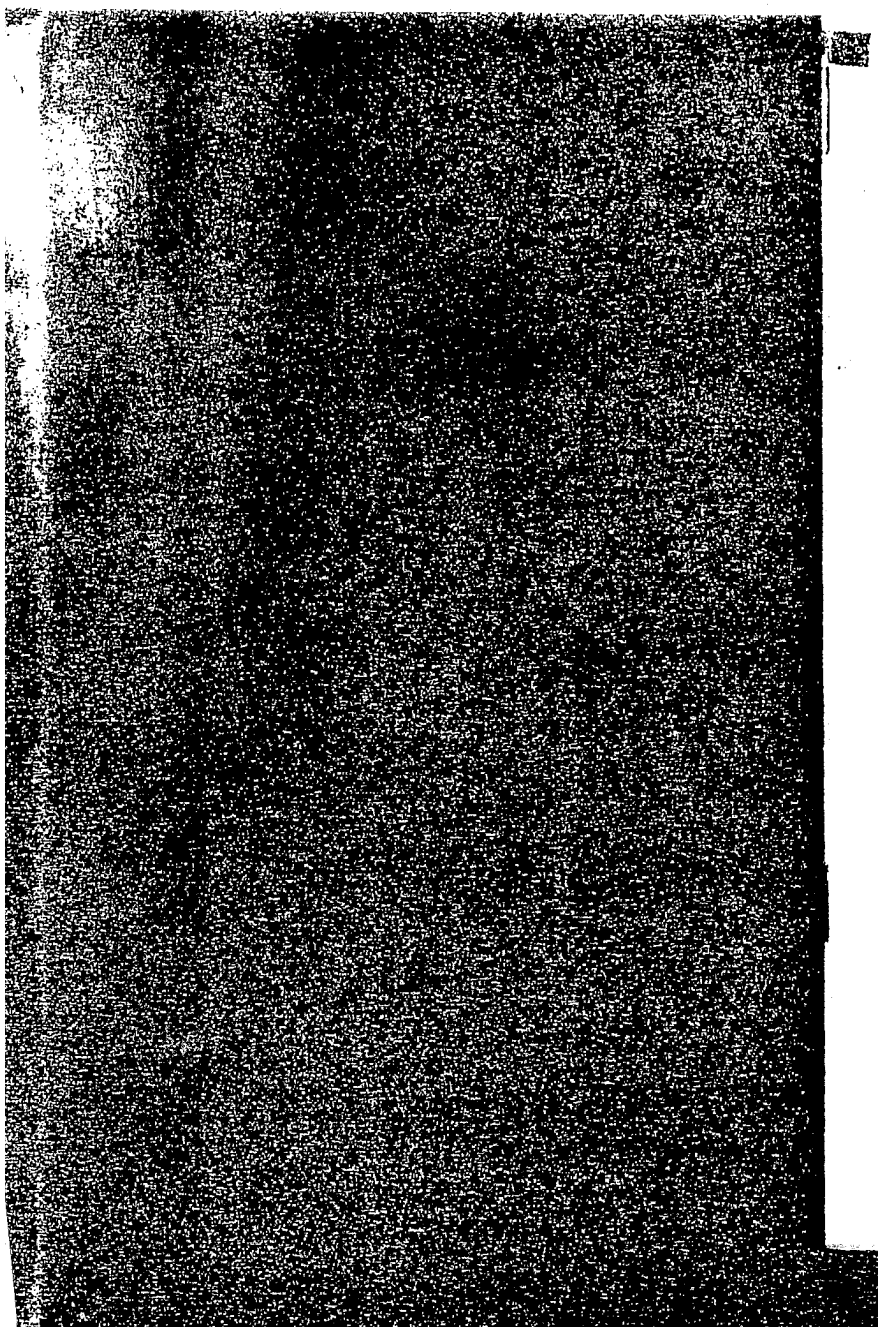

SERIES II

LITHOPC
IN PAIN
FORMULAT

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LITHOPONE

IN 1874 lithopone was invented by John Orr of Glasgow, Scotland. Lithopone was first manufactured on a very small scale in the United States shortly before 1900. Newark, N. J. can boast of the first lithopone manufacture by Cawley, Clark & Co. with N. J. Graves of Camden, N. J. a rival for honors. These products called Griffiths White, Fulton White, etc., would be regarded as very inferior pigments when compared with the modern lithopone.

Shortly after 1900 the Krebs Pigment and Chemical Company started manufacturing lithopone at Newport, Delaware. If it were not for the great success of early lithopone in the linoleum and window shade industries, it is quite possible that lithopone might never have won its place, today, as the leading white hiding pigment.

In 1906 the lithopone industry in the paint field was assured of success through the invention of ready mixed flat wall paints to which lithopone was essential. The marked improvement in the properties of lithopone during the past ten years has broadened its use, particularly by the paint industry.

The table below showing lithopone sales in the United States clearly indicates the rapid strides which this great industry has made from 1900.

Year	Tons	Year	Tons
1900	920	1918	62,400
1906	4,300	1919	81,000
1907	10,250	1920	89,350
1908	8,300	1921	55,000
1909	14,850	1922	83,000
1910	12,650	1923	100,000
1911	16,850	1924	109,500
1912	24,200	1925	145,000
1913	29,700	1926	160,000
1914	32,800	1927	175,000
1915	46,500	1928	200,000
1916	51,300	1929	202,000x
1917	63,700		

x Normal growth arrested by generally poor business conditions during the last quarter of 1929.

The good color and hiding power, as well as its other meritorious properties, and the fact that lithopone is a low cost white pigment, has caused such a growing demand for lithopone that it has displaced white lead, zinc oxide, etc., for many uses.

The following tables give further comparison between lithopone and other white pigments and show particularly the economic relationships based upon (1) hiding power and (2) per solid gallon.

While there is still some controversy on the relative Hiding Power of the various white pigments, the following results are of interest.

Hiding Power of Paints of Equal Mobility

Pigment	Composition % Pigment / % Oil	Pounds Pigment per Gal.	Sq. Ft. Per Pound Pigment — Cryptometer: Fresh Paint	Cryptometer: Aged 2 Weeks	Linoleum Brushout: Fresh Paint	Linoleum Brushout: Aged 2 Weeks
Titanox C	61.7 / 38.3	8.5	25.6	26.1	40.5	37.9
Zinc Oxide	51.5 / 48.5	7.1	25.0	25.2	39.7	30.2
Titanox B	67.4 / 32.6	11.4	22.8	23.1	33.5	31.8
Lithopone	64.5 / 35.5	10.2	21.8	24.0	28.7	30.0
Zinc Oxide 35% Leaded	70.3 / 29.7	13.8	17.6	17.8	25.4	23.6
Basic Lead Carbonate	77.2 / 22.8	18.1	14.7	14.0	17.3	22.9
Basic Lead Sulfate	73.5 / 26.5	15.9	12.0	12.7	15.5	14.3

The above table is part of the table 5 on Hiding Power of Paints of Equal Mobility on page 260, circular No. 362, March, 1930 of the January 1, 1931 Paint and Varnish Proceedings of the Scientific Section.

The above table plainly shows that hiding power should never be determined on fresh paint. Paint should be aged until a proper equilibrium is reached. Using the results obtained on paints two weeks old, the following table is calculated. For Hiding Power lithopone is taken as standard, i.e. 100. The amount of lithopone necessary to hide 1000 sq. ft. of surface is taken as standard at 43.5 pounds.

Tabulation of Relative Hiding Power and Costs

Pigment	Relative Hiding Power Aged 2 Weeks: Cryptometer	Relative Hiding Power Aged 2 Weeks: Linoleum Brushout	Pounds Per 1000 Sq. Ft.: Cryptometer	Pounds Per 1000 Sq. Ft.: Linoleum Brushout	Price Per Pound	Cost Per 1000 Sq. Ft.: Cryptometer	Cost Per 1000 Sq. Ft.: Linoleum Brushout
Lithopone	100	100	43.5	43.5	$0.045	$1.96	$1.96
Titanox B	96	106	45.3	41.0	0.065	2.94	2.66
Titanox C	109	126	40.0	34.5	0.070	2.80	2.32
Zinc Oxide	105	101	41.4	43.1	0.065	2.69	2.80
Zinc Oxide 35% Leaded	74	79	58.8	55.2	0.0625	3.67	3.45
Basic Lead Carbonate	58	76	75.0	57.0	0.0725	5.44	4.13
Basic Lead Sulfate	53	48	82.1	91.2	0.0675	5.52	6.15

Table of Pigment Cost per Solid Gallon

	Pounds per gal.	Price per lb.	Cost per solid gal.
French Process Zinc Oxide			
(Green Seal)	47.1	$0.1037	$4.88
(Red Seal)	47.1	.0937	4.41
Basic Lead Carbonate	56.7	.0725	4.11
Basic Lead Sulfate	53.4	.0675	3.60
35% Leaded Zinc Oxide	49.6	.0625	3.10
Lead Free Zinc Oxide	47.1	.0650	3.06
Titanox B	35.8	.0650	2.32
Titanox C	25.8	.0700	1.81
Lithopone	35.8	.0450	1.61
Krebolith	35.0	.0650	2.27
Ti-Tone	35.4	.0650	2.30

From the above tables the following conclusion may be drawn. Lithopone is the most economical pigment, since it has the lowest cost per unit of hiding power as well as the lowest cost per unit volume. In the field of high strength pigments, Krebolith and Ti-Tone also are characterized by economy in their use.

PROPERTIES OF PONOLITH LITHOPONE

PONOLITH COMPARED TO OTHER WHITE PIGMENTS

BEFORE studying the specific properties of Ponolith and its application to paint formulation, let us generalize on the reason for the phenomenal increase in lithopone consumption in the paint industry at the expense of its older brothers, white lead and zinc oxide.

The relative tinting strength of Ponolith is 135 compared to 70 for basic carbonate white lead and 100 for zinc oxide. Lithopone will produce a paint which hides better. A comparison of prices, carbonate white lead 7¼ cents, white seal zinc 11⅜ cents, green seal 10⅜ cents, red seal 9⅜ cents, and American Process zinc 6½ cents against 4½ cents, shows lithopone to be the most economical pigment known today. Its whiteness is far superior to white lead and better than French Process zinc oxides. Unlike white lead and like zinc oxide, it is not affected by hydrogen sulfide or sulfur fumes. Like zinc oxide it is non-poisonous, while white lead is recognized as poisonous. Lithopone has a wide, controlled range of oil absorption; on the one hand, a low oil absorption approaching that of white lead and permitting a high pigment concentration where desired; while on the other hand, a high oil absorption, approaching that of zinc oxide, permitting a puffy thick paint. Unlike zinc oxide and white lead, lithopone, when completely neutral or near neutral, is practically non-reactive with vehicles regardless of their acidity or nature. Lithopone is light resistant, does not settle or cake in the package nor interfere with the drying of vehicles. The proper lithopone in the proper formula will produce excellent paint for any purpose.

USES OF PONOLITH LITHOPONE

In view of the variety of characteristics found in lithopone it can be and is used in a great many applications. These uses take advantage of its outstanding properties such as color, hiding power, fine texture, range of oil absorption, etc. Its largest use is in paints of all kinds. Practically all paints for inside purposes contain a very large percentage of lithopone, in many cases 100% of the total pigment. These paints include flat whites, floor paints, house paints, mill white glosses, undercoats, all grades of enamels, quick drying enamels including those formulated with synthetic resins. It is equally adapted to tinted paints. In outside paints its use is large and with the increasing knowledge of its formulation, this use is rapidly growing. Other uses include cold water paints.