1935-1936 ACCIDENT RECORD

During the 1935-36 fiscal year this plant had a total of accident and surgically treated cases amounting to 6812. This number includes both the lost time and no lost time cases. In addition to this number, there were 4267 medically treated cases. This makes a grand total of 11,079 cases having been attended. However, I shall confine my comments to only the Accident record.

In considering the magnitude of the plant and the large number of all accident cases, there were but 74 cases of lost time. The lost time per accident ranged from one day to 251 days. The total number of days lost for the 74 cases was 589.

It may be of interest to you to know something of how the respective departments shared in these lost time accidents. The following is the record:

The Paint & Varnish and Stock Departments contributed 15 accident cases with a total loss of 21 days.

The Lead Plant had 7 cases with a loss of 67 days.

The Insecticide Department - 2 cases - 18 days lost time.

The Chemical Products Department - 4 cases - 36 days lost time.

Lithopone Department - 8 cases - 48 days lost time.

Dry Color - 7 cases - 70 days lost time.

Power Department - 1 case - 1 day lost time.

R & S Department - 4 cases - 28 days lost time.

Mechanical Department - 11 cases - 262 days lost time.

Tin Can Department - 9 cases - 77 days lost time.

The following Departments were free from list time accidents:

Coal Tar

Service

Acetic Acid

Lacquer

Watching & Safety

To these departments we owe congratulations, but were I to present a trophy to the department most deserving of such, I should have to concede the Lacquer Department the greatest consideration, for the reason that their

average number of employees is greater than the combined number of employees in the other four departments free from lost time accidents. To these other four departments honorable mention is due.

Let us now give our attention to the various parts of the human anatomy that were involved in all of our accident cases. The following are the facts based on a complete check up on the total of the 6600 cases.

Hand injuries head the list. 65% of all our accidents occur on the hand between the wrist and the finger tips. The eyes are next, contributing 15% of the total casualties. Should not this be sufficient reason why we should constently demand the use of Safety goggles? I some time ago briefly mentioned the fact that we have been having too many eye casualties. Fortunately but a comparative few have resulted in seriousness, but every small accident is a potential serious affair. The loss of an eye is nothing short of a tragedy. An injured eye has no trade in value on a gless eye.

Injuries to the head, exclusive of the eyes, was third, contributing 6% of our accidents.

The arms and feet are next, each represented by 5% of our accidents. Accidents to the leg represent 4% of our cases, and lastly, 2% of our injuries were on the trunk part of the body, chiefly the chest and back.

Let us now consider the parts of the anatomy involved in only our lost time accidents.

Injuries to the feet head the list with 18 cases, causing a time loss of 402 days. The eye was next with 4 cases, causing a time loss of 82 days. Next, the hands with 4 cases with a loss of 35 days. Next, the back with 5 cases with a loss of 35 days. Next, the legs with 5 cases with a loss of 19 days. Next, the arm, with 2 cases with a loss of 16 days, and lastly, the chest with 1 injury, a fractured rib, with but 1 lost day. Had this last case been a laborer, the time lost would necessarily have been greater.

The explanation of injuries to feet causing a greater loss of time is easy. There may be but one toe involved in an accident, but this toe cannot be so well protected and isolated as with a finger of the hand. Furthermore, he has to walk on the injured member which also may be impossible. But we have a remedy againstinjuries to feet by the encouragement of the

wearing of safety shoes which this plant has advocated and will provide at a reasonable cost. The wider use of this safety measure is through education alone- compulsion should not be necessary.

Likewise, we have a remedy against eye injuries which has previously been mentioned, in the use of Safety Goggles without cost to the employee. In case of a serious eye injury, where should the responsibility lie? Has he been instructed to obtain goggles, and if so, has he been instructed to wear them at all times when the eyes may be in danger?

The loss of time due to eye injuries is obvious. The eye causes much pain; often hospitalization is necessary to receive the frequent attention. A man trying to work with but one good eye with a painfully injured one lays himself liable to some further injury.

Severe injuries to hands, arms and legs always make for lost time accidents, for by these members our daily work is done. Unfortunately, we do not have the safety appliances protecting the hands as we have for the feet, other than the use of rubber or leather gloves which offer but little protection to traumatic injuries, but we do have a mind which is capable of anticipating impending or possible injury, if that mind has had the importance of Safety-Mindedness impressed upon it.

Let us now turn to the subject of our Accident rate as relates to the day of the week. The relation ot the day of the week to the accident frequency has somepractical importance in that if a certain day can be expected to produce more accidents than another, more caution should be exercised on that day and perhaps more and closer supervision should be in readiness.

The results of a study of this problem made by the writer revealed some interesting facts. The periodof time covered by this study extended from September 1, 1955 to August 31, 1956. During this past fiscal year, the number of employees has remained practically constant, thus making the study quite satisfactory.

The study shows very clearly that the last day of the working period was productive of the smallest number of accidents. This is not due to failure to report minor accidents, for the employee is more careful than usual, for he does not want anything to happen which might interfere

with anticipated enjoyments over the week-end.

Let us further see if a logical explanation or interpretation can be made as to what the day of the week might have to do with accident frequency.

Monday is the most dangerous day because the men have lost their stride. They are in a small way learning their jobs anew. In addition, a fair number of employees have lost more sleep than usual over the week end and perhaps more than the usual glass of beer or glass of cheer have been imbibed.

On Tuesday the conditions of Monday are present to a less extent. The employee obtained a good night's rest and is more capable of being on guard. By Wednesday and Thursday he has attained his normal stride, for he has had two more full nights' sleep and rest.

Now comes Friday. It is pay day and with a week-end holiday in mind, the employee is pepper up, more alert, more careful, and what happens? The accident rates make a decided drop.

Here are the figures after the analysis:

29% of all our accidents occurred on Monday

19.5% " " " " " Tuesday

18.3% " " " " " Wednesday

18% " " " " " Thursday

15.2% " " " " " Friday

Let us now briefly review a few specific lost time accidents during the past year.

An employee last October stepped on something slippery on the floor and fell, striking his back on an angle iron. His time out was 16 days.

The direct cause of this accident might possibly be charged against Plant Housekeeping. Spilled paint, oil or even water on a floor may put a man out of the business of working. One of the best things that can be done to prevent accidents is to keep your work place clean and orderly.

Our prize case of the year was that of a man who fell from the top of a ladder while working with a new pipe wrench, using both hands. Well, after the wrench slipped, he went to the Hospital, and before he could return to work, he took the count for 251 days for a fractured wrist and a crushed heel bone.

Another man in using a hand axe, missed his mark and struck his knee and he was put out of commission.

Similarly, another man speared his foot with a pronged fork. Infection set in, but he got by luckily, for he was benched only 17 days.

Another man was pushing a truck, slipped and fell, and for his reward he collected one sprained ankle, a fractured bone of the foot, one pair of crutches and 27 days in which to learn how to use them.

Another man stepped down from a ladder. He expected the floor much sooner, but it wasn't there, for he thought ht was on the first rung, but he was on the second. When he was picked up and taken home he was ahead a badly sprained ankle, a wrenched knee, a pair of crutches, but was out 21 days.

Another fell off a low stack of packed cartons, trying to pile the stock a tier higher than was customary. Result - 14 days.

Another man wearing ordinary shoes stepped into a pool of strong Caustic Soda. The pool was caused by a stopped up drain. This was truly a case of "hot dogs" and was good for 28 days.

Then there was a woman who slipped the end of her finger under a power press. Well, that joint was cleaned out, if you know what I mean, and she got a sentence of 27 days.

Most of these aforementioned cases were acts of pure carelessness on the part of the worker.

So much for arms and legs.

Let us now see if we have had any eye cases.

Here is a man who was skimming off hot soldering flux when a splash caught him in the eye. The judge said, "What, no goggles?— 40 days."

Another man was opening a stop cock on an acid line of a storage tank which had become corroded, necessitating some force to turn. The core of the stop cock broke, and acid splashed out into the face and eye. Burns put him out of business for 17 days.

The placing of the charge of the responsibility of our accident cases is not for me to decide. You have read a few of the cases with their diversified causes and effects. In fairness to all concerned, we must concede that the causes of accidents lie at times wholly with the employee

and on the other hand, much too often upon the fault of the employer, but regardless of the proper placement of the cause, the liability of the effects always become the obligation of the employer and becomes an object of reflection upon the department wherein the employee was in service.

In conclusion, let us endeavor not only to talk and think this business of safety, but to set ourselves and our respective departments up as a stage and act it.

If we talk Safety; think Safety and act Safely, we shall go a long way in being able to sell it, for the product is in great demand; very little, if any, investment is required by the workmen, and the dividend returns in the form of sound minds and sound bodies will be worth the effort.

G. R. Hess, M. D.
Superintendent, Medical Department

ALLIED RESEARCH LABORATORIES

Department - Allied Research Laboratories, occupying third floor and one-half basement floor of building 551. Area occupied - 7200 square feet on the third floor and approximately 3000 square feet in the basement.

27 employees (25 men and 2 women), white, and native born, according to the best available information.

This Department is devoted to research work on pigments, oils, varnishes, and their combinations as formulated into paints and enamels.

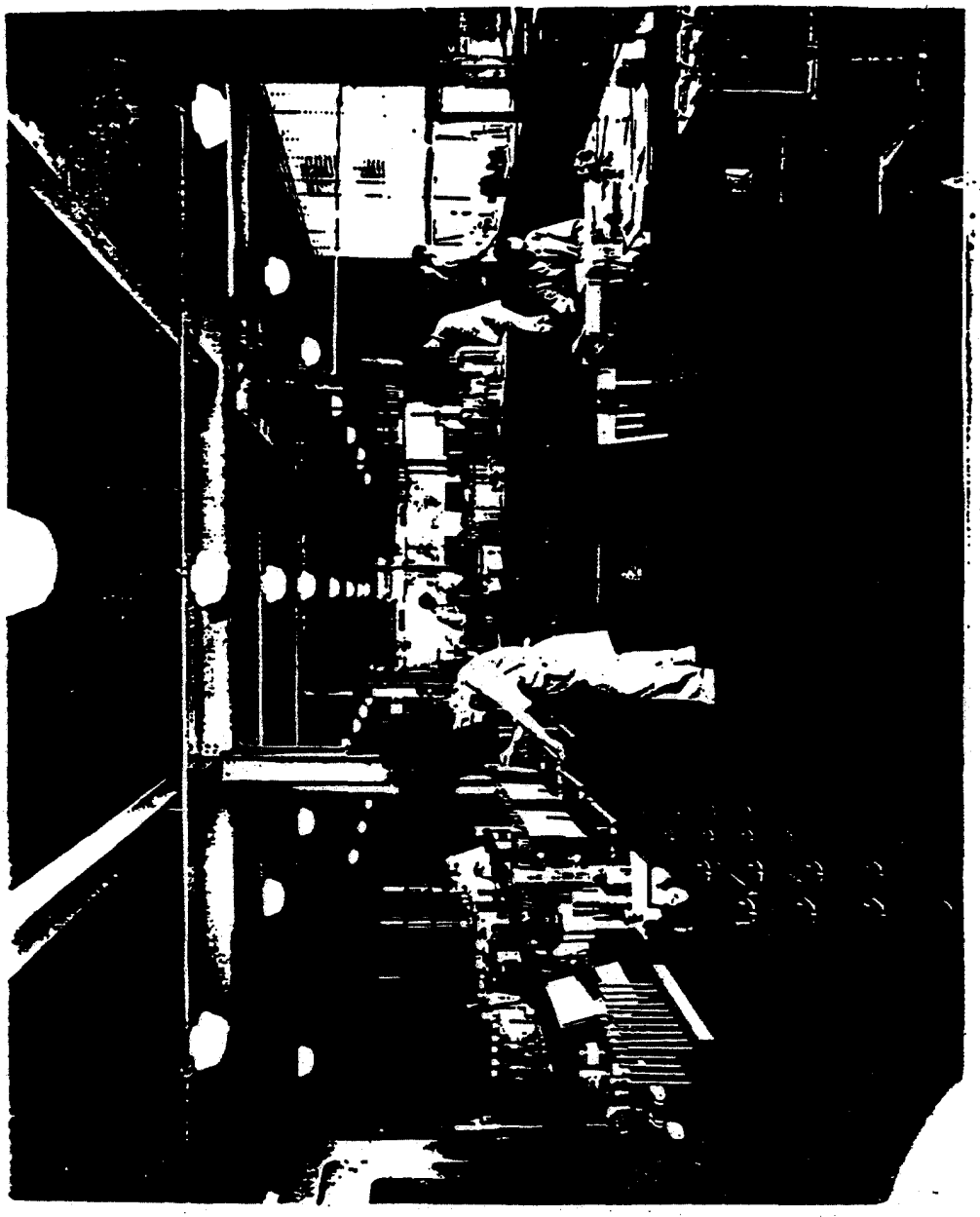
There are no definite products or intermediates produced by this Department. Involved in the research work, obviously there are prepared many small experimental batches which cover the range of varnishes, oils, paints, and enamels produced by the company.

The raw materials may roughly be divided into two classes: (1) dry pigments; (2) raw materials for oils and varnishes, i. e., resins and oils.

A large part of the machinery involved is chemical and scientific apparatus. In addition, we have one experimental Stewart Bolling two-roll mill, one experimental 8 inch Kent three-roll mill, a battery of small stone mills and iron mills, one experimental Day mixer. There is no production machinery in the department.

We believe that the department can be considered as kept in exceptionally sanitary condition, free from dust or vapors.

Included in the equipment is a commercial size DeVilbiss spray booth, which is exhausted by high velocity fan, which creates a velocity of wind at the front of the hood more than sufficient to comply with State regulations. All operations of chemical analysis which require fuming are conducted under a chemical hood, with positive draft. The varnish hoods are of fireproof construction and exhausted with airplane type fans. They are all metal or wired glass, flanged to prevent the overflow of any varnish batch which might foam over, and with gas and electrical connections available outside of the hood for easy control in case of fire. All large ovens are vented to the outdoors. The varnish thinning is done under a



Technical Laboratory Research Connected with Paint and Other Coating Production. The Same High Type of Technical Work should be Extended to Worker Protection

down draft suction, vented to the outside. For the above reasons, there are no real concentrations of vapors or dust out in the room proper. All mixing of the small batches is done in the basement, in order to prevent a concentration of pigment dust in the third floor laboratory. The amount of this work is small.

All dry pigments are kept in closed, tin cans or cannisters, and all volatile cans are kept covered. All the wash tables containing volatile thinner forthe cleaning of apparatus are kept covered, or the lids when raised are protected with chains and fuses in case of fire. The ultraviolet lamp in the Weather-Ometer is protected with a curtain to prevent damage by anyone looking directly at the light.

The noise level in the department is admittedly rather high for office conditions because of the high frequency sounds from the various fans, spray booth, etc. Another contributing factor is the four Modine heaters used for heating the third floor laboratory. Because of this reason, our conference room has a sound-proof ceiling. To assist in overcoming the difficulties presented by the high sound level, anti-side noise transmitters are used on our telephones and the Varnish Research Division have an amplifier on the telephone.

In view of the outline given above, it is obvious that we believe the department in general has been carefully controlled for safety factors. This opinion, however, should be determined in consideration of points now mentioned.

There are certain unavoidable features involved in the construction of the laboratory which have caused some complaints. The first is the exceptionally high temperature in the summer time, which should be ameliorated by fans, the sprinkling of the roof, or some type of air conditioning. In the winter time the open construction of the stairway, coupled with the fact that the building is used as exit and entrance for the majority of the employees, makes it impossible to maintain a draft-free and comfortable temperature in the laboratory at the intervals when the majority of the factory workers are coming in or leaving the plant. This should be handled by cutting off the third floor through partitions and doorways.

Another difficulty is, that while the men's locker and wash rooms are large and clean, they are in the basement, whereas the majority of the

men are working on the third floor. The rest room for the women employees is far too small.

Also, the entire building should be screened, because the workers are bothered badly by flies, probably attracted by the cafeteria.

C. D. HOLLEY

Director, Allied Research

RAW MATERIAL CONSUMPTION

Lacquer Plant
(Fiscal Year 1935-36)

Code No.	Name	Consumption	Composition
3	Silica	79,620 lbs.	SiO_2
8	Tuscan Clay	2,293	Aluminum Silicate
15	China Clay	96,848	Aluminum Silicate
19	French Ochre	95	Hydrated Iron Oxide
20	Asbestine Pulp	15,700	Magnesium Silicate
20L	Talc #482	721	$CaCO_3$
21	M S Raw Turkey Umber	297	Fe_2O_3, MnO_2, $CaCO_3$, SiO_2 and silicates
22	Burnt Turkey Umber	2,537	" " "
25	W L Raw Italian Sienna	2,871	" " "
26	F F Burnt Italian Sienna	3,061	" " "
27	#1575 Van Dyke Brown	856	18% H_2O, organic matter
32	DB Cosmic Black	486	19% C, 81% Calcium phosphate and $CaCO_3$
54	#54 Oxide	605	Fe_2O_3 and silicates
101	Hi-Tone Carbon Black	2,979	Carbon, 100%
104	#400 Lamp Black	5,267	"
132	132 Red Oxide B	587	Fe_2O_3 and silicates
214	#214 Oxide	11,170	Fe_2O_3 and silicates
267	Zinc Dust	175	100% Zinc Powder
292	Aluminum Bronze	334	100% Aluminum
306	C P Barytes	11,405	$BaSO_4$
316	Oxalic Acid	9	Oxalic Crystals
354	Mapico Black	3,405	Magnetic Iron Oxide
402	Oil Mahogany	9	Soluble Organic Dye
405	Spirit Soluble Nigrosine	107	Aniline Dye
406	Oil Soluble Fat Brown Dye	56	Soluble Organic Matter
407	Fat Orange Dye Oil Soluble	9	"
408	Fat Yellow Dye Oil	6	"
410	Calco Oil Soluble Red 410	2	"
416	Oil Soluble Nigrosine	15	"
435	Powdered Tartaric Acid	5	
440	Magnesium Carbonate	256	
461	Albalith	31,415	Lithopone (ZnS and $BaSO_4$)
478	Chrome Oxide	222	Sesqui-oxides of chromium
482	Metanil Yellow	30	Organic Dye
485	Blue Black Nigrosene (Water Soluble)	2	Aniline Dye
488	1450 Graphite	11,355	Carbon and Silicates
528	Super Spectra Black	10,652	100% Carbon
547	Aluminum Stearate	256	
566	Whiting	7,705	$CaCO_3$
587	Vac Dry White Shellac	25,185	
622	Chemical Hydrated Lime	14	
630	Ester Gum	140,085	
637	W W Rosin	3,254	
1087	Gilsonite	790	Asphaltum or Pitch
1097	Titanox B	17,307	Titanium Oxide, Barium Sulfate
1112	Spirit Copal Gum	1,075	Natural Resin
1117A	XXX Antimony Oxide	14,107	
1120	Refined White Shellac--Wax Free	11,519	

Code No.	Name	Consumption	Composition
1128	S P Fumed Litharge	521 lbs.	Lead monoxide
1132	Mapico Yellow Lemon	1,567	Monohydrate of Ferric Oxide
1145	Alizarine Lake Maroon	45	Organic pigment
1189	Benzol Black	502	Carbon
1191	Oil of Ebony	6	Organic dye
1194	C-C-O Whiting	5	$CaCO_3$
1195	#75 Cosmic Black	50	Carbon and Calcium Phosphate
1200	Malachite Green	1	Organic dye
1206	Slate Flour	6,209	Silicates--mostly aluminum
1208	D.S. Lithopone	51,489	High ZnS Lithopone
1211	#1211 S Raw Turkey Umber	100	Fe_2O_3, MnO_2, $CaCO_3$, Silicates
1214	#1214 S Burnt Italian Sienna	110	Fe_2O_3, MnO_2, Silicates
1219	Pelenite	8,349	Aluminum Silicate
1224	Manila Gum	1,127	
1225	(1286) Residue	4,452	Alcohol, insoluble damar gum
1226	Nitrocellulose	108,044	Cellulose Nitrate) Wet with
1227	15 Second Cotton	7,265	" ") denatured
1228	4 Second Cotton	15,022	" ") alcohol
1229	50-50 Second Cotton	68,461	" ")
1230	1/2 Sec A S Cotton	488	" ")
1237	Amberol BS 1 Light	508	Synthetic Resin
1238	A B C Damar	59,432	Natural Resin
1239	Damar Gum D & E Grade	90,440	" "
1246	Soapstone	35,352	$CaCO_3$
1247	DBB Manila Gum	4,195	Natural Resin
1267	Batu Scraped E. India Nubs	1,350	Natural Resin
1271	Titanox C	6,011	Titanium Dioxide, Calcium Sulfate
1400	Chinese Blue	3,303	Iron Blue
1401	Ultra Blue #302	6,615	Silicates and trace of sulfur
1402	High Vis Dope Cotton	25,047	Cellulose Nitrate
1403	Pure Titanium Oxide (or Titanox A)	2,380	
1404	Bronzing Cotton-40"	4,887	Cellulose Nitrate and Alcohol
1405	" " 1/2"	156	" " "
1408	" " 25"	2,288	" " "
1409	Zinc Stearate	18,955	
1410	Venus Silver #602	6	Aluminum Powder
1411	Patent Green #705	2	Aluminum Powder and dye
1412	Roman Gold #404	1	Powdered Brass
1413	Fire #516	10	Powdered Brass and Dye
1414	Rottenstone	1	Mixed Silicates
1415	Black Kadox Zinc	827	ZnO
1418	Resyl #12	40,890	Alkyd Resin
1419	Synthetic Resins	15,044	Alkyd Resin
1420	PXC Cotton	222,784	Cellulose Nitrate and Alcohol
1421	Superior Lining Bronze	1,252	100% Aluminum Powder
1423	1/4 Second Cotton RS	193,102	Cellulose Nitrate and Alcohol
1426	Calco Lac Black B	4,460	Organic Dye
1427	Oil Black #47535	99	Organic Dye
1428	PIP Cotton	568,955	Cellulose Nitrate and Alcohol
1429	Glyco Wax	8	Water and wax emulsion
1430	Super Mapico Yellow	7,657	Hydrated Iron Oxide
1431	Resyl #19	5,856	Alkyd Resin
1432	Water White Film Scrap	22,921	Cellulose Nitrate and Camphor
1433	1/2 Second PX Cotton 7606	3,755	Cellulose Nitrate and Alcohol
1434	Amberol Gum #801 Light	16,672	Synthetic Resin
1435	National Orange A Conc.	3,799	Organic Dye
1436	National Durol Black Conc. 2B	1,115	Organic Dye

Code No.	Name	Consumption	Composition
1437	National Azo Yellow Conc.	702	Organic dye
1438	National Fast Red S Conc.	455	" "
1440	Synthetic Resin	29,418	
1441	350 Mesh Bentonite	2,735	Mixed Silicates and organic matter
1442	Gum Tragacanth	662	Natural Resin
1443	Eg-Glo	12,384	Zinc Tungate
1444	Necmerpin S A	1,408	Organic Soap
1445	Hydro Wax	2,191	Water Soluble Wax
1446	5/8 Sec. PIP Cotton	154,202	Cellulose Nitrate and Alcohol
1447	9 Second Nitrocellulose	45,089	" " " "
1448	White Star Timonox	5,206	Antimony Oxide
1449	Damar Seeds	35,652	Natural Resin
1450	National Oil Yellow #2681	206	Organic Dye
1509	Snow Floss	7,821	Silica
1510	#641 Bone Black	25,207	Carbon and calcium phosphate
1528	Cumar Gum 1/2 Color	7,282	Synthetic Coal Tar Resin
1535	Gold Bronze	111	Powdered Brass
1536	Aroclor #1254	51	Chlorinated Synthetic Resin
1538	Zinc Sulfide	25,299	ZnS
1550	#650 Lead Free Zinc Oxide	22,267	ZnO
1552	ON 110 Hy Flow Super Cel	1,917	Silica
1575	Beckacite Gum #1001	20,195	Alkyd Resin
1583	Super Black	5,557	Carbon
1721	Permanent Green X 1010	40	Chromium Oxide
1728	Carbon Black	5,794	Carbon
1737	Carbolac #1	213	Carbon
1751	Nubian Resin Black	2,184	Organic Dye
1762	Cadmium Red Light	1,802	Cadmium Selenium Sulfide
1795	Medium Cadmium Red	1,200	Cadmium Selenium Sulfide
1797	Better Black	5,492	Carbon
1820	Carbolac #2	7,440	Carbon
1828	Standard Lining— 200 Mesh	1,305	100% Aluminum
1829	Cook's HG-11 Resin	45,550	Alkyd Resin
1831	Chinese Blue X-882	8,945	Iron Blue
1835	Pulverized Visco Glue	55	
1846	U S P Citric Acid	13	
1900	Siegle Blue 05922	586	Iron Blue
1901	Low Oil Absorption Titanium Oxide	180,458	
1905	Aluminum Ink H	2,585	Aluminum Paste
1904	Pure Rubber Smoked (#1 Ribbed Sheet)	769	
1905	PX Cotton	19,487	Cellulose Nitrate and Alcohol
1907	Cook's HG 15-Resin	141,746	Alkyd Resin
10109	Dark Para	189	100% Organic Red Pigment dyestuff
10189	Toluidine	5,930	100% organic red pigment dyestuff
10322	Alizarine Lake	6	
10330	Permanent Orange Toner	9	100% organic dyestuff
10333	Lt. Para Toner	2,642	" " "
10352	Harmon Maroon A 4760	305	" " "
10361	Permanent Red Toner	1,008	" " "
10612	Orange Pulp	126	Chrome Orange in Oil
10641	Lt. Chrome Yellow Pulp	4,092	60% 12307, 32% (1634), 8% xylol
10642	M. Chrome Yellow Pulp		75% 12010, 18.8 (1634), 6.2% Xylol

Code No.	Name	Consumption	Composition
10645	Orange Pulp	2,046	77.8 12084, 19.2 (1634), 3.0% xylol
10680	Dark Para Pulp	7,001	10109 dispersed in synthetic resin solution
10681	Chinese Blue Pulp	19,539	Iron Blue dispersed in synthetic resin solution
10682	Chrome Orange Pulp	1,270	12084 dispersed in synthetic resin solution
10685	Lt. Chrome Green Pulp	8,263	11212 dispersed in synthetic resin solution
10684	M. Chrome Yellow Pulp	5,431	12010 dispersed in synthetic resin solution
10685	Lt. Para Pulp	2,622	10333 dispersed in synthetic resin solution
10686	Iron Blue Pulp	16,061	Iron Blue dispersed in synthetic resin solution
10687	Dk. Chrome Green	6,898	11215 dispersed in synthetic resin solution
10688	Toluidine	5,298	10189 dispersed in synthetic resin solution
10689	Iron Blue Pulp	5,529	Iron Blue dispersed in synthetic resin solution
11023	C P Chinese Blue	184	100% Iron Blue Pigment
11024	C P Chrome Green	2,060	65% Lead Chromate, 4% Lead Sulfate, 31% Iron Blue
11025	C P Chrome Green	2,778	85% Lead Chromate, 8% Lead Sulfate, 7% Iron Blue
11077	C P Chrome Green	125	78% Lead Chromate, 6% Lead Sulfate, 16% Iron Blue
11096	C P Prussian Blue	2	100% Iron Blue
11166	C P Potash Blue	1,155	" " "
11167	C P Non Bronze Blue	5	100% Iron Blue
11212	C P Chrome Green	6,828	83% Lead Chromate, 10% Lead Sulfate, 7% Iron Blue
11215	C P Chrome Green	1,252	41% lead chromate, 3% lead sulfate, 56% iron blue
12007	C P Chrome Yellow L.	16,406	72% Lead Chromate, 28% Lead Sulfate,
12010	C P Chrome Yellow M.	28,104	100% Lead Chromate
12011	C P Chrome Orange M.	5,865	65% Lead Chromate, 4% Lead Sulfate, 31% Lead Oxide
12012	C P Chrome Orange, D	4,844	60% Lead Chromate, 40% Lead Oxide
12054	C P Zinc Yellow	2,456	100% Zinc Chromate
12069	Tartrazine Yellow Lake	4	Organic Dye
12074	C P Primrose Yellow	150	46% Lead Chromate, 52% Lead Sulfate, 2% Aluminum hydrate.
12077	Med. Chrome Yellow	1	98% Lead Chromate
12082	C P Chrome Orange M	755	60% Lead Chromate, 40% Lead Oxide
12084	C P Chrome Orange DD	4,749	60% Lead Chromate, 40% Lead Oxide
12101	Permanent Yellow	2	100% Organic yellow pigment dyestuff
12507	C P Chrome Yellow L.	715	69% Lead Chromate, 31% Lead Sulfate
12510	C P Chrome Yellow, M.	7,018	94% Lead Chromate, 6% Lead Sulfate
12511	C P Chrome Orange M	10	61% Lead Chrome, 3% Lead Sulfate, 36% Lead Oxide
D1935	C P Chrome Green Ex. Lt.	5	
D1951	Blue Pulp	168	Iron blue dispersed in synthetic resin
D1956	Red Pulp	44	Toluidine dispersed in synthetic resin
D1968	Lt. Chrome Yellow Pulp	501	Chrome Yellow dispersed in synthetic resin solution
D1987	Yellow Pulp	2	Chrome Yellow dispersed in varnish
D2015	Orange Pulp	50	Chrome Orange in oil
D2034	Yellow Pulp	1,757	Chrome Yellow dispersed in synthetic resin
D2114	Orange Pulp	44	Chrome Orange dispersed in castor oil
D2121	Blue Pulp	1,812	Iron Blue Paste
D2136	Blue Pulp	391	Iron Blue dispersed in synthetic resin

Code No.	Name	Consumption	Composition
On165	Celite	122	Mixed Silicates
	Dehydrated Nitrocellulose 1/4 Sec. Cotton	14	Cellulose Nitrate
	Hansa Rubine R	1	Organic Pigment
	Hansa Rubine G	1	Organic Pigment
	Rezyl #408	1	Alkyd Resin
	Methyl Amyl Ketone	50	
CY2614	26188 Paste Wood Filler	544	Silica and asbestine paste
CY3751	21980 " " "	110	" " " "
CB190	White Base	543	Kadox (ZnO) ground in oil and gum
CB 267	BB920 Black Base	122	Graphite ground in oil and gum
CB 371	Toluidine Base	16	Org. Red ground in (2111)
CB 427	Fire Red Toner Base	22	Organic Red ground in resin, oil and plasticizer
CB 456	BM 933 Maroon Base	89	Org. Maroon ground in gum and oil
CB 494	Maroon Base	67	Org. Maroon ground in (1634) and (1620)
CB 495	Blue Base	565	Iron Blue and Kadox ground in (1634) and (1620)
CB 496	Orange Base	1,008	Chrome orange ground in (1634) and (1620)
CB 497	BB 1003 Black Base	1,305	Carbon, " " "
CB 498	B R 1004 Red Base	519	Organic Red " " "
CB 499	Bl 1012 Blue Base	457	Ultramarine blue " " "
CB 500	Yellow Base	1,412	Chrome Yellow " " "
CB 501	White Base	1,677	TiO_2 " " "
CB 502	BR 1007, Red Base	564	Toluidine Red " " "
CB 503	Lt. Yellow Base	828	Chrome yellow " " "
CB 504	BO1015 Iron Oxide Base	406	Iron Oxide " " "
CB 505	Green Base	187	Chrome Green " " "
CB 750	BM 1016 Maroon Base	15	Organic maroon " " "
CB 751	BG 1002 Green Base	768	Chrome Green " " "
CB 752	BR 1001, Red Base	261	Organic red " " "
CB 753	BL 1006, Blue Base	458	Iron Blue and Kadox " "
CB 755	BW 1009, White Base	1,690	TiO_2 " " "
CB 756	BG 1005, Green Base	193	Chrome Green " " "
B564	BR 911, Red Base	1,200	Organic Red ground in oil and gum
B567	Red Oxide Base	1	Iron Oxide ground in gum
B568	Maroon Base	17	Organic maroon ground in oil and gum
B576	BG 922, Green Base	578	Chromium Oxide ground in gum and oil
B581	Hansa Yellow Base	6	Organic Yellow " " " " "
B727	BG 925, Green Base	58	Chromium Oxide " " "
B759	Brown Base	28	CW 666 ground in synthetic resin
BB202	Black Base	55	Carbon Black ground in synthetic varnish
BG250	Green Base	83	Chromic Oxide " " "
BL202	Blue Base	17	Ultramarine Blue " "
BW150	White Base	14,126	D.S. Lithopone ground in oil
BW250	White Base	50	Titanox C ground in synthetic varnish
BM229	Maroon Base	10	Organic maroon " "
BX 74	Burnt Sienna Oil Paste	51	
BX 543	Permansa Red Base	40	Organic red " "
BX 656	VanDyke Brown Base	264	VanDyke Brown, Aluminum Stearate in oil
CP 65	Scarlet 2RR	21	Organic Dye
CP 81	Bismark Brown	19	" "
CP 81R	" "	125	" "
CP 97	Lana Fuchsine	1,164	" "
CP 124	Acid Claret B	20	" "
CP 254	Graphic Red	331	Organic Red Pigment
CP 240	Acid Blue Black Ex. Conc.	6	Organic Dye
CP 281	Lake Red C	333	Organic Red Pigment
CP 313	Maroon Pigment	1	" " "
CP 351	" "	4,609	" " "
CP 368	Rubinox Red	1,458	" " "
CP 395	Naphthalene	16	
CP 456	Methyl Violet Ink	94	

Code No.	Name	Consumption	Composition
CP 480	Naphthalene	456	
CP 558	Solfast Sky Blue	22	Organic Blue Pigment
CP Iron Blue #2 Paste		8	Iron Blue and Vehicle
CW 556	Cellulose Acetate	55	
CW 565	Japan Black	1	Organic Dye
CW 568	Induline Base B	15	Organic Dye
CW 617	Film Scrap	84	Cellulose Nitrate and Camphor
CW 619	Film Scrap	188	Cellulose nitrate and Camphor
CW 627	Raw Turkey Umber	200	Fe_2O_3, MnO_2, $CaCO_3$, silicates
CW 648	Cellulose Nitrate	17,616	(Wet with Alcohol)
CW 690	Talbot Slack Lignite	58,408	Humus
CW 695	Golden Cadmolith	926	Cadmium Sulfide and Lithopone
CW 699	Nat. Fast Wool Yellow Cl.	968	Organic Dye
CW 704	Resyl 12 H	4,054	Alkyd Resin
CW 717	Nigrosene J Powder	781	Organic Dye
CW 722	5" N/C	129	Cellulose nitrate and alcohol
CW 733	RBH TiO_2 Paste	26	TiO_2, nitrocellulose thinner
CW 754	RBH Super Spectra Black	3	Carbon, nitrocellulose, thinner
CW 749	Air Floated Rose Tripoli	1,705	Mixed Silicates
CW 755	XR 5180	3,839	Bakelite Resin
CW 757	#2471 G. E. Co.	14,271	Alkyd Resin
CW 760	RBH Yellow #5	12	Chrome Yellow in Nitrocellulose and Thinner
CW 767	#2450 G.E.	1,461	Alkyd Resin
CW 777	RBH Yellow #6	2	Chrome Yellow in nitrocellulose and thinner
CW 780	Iron Oxide	1	
CW 784	#2477 G. E.	15	Alkyd Resin
CW 797	Erie Black GX-OO	517	Organic Dye
CW 828	GRS Black	503	Organic Dye
CW 830	Cellulose Acetate	28	
CW 832	Crocaine Scarlet M.P.O.	142	Organic Dye
CW 851	6" N/C	4,543	Cellulose nitrate and alcohol
CW 853	Vinsol #1	3,028	Turpene Resin
CW 862	28" N/C	1,125	Cellulose nitrate and alcohol
CW 865	Shellac	1,476	
CW 875	18-25 " N/C	199	Cellulose nitrate and alcohol
CW 881	60" N/C	3,574	" " "
CW 882	175" N/C	4,871	" " "
CW 884	Orange Cadmolith	2,765	Cadmium Sulfide and Lithopone
CW 897	Ethyl Cellulose	4	
CW 916	1919 dry Water Oil Blue Dye	16	Organic Dye
CW 919	Prussian Blue A4525	5	Iron Blue
(2)	Raw Linseed Oil	92	
(13)	Boiled Linseed Oil	51,275	
(14)	Steam Distilled Turpentine	35,043	
(30)	Solox	46	Denatured Alcohol
(38)	Paint Oil	5,944	
(44)	Superior Varnish Oil	597	Alkali Treated Linseed Oil
(63)	VM&P Naphtha	15,719	Petroleum Solvent
(113)	#1 Castor Oil	27,117	
(114)	Wood Alcohol	42	
(116)	Pentosol ASPM-D-519-30-T	214	
(140)	China Wood Oil	1,794	
(141)	S-W Kerosene	727	
(149)	90% Benzol	23,962	
(152)	Cobalt Drier	85	
(181)	Resinate Grinding Varnish	76	
(185)	Resinate Drier	1,424	
(187)	Methyl Acetone	1,225	

Code No.	Name	Consumption	Composition
(188)	Elaine Red Oil	5	Oleic Acid
(235)	Camasol ACM	15	Turkey Red Oil
(241)	Toluol	3,167,502	
(295)	White Steam Distilled Pine Oil	48	
(308)	Oil of Citranella	7	
(350)	Alcohol SD 1	972,365	Denatured Ethyl Alcohol—Form. #1
(348)	Oleum Spirits	81,852	Petroleum Solvent
(392)	Oil Drier	77	Hard Gum, Linseed Oil, Turpentine
(423)	Blown Refined Soya Bean Oil	2,927	
(429)	Grinding Varnish	24,117	
(434)	C P Glycerine	10	
(435)	Sinclair #2 Paraffine Oil	2,650	
(440)	Resinate Oil Drier	435	
(566)	Manila Gum Solution	917	Manila Gum and Alcohol
(584)	Xylol	1,574,777	
(604)	Oil of Sassafras	4	
(690)	98% Sulphuric Acid	240	
(780)	Manila Gum Solution	1,024	Manila Gum and Alcohol
(798)	Non-break Linseed Oil	1,876	
(864)	Formaldehyde	705	
(1164)	Grinding Varnish	2,162	
(1167)	Butanol	527,805	
(1168)	Ethyl Acetate	552,689	
(1170)	Butyl Acetate	609,049	
(1185)	Wood Oil Varnish	72	
(1248)	Cobalt Resinate Drier	3,121	
(1257)	High Flash Naphtha	77,249	
(1273)	Ret. Raw Soya Bean Oil Varnish	58	
(1519)	Damar Gum Solution	102	Damar Gum in alcohol and xylol
(1521)	Shellac Substitute V3521	1,586	Manilla Gum Solution in alcohol
(1620)	Dibutyl Phthalate	85,066	
(1621)	Kronitex AA (Kavalco) Tricresyl Phosphate (Monsanto)	55,347	
(1622)	Ansol M	4,496	
(1634)	#15 Castor Oil	64,179	Blown Castor Oil
(1656)	Cellosolve	52,571	
(1671)	Sec. Butyl Alcohol	989	
(1682)	Butyl Cellosolve	59,107	
(1686)	L. D. Naphtha	1,655,043	
(1687)	Grinding Base	224	Ester Gum, Tricresyl Phosphate
(1720)	V-3325	44,568	Varnish
(1767)	Anti-Shining Agent	6,425	Guacol
(1808)	Alcohol	501,585	Denatured, Form. #1
(1828)	C P Acetone	15,972	
(1840)	A D Oil #1404 Beckasol	1,496	Alkyd Resin
(2033)	Creosote	4	
(2046)	Butyl Lactate	19,906	
(2049)	Dipentine	51,011	
(2055)	V-8045	11,758	Grinding Varnish
(2102)	Synthetic Varnish	43,199	
(2111)	" "	99,297	
(2118)	" "	29,112	
(2119)	" "	5,812	
(2122)	" "	3,135	
(2129)	" "	26,928	
(2132)	" "	219,068	
(2135)	" "	27,557	
(2142)	" "	55,484	

Code No.	Name	Consumption	Composition
(2143)	Synthetic Varnish	59,344	
(2150)	" "	54,021	
(2241)	V-7404, Oilsolate Drier	29	
(2242)	V-5996 Resinate	112	
(2247)	V-9225)	19,868	Pb-Mn-Co drier
(2501)	V-8809	1,252	Heat Treated Vegetable Oil
(2511)	Varnish	4,575	
(2511) W	V-8574	428	Heat bodied wood oil
(2590)	Treated Linseed Oil	160,581	
(2456) B	Anti-Wrinkling Agent	1,562	
(2602)	Methyl Cellosolve	15,154	
(2610)	Carbitol	451	
(2611)	Isopropyl Acetate		
(2614)	White Rose Oil	10,214	Mineral Oil
(2615)	#9 Refined Oil	7,375	Mineral Oil
(2616)	#1000 Castor Oil	49,214	
(2617)	Methanol	209,515	
(2621)	9% N/C Solution	888	Cellulose Nitrate Solution
(2624)	Methyl Amyl Acetate	192,095	
(2625)	Secondary Amyl Acetate	26,828	
(2638)	Shingle Stain Oil	141	Coal Tar Solvent
(2639)	Methyl Ethyl Ketone	125,705	
(2646)	#1 Hydro Solvent	14,615	
(2649)	Ester #5	555,594	Pentacetate and secondary butyl acetate
(2650)	Di-Acetone Alcohol	1,320	
(2662)	Paraplex R G 260% Soluble	15,491	Synthetic Resin solution in
(2663)	Paraplex 5 B 80%	24,855	"
(2664)	Resyl x-215	12,068	"
(2665)	Glyptal 20 x 71	5,997	"
(2666)	High Gravity Glycerine	7,040	
(2667)	#1524 Beckasol	7,517	Alkyd Resin Solution
(2668)	Anhydrous Alcohol	41,551	
(2746)	Blending Varnish	553	
(2960) A	Mixing Varnish	5,815	
(3028)	Apco Thinner	408	Petroleum Solvent
(3060)	98% Glycerine	15	
(3081)	Triethanolamine	806	
(3085)	Para Thinner	4,481	
(3097)	Beckasol Resin Solution	19,220	Synthetic Resin Solution in Toluol
(4021)	Solvesso #5	215	Petroleum Solvent
(4096)	Zinc Nuodex 5%	2,172	Zinc drier
(4097)	Soligen Drier	20,718	
(CW 290)	Hexalin	645	
(CW 501)	OKO Oil	5	Treated Linseed Oil
(CW 502)	"	96	"
(CW 633)	Oil of wintergreen	38	Methyl Salicilate
(CW 659)	Lard Oil	16	
(CW 695)	High Boiling Naphtha	61	
(CW 755)	R G 7	9,138	Synthetic Resin Solution
(CW 756)	2450 Resin	2,100	"
(CW 774)	Celloseal	171	
(CW 775)	Puebla Grey	2,781	
(CW 775)	"	5	
(CW 786)	Ethylene Dioxide	5	
(CW 806)	#2471 Glyptol	5,127	Synthetic Resin Solution
(CW 851)	Resyl #5572	26	"
(CW 859)	Special Thinner	1,527	
(CW 890)	Beckasol #1525	5,519	"

Code No.	Name	Consumption	Composition
(CW 901)	Glidden's Red Primer	1,007	Lacquer Mixture
(CW 902)	Nepto-Lac	178	"
(CW 905)	Nepto Enamel	2,169	"
(CW 907)	#2471 plus (1170)	10,102	Synthetic Resin Solution
(CW 909)	Tricolac and Lucate Lac.	258 gals.	Lacquer Mixture
(V 7330)	Varnish, Synthetic	820 lbs.	
(V 7657)	Syn. Resin Solution	25,512	Alkyd Resin Solution
(V9179)	Varnish	2,389	Alkali Treated Linseed Oil Solvent
(V 9670)	Varnish	160	
(V 10622)	Heat Treated Oil	52	
(V 11025)	Varnish	426	
(V 11029)	Bakelite, China Wood Oil Varnish	13,126	
(V 11030)	" "	1,117	
(V 11033)	" "	8,901	
(V 11036)	" "	77,794	
(V 11041)	Fast Dry Enamel Liquid	340	China Wood Oil, Bakelite Resin
	Methyl Normal Amyl Ketone	11	
	Venyloid H	15	Synthetic Resin

RAW MATERIAL CONSUMPTION

Paint and Varnish Departments
(Fiscal Year 1935-36)

Code No.	Name	Consumption	Composition
2	Zinc Oxide-Green Seal	37,893 lbs.	Zinc Oxide.
3	Silica	305,715	Silicon Dioxide
4	Red Seal Zinc	47,658	Zinc Oxide.
8	Tuscan Clay	116,298	Aluminum Silicate
9	Sublimed White Lead	41,238	Lead Sulphate
15	China Clay	32,104	Aluminum Silicate
18	Carter Process White Lead	76,671	Pure Basic Lead Carbonate.
19	Ochre	126,156	Hydrated Iron Oxide
20	Asbestine Pulp	427,711	Magnesium Silicate
20-F	Asbestine #3	1,450	Magnesium Silicate
20-L	Talc #482	2,550,479	Magnesium Silicate
21	M S Raw Turkey Umber	904	Iron Oxide, Manganese Dioxide, Calcium Carbonate, Silica and Silicates.
24	Purple Red Iron Oxide	1,300	See 21 for composition.
25	Raw Italian Sienna (W L)	27,907	See 21.
22	Burnt Turkey Umber	3,606	See 21.
26	F F Burnt Italian Sienna	2,877	Iron Oxide, Manganese Dioxide, Silica and Silicates.
27	#1575 Van Dyke Brown	9,207	14% moisture, balance organic matter.
29	V M Red Lead	86,718	Red Lead
32	DB Cosmic Black	63,785	19% carbon, 81% calcium phosphate and calcium carbonate.
33	Paris White	85,625	Calcium Carbonate
41	Borax	16	100% Borax
42	Keystone Filler	72,344	Carbon and silica and silicates.
44	Lead Acetate Crystals	15,104	Lead Acetate Crystals.
45	Gypsum—Terra Alba #1	91,092	Calcium Sulphate.
48	Litharge	54,022	Litharge.
54	#54 Oxide	51,666	Iron Oxide and Silicates
55	#55 Tuscan Red	14,217	Iron Oxide
56	Karcad Black	21,374	67% Carbon, 8% Volatile, 25% Silica and Silicates.
61-S	Ultra Blue 596	2,325	Approx. natural lapis lazuli.
82	USSA Pure Free TN Shellac	130,418	Pure Orange Shellac
85	Lithopone	148,795	Zinc Sulfide and Barium sulfate
91	Princess Mineral Double Label	37,425	Iron Oxide and Silicates
102	E Rosin	515,652	Rosin
104	#400 Lamp Black	12,409	100% carbon
108-C	Zinc Oxide	108,028	Zinc Oxide
108-N	XX Zinc Oxide 92	175,985	Zinc Oxide
121	Spanish Red Oxide	1,269	Iron Oxide and Silica and Silicates
132	132 Red Oxide B	97,646	Iron Oxide and Silicates
134	Venetian Red Oxide	594,625	Iron Oxide and Calcium
135	#2 White Kauri Gum	6	Kauri Gum
168	Powdered Wood Charcoal	192	70% Carbon and ash and Volatile Combustible Matter 30%
174	Milori Green	5	Lead Chromate and Iron Blue

Code No.	Name	Consumption	Composition
181	Acheson Graphite	150 lbs.	Carbon Silicates
182	Persian Gulf Oxide	26,580	Iron Oxide and Silicates and Calcium Carbonate
201	Bradley's Orange Mineral	1,082	Red Lead
202	95% Red Lead	225,602	Red Lead 95%, Pb_3O_4
213	Blanc Fixe	15,939	Barium sulfate
214	#214 Oxide	45,693	Ferric Oxide 98%
225	Borate of Manganese	205	Borate of Manganese
253	Brown #2 Kauri Gum	7,480	Kauri Gum
258	Selected Gilsonite	55,467	Gilsonite
259	#2 Singapore Damar	55,946	Damar Gum
265	Buffalo Corn Starch	12,751	Pure Powdered Starch
267	Zinc Dust	86	Zinc
268	M Rosin	518,828	Rosin
270	Burnt Umber, Lump	15	Manganese Dioxide and moisture and Iron Oxide
292	Aluminum Bronze	120,851	Aluminum
303	Flake Caustic Soda	75	Caustic Soda
306	C P Barytes	370,752	Barium Sulfate
307	Arsenic	37	Arsenous Oxide
98	Ultra Blue	42,760	Approx. composition of lapis lazuli.
309	#2 Yellow Filtered and Refined Carnauba Wax	9,938	Carnauba Wax
310	White Ceresine Wax	19,293	Ceresine Wax
315	Sublimed Blue Lead	58,396	Lead Sulphate, Lead Oxide, Lead Sulphide
318	Oxalic Acid	1,250	Oxalic Acid
338	Gold Bronze	10,903	Metallic Bronze Powder
354	Mapico Black	112	Magnetic Iron Oxide
377	Plaster Paris Dental White	599	Hydrated Calcium Sulphate
390	Kauri Chips	34,467	Kauri Chips
392	119-121 Paraffin Wax	31,974	Paraffin Wax
398	Purified Yellow Beeswax (#1 Bricks)	25	Beeswax
402	Oil Mahogany	1,245	Soluble Organic Color Matter
404	Manganese Oxide	16,434	Manganese Oxide
405	Spirit Soluble Nigrosine	1,448	Aniline Color
406	Oil Soluble Fat Brown Dye	3,127	Soluble Organic Color matter.
407	Fat Orange Dye Oil Soluble	90	Soluble Organic Color matter.
408	Fat Yellow Dye Oil	15	See 406.
410	Calco Oil Soluble Red 410	512	See 406.
412	Leaded Zinc	4,709,602	Zinc Oxide and Lead Sulphate and Lead Oxide
413	Leaded Zinc	29,410	See 412.
416	Oil Soluble Nigrosine	1,415	Soluble Organic Color Matter.
420	#76 Cosmic Black	751	Carbon, Calcium Phosphate and Calcium Carbonate
440	Magnesium Carbonate	165	Magnesium Carbonate
461	Albalith	7,698,179	Zinc Sulfide and Barium sulfate.
465	Kauri #1 Gum	3,016	Kauri Gum
478	Chrome Oxide X628	2,693	Sesqui-Oxide of Chromium
483	Metanil Yellow		Organic Dyestuff
488	1450 Graphite	88,049	Carbon and Silicates
511	Leaded Zinc	200,027	Zinc Oxide and Lead Sulfate
523	Dextrine	750	Completely Soluble Starch
528	Super Spectra Black	1,068	Carbon
532	Silica	17,156	Silica
547	Aluminum Stearate	41,675	Aluminum Stearate
555	Candelilla Wax	5,728	Candelilla Wax

Code No.	Name	Consumption	Composition
555	Stearic Acid (Triple Pressed Granular)	21 lbs.	Stearic Acid
566	Whiting	312,708	Calcium Carbonate
568	4-A Congo Gum	8,149	
587	Vac Dry White Shellac	255,655	Dry White Shellac
590	#58 Texaco Asphalt	7,290	Asphaltum
596	Pale East India Nubs	222,209	East India Nubs
612	#85 Flake Graphite	3,595	Carbon in flake form.
622	Chemical Hydrated Lime	92,572	Chemical Hydrated Lime
630	Ester Gum	505,560	Ester Gum
631	Petroleum Tailings	11,599	Petroleum Tailings
635	Cobalt Linoleate	2,302	Cobalt Linoleate
637	W W Rosin	637,545	W W Rosin
653	8-A Opaque Congo	15	Congo
668	Casein	1	Pure Casein
937	Ferrous Chloride	1,099	Ferrous Chloride
996	#10 Texaco Asphalt	108,261	Asphaltum
1003	Carbon Black	10,914	Carbon
1026	Cobalt Acetate	7,998	Cobalt Acetate
1084	Standard Batavia Damar	1,855	Batavia Damar
1087	Gilsonite, Selected	201,607	Gilsonite
1096	F P A Manila Gum	98,758	Manila Gum
1097	Titanox B	150,587	Titanium Oxide, Barium Sulfate
1106	Acme Paste #3005	2,043	Acme Paste
1107	N. C. Carnauba Wax	25,447	Carnauba Wax
1112	Copal Gum Spirit Solution	6,510	Copal Gum
1116	Ex Brilliant Albron	150	Metallic Aluminum
1117-A	XXX Antimony Oxide	7,685	Antimony Oxide
1119	Tuscan Red, Extra Deep	146	Iron Oxide and Silicates plus Organic Color Matter
1120	Refined White Shellac Wax Free	4,626	Dry White Shellac
1122	Flaxsoap	4,901	Linseed Oil and Sodium Soap
1123	Venus Natural Copper Bronze	58	Powdered Metallic Copper
1125	Cumar Gum	9,298	Cumar Gum
1128	S P Fumed Litharge	45,565	Lead Monoxide
1132	Mapico Yellow Lemon	48,502	Monohydrate of Ferric Oxide
1133	Mapico Yellow-Dark Orange	79,746	Ferric Oxide and Calcium Sulfate
1139	Marblehead Lime, Hydrated	700	Hydrated Lime
1141	#239 A Oxide	65,511	Iron Oxide and Silicates
1142	Aluminum Palmitate	47	Aluminum Palmitate
1144	Bold Black E I Gum	176,920	East India Gum
1145	Alizarine Lake	82	Organic Dyestuff
1147	Cobalt Shade 2808	5,766	Ultramarine Blue
1150	150-152 Paraffin Wax	1,515	Paraffin Wax
1151	Electrolytic Lead Carbonate	7,580	White Lead Carbonate
1157	Indian Red #65	592	Iron Oxide
1194	C-C-O Whiting	711,266	Natural Mineral Calcium Carbonate
1208	Lithopone	1,568,472	Zinc Sulfide and Zinc Oxide
1211	#1211 S Raw Turkey Umber	25,406	Iron Oxide, Calcium Carbonate, Silicates and moisture .

Code No.	Name	Consumption	Composition
1212	R M B Burnt Turkey Umber	51,587 lbs.	Iron Oxide, Calcium Carbonate, Silicates and manganese dioxide.
1213	#3121 S Raw Italian Sienna	92,192	Iron Oxide, Manganese Dioxide and Silicates
1214	#1214 S Burnt Italian Sienna	24,415	Iron Oxide, Manganese Dioxide and Silicates
1220	#1220 M Oxide	199,341	Iron Oxide and Calcium Carbonate plus Silica and Silicates
1224	Manila Gum Amber Free Nubs	8,801	Manila Gum
1225	(1286) Residue	127	Residue
1230	1/2 Sec. A S Cotton	30	Nitrocellulose and Alcohol
1231	#1260 Oxide	246,012	Iron Oxide and Calcium Carbonate plus Silica and Silicates
1233	#1273 Oxide	136,034	See 1251.
1235	Maroon Light Oxide	113,289	See 1251.
1237	Amberol B S 1 Light	42,178	Modified synthetic glycerol resin.
1247	DBB Manila Gum	148,540	Manila Gum.
1262	Amberol F-7 Light	118,085	See 1257.
1266	Vegetable Pitch	9,052	Vegetable Pitch
1267	Batu Scraped E. India Nubs	7,522	Natural Gum
1270	S M Black	2,093	Lamp Black
1271	Titanox C	29,517	Titanium Oxide and Calcium Sulphate
1272	Magnesium Fluosilicate Crystals	705	Magnesium Fluosilicate Crystals
1289	Ultramarine Blue	6	Approx. Lapis Lazuli
1295	Litharge	511	Litharge
1296	#390 Oxide	250,885	Iron Oxide and Silicates
1297	Paranol Hard #1	184,706	Paranol Resin
1298	Paranol Ex Hard #1	14,898	Paranol Resin
1400	Chinese Blue	175	Iron Blue
1401	Ultra Blue #502	446	Lapis Lazuli
1405	Pure Titanium Oxide or Titanox A	1,180,011	Titanium Dioxide
1415	Black Kadox Zinc	804	Zinc Oxide
1417	Alizarine Lilac Lake	856	25% organic color, 75% alumina hydrate.
1430	Super Mapico Yellow	7,752	Ferric Oxide
1432	Water White Film Scrap	469	Nitrocellulose
1435	National Orange A Conc.	1	Organic Dye Stuff
1445	Eg-Glo	5	Zinc Tungate
1502	A U K Black	1,000	Gas Black free from foreign matter.
1505	98% Red Lead	107,564	Red Lead
1512	Phthalic Anhydride	206,600	Phthalic Acid
1519	Carbon Dioxide	2,420	Carbon Dioxide
1524	Primrose Ozokolite	1,017	Ozokolite
1526	Leaded Zinc	2,619,514	Lead Sulfate and Zinc Oxide
1528	Cumar Gum 1/2 Color	978	Cumar Gum
1530	R S A Parolite	580	Parolite Resin
1531	Asbestos Fibre	51,069	Asbestos Fibre
1535	#500 Long Residuum Stock	425	Asphaltum Residue
1538	Zinc Sulfide	36,658	Zinc Sulfide and Barium Sulfate
1544	Burnt Umber	167	Iron Oxide, Manganese Dioxide and Silicates
1546	American Zinc Oxide	2,800	Zinc Oxide
1549	F F Asbestos Fibre	17,000	Asbestos Fibre

Code No.	Name	Consumption	Composition
1550	#550 Lead Free Zinc Oxide	566 lbs.	Zinc Oxide
1552	On 110 Hy Flow Super Cel	559,276	Magnesium Silicate
1555	New #1276 Oxide	202	Iron Oxide
1558	Bakelite Resin #254	[illegible]	Resin
1560	Synthetic Resin	2,481	
1561	Sodium Silicofluoride	95	Sodium Silicofluoride
1563	Congo Ester Gum	591	Congo Ester Gum
1571	H C Bone Black	5,748	Carbon and Ash and Moisture
1572	Lead Oilsolate Mark XX	1,420	Lead Oilsolate
1573	Manganese Oilsolate	626	Manganese Oilsolate
1575	Beckacite Gum #1001	20,195	Synthetic Resin
1576	M D Luminous Paste	25,603	Aluminum and acetone
1580	Violet Toner A 8027	15	Approx. composition of lapis lazuli
1583	Super Black	6,425	Carbon
1585	Hansa Yellow G A W	21	Organic Dyestuff
1586	Hansa 3 R Yellow	8	Organic Dyestuff
1587	Golden Topaz Stanolind Petrolatum (petroleum jelly)	2,272	Petroleum Jelly
1592	Aluminum Powder	54,120	Aluminum Powder, Metallic
1595	Gold Bronze #6850	2,209	Metallic Bronze Powder
1598	B A Powder	158	Organic Dyestuff
1599	#60 Green	276	Organic Dyestuff
1705	Bakelite Resin #620	15,720	Resin
1707	#50 Zinc Oxide	84,532	Zinc Oxide
1709	Flake Graphite	895	Flake Graphite
1710	Manganese Acetate	5,825	Manganese Acetate
1712	Permanent Green Toner #5571	150	Organic Dyestuff
1721	Permanent Green X 1010	14,675	Chromium Oxide
1722	Cobalt Oilsolate	46	Cobalt Oilsolate
1728	Carbon Black	65,528	Carbon
1740	Amberol ST 137	74,528	Modified synthetic glycerol resin
1742	C P Calcium Oxide Powder	59	Calcium Oxide Powder
1755	Medusa White Portland Cement	14,250	Cement
1765	High Acid Ester Gum	2,045	Ester Gum
1766	Synthetic Resin HG-5	1,000	Synthetic Resin
1769	Purple Toner #2127	5	Aluminum Hydrate and Organic Dyestuff
1770	Blue Toner #2575	2	Iron Blue
1775	Aluminum Naphthenate	204	Aluminum Naphthenate
1776	Ceresa Wax A A	1,995	Ceresa Wax
1777	Dura 10 P	3,971	Dura Gum
1782	Paro Wax	647	Wax Paraffin
1787	Portland Cement	5,727	Cement
1788	#505 Durez	820	Durez Gum
1792	Bronze Special Finest	68,958	Metallic Aluminum Powder
1800	Amberol M-14	2,160	See 1740
1801	HG-10 Resin	14,161	Resin
1802	Maleic Anhydride	56	Maleic Anhydride
1804	L N 100 Resin	54, 796	Resin
1809	Resiston LR 137 (100% Phenolic Resin)	277	100% Phenolic Resin
1816	Raven Black Oxide	4	Magnetic Black Iron Oxide

Code No.	Name	Consumption	Composition
1817	Surfex	8,450 lbs.	Inert
1819	Synthetic Resin	10,765	Synthetic Resin
1820	Carbolac #2	1,579	Carbon
1826	Calcium Stearate	25	Calcium Stearate
1849	XR 4056 Resin	306	Resin
1850	Bakelite Resin XR 1329	4,405	Resin
1857	Dry Ice	105, 055	Carbon Dioxide
1864	Special Asphalt Filler (#3 Paving Filler)	10,561	Asphaltum
1865	#5386 Bright Red Iron Oxide	7,785	Iron Oxide and Silicates
1900	Siegal Blue #05922	143	Iron Blue
1901	Low Oil Absorption Titanium Oxide	1,528	Titanium Oxide
1905	Aluminum Ink H	51	Metallic Aluminum and Acetone
10109	Para Toner D	9,259	100% Organic Red Pigment Dyestuff
10121	Para Toner Lt.	9,795	See 10109.
10132	Alizarine Red Lake	5,178	25% Organic Dyestuff, 77% Aluminum Phosphate.
10180	Turkey Red Lake	676	20% Organic Dyestuff, 16% Aluminum Hydrate, 64% Blanc Fixe
10182	Amaranth Lake	1,476	15% Organic Dyestuff, 15% Aluminum Hydrate, 70% Blanc Fixe
10189	Toluidine Toner B	20,179	100% Organic Red Pigment Dyestuff
10275	Tuscan Red	1,196	12% Organic Dyestuff, 64% Barium Sulfate, 6% White Lead
10278	Maroon Lake	1,008	20% Organic Dyestuff, 65% Blanc Fixe, 14% Iron Oxide
10293	25% Para Red Lt.	80	25% Organic Dyestuff, 75% Whiting
10294	25% Para Red D.	510	25% Organic Dyestuff, 75% Whiting
10299	Alizarine Maroon Lake	9	10% Organic Dyestuff, 90% Aluminum Phosphate
10330	Permanent Orange Toner	55	100% Organic Dyestuff
10333	Para Toner Lt.	211	100% Organic Dyestuff
10352	Harmon Maroon A 4760	11	30% Organic Dyestuff, 30% Aluminum Hydrate, 40% Blanc Fixe
10355	Para Toner Lt.	5,867	100% Organic Dyestuff
10361	Permansa Red Toner	2,249	100% Organic Dyestuff
10363	Permansa Red Toner	72	100% Organic Dyestuff
10369	Permansa Orange Toner	184	100% Organic Dyestuff
10371	Solfast Rose Toner Y	6	100% Organic Dyestuff
10373	Solfast Cerise Toner	1	100% Organic Dyestuff
10600	First Quality in Oil Chrome Yellow M	34,634	Chrome Yellow in Linseed Oil
10601	First Quality in Oil Orange	9,599	Chrome Orange in Linseed Oil
10602	First Quality in Oil Chrome Yellow	10,405	Chrome Yellow in Linseed Oil
10605	First Quality in Oil Chrome Orange	5,290	Chrome Orange in Linseed Oil
10608	First Quality in Oil Chrome Orange	1,160	Chrome Orange in Linseed Oil
10614	First Quality in Oil Chrome Green	9,352	Chrome Green in Linseed Oil
10615	First Quality in Oil Chrome Green	55,124	Chrome Green in Linseed Oil
10616	First Quality in Oil Chrome Green	12,455	Chrome Green in Linseed Oil
10617	C P Chrome Yellow L	21,675	71% Chrome Yellow, 29% Raw Oil
10618	C P Chrome Yellow M	42,351	75% Chrome Yellow, 25% Raw Oil
10619	C P Chrome Orange L	34,069	85% Chrome Orange, 17% Raw Oil
10620	C P Chrome Green L	54,098	70% Chrome Green, 30% Raw Oil
10621	C P Chrome Green M	1,061	65% Chrome Green, 35% Raw Oil
10622	C P Chrome Green D	48,628	40% Chrome Green, 60% Raw Oil
10625	C P Chinese Blue	20,672	40% Iron Blue, 60% Raw Oil
10624	C P Chrome Orange M	2,807	85% Chrome Orange, 15% Raw Oil

Code No.	Name	Consumption	Composition
10625	Chrome Green in Oil	1,005 lbs.	Chrome Green in Linseed Oil
10626	Chrome Green in Oil	2,287	Chrome Green in Linseed Oil
10630	C P Chrome Yellow in Oil	37,201	Chrome Yellow in Linseed Oil
10631	C P Chrome Yellow in Oil	21,695	Chrome Yellow in Linseed Oil
10632	C P Toluidine Red	9,305	39% Toluidine Red, 61% Heat Bodied Oil
10633	C P Chrome Yellow M	4,236	75% Chrome Yellow, 25% Heat Bodied Oil
10650	C P Para Red Lt.	40,302	36% Para Red, 43% Linseed Rosin Varnish, 21% Naphtha
10651	C P Toluidine Red	12,641	37% Toluidine Red, 42% Linseed Rosin Varnish, 21% Naphtha
10652	C P Para Red D	1,399	50% Para Red, 43% Congo Ester Gum Varnish, 22% Naphtha
10653	C P Chrome Yellow Lt.	6,174	68% Chrome Yellow, 18% Ester Gum Varnish, 14% Naphtha
10654	C P Chrome Yellow Med.	14,825	75% Chrome Yellow, 15% Ester Gum Varnish, 10% Naphtha
10655	C P Chrome Orange Lt.	2,892	75% Chrome Orange, 15% Ester Gum Varnish, 10% Naphtha
10656	C P Chrome Orange M	7,874	85% Chrome Orange, 9% Ester Gum Varnish, 6% Naphtha
10658	C P Chrome Green Lt.	4,567	67% Chrome Green, 21% Ester Gum Varnish, 12% Naphtha
10659	C P Chrome Green D	1,891	55% Chrome Green, 27% Ester Gum Varnish, 18% Naphtha
10660	Para Red in Varnish	1,515	Organic Red in Varnish
10661	Para Red in Varnish	479	Organic Red in Varnish
10662	C P Chinese Blue	1,744	33% Iron Blue, 50% Linseed Rosin Varnish, 17% Naphtha
10665	Para Red in Varnish	20,771	Para Red, Rosin Varnish and Naphtha
11023	C P Chinese Blue	2,575	100% Iron Blue
11024	C P Chrome Green D	25,172	65% Lead Chromate, 4% Lead Sulfate, 31% Iron Blue
11025	C P Chrome Green Lt.	87,076	85% Lead Chromate, 9% Lead Sulfate, 7% Iron Blue
11077	C P Chrome Green, M	20,398	78% Lead Chromate, 6% Lead Sulfate, 16% Iron Blue
11087	C P Chrome Green L	4,076	96% Lead Chromate, 4% Iron Blue
11096	C P Prussian Blue	19	100% Iron Blue
11101	Chrome Green	170,156	Chrome Green
11102	Chrome Green	4	Chrome Green
11110	C P Chrome Green D	7,014	Chrome Green
11130	C P Chinese Blue	57	100% Iron Blue
11133	C P Chrome Green D	5	72% Chrome Yellow 28% Iron Blue
11148	C P Potash Blue	5	100% Iron Blue
11152	C P Chrome Green Lt	5,886	78% Lead Chromate, 14% Lead Sulfat, 8% Iron Blue
11156	C P Chrome Green D	2,845	45% Lead Chromate, 5% Lead Sulfate, 52% Iron Blue
11165	C P Calumet Green Lt.	8,025	81% Lead Chromate, 12% Lead Sulfate, 7% Iron Blue
11164	C P Calumet Green Med	2,710	69% Lead Chromate, 10% Lead Sulfate, 21% Iron Blue
11165	C P Calumet Green D	1,508	58% Lead Chromate, 8% Lead Sulfate, 34% Iron Blue
11166	C P Potash Blue	5,407	100% Iron Blue
11167	C P Non Bronze Blue	69	100% Iron Blue
11174	Solfast Brilliant Green Toner	125	100% Organic Dyestuff
11208	C P Chrome Green	2,058	Chrome Green
11213	C P Chrome Green Med.	15	77% Lead Chromate, 9% Lead Sulfate, 14% Iron Blue

Code No:	Name	Consumption	Composition
11212	C P Chrome Green Lt.	2,207	83% Lead Chromate, 10% Lead Sulfate, 7% Iron Blue
11216	C P Chrome Green DD	225	41% Lead Chromate, 3% Lead Sulfate, 56% Iron Blue
12007	C P Chrome Yellow L	5,650	72% Lead Chromate, 28% Lead Sulfate
12010	C P Chrome Yellow Med.	24,362	100% Lead Chromate
12011	C P Chrome Orange L	128,705	65% Lead Chromate, 4% Lead Sulfate, 31% Lead Oxide
12012	C P Chrome Orange D	90,416	60% Lead Chromate, 40% Lead Oxide
12051	American Vermilion	6,955	60% Lead Chromate, 40% Lead Oxide
12054	C P Zinc Yellow	15,078	100% Zinc Yellow
12074	C P Primrose Yellow	16,068	46% Lead Chromate, 52% Lead Sulfate, 2% Aluminum Hydrate
12080	C P Chrome Orange	1,551	60% Lead Chromate, 40% Lead Oxide
12082	C P Chrome Orange M	1,817	60% Lead Chromate, 40% Lead Oxide
12084	C P Chrome Orange DD	59	60% Lead Chromate, 40% Lead Oxide
12095	C P Chrome Orange DDD	2,484	60% Lead Chromate, 40% Lead Oxide
12101	Permansa Yellow G.	122	100% Organic Yellow Pigment Dyestuff
12105	Permansa Yellow 10 G	12	100% Organic Yellow Pigment Dyestuff
12107	Permansa Yellow G	4	100% Organic Yellow Pigment Dyestuff
12204	C P Primrose Yellow	2,719	46% Lead Chromate, 54% Lead Sulfate
12507	C P Chrome Yellow L	58,281	69% Lead Chromate, 31% Lead Sulfate
12510	C P Chrome Yellow M	100,754	94% Lead Chromate, 6% Lead Sulfate
12511	C P Chrome Orange M	2	61% Lead Chromate, 3% Lead Sulfate 36% Lead Oxide
12510	Red Lead	280,171	Red Lead
D1731	C P Chrome Green L	763	91% Chrome Yellow, 9% Iron Blue
D1732	C P Chrome Green D	843	72% Chrome Yellow, 28% Iron Blue
D1878	Alizarine Lake	5	37% Organic Dyestuff, 21% Aluminum Hydrate, 42% Calcium Phosphate
D1934	Base Color in Varnish C P Permansa Red	516	Organic Red in Varnish
D1935	C P Chrome Green Ex Lt	129	Chrome Green
D1937	Base Color in Varnish C P Toluidine Red	1,215	Organic Red in Varnish
D1938	Base Color in Varnish C P Para Red Lt.	710	Organic Red in Varnish
D1969	Dispersed C P Chrome Yellow Lt. in Varnish	560	Chrome Yellow in Varnish
D2015	Florida Zone Marking Paste	960	Chrome Orange in Oil
D2018	Dispersed Color in Varnish C P Graphic Red	2,924	Organic Red in Varnish
D2025	Dispersed Para Red in Varnish	571	Organic Red in Varnish
D2029	10% Light Para Red	2,223	10% Para Red, 90% Whiting
D2046	Dispersed Permanent Orange Toner in Varnish	505	Organic Orange in Varnish
D2060	Dispersed C P Toluidine Red in Varnish	45	Organic Red in Varnish
D2067	Dispersed C P Chrome Green Lt. in Varnish	461	Chrome Green in Varnish
D2065	Dispersed C P Chrome Yellow M in Varnish	1,510	Chrome Yellow in Varnish
D2096	Dispersed C P Para Red Lt.	12	Organic Red in Varnish
D2107	Dispersed C P Toluidine Red	6	Organic Red in Varnish
D2109	Dispersed C P Para Red D in Varnish	8	Organic Red in Varnish
D2115	Dispersed C P Toluidine Red in Varnish	8	Organic Red in Varnish
D2120	Dispersed C P Para Red Lt.	46	Organic Red in Varnish
D2125	C P Chrome Green L	4,814	Chrome Green

Code No.	Name	Consumption	Composition
D2150	Permanent Violet Lake	2	Organic Dyestuff--Aluminum Hydrate
D2156	Ferrite Yellow	1,068	Iron Oxide
W992	Laba C Manilla Nubs	1,777	Manilla Nubs
W1256	Bakelite B.R.5360	100	Resin
W1252	Bakelite B.R. 2963	169	Resin changed to 1851 dry
W1458	Calcium Sulphate	500	Calcium Sulphate
W1508	Synthetic Resin Varcum	1,219	Changed to 1886 dry--resin
W1510	#500 Kopal	475	Kopal Resin
W1511	#501 Kopal Resin	29	Resin
W1525	Resiston LR 137	288	Changed to 1809 dry
W1526	Resiston	26	Resin
W1529	Viscobrite H800 Resin	65	Resin
W1532	Octicca Oil	455	Octica oil
CP 61	Nat'l Orange A Conc.	5	Organic Dyestuff
CP 65	Scarlet 2 RR	6	Aluminum Hydrate and Organic Dyestuff
CP 97	Lana Fuchsine	16	Fuchsine
CP 98	Amaranth Brilliant Crimson #105	3	Obsolete
CP 253	Graphic Red Printing Ink Med	879	Barium salt of the Lithols
CP 254	Graphic Red	2,055	Calcium salt of the Lithols
CP 281	Lake Red C R Dry	5	Barium salt of Lake Red C
CP 284	Lake Red C Y Dry	5	Sodium salt of Lake Red C
CP 286	Rubanol Toner (Dark)	9	Calcium salt of Lithol Rubine
CP 294	Lithol Red	400	Obsolete
CP 315	Lacquer Maroon Med.	56	Manganese salt of Tobias and Beta Oxy Naphthoic Acid
CP 318	Graphic Red R Dry	5	Calcium Salt of Lithol
CP 348	Graphic Red M #348	2,243	Barium Salt of Lithols
CP 351	Lacquer Maroon #351	54	Calcium salt of Tobias and Beta Oxy and Naphthoic Acid
CP 355	Graphic Red R #355	16	Calcium Salt of Lithols
CP 377	Britone Maroon #377	24	Calcium Salt of Lithol
CP 429	Lacquer Maroon (Dark)	129	Identical with CP 315
CP 451	Botanical Beta Naphthol	174	Botanical Beta Naphthol
CP 558	Heliogen Blue	1	Copper Organic Dye
CW 519	Helio Bordeaux BL	1	Naphthol Sulfuric Acid
CW 623	Sulz Maroon	21	Organic Dyestuff
CW 666	Special Burnt Italian Sienna	374	Iron Oxide and Silicates and Manganese Dioxide
CW 669	Pipeline Cleaning of Zinc Oxide from Coffeyville	5,000	Zinc Oxide
CW 695	Golden Cadmolith	19	Cadmolith
CW 717	Nigrosine J Powder	3	Aniline Color
CW 731	#5292 Brown Oxide	474	Iron Oxide and Silicates
CW 801	Fresh Water Sand	87	Sand
CW 821	Varcum Resin #700	578	Resin
CW 845	Bakelite Resin #6717	242	Resin
CW 870	Lohrinol	10	Glyco Product
CW 880	Nancy Wood Rosin	4	Rosin
CW 887	Tetrachlorphenol	600	
CW 910	P.D. Genuine Pontianak Chips	160	Varnish Gum (natural)
B241	Lead Acetate	2,201	Lead Acetate and Water
BL 4	Blue Base	96	Iron Blue and Resin, Vegetable
BL 102	Ultramarine Blue	91	Natural Lapis Lasuli
BL 140	Bleaching Base	216	Ultramarine Violet, Linseed Oil and Turpentine
BW 102	White Pulp	525	Lead Carbonate and Linseed Oil
BW 105	White Pulp	4,517,524	Lead Carbonate and Linseed Oil
BW 150	Lithopone Pulp	417,207	Zinc Sulfide and Barium Sulfate plus Benzine
BX 180	Lead Acetate	1,780	Lead Acetate and Water
	International Fibre	50	Asbestine Fibre

Code No.	Name	Consumption	Composition
	Celite	711	Magnesium Silicate
	Sodium Salicylate	5	Sodium Salicylate
(1)	White Refined Linseed Oil	35,555	
(2)	Raw Linseed Oil	568,508	
(3)	Kettle Test Non Break Perilla Oil	212,488	
(3A)	Refined Perilla Oil	144,515	
(13)	Boiled Linseed Oil	42,599	
(14)	Steam Distilled Turpentine	44,522	
(30)	Salox	7	Sinasol
(44)	Superior Varnish Oil	165,850	
(61)	Coke Oven Tar	9	
(63)	VM&P Naphtha	256,200	
(113)	#1 Castor Oil	1,560	
(140)	China Wood Oil	429,087	
(141)	S-W Kerosene	88,368	
(149)	90% Benzol	46,480	
(150)	Mixing Varnish	1,003	Resin Gums and Thinners
(186)	Menhaden Fish Oil	115,156	
(187)	Methyl Acetone	48,870	
(188)	Elaine Red Oil	2,267	
(196)	Oil of Cedar Leaves	21	
(209)	Light Solvent Naphtha	93,682	
(225)	Light Oil	9,433	Creosote
(227)	L. O. Kauri Rubbing Varnish	7	
(241)	Toluol	52,928	
(293)	White Steam Distilled Oil (Pine)	3,466	
(308)	Oil of Citranella	19	
(330)	Alcohol SD 1	276,497	
(548) spec.	Oleum Spirits	55	
(548)	Oleum Spirits	1,847,764	
(574)	Japan Varnish	1,857	Shellac, Driers, Vegetable Oils, Mineral Spirits
(418)	Raw Soya Bean Oil	96,514	
(425)	Blown Refined Soya Bean Oil	50	
(432)	Lead Liquor	15#	Tower Lead
(434)	C P Glycerine	1,702	
(438)	Sinclair #2 Paraffine Oil	9,795	
(445)	Aqua Ammonia	295	
(548)	White Linseed Oil Fatty Acids	711	
(584)	Xylol	3,095	
(604)	Oil of Sassafras	105 lbs.	
(825)	L. O. Hard Gum Baking Varnish	5	Resins, Vegetable Oils, Mineral Spirits
(1167)	Butanol	3,554	
(1168)	Ethyl Acetate	78	
(1170)	Butyl Acetate	1,799	
(1176)	Kauri Gum Varnish	599	Resins, Driers, Vegetable Oils, Turpentine, Mineral Spirits
(1249)	Tube Finish	365	Vegetable Oils, Turpentine, Resins, Mineral Spirits
(1257)	Hi Flash Naphtha	16,046	
(1271)	Steam Refined Cylinder Stock	337	
(1275)	Non-Break Refined Soya Bean Oil	1,722	
(1294)	Gum Spirits of Turpentine	1,516	

Code No.	Name	Consumption	Composition
(1488)	Pale Grinding Linseed Oil	37 gals.	
(1489)	Mineral Seal Oil	1,576	
(1500)	Flat Varnish	572	Resins, Driers, Mineral Spirits, Turpentine, Vegetable Oils
(1511)	Carbon Tetrachloride	11	
(1519)	Damar Gum Solution	14	Gum, Alcohol, Toluol
(1566)	Mixing Varnish)		
(1596)	Blk. Bkg. Japan	166	Resins, Vegetable Oils, Mineral Spirits, Organic Distillators
(1617)	Solvent Base	25	Solvent Base
(1620)	Dibutyl Phthalate	179	
(1621)	Kronitex AA (Kavalco) Tricresyl Phosphate (Monsanto)	71	
(1634)	#15 Castor Oil	740	
(1651)	Ester Gum Solution	79	Ester Gum, Toluol
(1686)	L. D. Naphtha		
(1687)	Brushing Lacquer Varnish	7	Lindel and Ester Gum
(1711)	Fish Oil Fatty Acids	6,332	
(1758)	Long Oil Mixing Varnish	5	Resin, Wood Oil, Mineral Spirits, VM&P Naphtha
(1764)	Guaiacol Liquid	1,274	
(1830)	Scresen Paste	15	
(1832)	PKP Base Lacquer	2	
(2022)	Damar Varnish	0	Damar Gum
(2027)	Mixing Varnish	5	Resins, Driers, Vegetable Oils, Mineral Spirits, Turpentine
(2049)	Dipentine	4,612	
(2051)	Synthetic Varnish	2,508	Resins, Vegetable Oils, Mineral Spirits, Organic Dist.
(2055)	Grinding Varnish	2,525	Resins, Vegetable Oils, Mineral Spirits
(2100)	China Wood Oil Fatty Acid	14,525 lbs.	China Wood Oil
(2112)	Synthetic Mixing Varnish	1,659	
(2120)	White Linseed Fatty Acid	20,425	
(2136)	Heavy Body Varnish	1	Linseed Oil
(2246)	Drier	11,288	
(2510)	Elastoil E	959	Sardine Oil
(2401)	Liquid Asphaltum	25	
(2616)	#1000 Castor Oil	133	
(2624)	Methyl Amyl Acetate	10	
(2930) A	Mixing Varnish	15	
(2956) A	Grind Varnish	551	
(2956) T	Grind Varnish	5	
(3002) F	Elastoil R	2,661	
(3005)	Ceylon Cocoanut Oil	283	
(3013)	Alkali Refined Perilla Oil	24,302	
(3020)	#5 Enamel Solvents	1,159	
(3028)	Apco Naphtha Thinner	4,905	
(3051)	Sunflower Fatty Acid	1,586 lbs.	
(3060)	C P Glycerine, 98%	1,997	
(3081)	Triethanolamine	551	
(3082)	Deodorant B-5447	58	
(3085)	Para Thinner	45,084	Turpentine
(3519)	Heat Bodied Oil	443	Linseed Oil
(4020)	Mixing Oil		Polar Red Engine Oil
(4022)	#2 Hydro Solvent	1,579	
(4024)	Apco Thinner	78	Apco Thinner #125
(4090)	Saligen Drier, 25% Lead	798	
(4091)	Saligen Drier, 6% Manganese	430	

Code No.	Name	Consumption	Composition
(4092)	Liquid Soligen Drier	417	Soligen, Cobalt 6%
(5091)	Benzoil Peroxide Treated LO	251,157	
(5093)	Lead Oilsolate Solution Mark 11-A, 20% Lead	15,800 lbs.	
(5094)	Manganese Oilsolate Solution, Mark 11-A 5% manganese	14,652	
(CW 502)	57 M OKO Oil	51	
(CW 620)	Insecticide Base	665	Kerosene
(CW 586)	Oil of Lavender	20	
(CW 727)	Cutback Pitch	9	
(CW 761)	Enamel Oil V616	84	
(CW 764)	Cobalt Drier	50	
(CW 705)	Stanolin Topaz Petroleum Jelly	1,705 lbs.	Petroleum jelly
(CW 811)	Hempseed Oil	550	
(CW 819)	C.P. Chill Oil	15	
(CW 836)	Crude Hempseed Oil	28 gals.	
(CW 844)	Hempseed Oil #2	23,434	
(CW 856)	Std. Oil #4628 Oil	7	Linseed Oil
(CW 883)	Cocoanut Oil, fatty acids	3,127 lbs.	Cocoanut Oil
(CW 888)	Pale Nelio Resin	1	Resin
(CW 889)	Med. Nelio Resin	2	Resin
(CW 918)	Refined Screening Oil	3	Screening Oil
(W1465)	Washed Recovered Linseed Oil	1	Linseed Oil
(V10211)	Treated Soya Bean Oil	118	
(V10255)	Resin	665	
(W1528)	Resiston	26	Resin
(V1696)	Resin	27	
(CY 5706)	Toner Enamel Red	250	Graphic Red, Chrome Orange, Resin, Mineral Spirits, Vegetable Oil
(CY 5856)	Ivory Dipping Enamel	38	Lithopone, Soapstone, Toluol Naphtha, Resin, Vegetable Oil
(V 15000)	Synthetic Resin	40	
(V 15004)	Synthetic Resin	78	
Tar 202	Carbolical	526	Creosote Oil

RAW MATERIAL CONSUMPTION

Chemical Products

(Fiscal Year 1955-56)

Code No.	Name	Consumption	Composition
154	Venetian Red Oxide	6,024 lbs.	Iron Oxide
213	Blanc Fixe	96,329	Precipitated Barium Sulfate
221	Barium Chloride	250,455	
279	Sodium Nitrite	154,481	
293	Bichromate of Soda	195	
505	Flake Caustic Soda	459,767	Sodium Hydroxide
506	C P Barytes	10,658	Barium Sulfate
514	Copperas	498	Ferric Chloride
560	Flaked Calcium Chloride	141,505	
570	Soda Ash, 58% Lt.	1,445,865	Sodium Carbonate
580	Disodium Phosphate (Commercial Crystals)	1,646	
597	Tartar Emetic Tech. (Powdered)	9,098	Pot. Antimony Tartrate
455	Powdered Tartaric Acid		
454	Iron Free Alumina Sulfate	85,557	
485	Blue Black Negrosene (Water Soluble)	18	Colour Index No. 965
586	Whiting	2,892	Calcium Carbonate
601	Salt	2,962,402	Sodium Chloride
622	Chemical Hydrated Lime	258,080	Calcium Hydroxide
633	Sulphate of Ammonia	100	
657	W W Rosin	14,875	Wood Rosin
642	Solid Caustic Soda	2,752,270	Sodium Hydroxide
660	Bicarbonate of Soda	127,657	
910	Paratoluidine	189,290	
914	Chlorate of Soda	81,744	
919	Bisulfite of Soda	294,141	
944	S S Nigrosene	2	Colour Index No. 864
990	Aluminum Hydrate	6,697	
997	Benzoic Acid	6,057	
1058	Mettoluylen diamine	151	
1059	Methyl Violet	52,505	Colour Index No. 680
1060 B	Dry Powdered Glauber Salts	16,568	Sodium Sulfate.
1075	Granulated Sugar	1,114	
1095	Litharge	17,844	Lead Oxide PbO
1100	Iron Borings	496,402	
1127	Nuchar OO	91,655	Activated Charcoal
1148	10 Mole Lump Glauber Salt	900	Sodium Sulfate
1185	FF Wood Rosin	109,052	
1200	Malachite Green	114	Colour Index No. 657
1208C		5	Unknown
1235	Maroon Light Oxide	3,259	Iron Oxide
1405	Pure Titanium Oxide (or Titanox A)	50	
1415	Black Kadox Zinc	950	Zinc Oxide
1435	National Orange A Conc.	5	Colour Index No. 78
1510	#641 Bone Black	85	
	R. L. 105 Pigment Scarlet Lake	2	Colour Index #215 on zinc oxide.
	DuPont Delux Resin	18	Unknown composition.
	Permanent Red Toner	5	" "
	Sodium Naphthionate	24	Sodium Salt Naphthionic Acid
	Ice	10,861,025	
(2)	Raw Linseed Oil	45	
(13)	Boiled Linseed Oil	332	
(16)	66degree Sulphuric Acid	5,551,588	

Code No.	Name	Consumption	Composition
(44)	Superior Varnish Oil	2,579	Linseed Oil
(113)	#1 Castor Oil	17	
(121)	18 degree Muriatic Acid	3,827,938	28% hydrochloric acid
(134)	36 degree Nitric Acid	7,051	53% nitric acid
(235)	Camasol ACM	14,848	Sulfonated Castor Oil
(241)	Toluol	187,769	
(514)	Heat Bodied Oil 000	2,477	Linseed Oil
(515)	Heat Bodied Oil 00	1,552	Linseed Oil
(516)	Heat Bodied Oil 0	444	Linseed Oil
(452)	Lead Liquor	252	Lead Acetate
(443)	Aqua Ammonia	1,005,274	
(501)	Lithographing Varnish	1,565	Heat Bodied Linseed Oil
(502)	" "	9,632	" " " "
(503)	" "	4,410	" " " "
(504)	" "	758	" " " "
(505)	" "	1,792	" " " "
(506)	" "	22,159	" " " "
(507)	" "	118	" " " "
(508)	" "	25	" " " "
(554)	" "	503,157	" " " "
(584)	Xylol	10,517	
(650)	Aniline Oil	859,695	
(690)	98% Sulphuric Acid	5,497,670	
(695)	Glacial Acetic Acid	276,026	99.6% acetic acid
(769)	45 degree Nitric Acid	722,229	
(788)	Xylidine	3,631	
(798)	Non-Break Linseed Oil	7,725	Treated Linseed Oil
(819)	Redistilled Acetic Acid	26,000	
(864)	Formaldehyde	215,877	
(895)	Nitrobenzol	257,443	
(1226)	Special Diesel Fuel Oil	157,123 gals.	
(1255)	Mixed Acid	215,977 lbs.	50% nitric, 37% sulphuric 13% water.
(1715)	Orthotoluidine	8,047	
(2005)	Dia. Paraffine Oil	665	#1 Paraffine Oil
(2502)	Quebraco Extract (Tannin Co Grade S M S)	66,225	55% Tannic Acid
(3052)	Recovered Acetic Acid	25,751	
(3081)	Triethanolamine	5	
(3087)	Benzoyl Chloride	8,545	
(4082)	Hydrogen Peroxide, 30% or 100 volume	4,150	
(4080)	Phosphorus Trichloride	1,425	
(1547)	Beta Oxy Naphthoic Acid	32,056	
(1550)	#550 Lead Free Zinc Oxide)	78	
(1582)	Crude Naphthalene	4,956,014	
(1716)	"Kosmos R" Carbon Black	1,665	
(1717)	Trisodium Phosphate	5,617	
(1719)	Phenyl Methyl Pyrazolene	440	
(1752)	Urea	100	
(1799)	Free Acid of Paratoluidine Meta Sulphonic Acid	20,780	
(1806)	Rubber Latex	725	Aqueous Suspension Pure Rubber Latex
(1818)	Meta Xylidine Acetate	320	
(1824)	Disodium Phosphate Anhydrous	550	
(1838)	Strontium Nitrate	9,706	
(1839)	Sodium Tungstate	8,557	
(1840)	Victoria Pure Blue BGO	5,247	Colour Index #729
(1841)	Pigment Rubine 5G	2,112	Colour Index #160
(1848)	Sodium Molybdate	2,477	
(1858)	Magnesium Chloride	1,784	
(1859)	Meta-dinitrochlor Benzol	75	

Code No.	Name	Consumption	Composition
(1860)	Aresket	327	Unknown. Wetting agent.
(1862)	Nacconol W	419	Laurel Alcohol) Sulfonated
(1865)	Duponol W A Flake	411	Laurel Alcohol)
(1903)	Aluminum Ink H	15	Unknown.
(D 2035)	Ming Orange	59	Molybdated Lead Chromate.
(D 2157)	Peacock Blue Lake	267	Colour Index #658 on Mixed Base.
(12010)	Chrome Yellow	60	Lead Chromate
(12054)	Zinc Yellow	475	Zinc Chromate
(12094)	Primrose Yellow	160	Lead Chromate
(12202)	Chrome Yellow M Pulp	521	Lead Chromate
(12507)	C P Chrome Yellow	712	Lead Chromate
(12511)	Chrome Yellow	422	Lead Chromate
(12510)	95% Red Lead	685	Lead Oxide, Pb_3O_4
(CW 457)	Manganese Chloride	877	
(CW 564)	R Salt	1,657	2 Naphth. 3:6 Disulphonic
CW 745)	Ammonium Chloride	329	
(CW 744)	B Rosin	167	Wood Rosin
CW 745)	Cleves Acid	28	1 Naphthylamine 6 & 7 Sulfonic
(CW 766)	Meta Nitraniline	3,332	
(CW 773)	5-Chlor Orthotoluidine	515	
(CW 791)	Mono-Ammonium Phosphate	117	
(CW 818)	Victoria Blue R	347	Colour Index #160
(CW 826)	Methylene Blue	5	Colour Index #922
(CW 854)	Pickling Salt	32,356	Sodium Nitrite
(CW 868)	Speedex Dicalite	475	Infusorial Earth
(CW 885)	Aluminum Chloride	85	
CW 893)	Anthosine 3 B	119	Unknown, obsolete.
(CW 894)	Anthosine B.N.	180	Unknown, obsolete.
(CW 895)	Ferric Chloride Crystals	482	
(CW 899)	Double Refined Sodium Nitrate	1,860	
(NIX 686)	Para Amino Phenol	5	
	Magnesite	1,700	Magnesium Carbonate
	2 Naphthylamine 4'8 Disulphonic Acid	5	
	Nigrosene WSB	25	Colour Index #865
	Tamol NNO	150	Condensation Naphthalene Sulphonic Acid and Formaldehyde.
(CW 861)	Di Isobutylene	1,685	A hydrocarbon
(CW 865)	Orthonitro Toluol	2,912	
(CW 891)	Distilled Phenol	1,721	
(CW 892)	Special Varnish from Levey	6,205	Unknown.
05044	Lithographing Varnish	90	Heat Bodied Linseed Oil
V(10652)	Lead Resinate Solution	219	
C. L. (472)	Varnish	25	
Spec. Varnish #54150		3,592	
C. L. (2182)	Varnish	25	
CTV (1199)	Bodied Perilla Oil	1,627	

RAW MATERIAL CONSUMPTION

Dry Color Factory
(Fiscal Year 1935-36)

Code No.	Name	Consumption	Composition
3	Silica	800 lbs.	Silicon Dioxide
8	Tuscan Clay	24,322	Aluminum Silicate
18	Carter Process White Lead	1,200	Basic Carbonate White Lead
20	Asbestine Pulp	25,375	Hydrated Magnesium Aluminum Silicate
47	Bichromate of Potash	72,976	Potassium Bichromate
48	Litharge	476,349	Lead Oxide
54	#54 Oxide	1,410	Ferric (Iron) Oxide
102	E Rosins	5,522	Abietic Acid
132	132 Rex Oxide B	500	Ferric (Iron) Oxide
175	CP Milori Blue	525	Lead Chromate plus Iron Blue
201	Bradley's Orange Mineral	472	Red Lead Oxide
211	Nitrate of Lead	47	Lead Nitrate
215	Blanc Fixe	2,495	Precipitated Barium Sulfate
221	Barium Chloride	48,955	$BaCl_2$
279	Sodium Nitrite	97,355	$NaNO_2$
295	Bichromate of Soda	548,507	Sodium Bichromate
305	Flake Caustic Soda	192,149	Sodium Hydroxide
306	C P Barytes	152,458	Natural Barium Sulfate
314	Copperas	456,595	$FeSO_4$
316	Oxalic Acid	1,854	$C_2H_2O_4$
329	Chlorate of Potash	39,200	Potassium Chlorate
360	Flaked Calcium Chloride	7,064	$CaCl_2$
365	Acetate of Soda	6,967	Sodium Acetate
370	Soda Ash, 58% Lt.	91,972	Sodium Carbonate
379	Alizarine Red	9,992	20% Organic dyestuff plus 80% H_2O
380	Disodium Phosphate (Commercial) (Crystals)	38,285	$Na_2H\ PO_4$
435	Powdered Tartaric Acid	18,391	$C_4H_6O_2$
434	Iron Free Alumina Sulphate	125,768	Aluminum Sulphate
440	Magnesium Carbonate	549	Magnesium Carbonate
458	Auramine OO Conc.	4	Organic Dyestuff
523	Dextrine	160	Dextrine
555	Stearic Acid (Triple Pressed Granular)	5,061	Stearic Acid
566	Whiting	55,619	Calcium Carbonate
571	Yellow Prussiate of Soda	528,241	Sodium Ferrocyanide
635	Sulphate of Ammonia	144,588	Ammonium Sulfate
660	Bicarbonate of Soda	255	Sodium Bicarbonate
914	Chlorate of Soda	1,111	Sodium Chlorate
950	Sodium Naphthionate	655	Organic intermediate
1060 B	Dry Powdered Glauber Salts	6,657	Sodium Sulfate
1095	Litharge	2,052,296	Lead Oxide
1140	Lead Carbonate	1,182	Basic Carbonate White Lead
1140 E	O D P White Lead	68,096	Basic Carbonate White Lead
1194	C C O Whiting	15,200	Calcium Carbonate
1196	Acid Bromo J	80	Organic dyestuff
1198	Bordeaux B	1,982	Organic dyestuff
1201	Newport Scarlet 2R	479	Organic dyestuff
1251	O D P White Lead	182,652	Basic Carbonate White Lead (Pulp)

Code No.	Name	Consumption	Composition
1194	C C O Whiting	15,200	Calcium Carbonate
1196	Acid Bromo J	80	Organic dyestuff
1198	Bordeaux B	1,982	Organic dyestuff
1201	Newport Scarlet 2R	479	Organic dyestuff
1251	O D P White Lead	182,632	Basic Carbonate White Lead (Pulp)
1252	Alizarine Cyclamine R Paste	5,000	Organic dyestuff 8%, 92% H_2O (Basic)
1510	#641 Bone Black	129	Carbon Black
1550	#550 Lead Free Zinc Oxide	505	ZnO
1570	Orange Mineral AAA	1,493	Red Lead Oxide
1595	Iron Free Lime	697	$Ca(OH)_2$
1596	Orthonitraniline	21,884	Organic intermediate
1718	Ortho Chlor Paranitraniline	11,950	Organic intermediate
1720	Aceto Acetanilid	7,176	Organic intermediate
1752	Urea	3,339	$CO(NH_2)_2$
1756	Calco Bordeaux B	3,365	Organic dyestuff
1789	"Dutch Boy" Basic Lead Sulfate M-12	39,695	Basic Lead Sulfate
1812	Euston White Lead	303,703	Basic Carbonate White Lead
1824	Disodium Phosphate Anhydrous	12,864	$Na_2H\ PO_4$
1834	Patent Blue A	210	Organic dyestuff
1835	Pulverized Visco Glue	2,575	Glue
1836	Saponin	78	Organic dispersing agent
1837	Brilliant Green Crystals	570	Organic dyestuff
1839	Sodium Tungstate	6,624	Na_2WO_4
1842	Vanderbilt Peerless China Clay	2,862	Aluminum Silicate
1843	Peerless Coating Clay	11,010	Aluminum Silicate
1844	Thioflavin T C N Conc.	757	Organic dyestuff
1845	Azo ZZZ 66 Zinc Oxide	42,750	ZnO
1846	U S P Citric Acid	217	$C_6H_8O_7$
1847	Para Chlor Orthonitraniline	495	Organic intermediate
1848	Sodium Molybdate	644	Na_2MoO_4
1852	Rhodamine 6 GDN Extra	705	Organic Dyestuff
1853	Rhoduline Blue-6GA	570	Organic dyestuff
1854	Rhodamine B Extra	195	Organic dyestuff
1855	Ortho-nitro-paraphenetidine	10	Organic intermediate
1856	Granulated Gelatin	100	Gelatin
1857	Dry Ice	11,158	CO_2
1869	Orthochloraceto Acetanilid	289	Organic intermediate
12500	Red Lead	1,540	Red Lead Oxide
CP 30	Paranitraniline	115,550	Organic intermediate
CP 37	Beta Naphthol	2,600	Organic intermediate
CP 41	Mono Salt	5,959	Organic intermediate
CP 42	Toluidine M	78,668	Organic intermediate
CP 63	Scarlet 2 RR	188	Organic dyestuff
CP 219	Graphic Red R	995	Organic pigment dyestuff
CP 227	Graphic Red Med. Pulp	476	Organic pigment dyestuff
CP 264	Spec. Lake Red R Salt	1,505	Organic intermediate
CP 265	Beta Naphthol Chipped	45,194	Organic intermediate
CP 272	Tobias Acid	4	Organic intermediate
CP 288	Graphic Red R Pulp	170	Organic pigment dyestuff
CP 320	Graphic Red M Lake	120	Organic pigment dyestuff
CP 325	Rubinol Lake	55	Organic pigment dyestuff
CP 341	Britone Red M	200	Organic pigment dyestuff

Code No.	Name	Consumption	Composition
CP 366	Spec. Beta Naphthol	182,513	Organic Intermediate
CP 368	Rubinol Toner	2	Organic Dyestuff
CP 374	Britone Red R	10	Organic Dyestuff
CP 377	Britone Maroon	255	Organic Dyestuff
CP 449	Britone Red C Pulp	87	Organic Pigment Dyestuff
CP 483	Toluidine M Dispersed	1,028	Organic intermediate
CP 516	Rubanox Toner Pulp	5	Organic dyestuff
CPX 243	2:4 Dinitraniline	28	Organic intermediate
CPX 246	Britone Red M Pulp	4,530	Organic Pigment Dyestuff
CPX 248	Tungstated Victoria Blue Pulp	45	Organic Pigment Dyestuff
CPX 251	Britone Red R Pulp	210	Organic Pigment Dyestuff
CPX 257	Lake Red CR Pulp	9,557	Organic Pigment Dyestuff
CPX 296	Comic Base Ink-Graphic Red	70	Organic Pigment Dyestuff
CW 591	Tamic Acid	4	Tamic Extract
CW 699	National Fast Wool Yellow	60	Organic Dyestuff
CW 735	Pigment Scarlet 3B		Organic Dyestuff
CW 758	Lake Orange A Conc.	10	Organic Dyestuff
CW 765	Ground Bleached Barytes	117,690	Barium Sulfate
CW 770	Magnesium Chloride	60	$MaCl_2$
CW 781	Lake Orange 2 Y S	250	Organic Dyestuff
CW 782	Acid Green XX Conc.	60	Organic Dyestuff
CW 785	Naphthol Yellow S	40	Organic Dyestuff
CW 813	Mapico Yellow Lemon Pulp	1,081	Ferric (Iron) Oxide
CW 820	2:4 Dinitro Aniline	2,522	Organic Intermediate
CW 840	Naccanol GRA Hi. Conc. (Gardinol)	272	Organic dispersing agent
CW 852	Aresket	12	Organic dispersing agent
CW 854	Pickling Salt	26,880	90% Sodium nitrite plus 10% Sodium Chloride
CW 866	Igepon T Powder	10	Organic dispersing agent
CW 877	Japan Wax	224	
CW 886	Bromo Acid XX	125	Organic dyestuff
CW 904	Neptune Blue BRA Conc.	85	Organic dyestuff
Ice		2,441,000	
Petrolatum		120	Vaseline
#1512 Ink Oil		112	Mineral Oil
Violet A L		25	Organic dyestuff
Nekal N. F.		10	Organic dispersing agent
(2)	Raw Linseed Oil	19,567	Vegetable Oil
(16)	66° Sulphuric Acid	579,031	H_2SO_4
(45)	Resinate Mixing Varnish	40,976	Oleo-resinous Varnish
(48)	Heated Linseed Oil	17,255	Vegetable Oil
(121)	18° Muriatic Acid	890,091	HCl
(154)	36° Nitric Acid	552,339	HNO_3
(255)	Camasol ACM	60,773	Sulphonated Castor Oil
(241)	Toluol	5,243	Coal Tar Solvent
(316)	Heat Bodied Oil	304	Vegetable Oil (Linseed)
(318)	Heat Bodied Oil	2,150	Vegetable Oil
(330)	Alcohol SD 1	54	Denatured Alcohol
(348)	Oleum Spirits	46,946	Naphtha
(418)	Raw Soya Bean Oil	2,380 lbs.	Vegetable Oil
(504)	B.T. Heat Bodied Oil	80	Linseed Oil
(505)	" " " "	319	" "
(506)	" " " "	6	" "
(507)	" " " "	102	" "
(554)	" " " "	5,342	Litho Varnish
(584)	Xylol	20,706	Coal Tar Solvent
(690)	98% Sulphuric Acid	25,748	H_2SO_4 (98%)
(785)	Bleach Varn. Oil (linseed)	540	Vegetable Oil

Code No.	Name	Consumption	Composition
(788)	Xylidine	182	Organic intermediate
(798)	Non-breaking Linseed Oil	517,256	Vegetable Oil
(819)	Redistilled Acetic Acid 56%	126,586	
(1167)	Butanol	7,597	Coal Tar Solvent
(1170)	Butyl Acetate	502	Coal Tar Solvent
(1620)	Dibutyl Phthalate	7,255	Coal Tar Solvent
(1634)	#15 Castor Oil	5,492	Castor Oil
(1720)	Master Grinding Varnish	4,447	Oleo-Resinous Varnish
(2003)	Dia. Paraffine Oil #338	2,460	Mineral Oil
(2111)	Syn. Long Oil Mix. Varnish	61,379	Alkyd Varnish
(2351)	Blown Soya Bean Oil	25,574	Vegetable Oil
(2501)	Bichromate Liquor	1,632,251	Sodium Bichromate
(2505)	Naphtone Acid A	175	Mineral Oil Derivative
(2662)	Paraplex R G 60% Sol.	650	Synthetic Resin
(2947)R	Grinding Varnish	78,651	Oleo-resinous varnish
(2957)R	Mixing Varnish	19,991	Oleo-resinous varnish
(3002)F	Elastoil R	7,714	Mineral Oil
(4022)	#2 Hydro Solvent	159	Mineral Thinner
CW 725	Turkey Red Oil	4,966	Sulphonated Castor Oil
V 7665	100% Disp. Resin	21	Alkyd Varnish
V 7658	Mixing Varnish	518	Oleo-resinous varnish
V 11034	Congo Ester Gum Varnish	820	Oleo-resinous varnish
BV 37	Varnish	2,305	Oleo-resinous varnish
557	Pig Lead	986,590	Metallic Lead
(818)	Redistilled Acetic Acid	1,218,155	$HC_2H_3O_4$ (28%)
D926	Fiber Lead	945,705	Metallic Lead

RAW MATERIAL CONSUMPTION

Lithopone Department
(Fiscal Year 1935-36)

Code No.	Name	Consumption	Composition
655	Barytes Ore	18,000 tons	94% $BaSO_4$
	Coal	1,200 "	Screenings
	Coke Screenings	4,000 "	
	Crushed Zinc Sulfate	11,000	$ZnSO_4$ H_2O (approx.)
	Zinc Sulfate Dehydrated for sales in bags		Not used, warehoused.
	Zinc Cadmium Sludge	200 "	$CdSO_4$ Zn $ZnSO_4$ ZnO plus small amounts of other metals.
1250	Alum	20,000 lbs.	A 12 $(SO_4)5$ 18 H_2O
	Spelter	54,000 lbs.	Zinc.
1717	Tri-Sodium Phosphate	8,800 lbs.	Na_3PO_4 12 H_2O
1021	Silicate of Soda	9,600 lbs.	$Na_2Si_4O_9$ (40°Be)
	Sodium Salicylate	Exp. no reg. consumption	$NaC_7H_5O_3$
(16)	Sulphuric Acid	216,500 lbs.	H_2SO_4, 95%.
(1148	Glauber Salt	80,000 lbs.	Na_2SO_4 10 H_2O
98	Ultra Blue 98 dry	5,500 lbs.	Sintered ash of china clay, sod. carb., sulfur, charcoal.
998	Potassium Permanganate	5,000 lbs.	$KMnO_4$
267	Zinc Dust	150,000 lbs.	Zn.
601	Salt	21,000 lbs.	NaCl.
1403	Titanium Dioxide	128,000 lbs.	TiO_2
(275)	Castor Oil	2,400	Glycerol Ester of Ricinoleic Acid C 18, H34, O3
	Soap Flakes	5,000 lbs.	
(2120)	Linseed Fatty Acid	15,500 lbs.	C18 H32 O2
1512	Phthalic Anhydride	16,500 lbs.	C6 H4 (CO) 2O
1827	Lecithin	11,000 lbs.	C42 H84 PO9N
(348)	Mineral Spirits 6.48#/gal.	35,200 gals.	Medium Naphtha Distillation End Points: Initial 140-150, Final 200-210
(2)	Linseed Oil	15,500 lbs.	Glycerol ester of Linoleic Acid-C18 H32-02 Linolenic Acid C18 H30
547	Alumina Stearate	3,400 lbs.	$Al(CH_3.(CH_2)16\ COO)_3$
	Gum Arabic	100 lbs.	
(3081)	Triethanolamine	100 lbs.	N=C6 H15 O3
303	Caustic	6,400 lbs.	Caustic
	Sulfuric Acid, CP	15,800 lbs.	H_2SO_4, 94%
	Sod. Hexametaphosphate	600 lbs.	$(NaPO_3)6$

RAW MATERIAL CONSUMPTION

Coal Tar Raw Materials
(Fiscal Year 1955-56)

Code No.	Name	Consumption	Composition
20	Asbestine	200 lbs.	Magnesium Silicate
20F	"	29,450	" "
20L	"	2,750	" "
89	Red Copper Oxide	60	Copper Oxide
265	Starch	55	Buffalo Corn Starch
503	Caustic Soda	42,274	Na OH 98%
506	Barytes	51,650	Barium Sulphate
509	Calomel Powder	50	Mercurous chloride
590	Texas Asphaltum	426	Residual Petroleum Asphalt
594	Candle Pitch	1,852	Stearine Pitch
651	Petroleum Tailings	1,324	Petroleum Wax Residue
996	Asphalt	870	Residual Pet. Asphalt
1075	Sugar	5,010	Sucrose
1087	Gilsonite	95,555	Natural Asphalt
1122	Flaxsoap	97	Linseed Oil Soap - 67% water
1185	Rosin	86,250	Wood rosin
1261	Cottonseed Soap Stock	7,624	Cotton Seed Oil Soap
1290	Peradichlor Benzol	9	$Cl_2C_6H_4$
1551	Asbestos	558,350	Asbestos
1549	"	20,700	
1557	Coal Tar Pitch	1,852,280	Coke Oven Residue
1765	Caustic Potash	4,511	Potassium Hydroxide 96%
1790	Spent Earth	5,555	Clay and Oil foots
1808	Rosin	10,259	Wood Rosin
CW 527	Parolite for Paint Purpose	7,100	Residual Petroleum Asphalt
CW 575	Special # 1 Korite	2,715	" " "
CW 611	Paving Filler	1,145	Residual Petroleum Asphalt
CW 765	Off grade Barytes	48,800	Barium Sulphate
CS 792	Special Pitch	255,394	Coke Oven Pitch
D 2141	Spent Earth	17,810	Fuller's Earth saturated with Oil Foots
#455	Fly Spray Odor Synthetic Perfume	3	Synthetic Perfume
(00)	Pine Tar	7,388 gals.	Crude Residue from Pine Tar Dist.
(2)	Linseed Oil	2,395	Raw Linseed Oil
(14)	Turpentine	2	
(31)	Dark L. O. Drier	25	Cobalt Linoleate
(58)	Water Gas Tar	277,594	Crude Tar
(61)	Coke Oven Tar	117,212	" "
(63)	V.M. & P. Naphtha	2,640	Petroleum Naphtha
(115)	Castor Oil	719	
(140)	Raw China Wood Oil	1	Tung Oil
(141)	Kerosene	2,566	
(149)	Benzol	510	C.T. Benzol (50% benzene)
(186)	Fish Oil	5,892	Crude Fish Oil
(188)	Oleic Acid	559	85% Oleic Acid
(225)	Light Oil	162,513	
(295)	Pine Oil	856	White Steam Distilled Pine Oil
(295)M	" "	2,026	
(330)	Alcohol	140	Spl. Denatured Alcohol
(548)	Oleum Spirits	1,019	Petroleum Distillate
(590)	Gilsonite Black Japan	629	Gilsonite Cut with Pet. Solvents
(431)	Blown Fish Oil	80	Fish Oil
(458)	Paraffin Oil	144	Light Petroleum Oil
(584)	Xylol	106	
(889)	Cresylic Acid	10,597	98% Cresols

Code No.	Name	Consumption	Composition
(1030)	35% Tar Acid	14,576	35% Cresols
(1257)	High Flash Solvent Nephtha	8	Coal Tar Naphtha
(1271)	Cylinder Oil	265	Heavy Petroleum Oil
(1506)	High Boiling Cresylic	817	95% Cresols
(1544)	Neutral Oil	644	Crude C.T. Oil (heavy)
(1558)	Nicotine Sulphate	6,654 lbs.	40% Nic. Sulph.
(1711)	Fish Oil Fatty Acid	879 gals.	
(2005)	#1 Paraffin Oil	13,755	Petroleum Oil (light)
(2401)	Cut Back Korite	106,902	Petroleum Residue cut with Petroleum Distillate
(2511)	Koppers Kolineum	24,597	Heavy Coal Tar Oil
(5005)	Cocoanut Oil	557	
(5041)	Neutral Oil	9,297	Crude Coal Tar Oil
(5042)	#2 Cresol	1,105	Cresylic Acid 99.5%
(5043)	#3 Cresol	597	" " "
(5045)	25-30% Tar Acid	55,926	25% Cresol
(4025)	Gas Oil 52-56 Be.	21,222	Crude Petroleum Fraction
(4085)	Lignin Liquid	15,585 lbs.	Crude Sulph. Black Liquor
CW(521)	Pyrethrum	108 gals.	Extract of 20# flowers per Gallon
CW(612)	Nopco #1551	2,208 lbs.	Sulph. Fish Oil
CW(620)	Insecticide Base Oil	90 gals.	Paraffin Oil
CW(621)	Anthill	169	.2% Sol. of Arsenic
CW(627)	U.S.P. Pine Tar Oil	425	
CW(849)	15-20% Tar Acid Oil	8,010	Crude Cresols
CW(871)	Eocene	5,887	Petroleum Solvent
CW(905)	Crude Castor Oil	467	
BX 669	Base for Floorboard Stain	156	Black Ground in Oil

RAW MATERIAL CONSUMPTION

Red Lead, Litharge and White Lead Raw Materials
(Fiscal Year 1955-56)

Code No.	Name	Consumption	Composition
(1)	Linseed Oil, Acid Refined	1,175,212 lbs.	
(2)	Linseed Oil, Raw	55,675	
(1488)	Linseed Oil, Acid Refined	1,715,555	
(5091)	Linseed Oil Benzoyl Peroxide Treated	75,418	
(14)	Turpentine	137,881 gals.	
(2120)	Linseed Oil Fatty Acids	1,769	
370	Soda Ash	95,500 lbs.	Na_2CO_3
(820)	Acetic Acid 80%	206,640 gals.	CH_3COOH 80%
412	Leaded Zinc Oxide	1,982,300 lbs.	65% ZnO 35% $PbSo_4$
415	" " "	92,000	" " " "
557	Pig Lead	17,000 tons	Pb

RAW MATERIAL CONSUMPTION

Stocks and Distribution Department

Printing Ink (used for label imprinting)

Stamp Pad Ink (used for dating cartons)

Stencil Inks

Drum and Barrel Paints

Case Sealing Glues

Label Pastes (hand labeling)

Label Pastes (machine labeling)

Pure White Shellac (hand labeling)

Denatured Alcohol (hand labeling)

Benzine (drum and barrel finishing)

Hot Cement (machine labeling)

Houghton Cleaner (used in solution of warm water for removing labels from packages)

Solder (parcel post packing)

RAW MATERIAL CONSUMPTION

Tin Can Plant
(Fiscal Year 1935-36)

Name	Consumption	Composition
Bar Solder	60,000 lbs.	40% tin, 60% lead.
Wire Solder	30,000	45% tin, 55% lead.
Tin Plate and Terne Plate	20,000,000	Steel, tin and lead.
Bail Wire	400,000	Steel, zinc.
Alcohol 188°F #5	700 gal.	
Glycerine	670 gal.	
American Family Soap	7,500 bars	
Lard Oil #1	110 gal.	
Darex Oilproof Comp. #55	670 gal.	Mfg. by Dewey Almy
Darex Oilproof Comp. #75	151 gal.	Mfg. by Dewey Almy
Hermo Oilproof Comp.	2,800 gal.	Max Ams. Machine Co.
Solder Flux 43° Baume Grade A	5,700#	Mfg. by Fluxes, Inc.
Solder Roll Flux Crystals	4,200 lbs.	
Soluble Oil for drawing and cutting	500 gal.	
Silicate of Soda	7,500 lbs.	
Mosinee Wrapping Paper	5,700 lbs.	
Corrg. Cases for Shipping Containers	81,100 ea.	
Black Annealed Wire 16 Ga.	2,000 lbs.	Steel

FINISHED PRODUCTS

A request was made to all departments for a listing of marketable products prepared in this plant. In response to this request, the following listings were supplied, which represent, so far as known to these investigators, a substantially complete recording of the various types of coatings and coating materials manufactured in this plant.

Chemical Products:

Intermediates

Beta Naphthol
Paraphenylenediamine
Ortho Chlor Meta Toluidine Para Sulphonic Acid
Meta Nitro Paratoluidine
2,Naphthol 7,Sulphonic Acid
2,Naphthol 3,6 Disulphonic Acid
Acetanilid
Tobias Acid
2,Naphthylamine 1,Sulphonic Acid
Beta Oxy Naphthoic Acid
Meta Nitranilid of Beta Oxy Naphthoic Acid
Benzoyl Peroxide

Pigment Colors

Lithol Red
Lake Red C
Lithol Rubine
Solfast Reds
Pigment Green B
Phospho Tungstate Lake of Methyl Violet
Phospho Tungstate Lake of Victoria Blue
Phospho Tungstate Lake of Malachite Green

Drestuffs

Fuchsine
Alkali Blue

Flushed Inks for Lithographing

Alkali Blue Ink
Tungstated Victoria Blue Ink
Tungstated Methyl Violet Ink
Tannated Methyl Violet Ink
Scarlet Ink

Lacquers

Industrial

Clear Metal Lacquers
Bronzing Liquids
Crank Case Sealers
Primers (Lacquer)
Surfacers (Lacquer)

Automotive

Primers (Lacquer)
Surfacers
Putties
Enamels
Metallic Finishes

Lacquer: (con.)

Industrial	Automotive
Enamels—Pigmented and Metallic	
Broom Handle Finishes	Airplane Finishes
Pencil Lacquers	
Rubber Lacquers	Dopes, Primers, Enamels
Refrigerator Lacquers	
Cable Lacquers	Furniture Finishes
Paper Lacquers	
Decal Lacquers	Clear Sealers and Finishing Lacquers
Stencil Pastes	Stains
	Synthetic Enamels

Thinners

Pigment Product:

Dry White Lead
Lead in Oil Pastes
Lead in Oil and Zinc Oxide Pastes (Zilo)
Dry Red Lead
Red Lead in Oil Pastes
Dry Litharge

Lithopone:

Dry Lithopone
Lithopone Oil Pulp

Coal Tar:

Coal Tar Base Paint
Coal Tar Base Plastics
Asphalt Base Paints
Asphalt Base Plastics
Coal Tar Disinfectants
Cresol Solution
Fly Spray
Coal Tar Solvents

Paint:

Exterior House Paint
Interior Decorator's Enamel
Flat Wall Paints
Semi-Gloss Wall Paint
Shading Colors
Farm Implement Finishes
Freight Car Paints
Factory Up-Keep Finishes
Structural Steel Paints
Auto Enamels
Manufacturer's Enamels
Concrete and Stucco Paint
Zone Marking Paint

Varnish and "H" Departments:

Interior Varnish
Exterior Varnish
Industrial Varnish
Shellac—Orange and White
Label Varnish
Floor Wax

Varnish and "H" Departments: (con.)

Polishes
Floor Stains
Shingle Stains

Dry Colors:

Dry Colors for all purposes (organic and inorganic)
Water Pulp Colors
Dispersed or Flushed Colors in Oils and Varnishes

Tin Cans:

The finished products of the Tin Can Department are all standard sizes of round paint cans, 1/8 pint through 1 gallon; all sizes of paste cans up to 25 pounds capacity; all size square varnish type cans ranging from 1/2 pint through five gallon capacity.

The content of Volume II, embracing as it does brief descriptions of all operations and listing all of the materials utilized in the several departments, serves as a portrayal of the hygienic problems to be investigated. In many respects Volume II merely constitutes the background, paving the way for precise technical and laboratory appraisals and measurements of hygienic conditions connected with the methods and circumstances associated with the manipulation of many scores of raw materials throughout the several departments concerned.

THIS IS THE END OF VOLUME II