LEAD

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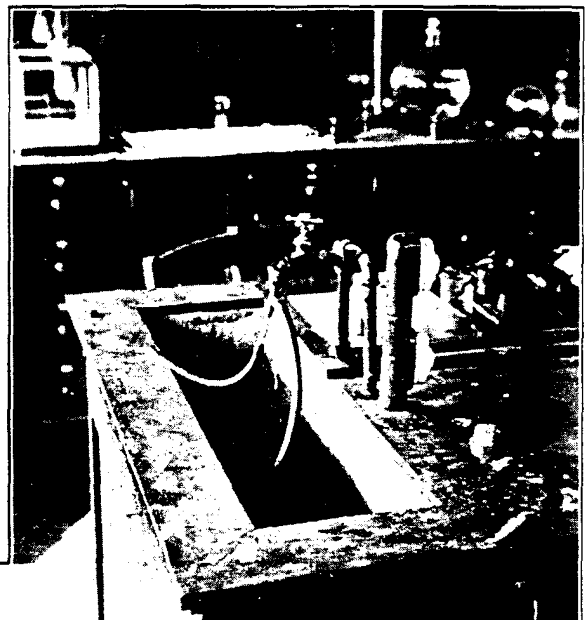
COURTESY LEAD INDUSTRIES DEVELOPMENT COUN

Parish hall in England with lead-lined flower boxes built in under first floor windows. Edward Armstrong, F.R.I.B.A., architect.

LEAD INDUSTRIES ASSOCIATION
RELY ON LEAD

Lead Laboratory Equipment at Oregon State College

SHEET LEAD is used for sinks, sink backs, troughs, desk tops, waste lines and special apparatus in the following buildings of the Oregon State Agricultural College at Corvallis, Oregon: Agricultural, Horticultural By-Products, Chemistry, Pharmacy, Poultry and Veterinary Clinic, Dairy, Home Economics, Mines, Physics, Engineering Laboratory and Apperson Hall (Electrical). This equipment has proved highly successful and has stood up for various numbers of years without maintenance. It is installed with "burned" joints so that only lead is exposed to the corrosive chemicals. The variety of uses to which lead is put in these laboratories is an excellent example of its adaptability, especially when installed by a skilled and resourceful person.



One of many 8 lb. sheet lead-lined sinks of all shapes and sizes, with lead pipe connections, in laboratories of Oregon State Agricultural College.

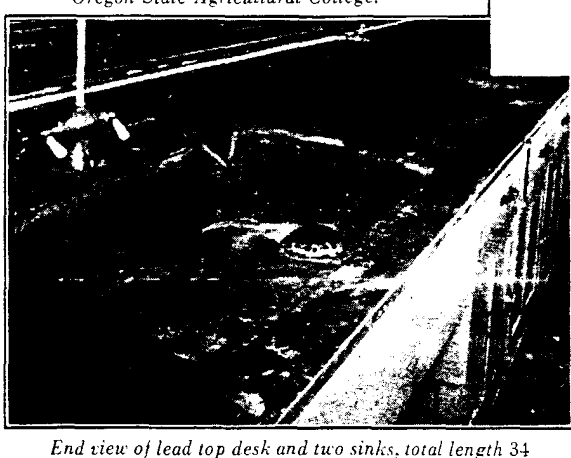
The photographs show several views of chemical and photographic laboratory table tops and sinks. In general, the sinks and table tops are 8 lb. lead and the backs 6 lb. Those shown have been in use from 5 to 11 years without maintenance. In addition to the corrosion resistance of lead, it has other advantages. Being relatively soft, it greatly reduces breakage of laboratory glassware and thus also saves the loss of solutions and time. Apparatus may be securely fastened down to table tops through the lead covering with ease, and if removed later, the holes can readily be closed.

A lead acid bath for cleaning glass is also illustrated. It was designed and made by C. G. Wiltshire, assistant professor and superintendent of the plumbing department of the College, who also had charge of the other lead work described and illustrated in this article. The acid bath is made of 3/8 in. lead and the water bath of 1/8 in. lead. All joints were "burned". Its life is said to be unlimited.

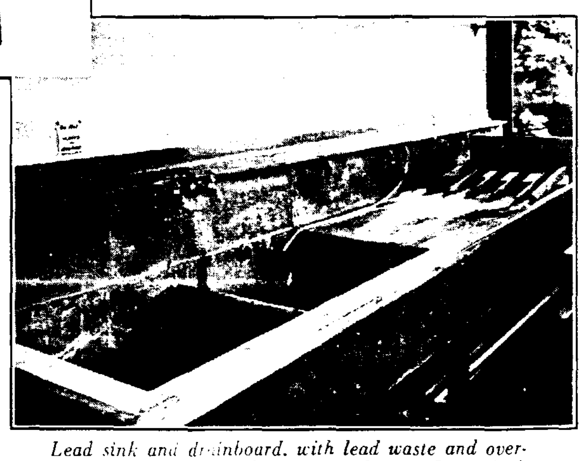
Lead absorption tower described in text, used at Oregon State Agricultural College.

A laboratory absorption tower is also shown, made of lead with "burned" joints. The following description is abstracted from a letter from George W. Gleeson, associate professor of chemical engineering at the College:

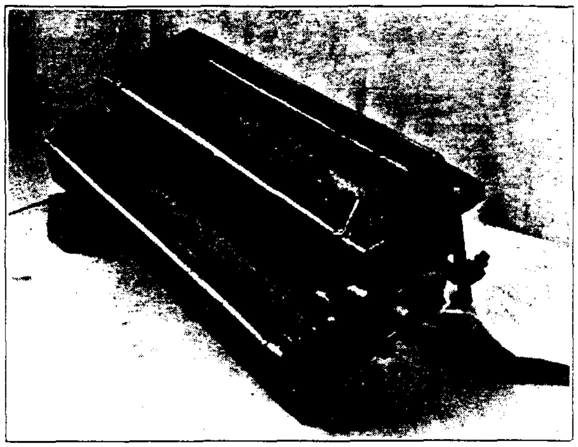
The tower is for the purpose of ab-



End view of lead top desk and two sinks, total length 34 ft. with one right angle turn, in Chemical Engineering Laboratory, Oregon State Agricultural College.



Lead sink and drainboard, with lead waste and overflow, in Photographic Laboratory, Oregon State Agricultural College.



Acid bath for glass cleaning made of lead with "burned" joints. Its life is said to be unlimited.

sorbing water vapor from air or other gases by passing at counter current through a flow of sulphuric acid. The tower is packed from the supporting base at A, for three-quarters of its height with 2,000 half-inch glass marbles. This gives a definite surface area of contact between the gases and acid. The gases enter through inlet B, pass up through holes in the supporting base at A, through the packing and out at C. Sulphuric acid enters at D through a lead pipe distributor and out at E through the small trap made by a reversal of the small lead pipe.

The apparatus serves not only for research purposes but for class experiment to demonstrate the principles of absorption. By measurement of the quantity of acid and air passing through the tower and knowing the water concentrations at inlet and exit, it is possible to make a material balance over the piece of apparatus insofar as water is concerned. The advantage of the lead construction is obvious when it is considered that sulphuric acid is the liquid.

The tower is made of 4 in. lead pipe with 1/4 in. walls. The lead bend at the top is made in the old way with bobbins, the walls remaining of equal thickness throughout. The bracket holders are 3/8 in. sheet lead and the support is copper covered with 8 lb. lead so that only lead is exposed.

Lumber Company Building Painted with Pure White Lead

THE new office and laboratory building for the Pulp Division of the Weyerhaeuser Timber Co., at Everett, Wash., is a handsome wooden structure beautified and protected by pure white lead paint. Naturally, a manufacturer of lumber products is anxious to have his own wood-built buildings well painted as an advertisement of the beauty and economy of this type of structure. By selecting white lead, the Weyerhaeuser Timber Co. has assured itself of an attractively finished wood-built building that can be maintained at a minimum cost.

Lumber manufacturers have recognized the importance of following their products right through to the finished job if they are to enjoy consumer satisfaction. Too often fine wood-built buildings have been spoiled by application of unsightly, low-grade paint, expensive to maintain. Consequently, lumber manufacturers have studied the paint problem and many mills are enclosing painting instructions with their bundles of siding. These instructions invariably recommend pure white lead paint as one of the paints on which reliance can be placed for satisfactory painting.

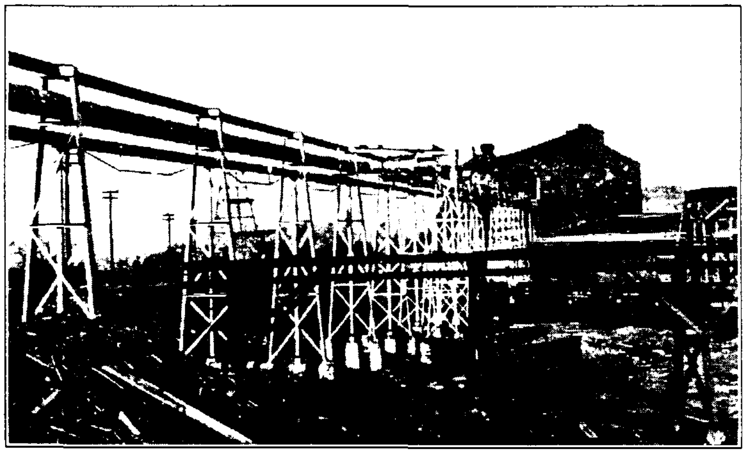
The fact that such a leading manufacturer of lumber products as Weyerhaeuser Timber Co. paints its own buildings with pure white lead is another proof of the confidence with which the vitally interested lumber manufacturers view the use of white lead. This is only natural since white lead has been so thoroughly tested in actual use for many years under all sorts of conditions that there is little guess-work or chance involved in its use.

New office and laboratory building for Pulp Division, Weyerhaeuser Timber Co., Everett, Wash., painted with pure white lead. Charles Drew, Tacoma, architect.

The Weyerhaeuser office building and laboratory pictured here was painted with pure white lead by R. Frederikson of Seattle, Wash. Charles Drew of Tacoma was the architect.

Long Lead Pipe Line Transports Sulphurous Gas

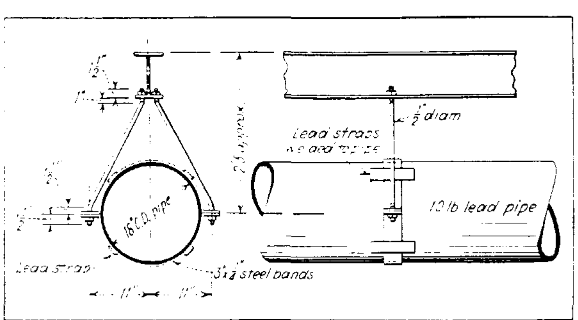
TO transport sulphurous gas from one plant, where it has heretofore been a waste material, to a neighboring sulphuric acid plant, where it will be transferred into a lead chamber system for conversion into sulphuric acid, a lead pipe line 18 in. in diameter and more than a quarter of a mile long is being constructed. This enables two large manufacturers in the same vicinity of western Pennsylvania to work out a mutual problem through the employment of lead.



Quarter-mile long, 18 in. diameter lead pipe line for transportation of sulphurous gas. The large expansion bend provided in the line is visible.

The lead pipe was made from 10 lb. (5/32 in. thick) chemical sheet lead and in 10 ft. lengths. The sheet lead was rolled around collapsible forms or mandrels and the seam lead "burned" or welded. The forms were then removed. To each section of pipe thus made, steel hangers, constructed in two pieces from 3 in. by ¼ in. bands, were applied on 30 in. centers by means of lead straps burned to the pipe. The exposed portions of the steel hangers are protected against corrosion by red lead paint. Since the lead pipe line itself is highly resistant to corrosion by the atmosphere, it requires no exterior protection.

A steel framework set on concrete foundations supports the pipe 30 ft. in the air. Since the ground is not level, the lead pipe runs up and down hill. Each section of pipe is hoisted into place independently and is welded at each end to the adjoining sections. An expansion loop approximately 11 ft. in diameter is provided in the pipe line. The drawing shows clearly the method of support and the expansion bend is visible in the photograph. Lead fans at each end of the pipe line propel the gas through the pipe.



Method of suspending large lead pipe line shown in photograph above.

Because lead is so highly resistant to corrosion by a wide variety of chemicals, it finds extensive use in the chemical industries. Though its resulting durability is a prime consideration, several other advantages are enjoyed by lead. It is readily available almost everywhere in all standard forms and, as demonstrated by this installation, may be readily fabricated to any desired shape by the aid of lead "burning" or welding. Repairs and replacements are easily and quickly made without long stoppages of processes. Lead always has a high salvage value when it has outlived its usefulness.

As in many other uses of lead, the flexibility of this metal is often a distinct advantage in chemical equipment. Movement or settlement which would fracture more brittle materials has little effect on lead because it is able to adjust itself without strain.

Colonial Assembly House Painted with White Lead

IN SALEM, MASS., the old Assembly House was built in 1782. Now more than 150 years later it is a well preserved Colonial landmark. Much credit for its excellent state of preservation must go to the many coats of pure white lead paint that have been applied to it in the intervening years. So far as can be determined, pure white lead paint has always been used on the Assembly House. For about forty years before his death, the late W. F. Carr of Salem, painted it with pure white lead, and his son has continued this practice in 1931 and again in 1935.

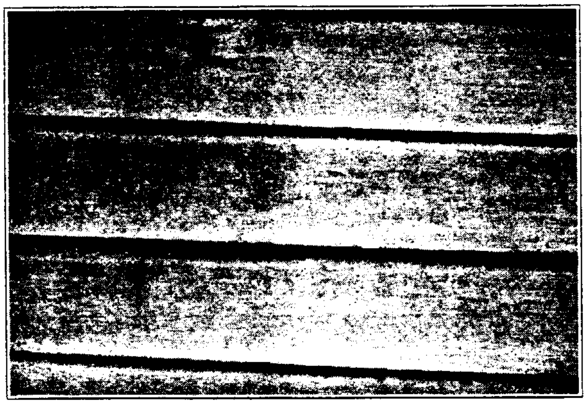
The Assembly House is situated in one of the most historically interesting cities and localities in the United

States. Lafayette dined in the Assembly House at Salem in 1784 and George Washington danced there at a ball given in his honor in 1789.

This building, that has endured through practically the entire life of the United States, is an excellent sample of the great durability that may be expected when wood and good paint are combined. For all its years, few traces of age show on this building. Fresh paint can always make a wood-constructed building look like new and good paint helps to preserve the structure. Both these ends are economically accomplished by white lead.

White lead is extremely durable and when repaint time arrives, it presents an excellent surface for repainting. No burning or scraping of old white lead paint is necessary because it wears by gradual chalking rather than cracking and scaling. This fact also saves a coat of paint at repaint time because the old paint has not been removed down to the wood.

Well preserved 150-year-old Assembly House at Salem, Mass., probably painted with pure white lead throughout its entire life.



A detail of the Salem Assembly House siding showing the excellent preservation after 150 years, thanks to the durable combination of wood and white lead.

Even with all the advantages that years of use have proved white lead to possess, its first cost is low. This factor, combined with the long life between paintings and the economies effected by white lead when repainting is necessary, makes the annual cost of white lead paint exceedingly low.

Lead Wastes in New Denver, Colo., Fire Station House

"DENVER is another large city that enjoys the protection of lead in sanitation and durability, where a man must be a plumber to demonstrate the ability of his trade," writes Max Kreutz, vigilant deputy plumbing inspector of Denver, Colo., and a member of the Executive Committee of the Pacific Coast Plumbing Inspectors Association. To prove his point, he submitted a picture, reproduced here, of a recent job in Denver.

The photograph shows the lead wastes, drum traps and vents for two showers in new Fire Station No. 11. This building was erected as a W.P.A. project, and since there was lead work to be done, a skilled plumber naturally had to do it. Only legitimate plumbers, men who have thoroughly learned the trade, are capable of installing lead. This job was done by John Toohey, a skilled mechanic and member of Plumbers' Local No. 3. In Mr. Kreutz's words, "This is a building where a competent man was employed, a plumber who can do his stuff with lead and solder." Two inch heavy lead was used on this job and all bends were made with sand.

In Denver, the inspectors spare no effort to educate property owners why certain requirements are made in

Lead wastes and drum traps from two shower baths in new Fire Station No. 11, Denver, Colo., a W.P.A. project.

plumbing installations. By taking the trouble to show owners the reasons for these requirements, they obtain cooperation rather than resistance. Such efforts require relatively little time and pay dividends in easier enforcement of the plumbing ordinances and fewer attempts to circumvent the code when repairs or replacements are made.

Denver's plumbing code likewise covers the installation of water services and requires them to be lead. Thus home owners are protected against expensive service pipe repairs or replacements because of the durability of thick-walled lead services. Lead pipe is also sufficiently flexible to provide for ground settlement which may damage rigid pipes. Denver property owners are further assured that their water services are installed by men who know their business, because only skilled men can install lead and it is beyond the ability of laborers or other persons incompetent to do plumbing.

Lead pipe, being a relatively poor conductor of electricity, is less apt to pick up stray currents in the ground, a particular advantage because of the extensive use of electricity in modern cities.

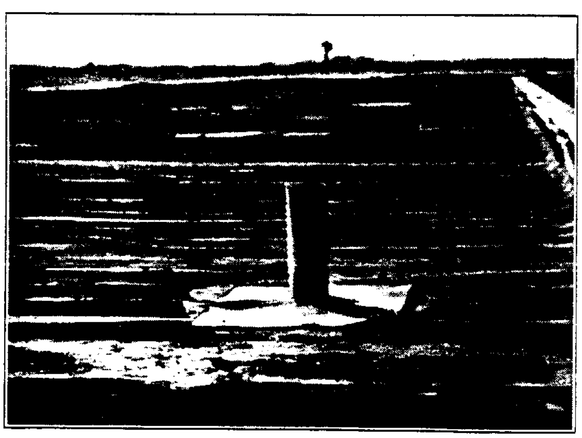
Lead Pipe Flashings for Large Housing Project

LEAD is used exclusively for flashing the vent pipes at the roofs in the huge new Kenfield Housing Project at Buffalo, N. Y. This is a P.W.A. project comprising a total of 78 buildings and costing some $4,500,000. It consists of 658 three-, four- and five-room apartments which will rent at from $5 to $7 per month per room. No tenant will be admitted whose income exceeds five times his rent.

Each flashing has an apron 18 in. square made of 6 lb. sheet lead. The collar is constructed of 15 in. of 4½ in. I. D. lead pipe with 3/32 in. wall. The top 3 in. of the collar is turned down into the vent pipe when installed, as shown in one of the photographs. For this project 360 of these lead flashings were required.

Dressing the top 3 in. of a lead collar flashing down into a vent pipe on the Kenfield Housing Project, Buffalo, N. Y. Chester Oakley, Buffalo, architect.

Two advantages of lead roof flashings are durability and ease of installation. Lead is the most durable common metal when exposed to the atmosphere and it has extra thickness which naturally adds further to its long life. Soft and pliable lead may be easily worked down into the top of the pipe, making a neat and permanently water-tight installation. In the Kenfield project, the roofs are flat asphalt roofs, and the lead aprons of the flashings dress down nicely and adhere well to the roofing under and over them so that the joint between roofing and flashing is always tight. When roofs are pitched, as is frequently the case, the flashing is usually visible and lead enjoys two other advantages. The soft gray color of lead flashing is attractive and unobtrusive, and water running over it will not stain the roofing or other nearby materials.



A row of vent pipes with lead flashings in place, Kenfield Housing Project, Buffalo, N. Y.

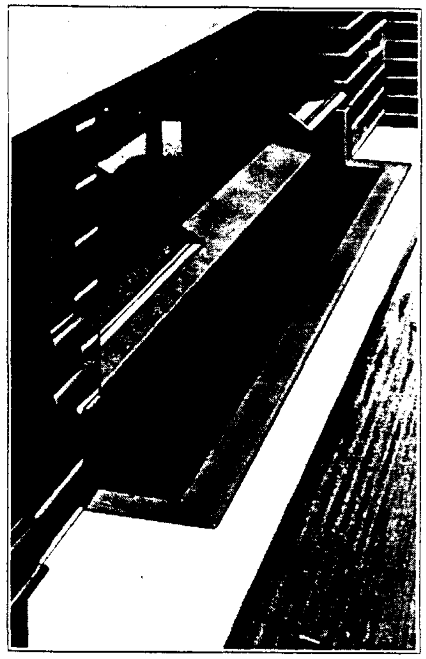
The same advantages that lead enjoys for flashing pipes passing through roofs apply to lead for all kinds of flashing. It has been extensively used on fine buildings for many years and lower cost now permits its use on all classes of buildings.

Chester Oakley, of Buffalo, was chief architect for this project. Fleischer Engineering and Construction Co. and Joseph A. Bass were contractors for the superstructures, and John W. Cowper, Inc., for the foundations. The plumbing contractors who installed the lead flashings were Buss and Cominsky.

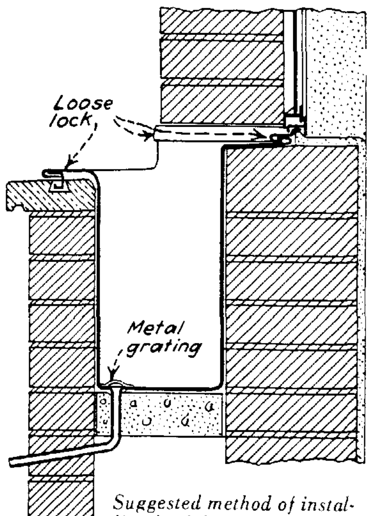
Lead-Lined Flower Boxes Offer Interesting Architectural Possibilities

FROM England comes an interesting application of lead as a lining for flower boxes built into walls under windows. The parish hall for the Parish of All Hallows, Southwark, London, was designed by Edward Armstrong, F.R.I.B.A., architect. His plans called for flower boxes built directly into the brick façade under the ground floor windows. Naturally these boxes require a waterproof lining which is provided by 5 lb. sheet lead, the most durable material that could be employed and one which lends itself readily to fabrication to meet these unusual conditions.

Detail of lead flower box lining on building shown on cover. The lead weep pipes are also visible.



COURTESY LEAD INDUSTRIES DEVELOPMENT COUNCIL



Suggested method of installing lead flower box linings where provision must be made for expansion due to temperature changes.

The lead lining was formed into a box with "burned" joints at the corners and rests on a 3 in. concrete base. At the back the lead was carried up over the sill and tucked under the metal window frame. At the front, the lead turned out and was calked into a reglet in the stone sill. It was also calked into a brick joint at the sides of the windows and returned a short distance on the face of the brick wall and calked into a joint. Two ½ in. lead weep pipes were provided at the bottom, discharging clear of the brick wall. All brick and concrete coming in contact with the lead was coated with alphaltum before the lead was applied.

If this type of box is used in those parts of the United States where temperature changes are large, it would be well to allow for expansion by calking separate locking strips into the reglets and brick joints and loose-locking the edges of the box to them. In that way, the box could expand and contract independently of the materials surrounding it. In other words, it would be handled just as lead flashing should be installed when it must be calked into masonry (Lead, November, 1936). Either 5 lb. soft lead, like that used in the English installation described here, or 3 lb. hard lead may be used.

Concealed lead flower boxes like this offer many possibilities to the architect who would make his work distinctive for they are so adaptable and easily fabricated to meet varying construction conditions. Exposed lead flower boxes, usually cast and ornamental, are other means of adding attractive features to a building.

Licensees for "Lead Industries' Seal of Approval"

THE following companies were licensed as of February 28, 1937, to stamp the "Lead Industries' Seal of Approval" on lead pipe, traps and bends meeting the standards adopted by the Lead Industries Association. Announcement of the standards and use of the Seal was made in the January, 1937, issue of LEAD.

Alpha Metal & Rolling Mills, Inc.
The Andrews Lead Co., Inc.
Baker Lead Mfg. Co.
Cambridge Smelting Co.
Crown Metal Co.
The Eagle-Picher Lead Co.
Federated Metals Division of American Smelting & Refining Co.
The Flemm Lead Co., Inc.
Gardiner Metal Co.
Marks Lissberger & Son, Inc.
National Lead Co.
North American Smelting Co.
Northwest Lead Co.
Rochester Lead Works, Inc.
White Metal Rolling & Stamping Corp.

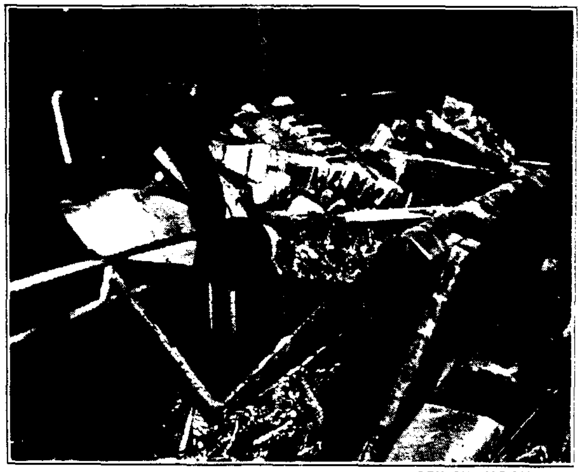
Huge Lead Casting for America's Cup Defender Keel

DESIGN and construction of an America's Cup yacht naturally presents many new problems to be solved. Not the least of these is the method of pouring the huge lead keel, which in the case of the new Cup defender, Ranger, now under construction at the Bath Iron Works, Bath, Me., is believed to be the largest lead keel ever poured.

The keel of the new yacht, which is expected to defend the America's Cup on July 31, 1937, against T. O. M. Sopwith's Endeavor II, is about 39 ft. long and approximately 5 ft. deep and 5 ft. wide at its deepest and widest points. It contains more than 200,000 lb. of lead. Obviously this makes quite a casting.

A sand mold, reinforced with steel and timber, was employed. It was studded inside with large headed nails to conduct heat away from the surface of the mold. A particular problem was the flat core, about 2 in. thick, which was necessary to provide a slot for the centerboard. This core was made of steel, which warped slightly during the pouring and consequently offered a little difficulty in removing it. This was the only trouble encountered in making the casting and was of no great importance. The inside of the mold and the surface of the steel core were, of course, coated with graphite.

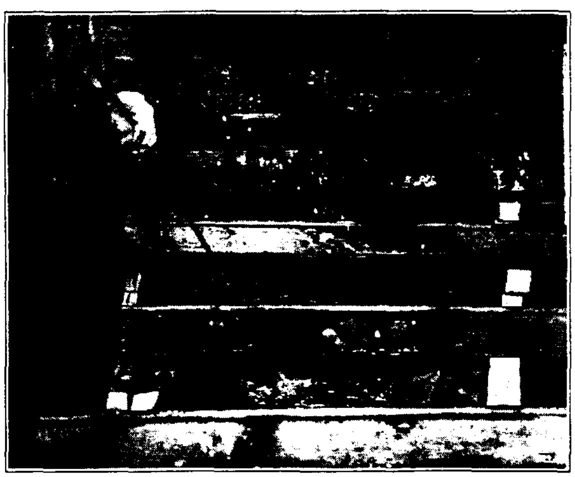
The lead was melted in four steel troughs heated by gasoline torches. Each trough held only about two tons of lead. This made melting rapid and made it possible to use the troughs in rotation, molten lead being drawn from one while it was melting in the others. Pig lead was fed to these troughs in ton lots by an overhead crane. Pipes, heated by coke, charcoal and wood, distributed the lead from the troughs to the mold. These pipes required considerable heat because of the freezing weather during the operation.



LEVICK-MICHAELSON

Melting pig lead for the new America's Cup defender keel in one of the four troughs provided for the purpose.

Shrinkage was not as much as might be expected in so large a casting probably because parts of it cooled while molten lead was still being added, the latter filling in the shrinkage space in the part already solidified. It required approximately $6\frac{1}{2}$ hours to complete the casting operation and the keel was permitted to stand a week after pouring was completed. The surface of the casting required comparatively little finishing after the mold was removed.



LEVICK-MICHAELSON

Lead in the mold for the keel of the new America's Cup defender during the pouring operation.

The new yacht is larger than either of the last two cup defenders, Rainbow and Enterprise, and likewise has more lead in her keel. Enterprise had about 75 tons of the heavy metal and Rainbow 80, although 10 more tons were grafted onto the latter a year ago. Largest of all Cup defenders, Reliance of 1903, had only 65 tons. The British challenger, Endeavor II, has about 90 tons of lead on her fin.

The new Cup yacht was designed by W. Starling Burgess and Sparkman and Stephens for Harold S. Vanderbilt.

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