Lead

VOLUME FIFTEEN MAY-JUNE 1945 NUMBER THREE

According to "Yank," the Army Weekly, when the Marines had carried the flag to the top of the volcano "Sgt. Henry O. Hanson of Somerville, Mass., looked around for a pole and found a lead pipe on the ground. At 1137 hours he with Lt. Schrier and other 5th Division Marines raised the American Flag on the topmost mound of Suribachi." We take this as being symbolic of lead's record of service in meeting wartime emergencies.

7th WAR LOAN

IS YOUR OBLIGATION TO BE A BACKER OF THE FINEST MEN AND THE GREATEST FIGHTING FORCE THE WORLD HAS EVER KNOWN

Pure White Lead Paint Lives Up To Its Promises

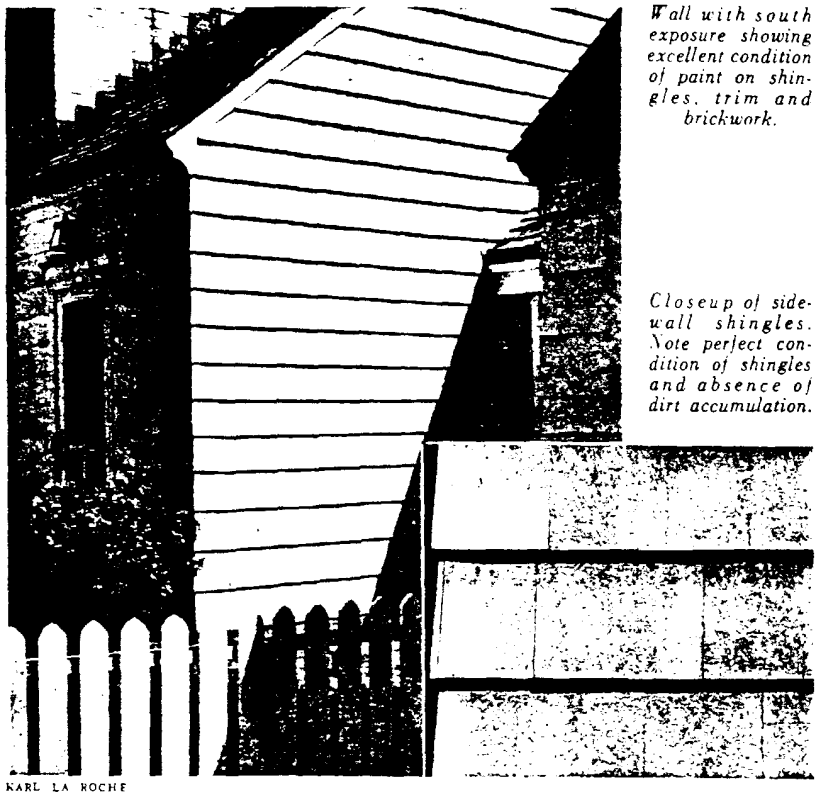
IN 1939 it was our good fortune to obtain the cooperation of one of the many home owners who take pride in incorporating only materials of highest quality into their new residences. He made full use of the great durability of lead products in the three major fields of their building application, namely plumbing, roofing and flashing, and paint. We published detailed descriptions of all three applications together with numerous photographs of the building under construction. Now, six years later it is worth while to take stock and inquire as to the performance of these materials and to see whether or not he was justified in selecting lead to fulfill these important functions.

Six years is of course too short a time to be a serious test of plumbing and flashing metals although failures of these functions in shorter periods are by no means unknown. Suffice it to say here that both lead plumbing and lead flashing are in perfect condition and the owner has not found it necessary to give any thought to service or repairs to these details.

However, six years is certainly a long enough period to be regarded as a reasonably severe test for a paint job especially when the job in question was the original application on raw wood and so was required to stand strictly on its own merits. Careful examination shows the pure white lead paint to be in excellent condition on all three of the exterior materials used on the house, shingle sidewalls, white pine trim and brick chimneys. Although the evidence of chalking is slight there is little accumulation of dirt even on the comparatively rough surface of the shingles. Where soot has accumulated due to wind blown roof drainage it can be easily brushed off with a painters duster.

DAYTON SNYDER

The house in Stamford, Conn., at the time of its completion in 1939.



KARL LA ROCHE

Wall with south exposure showing excellent condition of paint on shingles, trim and brickwork.

Closeup of sidewall shingles. Note perfect condition of shingles and absence of dirt accumulation.

Although the paint is still in excellent condition and has by no means reached the end of its effective protection of the underlying wood and masonry from the weather, the owner intends to repaint this spring. Needless to say he expects to use pure white lead paint again. The painting operation will entail only the labor of applying the paint plus a preliminary brushing to remove surface dust. The pure white lead paint, holding true to its well known characteristics, has not only lasted extremely well but it has retained its smooth and unbroken surface ready to receive the repaint job without special preparation. All users of pure white lead paint can expect to get this same economical service.

The Sargent-Murray-Gilman house in Gloucester, Mass., built in 1797, once the home of Rev. Samuel Gilman who wrote "Fair Harvard," is painted with pure white lead paint.

The Ropes Memorial in Salem, Mass., built in 1719, like so many other surviving landmarks of wood construction, stands today protected by pure white lead paint.

The old Poole Homestead in Rockport, Mass., built in 1724 has been modernized inside with electric light and plumbing, and it is thoroughly up to date outside protected by pure white lead paint.

PHOTOS BY DAYTON SNYDER

A Portfolio of American Landmarks

No. 31

Along The Massachusetts Sea Coast

LARGE or small the homes of the early residents of this country were sources of pride to their owners who gave thought to their planning. built them well and strongly, and cared for them dilligently. Otherwise America could not now possess such a rich heritage of charming precedent for present day homes for pleasant living.

The three houses illustrated here range from the cottage to the mansion, yet they all show evidence of their owners understanding of the importance of design, structure and maintenance.

The "Old Poole Homestead" is but one of a number of existing cottages in Rockport, Mass.. identified with the Poole family, but it is cared for as lovingly as is the Ropes Memorial in Salem. Mass.. or the Sargent-Murray-Gilman house in Gloucester. Mass.. which in 1915 was saved from dismantling for its fine interiors by popular subscription. They are all kept beautiful and maintained in sound. livable condition with the help of pure white lead paint. The owners of these precious landmarks take particular care that they are provided with the best and surest protection from the ravages of time and the elements by the use of pure white lead paint, the same high quality material that was the standby of the craftsmen who built the many charming houses of the early settlements of America.

THIS IS NO. 31 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.

Sheet Lead Work Completed On Pennsylvania State Capitol Dome

IN our last issue we described some of the leadwork which was recently installed as a part of the extensive repairs to the dome of the Capitol Building of the Commonwealth of Pennsylvania. The design of the dome was based on that of St. Peters Church in Rome, but although in silhouette it is one of the most graceful domes in America, the scale of the original ribs was heavy and some of the mouldings at the base and on the lantern were not entirely pleasing. Mr. William Gehron, architect, who designed a number of the more recent state buildings in Harrisburg, including the impressive Memorial Bridge, took the opportunity afforded by the repair job to refine the detail of the ribs and to rebuild the lantern. Changing the ribs and the lantern roof to lead and the lantern to stone also brings the structure more nearly into conformity with precedent since the dome of St. Peters is roofed entirely with lead.

The new lantern is roofed entirely with sheet lead applied over a skeleton of treated wood which in turn is bedded soldily in concrete. The lead is applied in essentially the same manner as on the ribs of the main dome. In this case however the ribs are smaller, only about 5 in. high at the base, and the lead covering is in one piece transversely instead of seven as on the main ribs. All sheets including the pans between ribs and the moulded courses above and below the ribs are secured to the underlying wood with metal cleats folded into loose locked joints. A water tight joint was provided at the base of the ball by means of a clamping ring of bronze secured to the steel with screws. Lead and ring were bedded in white lead.

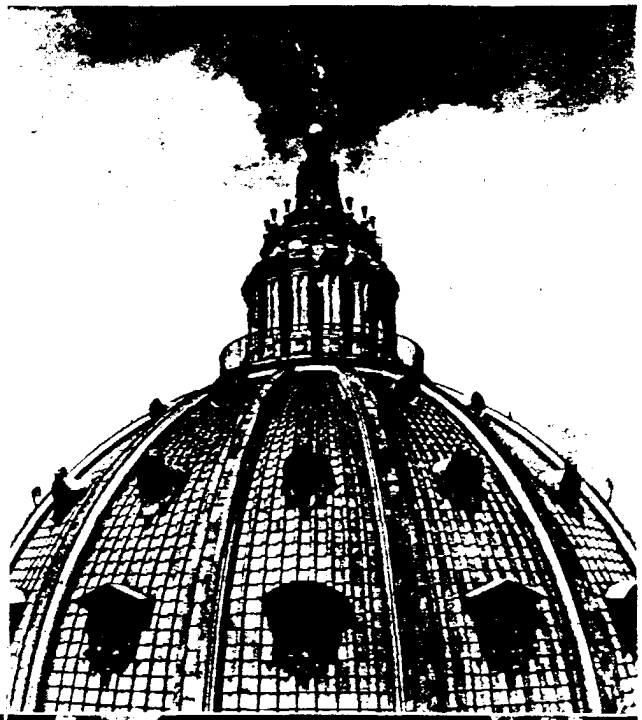
A lead coping and flashing was applied on the cornice around the lantern. In this case the areas to be covered were small enough not to require provision for expansion so no transverse joints were necessary. Each coping is a single sheet of lead. Here, as in the copings at the base of the dome, the portions of the lead in contact with mortar were painted with asphalt paint as a protection from free lime until the mortar is cured.

The figure that tops the lantern roof and the ball on which it stands, as well as the moulded portion of the main ribs, are finished in gold leaf. The

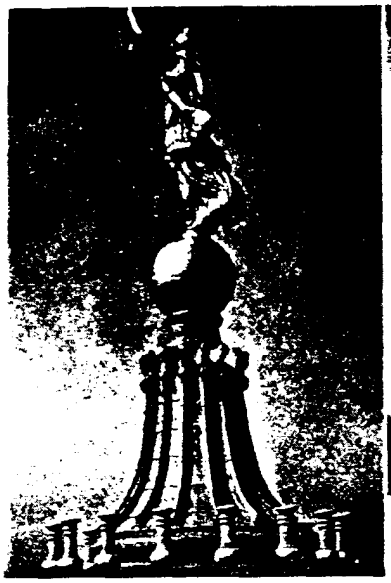
Upper right, view of completed dome showing excellent appearance of the new lead ribs, also reconstructed lantern totally roofed with lead.

Lower right, lead coping on lantern cornice. Each section is covered with one piece of lead extending through under the attic course.

Lower left, rib terminal detail of preformed sheet lead over solid wood core at base of dome.



PHOTOS BY W. H. HINES



Detail of lantern roof showing careful attention to jointing on complicated area.

General view of Pennsylvania State Capitol Building with leadwork on dome completed.

igure and ball are of iron on which wo coats of red lead were applied followed by a coat of white lead as a base or the gold leaf. The ribs to be gold eafed were painted with white lead or both priming and body coats since netallic lead does not require the rust nhibitive protection of red lead.

A construction project of the magnitude of this repair job would not have been undertaken during war time f it had not been necessary to eliminate serious hazards to the public and to an important building. Since he work was necessary it was considered essential that all materials used be of a nature to provide maximum durability and eliminate so far as possible all likelihood of further troubles. It is indeed fortunate that lead was freely available at the time so that the necessary metal-work could be executed without conflict with munitions manufacture and procurement.

While this building is of monumental character, the advantages of lead roofing and flashing should not be considered as being available only to large and expensive structures. Lead may be used in weights and thicknesses which make material costs compatable with modest residential and commercial buildings.

Hard lead, an alloy of lead and antimony may safely be used in weights of 2½ lb. to 3 lb. per square foot (5/128 in. to 3/64 in. thick) depending on conditions, which because of the low price of lead per pound is not excessive in cost but which because of the low corrosion rate and the greater thickness compared to other sheet metals presents greater resistance to corrosion damage than any other roofing metal. A reprint "Summary of Notes on Lead Roofing" describing the use of hard lead is available on request to the Lead Industries Association.

State and Federal Vocational Education Agencies Helpful In Establishing Lead Welding Classes

THE interest of men in the plumbing trade is turning increasingly to lead welding. These men have realized more than most of us the effects of the Japanese conquest of the worlds major sources of tin since tin is a necessary component of the solder used for making the wiped joints commonly used in fabricating lead plumbing. Since lead welding makes possible the joining of lead pipes without the use of solder the plumbers are convinced that by using this process they can continue to install high quality lead work and at the same time release at least part of the restricted amounts of tin allowed them by the War Production Board to other essential uses.

However lead welding is not a casual operation which can be done without preparation. It is a skilled craft which must be acquired by practice although there is nothing mysterious about it as many people seem to believe. The plumbers local unions in a number of cities have been active in providing opportunities for their men to learn lead welding by setting up classes where they can receive instruction.

The first problem to be solved in arranging for such a class is finding an instructor. In some cities experienced lead welders have been available and successful teaching programs were easily established. In other places it has been necessary first to establish training classes for teachers. In such cases the state and national vocational educational agencies have been very helpful.

One of the recently established programs of lead welding instruction is in Illinois where a class for teachers was held at Millikin University at Decatur. This class was sponsored by Plumbers Local Union 65, the Decatur School Board and the Illinois Board for Vocational Education. It was organized in response to a number of requests from locals in Illinois cities.

Prospective teachers of lead welding from eight Illinois cities who will instruct members of their local unions in this important craft.

Instruction was provided not only in the actual skill of lead welding but also in teaching and class organization, so that the men attending would be thoroughly equipped to pass their newly acquired skill on to journeymen and apprentices in classes sponsored by their home organizations.

The class was well attended by representatives from eight Illinois cities where lead welding classes will be established under the sponsorship of local plumbers unions. Other state and federal vocational training agencies have established courses in lead welding, one of the most recent being in Lowell, Massachusetts, under the sponsorship of Plumbers Local 400 and the Lowell Trade School.

The plumbing trade and the vocational educational authorities are to be congratulated on their activity in promoting the teaching and use of lead welding. It not only serves the patriotic purpose of conserving tin, a critically needed material which will not be in plentiful supply until long after Japanese held producing areas are freed, but adds an extremely useful skill to the plumbers ability.

New Type of Lead Sheathed Cable Installed For Television Transmission

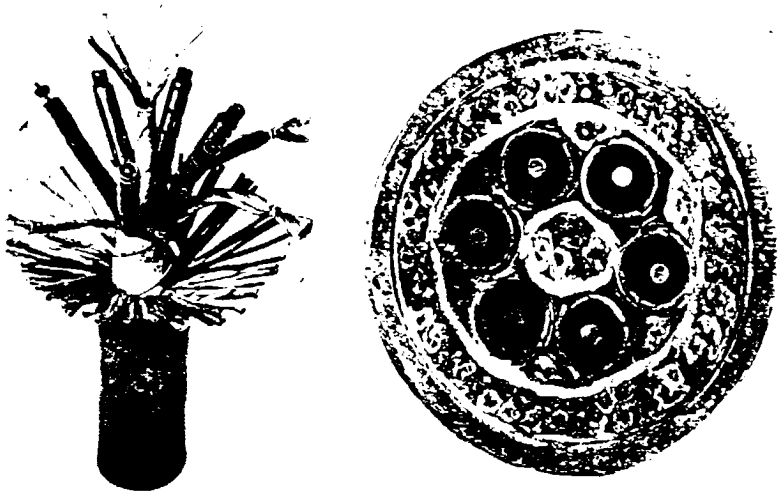
ONE of the latest developments in communication transmission equipment is a new type of cable known as coaxial cable. The outstanding feature of this type of conductor is that each individual circuit, instead of being a pair of wires, consists of a single wire which functions as one side of the circuit inside a metal tube which acts as the other side. The wire is insulated from and kept concentric with the tube by a series of insulating discs spaced about 1 in. apart throughout the length of the conductor.

This type of conductor has been found to be adaptable to the transmission of the high frequency signals expected to be used in the network transmission of television and the widespread use of this long expected development of broadcasting will probably depend to a large degree on the extent to which the new cable becomes available.

Several stretches of cable containing coaxial circuits have been laid in various parts of the country and some are under construction at the present time. With the exception of the first line of coaxial cable which was intended purely for experimental purposes and which extends from Philadelphia to New York, all of the installations have been combination cables containing four to six coaxial conductors and a number of regular paired wire circuits which can immediately be put into service for regular communications work pending the installation of the special equipment necessary for the utilization of the coaxial conductors.

However, all of the new cables have one characteristic in common which is identical with thousands of miles of other communication and power

Right, cross section of combination coaxial cable of type now being installed. Left, a section of same cable fanned out to show both types of conductors.



PHOTOS COURTESY WESTERN ELECTRIC CO.

cables already in use. They are all sheathed in seamless tubes of flexible corrosion resistant lead.

The lead sheath which is applied to the tightly compacted bundle of wires and cables by an extrusion process makes possible the fabrication of relatively long lengths of finished cable which can be coiled on reels and transported to the place of installation. There it can be unreeled and pulled through prepared conduits or, if suitably protected by a wrapping of jute and impregnated fabric, laid directly in a trench and covered with earth. Actually much of the coaxial cable is being laid by the latter method.

For many years most of the communication lines in our cities have been carried under ground in lead sheathed cables and a great deal of progress has been made in extending underground construction on long distance lines. In normal times cable sheathing is one of the major uses of metallic lead and in this war huge quantities of lead sheathed cables are being used on land, on shipboard and in the air and for power transmission as well as for communications work.

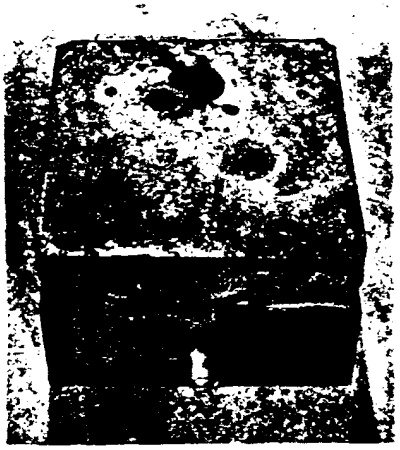
This new cable, in addition to providing a means for inter-station transmission for television, is expected to be useful in greatly increasing the number of long distance telephone channels available. The electrical properties of the coaxial conductors are still being investigated and developed, but the performance of the lead sheath is well known and it can be depended upon to protect the delicate conductors from damage as it had done on many previously laid cables of other types.

Lead Alloy Forming Dies Important Tools In Airplane Industry

PROBABLY no other single process is more important in the construction of modern airplanes than the forming of sheet metal parts. Not only the outer covering but many structural parts of planes must be stamped or pressed into shape before they can be assembled and riveted or welded into fighting ships.

Since airplane design is almost never frozen and any revision in design may require new tools to make the altered parts it is imperative that these tools be produced quickly and economically. Comparatively recent development of a process of casting sheet metal forming dies in low melting point alloys has made possible the very flexible design control system which keeps American warplanes constantly up to date while they continue to be manufactured on a production line basis.

Lead-antimony punch just cast in zinc-alloy die with form boards removed.



In many of these forming dies, which are always used in matching pairs, antimonial lead is the material from which one of the members is made. The other half of the pair is made of a special zinc alloy die metal. The process of manufacture is to cast the die or female member of the zinc alloy metal in sand from a plaster pattern made by hand from drawings and ternplates. After the working surface of this member is smoothed and polished it is surrounded by a fence or dam of asbestos boards and fire clay high enough to provide clearance between the platens of the press. It is then filled with molten antimonial lead to the top of the dam. The necessary bolts for securing the punch to the press are set by template, and the metal is allowed to cool. The dies are then ready for use.

The antimonial lead is sufficiently ductile to flow under the pressure of the press to fill up any solidification shrinkage which has occurred but is hard enough to stand for fairly long runs of light gauge metal parts. The antimony content of the lead varies with the use and the machines on which the dies are to be used. Maximum hardness can be achieved only at the expense of some ductility and a consequent increase in brittleness. For drop hammer work from 4 to 7 per cent, antimony is commonly used but for dies used on presses where impact is not a factor higher antimony content can be used with resulting greater hardness and durability of dies.

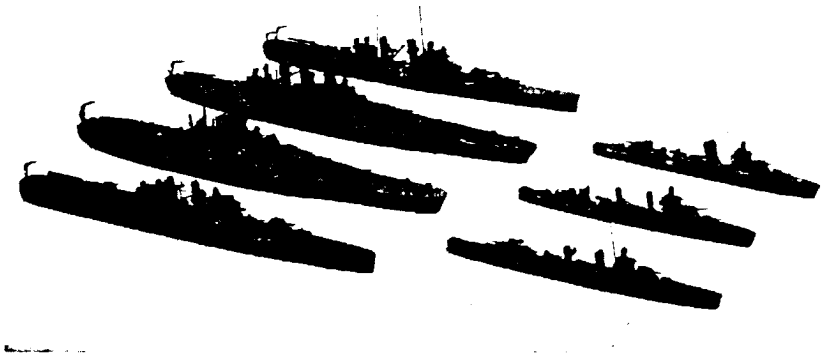
The zinc alloy-antimonial lead die sets are being regularly used by airplane and other industries for forming aluminum, magnesium, dural, mild steel and other sheet metals for both development and regular manufacturing operations. Their chief advantages are rapid production and 100 per cent salvagability with consequent savings in time and cost, both of prime importance in the production of all manufactured articles.

Lead-antimony punch removed from die ready for immediate use on forming press.

The U. S. Navy Built of Lead That Never Goes To Sea

THE mighty United States Navy of ships that fear no foe or weather has a miniature counterpart that never gets wet: battleships, cruisers, destroyers, submarines and merchant ships, perfect in scale and proportion, which ride only on seas of painted wood in the classrooms of training stations, many of them far inland from salt water and sea breezes. But so accurate in mass and detail are these lilliputian vessels that fledgling Navy men who have studied them during their training are able to recognize and name the great ships which they represent the first time they lay eyes on them.

The production of these new and effective training aids has been part of the wartime work of certain manufacturers who, before the war, made toys and hobbyists supplies. The fine detail of superstructures, armament and fitments is all executed in cast lead alloy and applied to accurately shaped wood hulls.



DAYTON SNYDER

Like real ships awaiting action the lead alloy and wood ship models await their appointments in Navy Class rooms.

These models are fulfilling a very definite need in familiarizing men in training with the appearance of the ships of our Navy. While they are small and would delight the heart of any small boy they are much too finely made to be classed as toys. Should the Navy have more than they require or should a reduction in the training program make it possible to dispose of any of these models, they will be eagerly sought by collectors and by Navy men who would be proud to possess replicas of the ships on which they served.

The models pictured were made by the Comet Metal Products Co. of Richmond Hills, L. I., N. Y. They are at a scale of 1 to 500. Similar models of the ships of our enemies, one of which was illustrated in a previous issue, are also part of the Navy's training equipment.

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.

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.

SPECIFY SEAL OF LEAD INDUSTRIES' APPROVAL MATERIAL

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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