Pure White Lead Proves Its Stamina By Long Service Between Repaintings

MORE often than not the houses painted with pure white lead paint which are pictured in these pages have been photographed when their paint was fresh and new, making the best possible appearance. Here is one though that we frankly admit needs repainting. The owner, like many others in these war times, has put off the job longer than he wanted or intended to but he expects to repaint this summer if possible. He says, "After experiencing extreme difficulties with mixed pigment paints peeling and blistering on the exterior of my house, I used pure white lead seven years ago which put an end to my difficulties. Now the house needs repainting and I wish to mix my own tint using pure white lead again."

This house near Syracuse, New York, shows pure white lead paint still in excellent condition after seven years exposure to severe climatic conditions.

The important fact about this house is that although it is seven years since its last repainting with pure white lead paint it still does not look shabby and best of all the paint has not failed in its function of protecting the underlying wood from the weather. Also the surface is smooth and clean, ready for repainting without special preparation.

This house in its present condition demonstrates the two outstanding characteristics of pure white lead paint: the first, its durability in having stood nearly twice as long between repaintings as is usually considered good practice; the second, its wearing quality in having remained smooth and unbroken throughout its long life.

This quality of remaining smooth without any tendency to crack throughout its entire life is of special importance in times like these when an emergency may force unavoidable neglect. It is a well known fact that many paints which show excellent performance records under periodic maintenance schedules have a tendency to fail if the repainting program is not carried through on time. Such failures usually show up as cracking of the paint film, making minute breaks through which water penetrates to the wood. The water in turn forces the paint off in scales with the result that the paint must be entirely removed before repainting can be undertaken. Pure white lead retains its elasticity regardless of painting schedules.

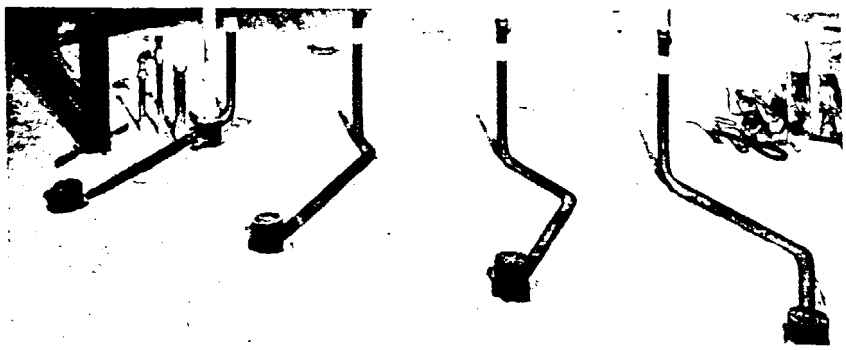
The house shown on this page stands near Syracuse, New York, which has a rigorous climate and where the past winter was especially severe. The excellent condition of the paint at the present time is a particularly convincing demonstration of the ability of pure white lead to withstand severe weather conditions even after unusually long exposure.

Lead Pipe Underfloor Plumbing Insures Trouble Free Operations

FROM the point of view of the owner or manager of any building property the best plumbing system is the one which requires the least attention. Such a system will operate quietly under all conditions, will be entirely free from stoppages throughout its life and will be sufficiently durable to last as long as the building. It is the responsibility of the architect and the plumber to plan and install plumbing systems which will fulfill these conditions as nearly as may be.

Quiet operation with freedom from probability of stoppages can be achieved by laying out and installing all drainage lines in a manner that

Lead waste connections to lead closet bends in Omaha, Neb. Nurses home.



Lead pipe underfloor plumbing provides quiet trouble free operation in Kansas City, Mo. apartment house.

will allow free flow of waste water with a minimum of friction and turbulence. Durability can be provided by selecting a material which has proved by its performance that it cannot only resist the severe corrosive action of sewage wastes and gases but is sufficiently flexible to withstand normal movement between plumbing pipes and structure.

Since the fabrication of lead pipe is not restricted by a rigid pattern of straight lines and predetermined angles it can be so installed as to allow the smoothest possible flow for wastes and gases. Bends are gradual and of the exact degree required. joints are properly made at an angle in the direction of flow and the offsets and shoulders which are unavoidable in threaded fittings do not occur. These characteristics of lead fabrication allow its installation to be made in a manner to provide the

(Continued on page 8)

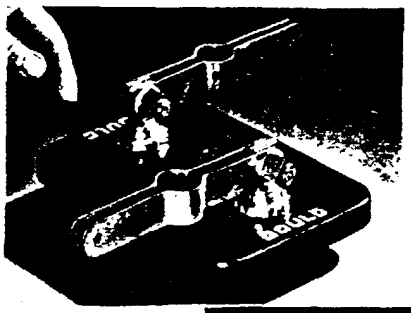
Lead Plating Provides Acid Resistance for Copper Storage Battery Connectors

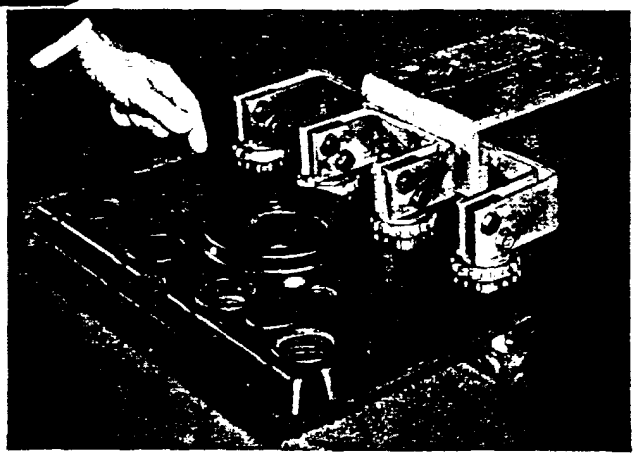
THE effectiveness of electroplating as a means of lead coating metal parts to protect them from corrosion is attested by the adoption of this process for use on copper connectors on heavy duty storage batteries. Nearly everyone is familiar with the mushy green deposit which builds up on the unprotected copper or brass parts of the terminal connectors on automobile storage batteries as well as with the absence of indications of corrosion on the lead intercell connectors. By means of plated lead coatings copper parts used with certain types of batteries are now being made proof against the destructive attack of the sulphuric acid electrolyte and its fumes.

Shown herewith are two types of copper connectors both coated with electrodeposited lead. The larger picture shows the cell cover of a submarine battery with the terminals in place bolted to a heavy copper bus bar connection. Both the connector and the bolts are electroplated with lead. The smaller picture shows the cell cover of a stationary battery for comparatively light duty with lead plated copper cell connectors bolted in place.

Common practice in storage battery cell assembly is to use connectors of solid lead which is practically acid proof. The use of lead plating permits the utilization of the high electrical conductivity of copper with consequent savings in space and weight without sacrificing the corrosion resistance of lead.

Electrodeposited lead coatings are remarkably free from porosity especially in relatively thick applications. They also have the property of being easily increased in thickness if desired simply by continuing the plating process for additional time. Lead can be plated directly on iron or steel as well as on non-ferrous metals and recent developments include lead plating on plastic materials.





Lead plated copper cell connectors for use on storage batteries. Above, cell cap for light duty battery with cell connectors in place. Right, cell connector in place on terminals of submarine battery. Lead plating provides protection against highly corrosive sulphuric acid fumes.

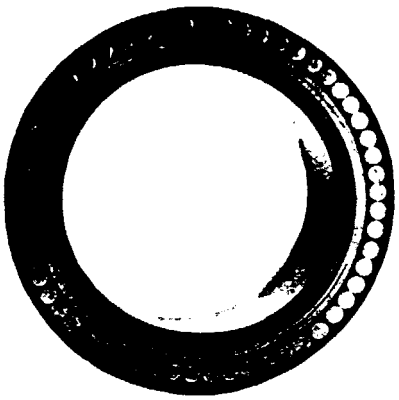
NATIONAL BATTERY CO.

Lead Pipe Lines Thirty Five Miles Long One of the Big Stories of the Invasion

ALTHOUGH lead has an astonishing variety of uses in normal times and has acquired many new ones in the past few years as the result of war necessities, by far the majority of such applications receive little general notice because they are of interest only to engineers and technical men. However, during the invasion of Europe one of the most spectacular operations of the supply section of the Allied forces was accomplished by the use of lead in the form of some of the longest continuous pipes ever manufactured. This project consisted of laying pipe lines under the English Channel for the purpose of transporting gasoline from England to France thus bypassing the almost insurmountable obstacle of the destruction of French ports by the Germans.

Since the roughness of the Channel waters and the likelihood of aerial attack precluded any possibility of splicing or coupling the pipe during the laying operation, it was necessary to manufacture each line sufficiently long to reach from shore to shore in one continuous piece. Few materials were adaptable to such manufacture or to handling after fabrication but the conditions which had to be met were similar to those encountered in laying submarine communications cable.

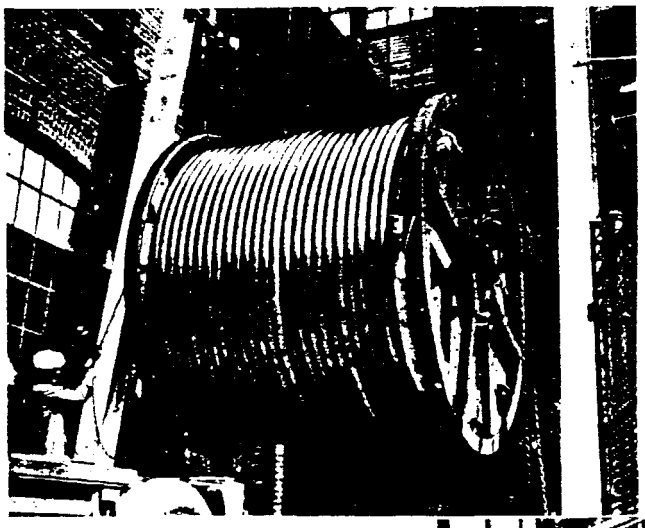
Submarine cable is essentially a lead alloy pipe packed full of insulated copper wires and armored with a sheath of steel. If such a cable could be produced without the wires it would become in effect a pipe suitable for the purpose desired. This is exactly what was done although the operation was not nearly so simple as the description indicates. Many new manufacturing and handling techniques had to be worked out under pressure of time.



OKONITE-CALLENDER CORP.

A section of the finished cable showing the lead tube, the steel reinforcing tapes, the steel wire armor and the jute wrapping.

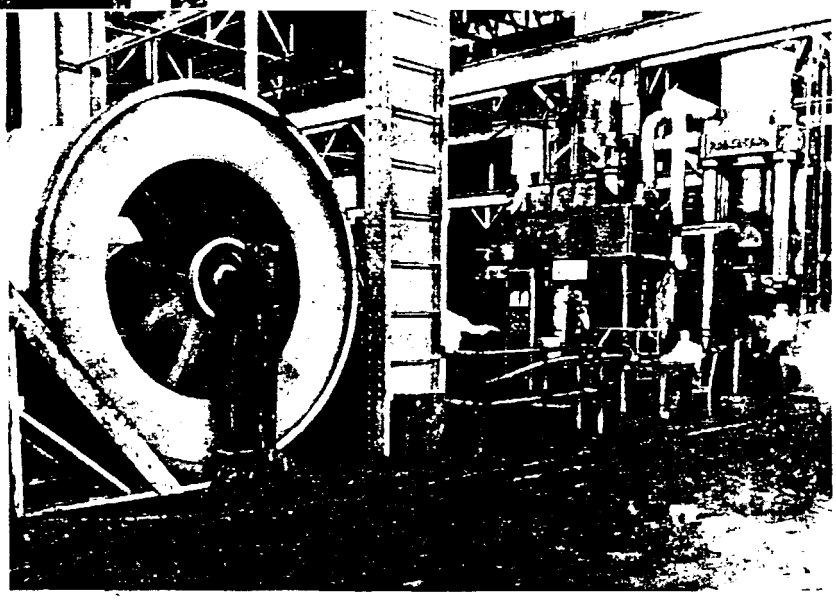
In order to avoid duplication of effort the U. S. Army Engineers collaborated with the British military forces to provide this means of fuel transportation which was used to supply the Allied forces in France and Germany. Only by means of the closest cooperation with the Army by four American cable manufacturers could the gigantic project have been accomplished in the short space of time allotted. These were General Cable Corporation, General Electric Co., Okonite-Callender Corporation and the Phelps-Dodge Copper Products Corporation. New plants were built, existing machinery was assembled from distant locations and spe-



GENERAL CABLE CORP.

A 2500 foot length of lead pipe starting on its trip to the covering machines.

Lead tube can be seen to left of the girl seated at table as it emerges from the giant cable press in right background.



PHELPS-DODGE CORP.

This Sort of Thing Costs Money

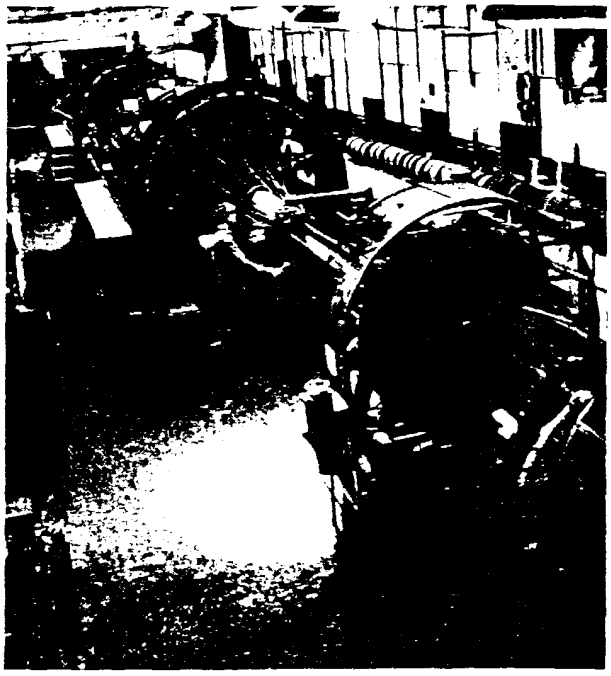
BUY WAR BONDS

cial handling equipment was designed and installed. all with such great secrecy that not even the key workmen knew what the final purpose was.

In manufacture the great hydraulic presses which are intended to form the continuous lead sheath over the compacted core of wires were adapted to extrude a hollow lead pipe. Great care was taken to produce perfect pipe in lengths as great as 2,500 feet with no faults or defects. These lengths coiled on reels were then transported to the giant machines which coated the pipe with pitch. wrapped it with overlapping steel reinforcing tapes. armored it with steel wires bedded in pitch and finally wrapped it with a thick layer of jute cords.

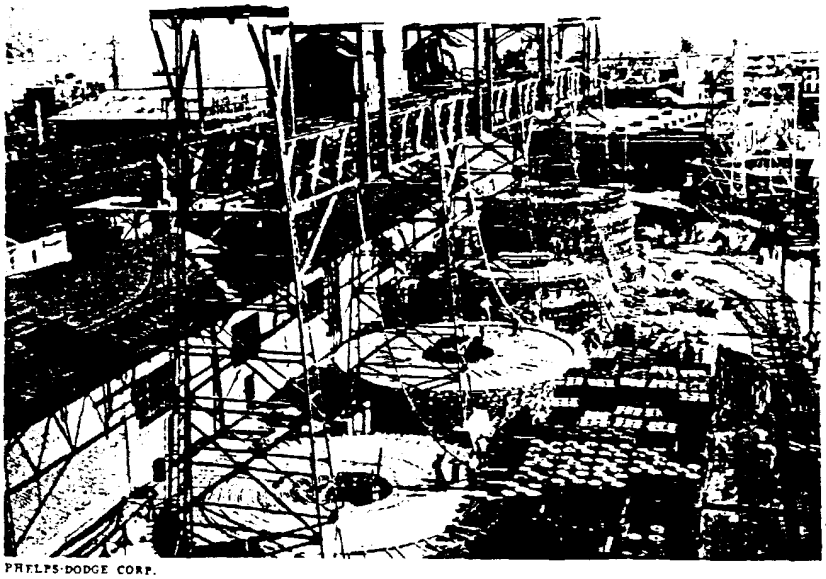
The individual lengths of lead pipe were joined by a special welding process which maintains both the internal and external diameter uniform. A pressure of 25 lb. per sq. in. was maintained throughout the covering operation to prevent the lead pipe from collapsing.

For handling and storing the cable as it came from the machines and to load it into ships the manufacturers found it necessary to build towering steel trestleworks on which were mounted power driven sheaves of large diameter. As the completed cable issued from the machines it was led out through holes in the roof over the sheaves and down to the ground where it was coiled in great piles as large as 50 feet in diameter and 40 feet high. To prevent the lower layers from being crushed the cable was filled with water under pressure. The finished cable in lengths as great as 40 miles was finally uncoiled by pulling it back up over the sheaves and out to waiting ships with specially prepared holds. The cable was laid by paying it out over the stern as the ship traveled across the Channel. In all, 12 lines of the armored lead pipe were laid from England to France.



Part of one line of covering machinery showing application of steel armoring wires to underchannel pipeline.

GENERAL CABLE CORP.



A storage yard where armored lead gasoline pipeline was piled during the manufacturing process.

PHELPS-DODGE CORP.

While the manufacture and laying of this remarkable pipeline was a unique and magnificent operation it was actually only the utilization to an extreme degree of two of the characteristics which make lead so useful and economical in many applications. The flexibility of lead and its adaptability to manufacture and use in long lengths are well known and widely used by industry and utilities. Many thousands of miles of lead sheathing protects the power and communications cables that are the arteries and nerve channels of America's military. industrial and commercial body.

Lead Calked Joints Provide Pressure Seal in Flexible Cast Iron Pipelines

IT is generally recognized that the lead calked joints of standard types of cast iron pipe have a certain degree of flexibility. This is a very useful property and it serves to protect the pipe from breakage as the result of the unavoidable flexures which occur as the result of earth settlement or other movement which the engineer may be unable to control.

However the ordinary calked joint is not primarily intended to be extremely flexible and an excessive amount of bending or subsequent straightening or bending in the opposite direction will have a tendency to loosen the calking.

Under some conditions it is desirable to use a joint that will flex safely as much as 10 to 13 degrees and which will remain tight through a subsequent reverse bend. The problem of such a joint was encountered many years ago and James Watt the inventor of the steam engine is credited with originating the principle on which the construction of most types of such joints are still based. Modern practice is well illustrated by what is known as the "Metropolitan joint," a commonly used lead calked flexible connection for cast iron pipe. On the spigot end is cast a torus which is machined to a spherical shape concentric with the pipe. About halfway of the depth of the bell an upstanding fillet is machined to the same spherical radius. When the spigot is socketed in the bell the two spherical surfaces form, in effect, a ground joint which centers the spigot in the bell, and provides a stop for the molten lead during pouring. After the lead is calked the joint can be flexed approximately 13 degrees in any direction and because of the spherical shape of the contacting parts the parts will remain in the same relative positions. The pressure resistance of the joint is provided by the tight bearing of the calked lead against the machined surface of the spherical spigot.

Metropolitan type cast iron pipe is often used for installations where a number of lengths must be joined before being placed in final position-as in river crossings where the joints may be made up on the bank and the pipe pulled across the stream with cables. Should leaks develop in the course of placing the pipe in position the lead calking is easily accessible for recalking.

Pouring lead joint in flexible joint cast iron pipe being laid across swampland.

Flexibility of special lead calked joints is clearly demonstrated by the bending of this large pipeline as it is pulled across a Louisiana bayou.

U. S. PIPE AND FOUNDRY CO.

It is important that lead to be used for calking cast iron pipe shall be of high purity and uniform consistency if it is consistently to produce dependable joints. A sure way to provide that the proper type of lead is supplied for this purose is to specify that all calking lead shall be delivered to the job bearing the Lead Industries Association's Seal of Approval. This seal certifies that the lead conforms to the association's rigid standards which are currently identical in substance with the Commercial Standards for Calking Lead published by the U. S. Department of Commerce.

A Portfolio of American Landmarks

No. 32

Salem, Massachusetts

SALEM, Massachusetts, was certainly one of the first settlements in what is now the United States and there is evidence that certain houses there include portions of early buildings which were shipped ready cut from England. If so, some of these may be the oldest wood houses in America.

These oldest houses were never painted and as a matter of fact paint was considered a sinful ostentation by the straightlaced Puritans of the time. In some cases severe punishments were meted out to citizens who were bold enough to relieve the drabness of their residences by means of the paint brush.

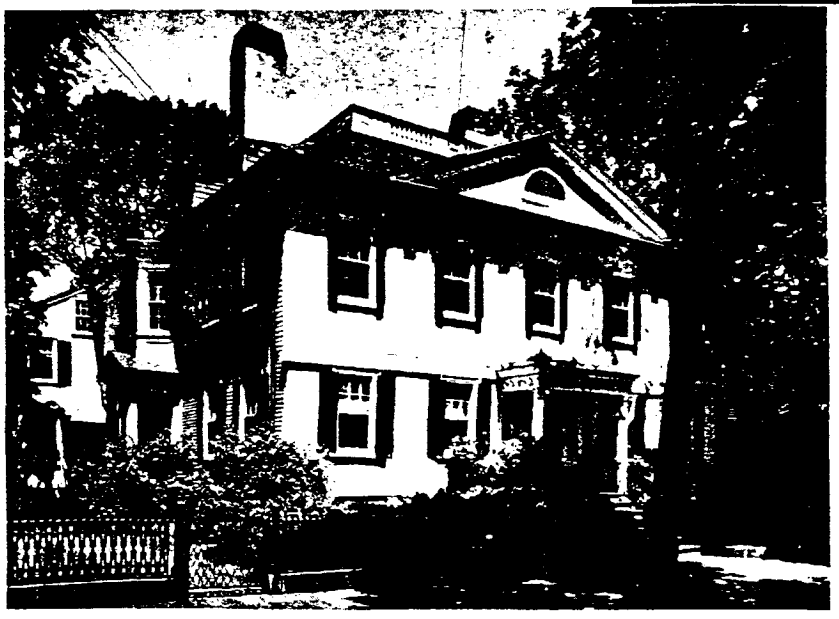
However the obvious thrift of protecting one's most valuable property by means of a comparatively inexpensive application of paint eventually overcame an arbitrary custom and Salem became one of the most architecturally distinguished and best painted cities of New England.

The buildings pictured on this page were erected during the period when Salem was at the height of its prosperity. Their builders and owners were fully aware of the value of high quality paint as a weather protection as well as a beautifying agent. They are today still painted with pure white lead paint.

Phillips house built about 1800. Pure white lead in its natural brilliant white as well as tinted accents the beautifully proportioned decorative features.

William Barker house built in 1812 is said to have once been the property of a descendant of Sir Richard Saltonstall, one of the original settlers of Salem. Both the brickwork and the delightful wood detail are painted with pure white lead paint.

The Assembly House, built in 1782, was the scene of many brilliant social functions. It was converted to a residence before 1800 and it is still so used. Its present owner continues to rely on pure white lead paint in his maintenance program.



PHOTOS BY DAYTON SNYDER

THIS IS NO. 32 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.

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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, 120 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.

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 the *American Builder*, July, 1939.

STOP DEMON RUST
Leaflet giving concise, simple instructions in the use of the rust preventing qualities of Red Lead Paint in protecting farm machinery.

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.

LEAD EQUIPMENT USED IN INDUSTRY
By F. E. Wormser, Secretary of Lead Industries Association
A summary of the uses of lead in the production and handling of corrosive chemicals. Reprinted from "Metal Progress" to be included in the next edition of *American Society of Metals Handbook*.

SUMMARY OF NOTES ON LEAD ROOFING
A brief description of the uses of lead for roofing and flashing purposes and the proper practices of its application. Reprinted from *Sheet Metal Worker*.

NEW LEAD COATING PROCESS ELIMINATES USE OF ZINC ALLOYS
By W. Yonkman, Engineer, Western Electric Co.
A description of a successful hot dip lead coating process with complete instructions for changing over from hot dip galvanizing using the same equipment. Reprinted from *Product Engineering*, May, 1934.

COMMERCIAL STANDARDS:
Calking Lead, CS94-41
Lead Pipe, CS95-41
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.

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 including the technique of application, thickness of coatings, uses and advantages. Reprinted from the November, 1944 issue of *Metals and Alloys*.

LEAD X-RAY SHIELDING
Graphic chart based on recommendations of the International Commission on X-Ray and Radium Protection giving thicknesses of lead for respective voltages in millimetres, inches and pounds per square foot.

(Continued from page 3)

smoothest possible unobstructed flow with the least amount of turbulence.

The soundness of these principles of drainage construction is so well recognized that many city plumbing codes require that only lead pipe may be used under bathroom floors. The accompanying photographs illustrate adaptability of lead pipe to free flowing construction. The one in a Kansas City apartment house shows all lead under floor piping of wastes and vents which can be depended upon for quiet unobstructed operation. The one in the nurses home in Omaha, also all lead under floor, illustrates the ease with which lead pipe is adapted to the angular relationship of fixture locations.

It is interesting to note that hard lead floor flanges bearing the Lead Industries Association seal of approval, two of which are shown set temporarily in place in the Kansas City picture, will be used on both of these jobs. These flanges after three years of use are proving to be substantial and satisfactory. The Seal of Approval on these flanges as on other lead products certifies that they conform to the exacting standards of the Lead Industries Association in dimensions, weight and purity of materials.

UPON REQUEST, THE LEAD INDUSTRIES ASSOCIATION WILL BE GLAD TO MAIL "LEAD" REGULARLY, FREE OF CHARGE, TO THOSE INTERESTED, AND WILL COOPERATE WITHOUT OBLIGATION IN THE SOLUTION OF YOUR LEAD PROBLEMS

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