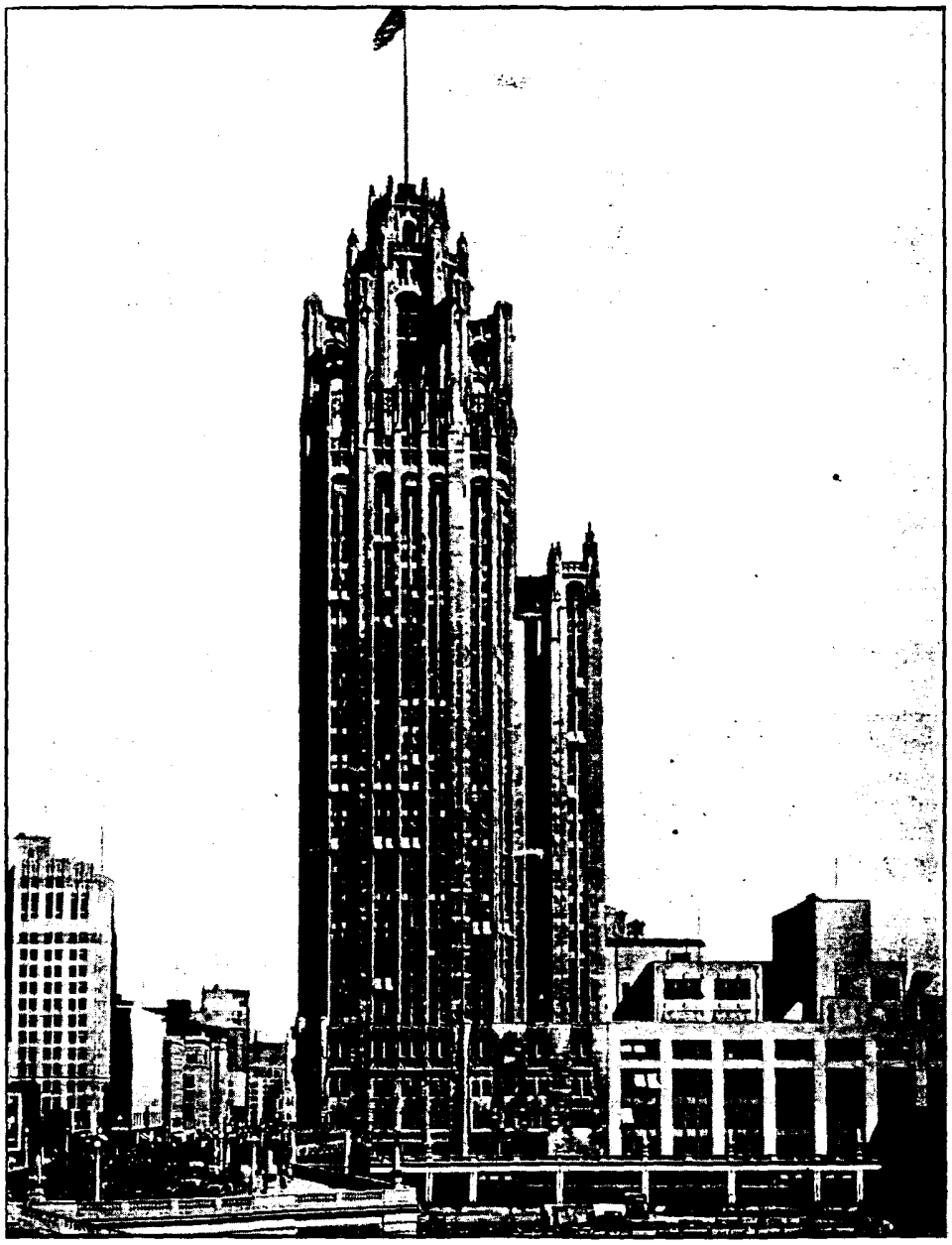
LEAD



TRIBUNE TOWER — BY EWING GALLOWAY, N. Y.

A Beautiful Addition to Chicago's Skyline

Published by the

LEAD INDUSTRIES ASSOCIATION

Graybar Building ✧ 420 Lexington Avenue ✧ New York

NOVEMBER 1930

Pennsylvania Railroad's Philadelphia Improvements Will Require Lead for Anti-Vibration Mats and Other Purposes

THE Pennsylvania Railroad has under construction a mammoth improvement program centering largely around Philadelphia, calling for the expenditure of some $300,000,000. Lead in several forms will be used to help carry out these improvements. Part of this program has already been completed, including the electrification of all the suburban lines out of Philadelphia, and a considerable portion of the through electrification of the entire main line between New York, Philadelphia, Baltimore and Washington. Much of the work is still in progress.

COURTESY PENNSYLVANIA R. R. CO.

NEW OFFICE BUILDING
and suburban station of the Pennsylvania Railroad near the site of present Broad Street Station
Graham, Anderson, Probst and White, *Architects*

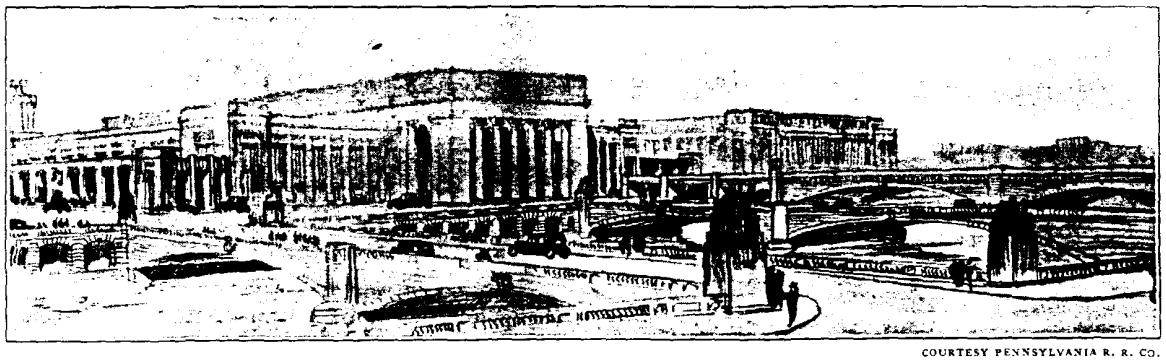
One of the most important features of the program is the erection of a new Philadelphia terminal which will replace the famous old Broad Street Station after a useful life of nearly fifty years.

A new passenger station will be erected at West Philadelphia and will occupy almost an entire city block. The main concourse will be 325x150 feet and will be surrounded by ticket offices, restaurants, waiting-rooms and other necessary station facilities. Through trains will operate from sixteen platformed tracks below the street level.

Adjacent to old Broad Street Station in the heart of downtown Philadelphia, has just been completed a magnificent office building which will house both the Railroad's executive offices and offices for business rental purposes. Underneath the building a suburban station with a main concourse measuring 180x400 feet will give direct entrance to the city's subways.

Suburban trains will be handled on six tracks above the street level at the West Philadelphia Station, will pass over a new bridge across the Schuylkill River and will enter a subway leading to the suburban terminal under the office building. This will allow for removal of the present elevated railroad carrying the tracks into Broad Street Station. The ground over which these tracks now extend will thereby be made available for commercial development and municipal improvement of the highest order.

It is readily seen that, with trains passing constantly underneath both the new terminal at West Philadelphia and the office building and suburban

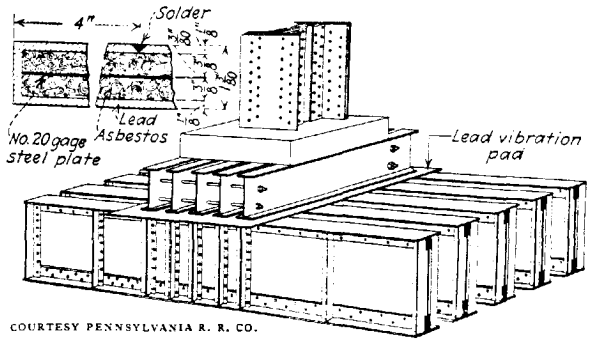


COURTESY PENNSYLVANIA R. R. CO.

THE PENNSYLVANIA STATION AT WEST PHILADELPHIA, NOW UNDER CONSTRUCTION
The bridge in the foreground is the new Market Street Bridge, in the middle is the bridge which will carry the new Pennsylvania Boulevard, and the third is the one which will carry the suburban trains into the new subway
Graham, Anderson, Probst and White, *Architects*

station downtown, a great amount of noise and vibration would be transmitted to the buildings if adequate precautions were not taken. To guard against this possibility, lead-asbestos mats are placed on the many foundations under the grillages on which rest the column footings. These mats consist of a bottom layer of 1/8 in. sheet lead, on top of which are placed, in order, sheets of 3/8 in. asbestos board, No. 20 gage steel, 3/8 in. asbestos board and a second sheet of 1/8 in. lead. The lower lead sheet is slightly larger than the rest and is bent up and over the top sheet to form a lead container for the other materials, and is soldered.

Thus an insulating pad is formed which will stop the passage of vibration from the tracks up through the building steel, for lead is the only common metal which deadens vibration, which will withstand building loads, and, due to lead's great corrosion resistance, will last as long as the building resting upon it. This method of securing complete freedom from noise and vibration has already been successfully employed in New York for a number of years and is becoming quite widely used where buildings are erected in close proximity to railroad tracks and other sources of vibration and noise such as highway bridges.



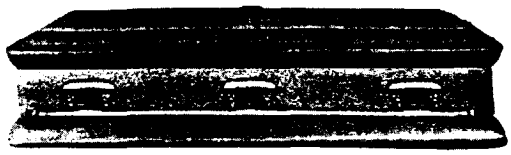
Sketch of a Lead Anti-Vibration Mat and how it is used

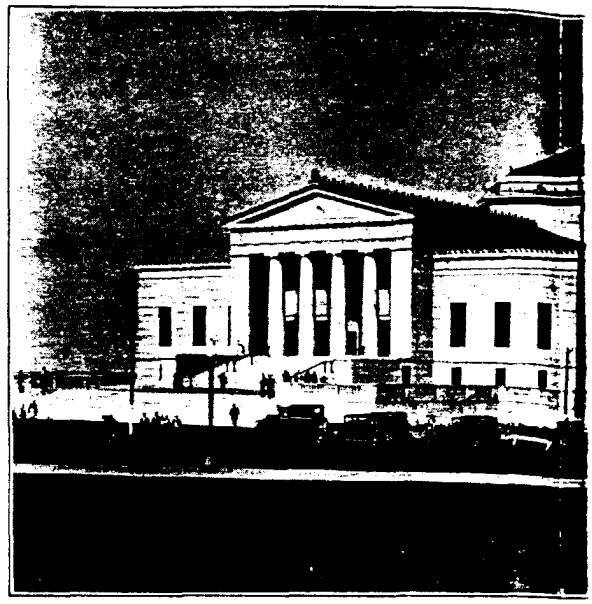
Above ground sheet lead is used for flashings on these fine buildings. Red lead protects the steel of the buildings, and the poles carrying the electric trolley wires, from rust and destruction. White lead in paint will be used to protect and beautify. In other ways, too, such as in lead-covered cable and in storage batteries, lead will find a place in these far-reaching improvements of the Pennsylvania Railroad in and around Philadelphia.

The Everlasting Metal Now Being Used for Caskets

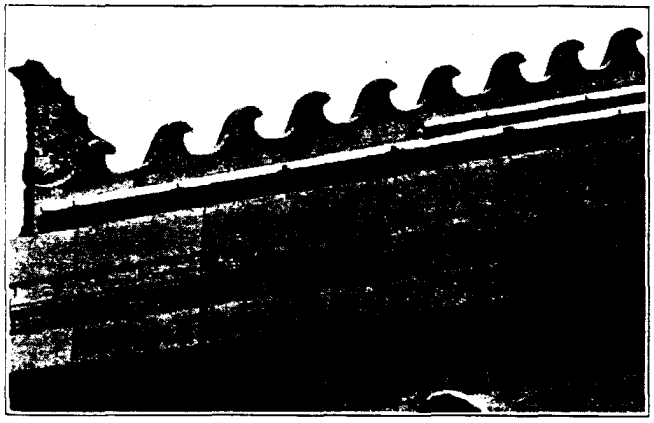
A NEW hard lead casket has been developed by the Sterling Casket Hardware Company of Brooklyn, New York. This is a modern application of lead which for centuries has been one of the most important materials of the casket-maker, because lead is the most durable of the common metals and because its casting qualities are unsurpassed. According to the late Sir Lawrence Weaver, foremost authority on old English leadwork, it was largely used for coffins from the early twelfth to the late seventeenth century. Such historic figures as the Black Prince and Richard II lie buried in lead caskets. Lead heart-caskets were also highly favored; the heart of Richard Cœur-de-Lion was preserved in one for centuries in the Rouen Cathedral in France. There are scores of examples of lead caskets and heart-caskets used in medieval times. Other recognition of lead's permanence is given by its use to fill incised inscriptions in tombstones to render the writing imperishable, and by the custom of making objects of lead to be buried with the ancients.

In modern times, lead is most widely known in sepulchral work for its use as casket trim. It is the standard material for this purpose in all good casket construction, and hard lead thus used is known simply as c.t. (casket trimming) metal. It was through wide experience with it for this purpose as well as through a knowledge of its use in earlier times that the Sterling Company decided to manufacture caskets made entirely of hard lead. The caskets now being produced by this company consist of only two castings, the body of the casket being a single casting and the lid another. Thus the caskets are constructed of one homogeneous, everlasting material that has been tested through thousands of years, without soldered or burned joints or bracing that might fail. They are cast in metal molds, giving a more uniform wall thickness and better surface for receiving finishes than if they were sand-cast. They weigh only 800 pounds, considerably lighter than similar bronze caskets. The top is hermetically sealed, and no leaks developed when tested under air pressure sufficient to blow the top off. Any desired finish may be applied to these modern examples of the casket-maker's art.


One of the hard lead caskets built to last through the ages



JOHN G. SHEDD AQUARIUM,



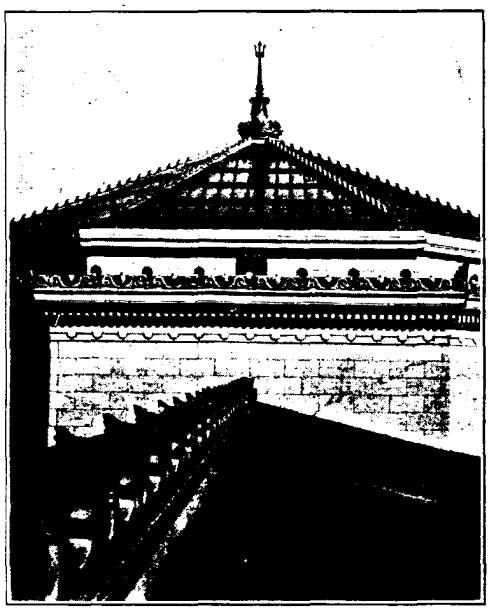
A detail of the hard lead cresting, depicting rolling waves, on the roof

Lead in the World's

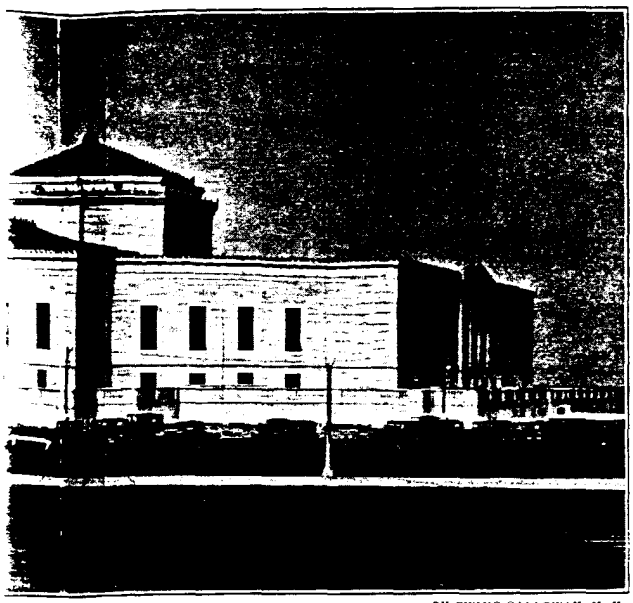
ON Chicago's fast-developing and beautiful lake-front, close to the Field Museum of Natural History and Soldiers' Field, now stands the new John G. Shedd Aquarium, the largest aquarium in the world, made possible through the generosity of the late John G. Shedd, Marshall Field and Company's former president. The building is a magnificent and imposing structure, in keeping with its surroundings, and designed by Graham, Anderson, Probst and White, Chicago architects, for permanence. Lead naturally plays an important part in its construction.

Built of white Georgia marble, it is literally crowned with lead, which will never stain nor discolor the beautiful white stone. There are 320 feet of cast hard lead cresting 15 inches high around the edge of the roof and up the ridges of the skylight modelled to represent rolling waves. This cresting required about 26,000 pounds of lead. Along the ridge-pole of the roof, over the main hall, is 115 feet of cast hard lead cresting three feet high representing sea-shells, weighing in all about 22,000 pounds.

The skylight is constructed of lead-sheathed steel glazing bars, which will insure its permanence without attention or maintenance. And crowning the whole is



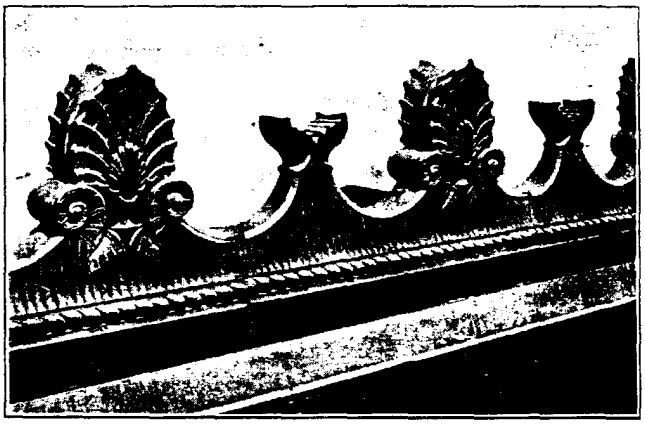
View of the skylight constructed with lead-covered steel glazing bars; also the huge lead finial and several types of lead cresting



BY EWING GALLOWAY, N. Y.

ARIUM, GRANT PARK, CHICAGO

d's Largest Aquarium

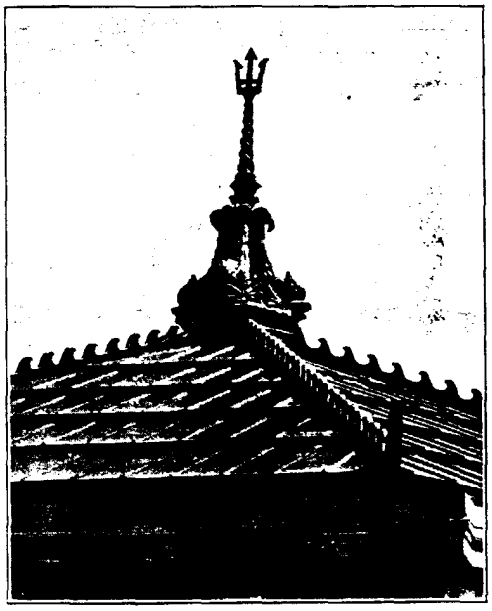


Another detail of the lead cresting, this one representing sea-shells. Lead flashing is also plainly visible

a lead finial, a trident with fish and waves at its base, rising 16 feet 2 inches above the top of the skylight and measuring 6 feet 2 inches at its base. This finial is cast of 8,800 pounds of antimonial lead. In addition some 57,000 pounds of hard lead sheet were used for flashing and roofing purposes.

In the interior of the building there are literally miles of lead pipe. All of the water used for the various kinds of fish is handled in lead pipe, ranging in size from one-half inch to six inches. All of the valves in this system are lead also.

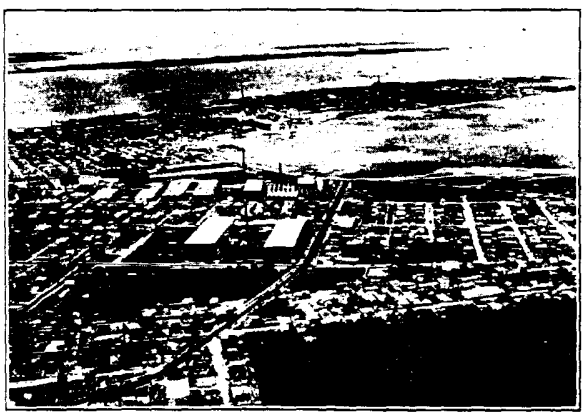
Some appreciation of the size of the John G. Shedd Aquarium may be obtained from the fact that it has a total of 132 exhibition tanks and 87 reserve tanks. There is storage capacity in the building for two million gallons of water. One-half of this is fresh water from Lake Michigan. The other million gallons is pure ocean water brought from Key West, Florida, in 160 railroad tank cars. The Aquarium exhibits both salt water and fresh water fish, some in heated water and others in chilled water. It hopes, eventually, to number among its exhibits specimens from every part of the country as well as from other parts of the world.



Detail of the impressive lead finial and lead-covered steel glazing bars used in the skylight; also lead cresting

Lead Pipe's Great Record for New Bedford's Water Supply

SOME 18,000 lead water services (130 miles of lead pipe) supply the citizens of historic New Bedford with water. A few hundred of these services are the original pipes put in the ground in 1869 when the Water Works was put in operation. Some of these first pipes were also made of wrought iron, but these soon began to fill up with rust and were replaced by lead. Since then only lead pipes have been used, and fully 90 per cent of the lead pipes installed in this period of sixty-one years are still in operation. Mr. Stephen H. Taylor, city water department superintendent, makes a point which is worth considering by all other cities which have spent much for beautiful and well-paved streets. He says, "In localities where streets are paved with modern expensive pavement, the first cost of installing services is of slight importance as compared with the expense and inconvenience to the public of digging up one of these paved streets to repair or replace a service which has proved defective after a few years' use."



UNDERWOOD & UNDERWOOD, N. Y.

A view of part of New Bedford, Massachusetts, from the air

Practically all New Bedford's services are laid by the water department, not only to the street line, but to the inside of the building itself. This is accomplished in a very quick and economical manner. Measurements are taken on the premises when application is made for a new service. The pipe is cut to length, and the curb stop and coupling which attaches to the corporation cock in the main are put in with cup joints in the shop. All that is then necessary in the field is to dig the trench, attach the coupling to the corporation cock, uncoil the flexible lead pipe in the trench, and back fill the trench.

During the nineteenth century, New Bedford was the whaling center of the world, and today the public library, Bourne Whaling Museum and Seamen's Bethel are rich in relics of this once great industry, which at its peak in 1857 employed 10,000 men.

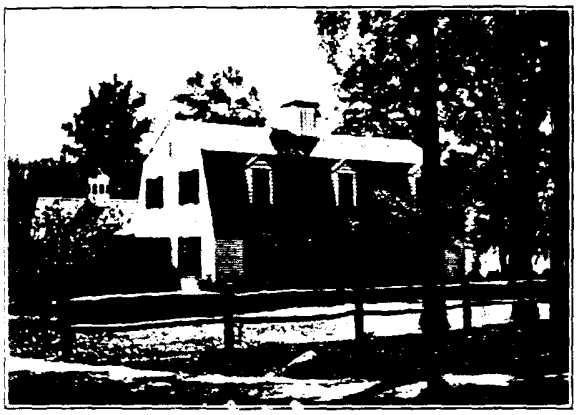
New Bedford's principal industry has changed to textiles, for it is now the leading textile center of the country. There are now 66 mills with 3,382,000 spindles and 58,000 looms in New Bedford. It produces from 35 to 40 per cent of all the fine cotton fabrics made in this country.

Part of a trench excavation, showing the tap in the main and the lead service pipe being uncoiled

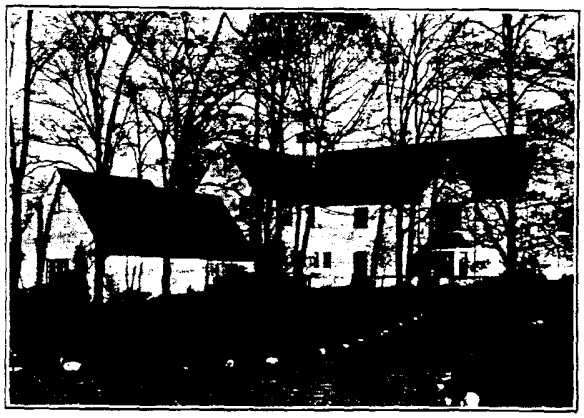
New Bedford pumping station and intakes on the shore of Little Quittacas Pond

Method of soldering sidewalk stops and couplings for corporation cocks to lead pipe in the shops of the New Bedford Water Department

Two Fine Examples of Homes Painted with Pure White Lead



IN the two attractive homes pictured here no false economy was practiced by the use of cheap materials which would ultimately mean heavy expenditures for repairs. This is illustrated by the fact that both houses are painted with pure white lead and oil



inside and out. They were designed by Leigh French, Jr., and Phillip Ives, associated architects, of New York.

The home on the right is at Wilson Point, South Norwalk, Connecticut, and was painted by John Anderson of Brooklyn. The interesting trend of painting brick houses is exemplified by this illustration.

The other house is at Farmington, Connecticut, and the painting contractor was F. A. Shultz of Farmington. A lead chimney cap is also plainly visible in this photograph.

Pure White Lead Averages More Than Six-Year Life on This Seaside Home

WIND, sun, snow, rain and salt air sweeping in from the sea afford a severe test for paint in New Bedford, Mass. Yet in this old New England city there is a house on the seashore which is a thriving testimonial to the economy, beauty and protective qualities of white lead. This house, built in the early '90's, has always been painted with pure white lead by the same decorating firm.

This New Bedford home has been painted with nothing but pure white lead since 1894

The table below shows the painting record of this house and reveals that the average period between paintings has been more than six years:

1894	(new)	three coats of white lead
1900	(repaint)	two coats of white lead
1906	(repaint)	two coats of white lead
1912	(repaint)	two coats of white lead
1920	(repaint)	two coats of white lead
1925	(repaint)	two coats of white lead

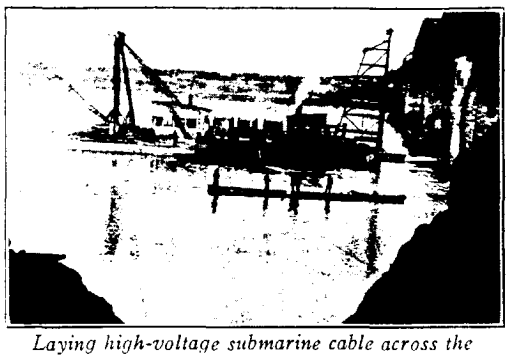
Typical of white lead paint jobs is the fact that the paint on this house has never had to be scraped or burned off before repainting, for the paint has never cracked, peeled, nor blistered. After simply dusting the surface, the old paint was always in excellent condition to receive the new coats, so that the expense of repainting was minimized. And, of course, under these well-preserved coats of paint the elements have had little chance to attack the building materials themselves. Samples of the siding were recently cut out of the house and found to be in perfect condition.

All the painting on this house has been done by the Akin-Dennison Company, of New Bedford, through two generations.

A 75,000-Volt Submarine Cable Under the Mississippi

HIGHER and higher voltages are being transmitted underground by electrical cables on land and under rivers and other bodies of water where the operating conditions to be met are extremely exacting. Recently the Mississippi River at St. Louis was spanned under water by a submarine cable carrying 75,000 volts for the use of the Union Electric Light and Power Co. There are now only two such high-voltage submarine cable installations in the world; the other was made only a short time previously across the Delaware River.

In protecting the cable from many destructive agencies, lead has been used as one of the principal materials of construction. This latest installation across the Mississippi consists of six one-half mile lengths of single conductor 750,000 circ.-mill. stranded cable, Type H construction. It is insulated with 26/32 in. of paper, one metallized paper tape, 5/32 in. of lead, jute bedding and No. 4 BWG galvanized steel armor with jute over all. The over-all dimension is 3⅞ inches, and the cable was shipped in lengths of 2700 feet, weighing 31 tons. About 55 tons of lead were used in all. This submarine installation consists of two circuits of three cables each, designed to transmit 60,000 kva., and is connected up with approximately forty-two miles of 75,000-volt underground cable, consisting of two circuits, three cables per circuit, seven miles in length. It is single-conductor 750,000 circ.-mil. stranded cable, insulated with 26/32 of paper, one metallized paper tape and 9/64 inch of lead. In laying the cable, reels are mounted on a barge which cannot come within about 200 feet of the shore because of shallow water. Therefore the ends of the cable are carried ashore on floats, as shown, and fastened. Then the barge is moved across the river, unreeling the cable into place until it approaches the opposite shore as closely as possible. Here the cable remaining on the reels is unwound and laid on deck, and is then carried ashore on floats in the same manner as at the start.



Laying high-voltage submarine cable across the Mississippi River at St. Louis

Samples of these submarine cables tested to failure stood 301,000 volts for many hours. The cable for this recent interesting submarine installation was supplied by General Cable Corporation.

Use of Tetraethyl Lead Growing Rapidly

THE use of lead in the manufacture of tetraethyl lead, the anti-knock ingredient in Ethyl gasoline, has grown from an insignificant start to appreciable proportions in little more than three years. In 1927 only 300,000,000 gallons of Ethyl gasoline, containing 1,300,000 pounds of lead, were sold in the United States. This was but 2.6 per cent of the total gasoline consumption. Last year, 1929, these figures amounted to 1,290,000,000 gallons and 5,900,000 pounds, respectively, which was 8.0 per cent of the total gasoline consumption. This rapid increase is still apparent in the first six months of 1930, when 910,000,000 gallons of Ethyl gasoline, containing 4,100,000 pounds of lead were sold.

The anti-knock compound is simply an intimate mixture of tetraethyl lead, ethylene dibromide, halowax and red aniline dye. The tetraethyl lead is the ingredient that removes the knock. Ethylene dibromide prevents the formation of lead oxide and halowax is an extremely efficient lubricant which keeps valves from drying out and sticking. The aniline dye is simply added to distinguish Ethyl from other gasolines. Only about two grams of lead are used in a gallon of gasoline. Some eighty prominent oil companies are now distributing Ethyl gasoline.

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THE TRIBUNE TOWER IN CHICAGO

The graceful lines and permanent beauty of the Tribune Tower on Michigan Boulevard, Chicago, designed by John M. Howells and Raymond M. Hood, associated architects, are preserved with the help of twelve hundred ornamental hard lead spandrels. These spandrels are each 33 in. x 48 in. and are stamped from sheet lead weighing four pounds to the square foot, requiring about 50,000 lb. of lead. Moreover, permanent protection to the building is afforded by the use of lead for flashing and roofing purposes.

The Lead Industries Association invites inquiries on any subject relating to lead and will be glad to cooperate in the solution of your lead problems.

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