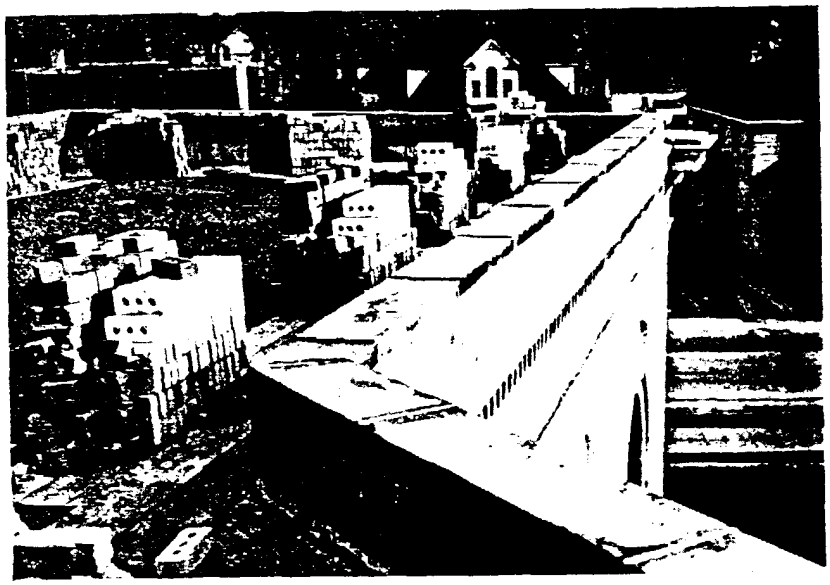
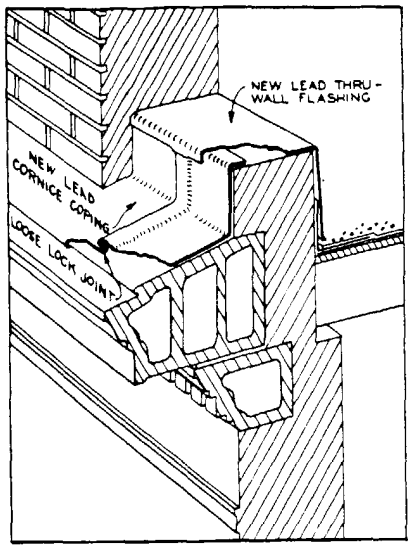
Lead Flashings Provide Permanent Rainproofing for Library Building

THE failure of a metal roof flashing is one of the most troublesome and expensive calamities that can overtake a building superintendent. It exposes the inner finish and the contents of the building to damage and it defies temporary expedients and emergency repairs. Consequently, when permanent repairs are undertaken the replacement material is usually chosen with careful consideration for its resistance to the destructive element which caused the original failure.

Such was the case when it became necessary to execute repairs and install new flashings on the roof of the library building of the Village of Lynbrook, Long Island. The original flashings which had been in place for about twenty years were severely damaged by corrosion. Also, because of the comparative stiffness and springiness of the metal they had not fitted closely to the roof and masonry. Since lead is highly resistant to corrosion and since lead, because of its flexibility, can be easily worked to fit tight against the supporting structure, the owners and the architects in charge of the repair work were convinced that it would provide the permanence which they were seeking.



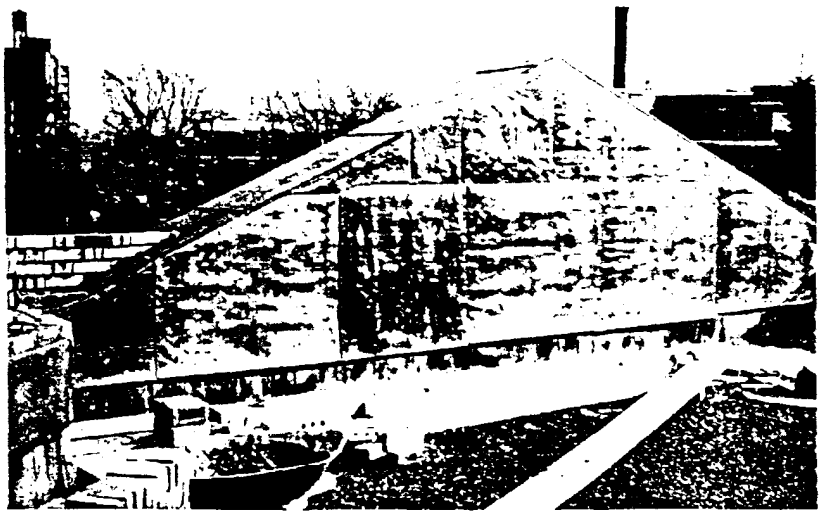
Construction at rear where cornice is replaced by a brick ledge, is similar to front. This view shows completed flashing back of parapet.

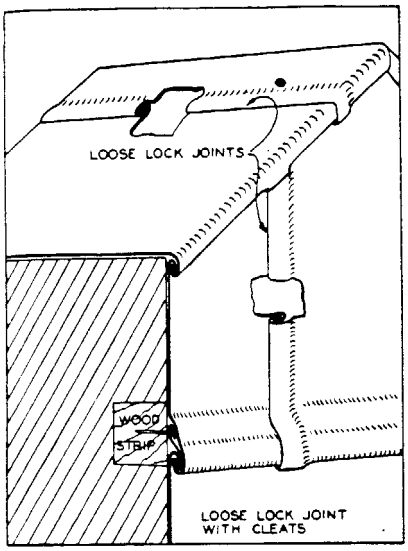


Detail showing installation and jointing of lead sheets. At right, detail of pediment backwall.

The architects, Jagow and Heidelberger of Hempstead, Long Island, decided that the best procedure would be to remove the parapet walls and install through-wall flashings all around. They specified 4 lb. antimonial sheet lead to cover the cornice and extend up to the flashing level. Another sheet of the same material laps over this upstand, extends through the wall and covers the base

Wall back of pediment is completely covered with sheet lead supported by cleats set into horizontal joint.





flashing to the roof. The parapet wall was rebuilt with one course of brick covering the sheet lead upstand on the exterior face of the wall.

The vertical face of the wall back of the central pediment was covered with lead which was joined to the lead coping on the sloped cornice with lock seam joints. Supporting cleats inserted in a horizontal joint in the vertical sheet were nailed to a wood strip securely imbedded in the masonry.

The entire lead installation was made without solder. All joints were loose locked and filled with non-hardening roofers calking compound. Where the lead is in contact with masonry it was coated with asphalt paint to protect it from the action of the free lime in the mortar until setting was complete.

The sheet lead work was done by the J. J. Fisher Co., Inc., of Brooklyn, New York, sheet metal contractors for Mormile & Co. of Long Island City, New York, general contractors.

The new installation of lead provides the building with a double protection against destruction of the flashings by corrosion. In the first place the metal itself is highly corrosion resistant and in the second place, the thickness of lead which is greater than other metals used for flashings, offers greater resistance to penetration. The new flashings can be expected to provide full protection for many years to come.

Lead Die Cast Parts in Fire Extinguishers

THE use of die casting in the fabrication of nonferrous metals is rapidly becoming one of the major processes of manufacturing. As was the case with welding, lead has been a pioneering material for die casting. A simple bullet mold is, in effect, a die casting tool, although the force used to fill the mold is gravity only.

Modern pressure-operated die casting machines can make castings of surprising intricacy and great accuracy and lead together with its alloys is one of the commonly used metals in their operation.

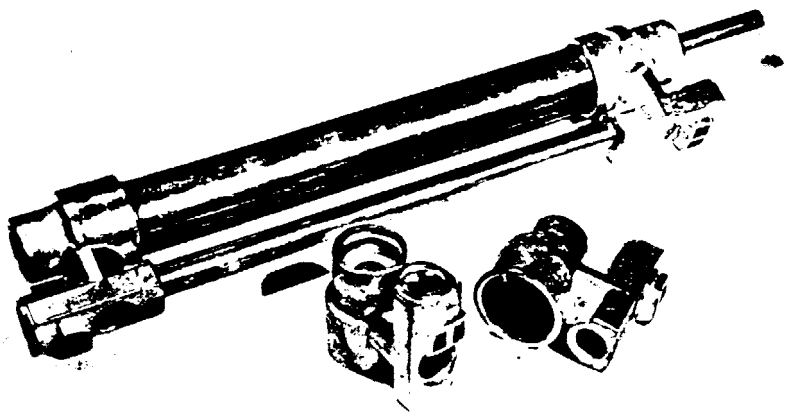
Illustrated herewith is the working barrel of a hand operated pump type fire extinguisher. The cylinder, tubes, rod and plunger are of brass, but the valve housings at either end are die cast of lead. What the picture cannot show is the inner ports and passages connecting the cylinder and the by-pass tube, nor the accurate valve seat for a bronze ball check which makes the pump operate. In the manufacturing process, this ball is inserted through an opening provided and this opening is sealed with a lead plug, also die cast, which is secured by swaging the rim of the opening over it. The two castings are nearly identical and the pump operates on both the in and out strokes of the plunger.

There are two principle advantages in using lead for these valve housings. The first is in insuring the unfailing operation of the pump, the second is resistance to corrosion. The unit shown in the illustration is suspended inside the body of the extinguisher so that it is free to rotate on the discharge tube. Intake ports are located on the periphery of the castings so that they will be immersed in the fluid as long as any remains in the container. The weight of the lead castings assists in insuring that the intake ports will be at the bottom with the extinguisher in a horizontal position.

Normally there is no corrosion problem inside the extinguisher since the fluid which has a carbon tetrachloride base has little if any tendency to react with metals. However, since a fire extinguisher must be ready to function without delay after long periods of inactivity or even neglect, the stability of lead tends to insure the free and effective operation of the ball check valves on the first operation of the plunger.

The manufacturer of this fire extinguisher, the General Detroit Corp. of Detroit, Mich., also use die cast lead nozzles on their foam type and pump tank type and on regulation soda-acid type fire extinguishers.

Assembled pump and lead die cast valve housings. Opening for introduction of ball check visible in foreground.

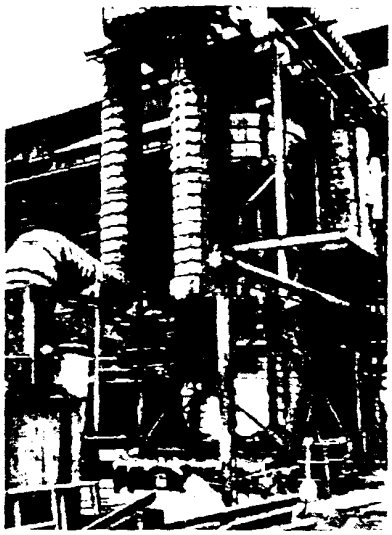


Lead Structures In A Byproduct Sulphuric Acid Plant

IN the plant of any chemical industry where lead is used as a construction material there will be a variety of structural practices and application techniques suited to the various conditions to which the lead will be exposed. Such a plant showing several methods of application of chemical lead is the sulphur dioxide purification plant operated in connection with a zinc smelter at Josephtown, Pa.

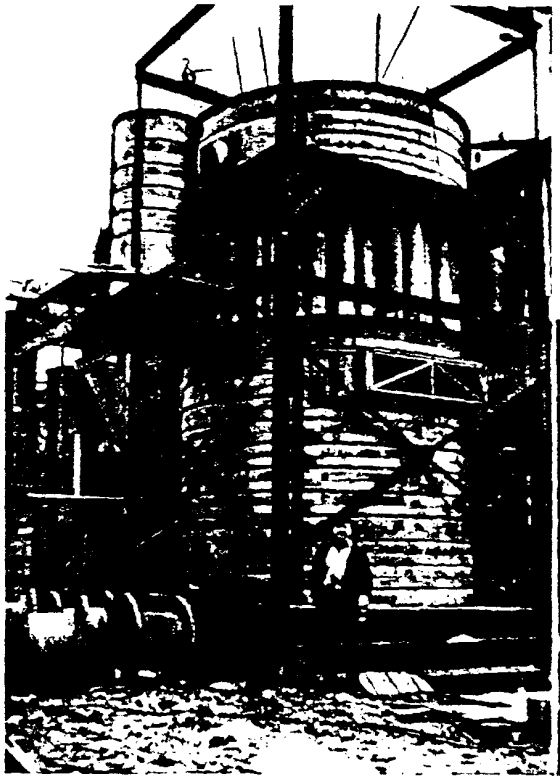
The plant receives hot sulphurous gases driven off from the zinc ore in the roasting plant and converts them into sulphuric acid, which is an important by-product of the plant. Since chemical lead is highly resistant to corrosion by sulphur compounds it is a desirable material for use with these gases. Most of the units in this plant are constructed entirely or in part of lead supported on suitable structures of steel or concrete.

Some of the most interesting units are the "Mist Cottrells" or electrical precipitators which receive the wet gas from the scrubber-cooler towers and remove from it part of its sulphuric acid content. In appearance these units are huge lead cylinders about 12 ft. in diameter and 28 ft. high with the upper midsection cut away and replaced with a forest of 10 in. diameter lead tubes. Actually there is an upper and a lower chamber. Through the center of each tube runs a star shaped lead-covered steel rod held in place at top and bottom in a lead covered steel grid insulated electrically from the body of the unit. An electrical potential of 60,000 to 70,000 v. D.C. is maintained between the rods and tubes and this causes the particles of mist to become charged and attracted to the walls of the tubes. Here they collect as liquid sulphuric acid and flow down into the lower chamber.



General view of Cottrell separators showing steel strapped sheet lead ductwork.

The cylindrical chambers are of 10-lb. sheet lead supported on a steel structure by 4-in. steel bands at 12 in. intervals vertically which are in turn bolted to vertical steel angles. Each band is entirely covered by a sheet of lead welded continuously to the sheet lead body of the cylinder. This is a very commonly used type of construction for large and small lead vessels not subject to appreciable pressures or heads. It provides ample support for the weight of the lead and ade-



Cottrell separator under construction showing cylindrical lead sections and connecting lead tubes.

Close up of cylindrical chamber showing lead covering of steel bands.

quate protection for the steel supports.

A steel grid at the level of the top ends of the tubes provides support for this section of the unit. The exposure of part of the length of the tubes provides a certain amount of additional cooling effect on the transient gases.

The chemical lead in these "Mist Cottrells" has been exposed to contact with dilute sulphuric acid vapors and liquids at temperatures of 77° to 104° F. since their construction 17 years ago but shows evidence of only negligible corrosion. Other chemical lead units in the plant under the same or slightly different exposures have stood up equally well. In future issues some of these other units will be discussed and their construction described for comparison of methods and practices in the use and application of lead to chemical industry equipment.

Use of Lead Soil Lines Saves Space And Reduces Construction Costs

ASIDE from the well known attributes of durability and flexibility which are the principle reasons for its requirements in so many plumbing codes, lead possesses an additional advantage which makes it especially desirable for use on remodeling or alteration jobs. That is its relatively small outside diameter and the absence of space consuming hubs and flanges at connections. In many cases where space is at a premium, the substitution of lead for other materials will allow the installation of new plumbing without the necessity of raising floors or furring ceilings.

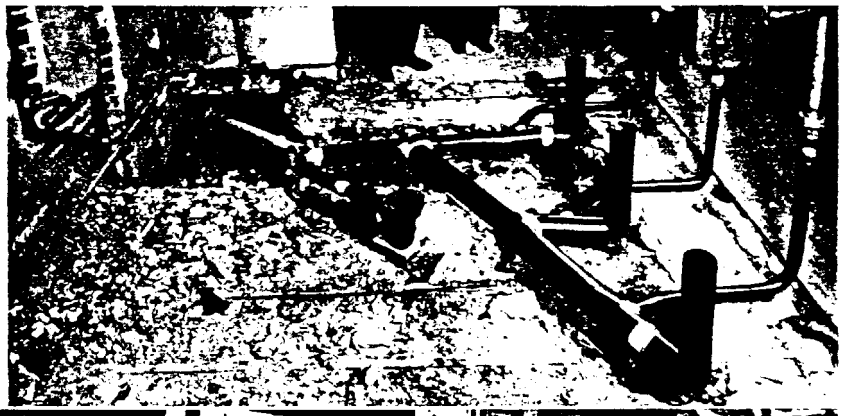
The accompanying illustrations show two remodeling jobs and one new construction in all of which the vertical space required for the installation of horizontal soil lines was held to an absolute minimum by the use of lead pipe.

In the Springfield, Ill. job where the general floor level was raised slightly, the use of a lead soil line permitted the installation of a new toilet at the new floor level. In the Omaha job the installation of a complete new toilet required raising the floor only a single easy step. In the San Antonio job the use of lead soil lines allowed the installation of wall hung closets at proper height from the floor without appreciable reduction of the effective depth of the floor slab.

This space saving by means of the use of lead can usually be accomplished at no increase in construction

(Continued on page 8)

Lead soil pipes in Ritz Theatre remodeling in Omaha, Neb., simplify floor construction problems.



Below, lead soil line in Springfield, Ill., dress shop.

Below, right, lead soil lines in San Antonio, Tex., warehouse toilets.

A Portfolio of American Landmarks

No. 41

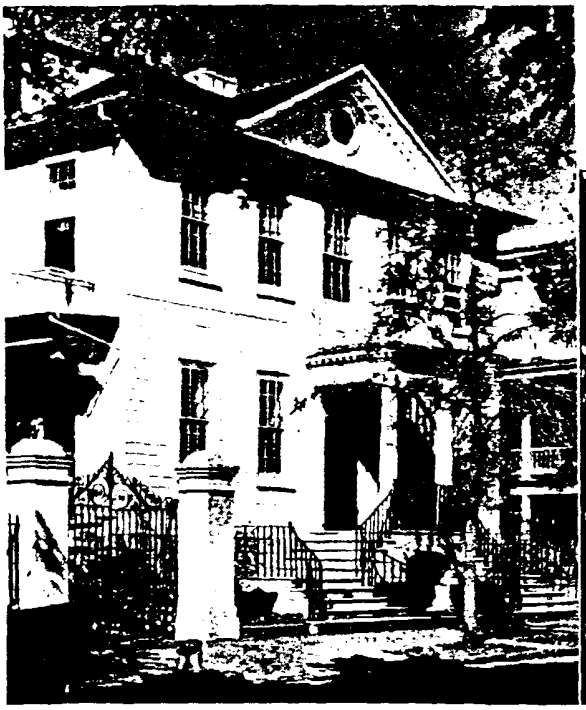
Old Mansions In Charleston, South Carolina

This scholarly restoration of an old house at the end of Stoll's Alley, near the waterfront follows the tradition of early builders in the use of pure white lead paint.

THE city of Charleston, South Carolina, might be called a paradise for the student of early American architecture. The southern end of "White Point" as the site of the city was originally known is dotted so thickly with notable buildings that hardly a block fails to contain at least one and most blocks are the sites of several.

Charlestonians early became aware of the importance of their buildings and take a great pride in preserving them for their own enjoyment as well as for the pleasure of the interested tourist. Though there is a sizeable percentage of masonry construction many of the finest of Charleston's architectural landmarks are of wood and many of them owe their excellent state of preservation in part to pure white lead paint.

In addition to providing excellent protection to the exterior siding and wood trim, pure white lead paint maintains the clean surface whiteness that is so effective in contrast to the gloomy dark greens of the broad leaf evergreens which thrive in the subtropical climate.



The John Edwards house built about 1800, a fine example of simulated rustication which shows to advantage with the help of pure white lead paint.

The Haywood House is generally regarded as being Post Revolutionary although the Battle of Fort Moultrie is said to have been witnessed from its roof. Pure white lead paint which has helped to preserve it through the years is still used on its exterior walls.

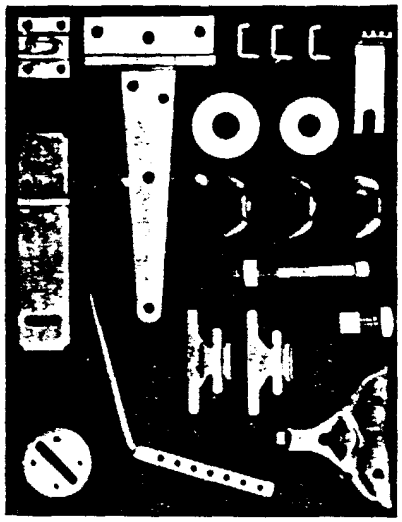
THIS IS NO. 41 OF A SERIES REPRESENTATIVE OF THE MANY AMERICAN LANDMARKS IN VARIOUS SECTIONS OF THE COUNTRY THAT ARE PRESERVED FOR THE FUTURE WITH PURE WHITE LEAD AND OIL PAINT. MANY OF THEM HAVE ALWAYS BEEN PROTECTED WITH THIS RELIABLE MATERIAL ACCORDING TO AVAILABLE RECORDS.

Hot Dip Lead Alloy Coatings Applicable To Various Metals

HOT dip lead alloy coating is not limited in application to steel nor in usefulness to corrosion protection. Lead coatings may be applied to cast iron and brass for various purposes. Two of the items shown in the accompanying illustrations have lead coatings which greatly facilitate their attachment to fabricated assemblies by soldering.

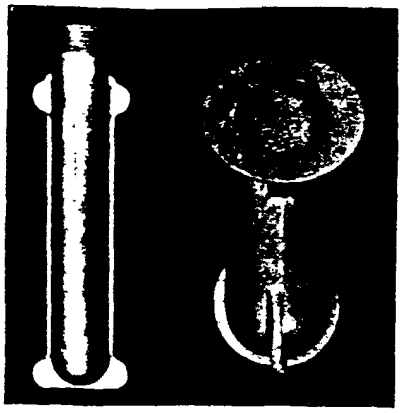
The cast iron spout is a part of a radiator for an internal combustion engine. It is attached at one end to the radiator shell by a sweat joint reinforced by rivets. The lead coating, already heat bonded to the cast iron, performs the same function as would a preliminary "tinning" on the surface to be soldered. Thus the lead coating provides an all over corrosion protection and at the same time increases the efficiency of the joint.

The gas meter attachment part is a brass casting which is attached by soldering to the meter body. In this case also the lead coating performs the function of a preliminary tinning and provides a surface to which paint or enamel will adhere as well.



A group of steel articles hot dip lead-alloy coated in commercial shops.

However, the principal field of lead alloy coatings is on steel as a corrosion resistant covering. They are especially useful on those steel items which usually carry a decorative coating of paint. The lead coating takes and holds paint well and provides an extra measure of protection against the atmosphere and moisture. Where difficulty of access makes maintenance painting impossible a lead alloy coating under the paint applied during installation will supply a far greater degree of protection than paint alone.



Brass and iron castings hot dip lead alloy coated.

Hot dip lead coatings are being applied commercially to a great variety of steel items such as hardware, bolts, springs and metal baskets used in metal cleaning and plating operations.

Noticeable features of such objects are the thorough penetration rather than the bridging over of joints and crevices as well as the cleanness and sharpness of threaded portions rendering chasing or retapping unnecessary.

Extruded Lead Cap Strip Protects Masonry Joints from Weather

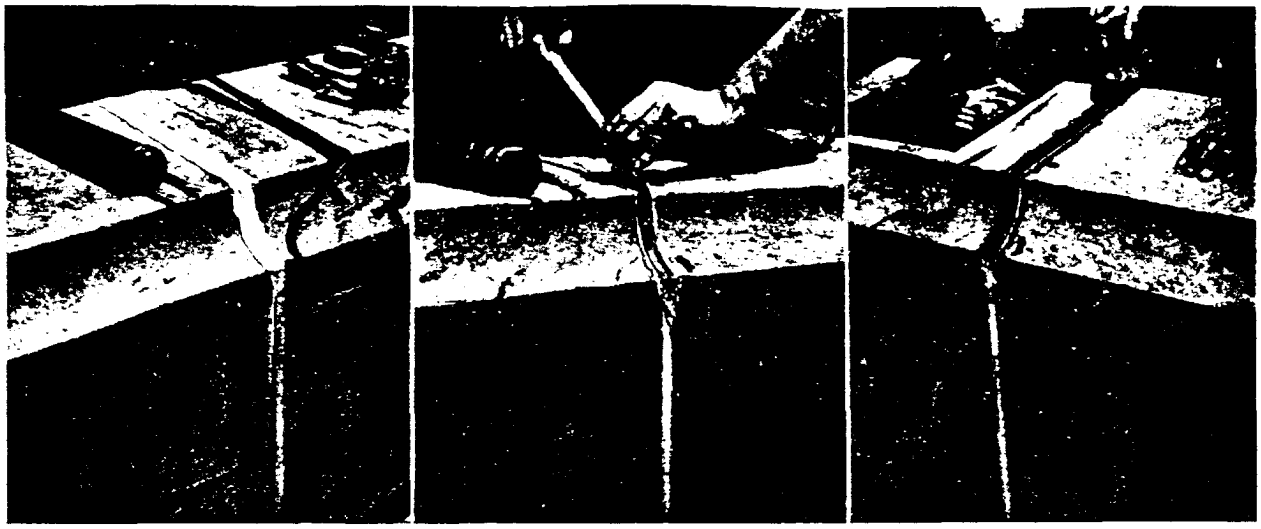
DURING the recent rennovating operations from which the New York Public Library emerged, once more, a white marble building, a thorough job of waterproofing and calking was done at all points where water might damage the stone.

Of course, the most vulnerable point in this respect is the transverse joints in the coping stones. Various devices have been tried by the many builders who have been harassed by this problem but until recently no method has proved to be both secure and permanent. However, there has been available for several years a lead cap which, when properly applied, will cover and seal these open joints and thus provide protection against leakage and frost.

This material known as "Weathercap" is in the form of an extruded lead strip of T shaped cross section which can be cut or mitered with ordinary tools and formed to fit accurately the contours of any mouldings or carving which it may traverse. Being of lead it will not produce any soluble corrosion products to discolor the stone. In fact the usual tendency of lead exposed to the weather is to carbonate and form a thin white or light grey film on the surface. Thus it becomes almost invisible after a short period of time.

The installation procedure for Weathercap is quite simple. The mortar joints are raked out to a depth slightly greater than the length of the stem of the T and filled with a non hardening compound. The lead strip, cut to length and formed to conform to the shape of the stone is pressed firmly into place and the excess compound is removed with a stiff brush. The lead cap performs two functions. It turns the drive of rain and sleet and in fair weather it protects the calking compound from the direct rays of the sun.

Several properties of lead make it especially suitable for use in this particular building specialty although in



The three simple steps in the application of extruded lead protective strip to stone coping joints.

The following articles and reprints contain information, drawings and specifications on the use of lead products helpful to architects, engineers and others in the construction industry. They are available, free of charge, upon request to the Lead Industries Association, 420 Lexington Avenue, New York 17, N. Y.

PROPERTY PROTECTION WITH WHITE LEAD PAINT
A 28 page booklet on the protective value, durability and beauty of pure white lead paint with quantity estimating tables, formulas and mixing and tinting instructions for exterior and interior use.

RED LEAD FOR STRUCTURAL WORK
By Dr. L. L. Carrick, Director, Red Lead Research, Lead Industries Association
A discussion of the rust inhibitive qualities of red lead paint and the best means of making use of those qualities for the protection of structural metal. Reprinted from *Engineering News Record*, April 6, 1943.

LEAD CARRIES ITS WEIGHT
By Fred P. Peters
An interesting resume of many of the long established uses of lead plus information on a number of recently developed adaptations of the properties of lead to special purposes. Reprinted from *Scientific American*, June, 1944.

SOME PAINTING PROBLEMS AND THE ANSWERS
By Dr. F. L. Browne, Senior Chemist, Forests Products Laboratory, Madison, Wis.
Reprinted from the *National Real Estate Journal*, Sept., 1939.

LEAD, A METAL OF MANY USES IN THE THEATRE
By J. Leland Benson
A discussion of the many ways, both utilitarian and decorative, in which lead is or can be used in the theatre. *Reprinted from Theatre Catalog 1945 Edition.*

COMMERCIAL STANDARDS:
Calking Lead, CS94-41
Lead Pipe, Cs-95-41
Lead Traps and Bends, CS96-41
Official publications by the Government Printing Office of the above Commercial Standards as promulgated by the U. S. Department of Commerce through the National Bureau of Standards, effective June 25, 1941.

FEDERAL SPECIFICATION WW-P-325
For Pipe, Bends and Traps, LEAD
Part 5 of Section IV of the Federal Standards Stock Catalog, official publication by the Government Printing Office.

STAMFORD'S DOUBLE LIFETIME HOME
A complete analysis of hard lead flashing, white lead paint, lead plumbing, plywood and red cedar Certigrade shingle details and installation methods. Reprinted from *American Builder*, July, 1939.

LEAD COATINGS ON STEEL
By Harold A. Knight, News Editor, Metals and Alloys
A thorough discussion of hot dip and electroplated coatings on steel sheet, wire and fabricated products. Reprinted from the November, 1944 issue of *Metals and Alloys*.

LEAD WELDING
By Robert L. Ziegfeld and David M. Borcina
A concise discussion of the process and method of welding lead sheet and pipe with descriptions of tools and procedure. Includes brief historical notes and a list of commonly used corrosive chemicals with notes on their reactivity with lead.

LEAD X-RAY SHIELDING
A graphic chart adapted from American Standards Association Bulletin Z 54.1—1946 "Safety Code for the Industrial Use of X-Rays" to show weights per square foot and thicknesses in inches of commercial lead sheets corresponding to metric dimensions indicated on the original chart.

MATERIALS AND METHODS OF X-RAY PROTECTION
By George Singer, Acting Chief Radiation Section, National Bureau of Standards, Washington, D. C., and George C. Lawrence, Ph.D., National Research Council of Canada
A discussion of the materials suitable for use in shielding X-Ray installations. Reprinted from *Industrial Radiography* Vol. IV, No. 2, Fall, 1945.

many cases any one of them might make its adoption desirable. The malleability which makes the extrusion manufacturing process economical also contributes to the ease of shaping and fitting of the strip. Resistance to corrosion is part of the reason for the absence of staining effect when exposed to the weather.

Weathercap has been used for a number of years and it has given excellent service on many well known buildings. It is made in angular cross section for stairs or parapets as well as T shaped for copings, cornices, etc. It is furnished by the Minwax Co. of Boston, Mass.

(Continued from page 5)

costs. Actually the plumbing itself will probably cost no more than if done with conventional materials because there will be fewer joints to be made in the lead. This leaves whatever savings may accrue from absence of furring and blocking to be put into finishing and decorating.

There need be no hesitation about the inaccessibility of such soil lines because lead, properly installed, can easily be expected to give satisfactory service throughout the life of the building.

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