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OUTLINE
of
PAINT AND VARNISH HISTORY
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The use of paint as a protective coating has come down to us from remote antiquity. Even Noah "pitched the Ark within and without with pitch" and the mother of Moses placed him in an ark of bulrushes which she "daubed with slime and with pitch." At later periods the Jews evidently used paint on their houses, as in Jeremiah appears - "Woe unto him that sayest, I will build me a wide house - - ceiled with cedar and painted with vermilion." (Even then it was bad taste to paint a house with vermilion.)

Its use for decoration and picture painting began very much earlier. Pictures of bison, wild boar, reindeer and other animals have recently been found in some caves in Spain. These were evidently the work of cavemen and date from the Paleolithic age, probably 50,000 years ago. These prehistoric pictures are real masterpeices and are far superior to pictures of battles and hunting scenes on the walls of Babylon erected about 3500 years B.C., and wall paintings found in tombs in Thebes dating from 1500 B.C.

In the British Museum are many mummies elaborately decorated, the oldest of these is that of Menkara who lived about 4000 years B.C. Many beautifully painted things were found in the tomb of King Tutankhamen were they had lain undisturbed for 3300 years. These references seem to establish the use of paint at least 4000 years before the coming of Christ.

The art of painting developed much more slowly than did sculpture. This was, undoubtedly, due to the crude nature of painting materials available rather than to the skill of the artist. Greek sculpture attained a high state of development as early as four or five centuries B.C., but the art of painting was not fully developed until the remarkable work of the Italian masters in the fifteenth century.

The materials used by the ancients were probably all minerals, natural earth colors, organic dyes from plants, and waxes. The old Greek philosophers are the first to give any definite reference to detail. Theophrastus writing about 350 years B.C. refers to "cerussa" a native mineral carbonate of lead found in small quantities in Europe and Pliny who lived A.D. 23 to 79 writes of the mode of boiling wax and painting ships with it after which - "neither the sea, nor the wind, nor the sun can destroy the wood thus protected."
(First reference to - "Save the surface and you save all.")

The Romans being essentially a warlike people never brought the decoration of buildings to the high plane it reached with the Greeks, though the ruins of Pompeii show many structures with mural decorations in very fair condition. The colors used are glaring, usually a black background

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with bright red, yellow, and blue. The black was, undoubtedly, Lamp Black; the red was the mineral Cinnabar, natural Vermilion, referred to by Theophrastus and Pliny. This has stood for these centuries with little change of color. The yellow, no doubt, was Yellow Ochre, as pots of Yellow Ochre were found at Pompeii and the blue, undoubtedly, was Lapis Lazuli, the true native ultramarine blue which is found in Persia.

The earliest reference to the manufacture of any paint material is by Theophrastus who described white lead as prepared from lead and vinegar evaporated to dryness. Phiny again mentions it. It is not known when the white lead of today was first made or to what country it owes its birth, but tradition assigns discovery of the method to the Dutch and to a man named Stratingh. It must be over 300 years old, as a patent for a method like the present Old Dutch was taken out in England in 1622. The length of time involved encouraged effort to develop a more rapid method and the first quick process on record is the Chamber process patented by Sir James Creed in England in 1749. Many other processes have been invented but the most satisfactory one now in use is the Carter process patented in July 1889.

Zinc White seems to have been suggested first by Curtois of Dijon, France, in 1782 and after several unsuccessful attempts to use it for a paint material, Leclair in 1845 found a method to use it for oil paints. Up to this time all zinc oxide was made by the French process from vapors given off by a bath of zinc metal. Zinc oxide has always met with much favor in France and recent legislation has been enacted prohibiting the use of lead carbonate in paints. In 1856 Wetherill patented the American process of making zinc oxide directly from the ore, mixed with coal, by volatilization on a grate.

In 1879 the Lewis patent for making sublimed lead was taken out. A vein of lead and zinc ore was discovered in 1870 and smelting it by the Lewis method developed leaded zinc like the Ozlo pigment in general use.

Lithopone was first patented in 1874 under the name of Orr's White. There are many variations in the manufacturing process now in use but all produce a material essentially the same.

Black appears to be the earliest coloring pigment used as from time immemorial soot has been used by savage tribes to paint their faces and other objects they wished to beautify in this way. Black substantially the same as our present Lamp Black was made by the Chinese at least 2000 years ago by burning oil in small earthenware lamps with a limited supply of air and collecting the soot thus condensed. Asphalt or Bitumen found on the shores of the Dead Sea was used by the early Egyptians on mummy cases. At a much later date, in Europe, Ivory and Bone Blacks were made by burning ivory cuttings or bones in closed retorts and grinding and refining the charred residue. Frankfort or Vine Black was made by a similar method using vine cuttings, stones from plums, olives, almonds or similar fruits. Carbon Blacks made by the incomplete combustion of gas were first made in this country in 1864.

The earliest blue on record is Indigo used in India and Egypt and mentioned by the Ancient Byzantine writers as well as Pliny and others. It is named in the Marseilles Tariff of 1228. Natural Ultramarine Blue, Lapis

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Lazuli, was used many centuries ago but ultramarine was first made artificially by Christian Gmelin in France in 1828. Prussian blue was first made in 1710 by a color maker names Diesbach in Berlin.

Malachite, green copper mineral, was employed by the ancients. Verdigris was used by the Romans as a pigment and has been detected in the wall paint of Pompeii. Paris Green or Emerald Green was discovered in 1814, though Scheele's Green very similar to this was made in 1778. This pigment is little used as a paint material now. Chrome Green, essentially the same as those now used were first made in France in 1838.

Yellow Ochre, one of the most ancient pigments, was used by the Egyptians, Greeks and Romans. Naples Yellow which is basic lead antimoniate, has been found on Babylonian bricks at least 2500 years old. Chrome Yellow, lead chromate, in common use today, was first made about 100 years ago, though some is found in nature.

The browns, such as umber, sienna, iron oxide, etc. are natural earth colors which probably were some of the earliest pigments used for decorative purposes.

The earliest red pigment about which we have any information is the native Cinnabar, mercuric sulphide, used by the ancients and Chinese. Chinese or English Vermilion is now produced artificially by combining mercury and sulphur in a process submitting it to sublimation or by a wet method. This manufacture was first undertaken in England about 125 years ago. Red pigment using organic dye derived from the madder plant, a native of Greece, was made in Europe in the 13th century, though madder was used by the Greeks and Romans for dyeing long before it was used for painting. Many other organic dyes have been used but these have been largely displaced by aniline dyes first discovered by Dr. William Henry Perkin in 1856. He made in that year a mauve dye used to dye silk for a dress for Queen Victoria. For this he was knighted.

The history of paint vehicles and varnishes can be presented much more simply than that of pigments. The pitch that Noah used was, undoubtedly, a form of crude petroleum and it is remarkable that no other substance has been discovered that is so well adapted to protect surfaces against moisture.

Waxes were first used as the vehicle for colored paints. Excellent examples of the use of melted wax as a binding medium for pigments, executed in the second and third centuries, are shown in London museums. Later evidently a mixture with oil or animal fat was used to lessen the inconvenience of heating the wax. For interior decoration a size made with fish glue, gum arabic or similar gum or the white or yolk of egg, were the earliest mediums used.

The earliest mention of drying oils as a paint vehicle is by Aetius, a Greek physician, in the biginning of the sixth century. This may have been Linseed Oil. Heraclius in the seventh century first mentions the

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mixing of oxide of lead with oil to make it dry quicker. In the library at Lucca is a manuscript of the eighth or ninth century giving a recipe for a transparent varnish composed of linseed oil and varnish gum, probably amber. Oil painting had been definitely established as early as A.D. 1100, though in an unsatisfactory form. In fact, the art of painting was very crude until the fifteenth or sixteenth century when it underwent a transition from ancient to modern art. About this time other oils such as poppy seed oil and walnut oil came to be much favored.

China Wood Oil or Tung Oil though employed by the Chinese for centuries in finishing their junks and for lacquers, was introduced into the manufacture of varnishes only about 25 years ago.

Fish Oils have evidently been used for many years and other seed oils and petroleum have also been widely used. But during all these centuries, Linseed Oil has been by far the chief oil for the paint industry.

Turpentine from European pine trees dates back for many centuries, but American Turpentine that we know today was first developed by the early settlers in the southern states about 300 years ago.

Naptha, of course, followed the discovery of Petroleum in the U. S. when Col. Drake sunk his first oil well in Titusville, Pa. in 1859.

The varnish gum first used, no doubt, was amber as it is found quite generally throughout Europe and beads made from it were found in the early British graves and Etruscan tombs. Other varnish gum such as Zanzibar, Sierra Leone, Benguela, Mastic, Sandarac, no doubt, preceded the modern Kauri and later Manilla, Brazilian and Congo Gums. Shellac has been known to the natives in India for several thousand years and used as a varnish gum for some centuries, as a manuscript issued by Akbar, emperor of Hindustan in 1590, mentions the proportion of Shellac Gum to be employed in varnish used for the woodwork of public buildings. (This seems to be the first definite reference to specifications for paints or varnish materials.)

This outline of ancient history brings us down to about the time of the Civil War in the United States. Prepared paint was unknown. Houses were painted with white lead thinned with oil and a little turpentine and drier. Tints were obtained by using pigments of the character described, either dry or ground in oil. The same character of paint was used generally on steamships, railway freight cars, wagons, etc. Carriages and railway passenger cars were painted with turpentine colors, that is, pigments ground in turpentine. Primers and undercoatings were mixed on the job, using lead and varying proportions of oil, japan, varnish and turpentine. Rubbing and finishing varnishes were later applied for gloss and wearing quality.

Furniture was finished with stains made from water soluble vegetable dyes or earth pigments. Filler was prepared specially for the work in hand. Much furniture was finished with a French polish, that is, shellac rubbed on with a pad until a good surface and proper gloss was obtained. Often one or

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two coats of rubbing varnish was applied and when thoroughly dry rubbed with pumice and water and then finished with finishing varnish. Or polishing varnish was used which was allowed to dry thoroughly and then rubbed with pumice and water followed by polishing with the bare hand.

All the mixing of paint was done by the painter himself, who was an expert craftsman in those days. His efforts were to get all materials in as near the primary state as possible so he could be sure of their purity.

Shortage of labor during the Civil War encouraged effort for all lines of industry to offer their product in a state more adaptable for the consumers' immediate use and as a result prepared paint appeared on the market. The first paint so made proved very unsatisfactory as it settled in the package and could not be readily stirred up. D. H. Averill of Newburg, a suburb of Cleveland, in 1866 invented a liquid paint which did not settle in the package. Unfortunately he mixed liberal proportions of adulteration with the lead, zinc and linseed oil used and thus did not make the paint as good as he might have done.

He thought he had made a discovery which would lead to great wealth but he was destined to disappointment. Many others followed in his lead and prepared or mixed paint soon acquired a very bad reputation and there came to be a well founded prejudice against all prepared paint from which it has never fully recovered. Patent paint as it was called was vigorously opposed by many manufacturers.

However, the demand persisted and some of the larger and better manufacturers began to turn their attention to the production of high quality liquid paint. The Sherwin-Williams Company were pioneers in this movement and in 1880 put on the market Sherwin-Williams Prepared Paint as the best outside house paint it was possible to produce. At first they found it very difficult to introduce this prepared paint because of the prejudice against it but effort was fundamentally right and the product soon met with much favor and led the field.

It had the effect of elevating the character of paint generally so that now there are many good prepared paints on the market and it is very generally recognized that the exterior buildings can be kept well painted most economically over a period of years through the use of prepared paint made with lead carbonate, zinc oxide, linseed oil, drier and turpentine, and this combination is specified very generally by railways, steamship companies, War Department and Navy, etc. etc.

As prepared paint for outside of houses proved so useful, the demand grew for paints prepared for other purposes. Special paints for floors were made, enamels and stains in varnish for interior woodwork and furniture were produced. Special flat wall paints came into general use as a substitute for wall paper. Special paints were offered for farm

buildings, roofs, concrete, etc. Special varnishes were offered for floors, interior woodwork, outside exposure, etc. and innumerable other specialties were offered to the trade.

Such a bewildering array of special products are now on the market, many known by special trade names, that the paint dealer is often confused as to just what to offer for the prospective job. This has led one manufacturer to prepare complete guide outlining to the consumer just what product is best adapted for the article to be painted.

While all this development of paints for the building industry and household use was going on, there was a similar development in industrial paint to keep pace with changes in the method of painting. This has required change from brushing material to that adapted for many other methods introduced in modern factory practice, such as dipping first largely used in the agricultural implement manufacture about 50 years ago, spraying, first attempted on a large scale in painting the World's Fair Buildings at Chicago in 1893, and the later methods of flooding or flowing introduced about 1906 to keep up to quantity production in modern automobile plants. Air drying has been largely superseded by baking. Pyroxylin Enamels and Lacquers are now being developed by some manufacturers, thus taking advantage of this artistic and quick drying finish first developed by Alexander Parks in England in 1855.

At the outbreak of the World War in 1914, American chemists immediately turned their attention to the manufacture of Aniline Dyes and Intermediates which were imported from Germany. Many manufacturers entered the field and a great deal of energy and capital was devoted to the problem. New factories were built with great speed and new manufacturing organizations were developed and the American product soon appeared on the market, filling the want which could no longer be supplied from Germany. The American Dyes Institute was organized to co-ordinate this effort and eliminate useless duplication. This has now resulted in a very well established dye industry in this country, making the paint, color and textile industry to a very large extent no longer dependent upon Germany.

Varnish manufacture has suffered so seriously from fluctuations in market price and irregular supplies of China Wood Oil, that during recent years much investigation has been carried on hoping to grow China Wood or Tung Oil trees in Florida. Experiments in this culture look very promising and it is estimated that 50,000 acres planted with Tung Oil trees would take care of all American requirements.

The paint and vernish industry has grown amazingly until it now embraces nearly 500 individual companies in the United States with production approaching 200,000,000 gallons annually. "Save the surface and you save all" is so well understood that it is quite probable that the industry may attain the goal set in 1922 to double the business in 1926.