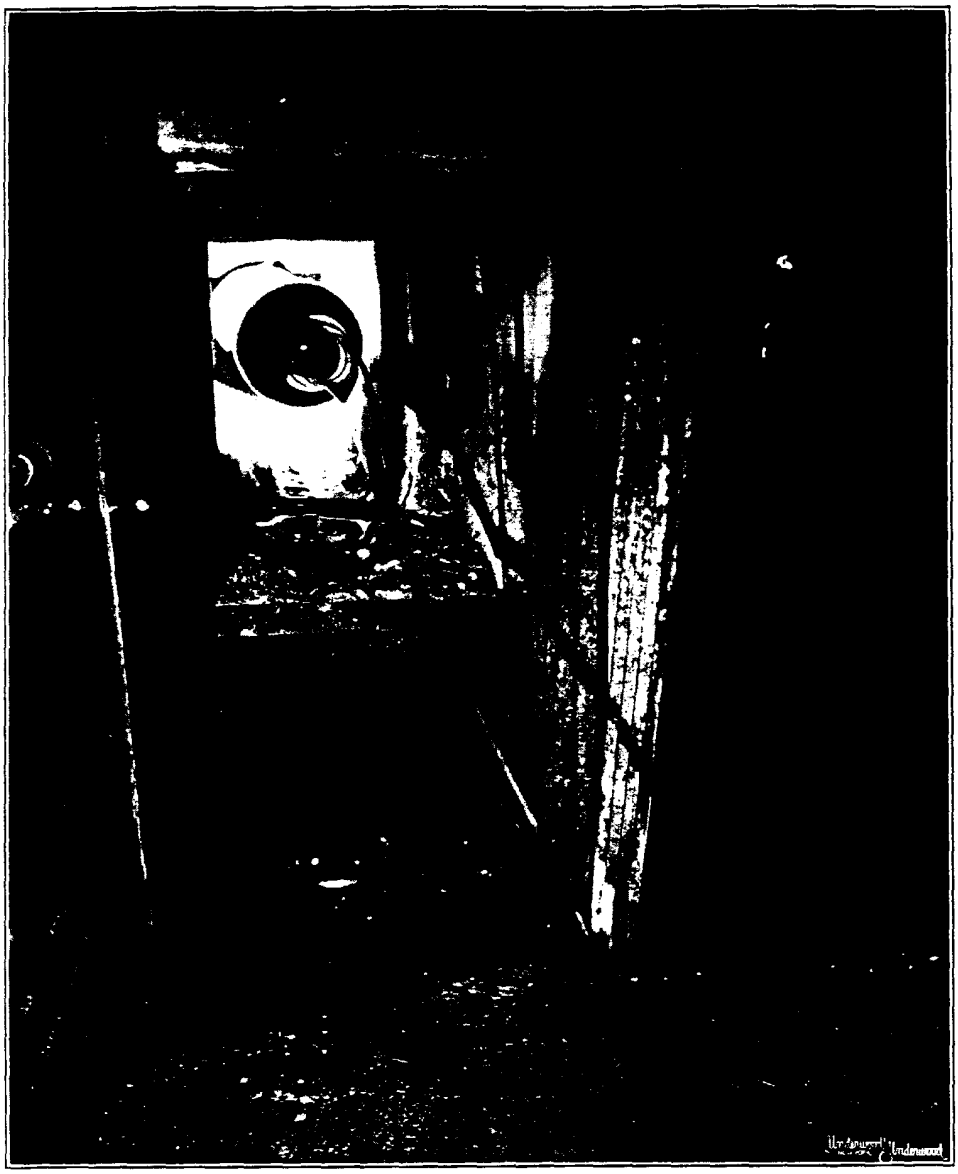
LEAD



COURTESY CORNING GLASS WORKS

LEAD GLASS TUBING FOR ELECTRICAL PURPOSES BEING EXTRUDED FROM CONTINUOUS MELTING TANKS

Published by the

LEAD INDUSTRIES ASSOCIATION

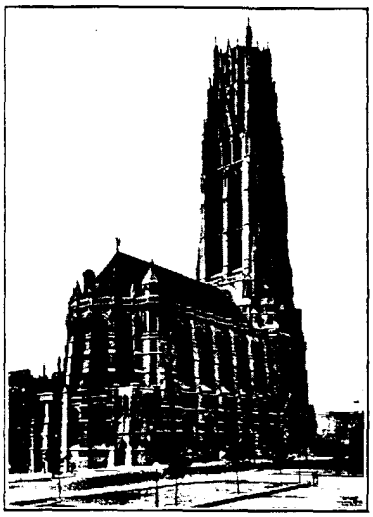
Graybar Building ✧ 420 Lexington Avenue ✧ New York

VOLUME I

NUMBER 3

New Riverside Church Unusual in Many Respects

THE new Riverside Church, towering above Riverside Drive in New York, is a remarkable architectural achievement for it combines modern efficiency and liberality with the beauty and grandeur of medieval cathedral architecture. Its tower is a magnificent Gothic structure, 392 feet high, at the top housing the famous Laura Spellman Rockefeller Carillon of sixty bells, but within this skyscraper tower are elevators serving twenty-one floors of offices, school rooms, meeting rooms, library and reading rooms, kitchens, and play rooms. In the basements are gymnasiums, bowling alleys, and a huge assembly hall. Thus in addition to serving its prime religious purpose, this church is actually a community center serving many needs of the community outside of the religious sphere.



WURTS BROS.

NEW RIVERSIDE CHURCH, NEW YORK
Henry C. Pelton and Allen & Collens,
Associated Architects

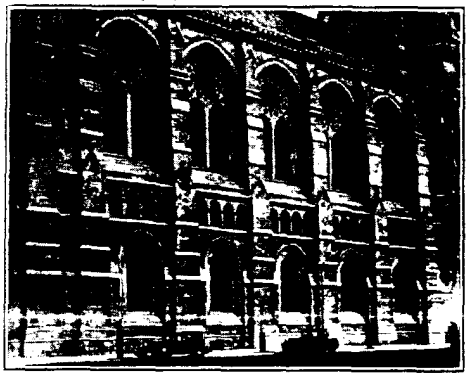
The same broad attitude that has recognized and established all these varied functions of the church has dictated its decorative treatment. Though apparently following classic treatment with stone statuary, wood carving and stained glass windows, close study of the ornamentation reveals that not only have the leaders of Christianity been commemorated here, but the great figures of science, medicine, philosophy, music and government, as well as the leaders of other religions. In the decorative scheme the soft beauty of lead has played an unostentatious but important part. The many imposing stained glass windows, of course, rely upon liberal use of lead cames for much of their effectiveness. Through the ages it has been by the use of this combination of lead and glass that the finest examples of the glazier's art have been accomplished. An idea of the liberal window treatment can be had from the subjects of the aisle windows, which include Christ and Humanity, Reformers, the International Character of Religion, Music, even including the radio and phonograph, Children, Scholars, Material Creation, Agriculture, and State and Government. The chapel windows were done by Nichola D'Ascenzo of Philadelphia, the aisle windows by Reynolds, Francis and Rohnstock of Boston, the clearstory windows by Charles Lorin and Jacques Simon of France, the apse windows by Wilbur H. Burnham of Boston, and the ambulatory and triforium gallery windows by Wright Goodhue of Boston.

The beautiful organ grilles are made of iron, effectively decorated with cast lead for the more delicate ornamentation. These grilles were the work of Renner and Maras, of Long Island City, N. Y. In addition, the finest materials went into the painting and decoration of the church. Emil Angelon of New York used about 10,000 pounds of white lead for this purpose.

FRANK EHRENFORD

These grilles are partially ornamented with lead

Many leaded windows add to the majestic beauty of this modern church



FRANK EHRENFORD

FRANK EHRENFORD

One of the numerous leaded windows of the Riverside Church

LIA25121

Lead Service Pipe Perfect After Forty-Seven Years

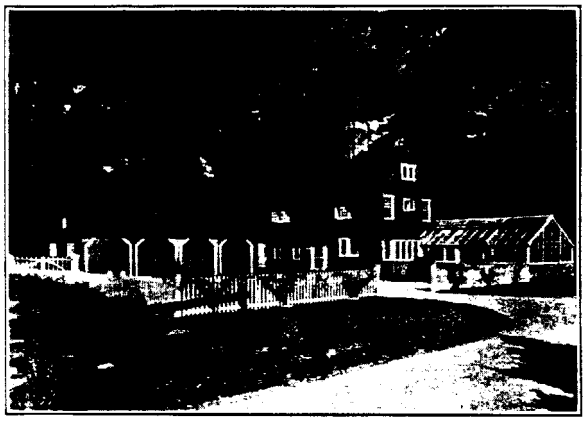
THE old Whittier School in Denver was built in 1883, according to a stone marker on the building which bore the date. It is now being torn down to make way for a new school building. Mr. Jack Taylor, an excavator working on this site, recently tore out the original service pipe which had served the building for 47 years, and remarked on its wonderful state of preservation. This pipe was lead pipe, and after nearly half a century of service it was found to be as soft and flexible as new and in perfect condition. Had it been called upon to do so, it would probably have continued to serve the building indefinitely.

The old Whittier School, Denver

Lead-Backed Rugs Provide Double Protection

IN the outer offices of most business and professional men, in apartment house foyers and halls, in hotels and elsewhere many small scatter-rugs are frequently used. There is not only danger of these rugs slipping, but it is also easy in many cases for anyone to pick up one or two of the small rugs and walk off with them. Sheet lead, strangely enough, is now being used to guard against these evils.

The rugs are fastened by wire or heavy cord to sheets of six- or eight-pound lead cut to the size of the rugs and completely backing them. This prevents the slipping of the rug, while the weight of the lead makes it extremely difficult to conceal a rug under a coat. In addition, the lead keeps the edges of the rugs from curling up and prevents tripping.



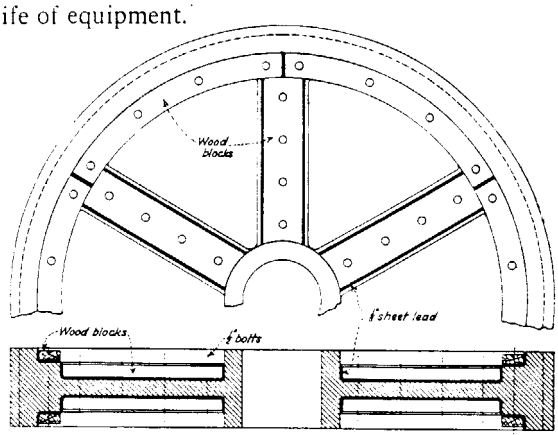
This attractive cottage on the L. M. Richmond property at Glen Head, Long Island, N. Y., is completely painted with white lead and oil, tinted

Roger H. Bullard, New York, *Architect*
Peterson & Peterson, Glen Cove, L. I., *Painting Contractor*

Lead Silences Gear Noise

THE problem of noisy, vibrating gears may often be quite serious, for excessive vibration causes rapid depreciation of equipment and wear of gear teeth. To meet this situation, Mr. V. T. Root, master mechanic of the Hayden Plant of the Nevada Consolidated Copper Company, has covered with lead, a vibration-absorbing material, the spokes and rims of the large 5-ft. herring-bone gears which drive the ball mills. These have been in operation for several months with excellent results.

The accompanying sketch shows the manner of applying the lead. One-eighth inch thick sheet lead is pressed into place and held there by means of wood blocks and ½-in. bolts. This method of minimizing vibration is comparatively inexpensive and should more than justify its cost by increasing the life of equipment.



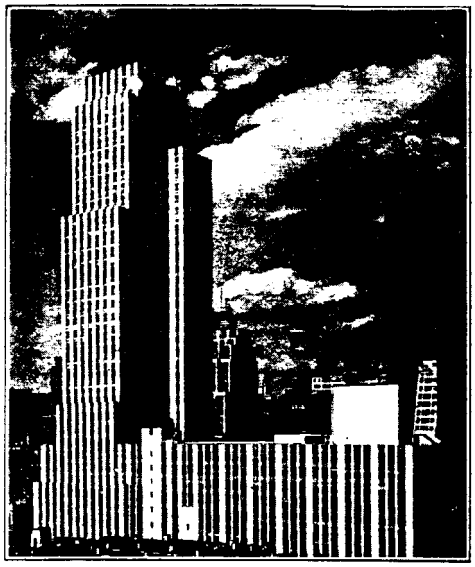
COURTESY ENGINEERING & MINING JOURNAL

The manner in which sheet lead is applied to large gears to reduce vibration

LIA25122

Lead Pads Dampen Machinery Vibration In Modern Newspaper Plant

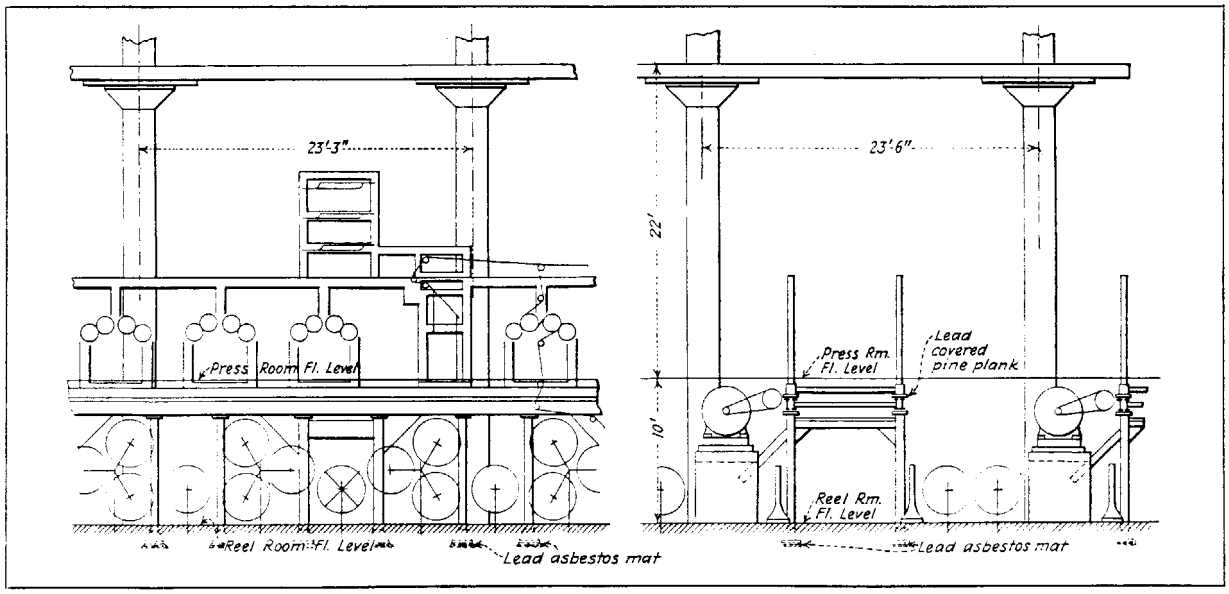
VIBRATION is an insidiously harmful enemy of all structures, static or moving, and modern engineering attempts to guard against it in every possible way. The first issue of LEAD described how a combination lead-asbestos mat was used in the modern skyscraper to protect it from the transmission of vibration to the structure from passing railroad cars and related traffic near or under the building.



New office building and plant of the New York Daily News, East 42nd Street

Another application of this device is its use under moving machinery, particularly printing presses. A few of the latest printing establishments in the United States and Canada have installed lead-asbestos anti-vibration mats as a solution of their vibration problem, with great success. This is exemplified by the practice of the New York *Daily News* in the construction of its imposing new building on East 42nd Street. Only part of this building is used by the editorial, business and mechanical departments of the newspaper; the remainder is rented as office space. Therefore, it was absolutely essential to take every precaution against vibration being transmitted from the huge battery of presses on the second floor of the building to other floors. Through previous experience with lead-asbestos mats, Lockwood Greene Engineers, Inc., engineers for the building, had become impressed with the advantages of using this type of protection against vibration and, accordingly, selected them for use in the *Daily News* plant. That their judgment has been fully vindicated, anyone may learn for himself by visiting floors near the press room during their operation.

The mats used in the *Daily News* installation are similar to those described in the November, 1930, issue of LEAD and comprise two layers of ⅛-in. sheet lead enclosing two layers of ¼-in. asbestos fire-felt separated by a piece of 20-gage steel. The lead is turned over at the edges and burned to form a homogeneous enclosure. The preparation of these mats differs in one important particular from the larger lead-asbestos mats used



Installation of presses and reels, showing vibration insulation

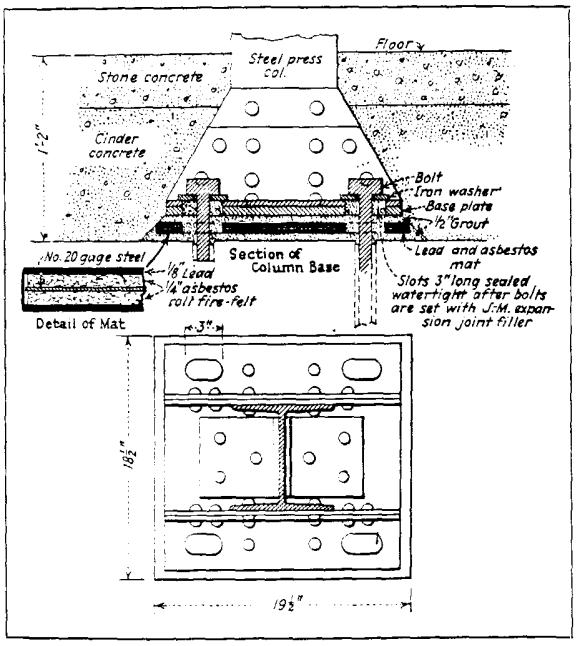
LIA25123

under building columns in the Grand Central zone of New York City, in that the printing-press mats are subjected to a preliminary hydraulic pressure of 100 lb. per sq. in. before being installed, for the purpose of removing any play. Moreover, they are provided with bolt holes to permit fastening of the columns through the mats. An accompanying sketch shows how the mat has been placed beneath the printing-press support on a reinforced concrete slab which is 26 in. thick. As the entire base of the press column is imbedded in concrete, the mat is not visible.

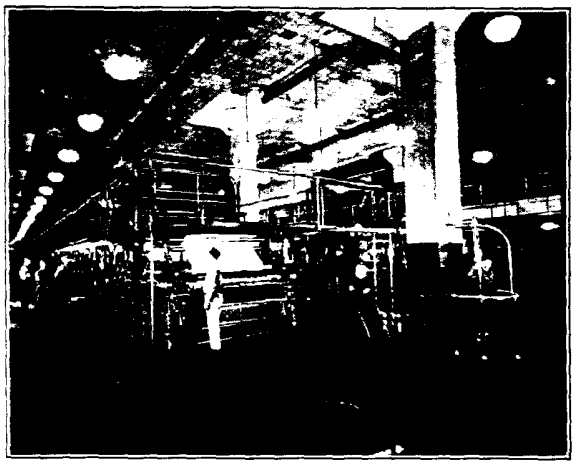
It will doubtless occur to the reader that other vibration-insulating materials might be substituted for lead, especially cork and rubber compositions. Although most organic materials have a greater vibration-dampening property than lead, they possess the disadvantage of being susceptible to deterioration from contact with oil and greases always found near moving machinery. Furthermore, they may harden with age, and last, but not least, they cannot stand the high unit load which lead is capable of carrying. Hence a more elaborate and costly foundation is needed if weaker organic substances are used, so that the load will be distributed to within the capacity of the material comprising the mat.

In addition to the lead-asbestos mats, lead-covered 3-in. pine planks are used beneath the bed plates of the presses as a further anti-vibration measure.

The composing-room of the *Daily News* plant employs sheet lead underneath the linotype machines, so that not only is lead used in the machine for type



Detail of lead-asbestos pads under press columns



Press room in the New York Daily News plant

setting but also underneath for an entirely different purpose—vibration dampening.

In the *Daily News* plant, in order to take care of its huge circulation—1,300,000 daily—there are 36 units of Goss straightline presses installed at a cost of $800,000, and the press room is large enough to receive 40 more such units to take care of future expansion. In the composing-room are 30 linotype machines, with ample room provided for 12 more.

Lockwood Greene Engineers, Inc., were pioneers in the development of the lead-asbestos mats in its adaption to printing plants. Hood and Howell were the architects of the Daily News Building, and J. F. Abernethy and Company of Brooklyn fashioned all the mats used. Mr. E. J. Duffy is mechanical superintendent of the *Daily News* plant; his help, and that of others mentioned above, in the preparation of this article is gratefully acknowledged.

U. S. Government Revises Mixed Paint Specifications

THE United States Government has recently revised its master specification for white paint and tinted paints made on a white base, semi-paste and ready mixed. This specification, which formerly required a minimum of 45 per cent of white lead, has raised this minimum to 60 per cent. The maximum of pigments containing no lead or zinc has been lowered from 15 to 10 per cent. The balance is zinc oxide. It will be seen from this that the minimum requirements are 60 per cent white lead, 30 per cent zinc oxide and 10 per cent of other materials, and under the new specifications a 100 per cent white lead paint is allowed.

LIA25124

Lead Tubes Aid Sales of Adaptable Products

Extrusion presses turning out lead collapsible tubes in the plant of the Bond Manufacturing Corp., Wilmington, Del.

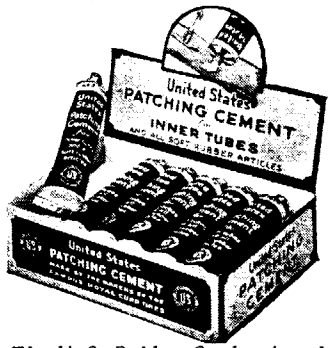
PACKAGING is one of the most important features of modern merchandising, and the use of lead collapsible tubes as containers has enabled many manufacturers to reach an entirely new clientele. New markets have often developed by their use side by side with the former sale of the product in cans or jars, though many products are packaged exclusively in lead tubes.

Recently there has been great expansion in the use of lead tubes in the marketing of shoe polish, colors in oil for the paint trade and refills for fire extinguishers. Among other products sold in lead tubes are automobile radiator and gasket cement, tire cut fillers and roof cement for automobiles, dyes, cleaning preparations, paste, glue and mechanics' hand soap. Such a product as shoe polish is ideally packaged in collapsible tubes, as the polish does not dry out and harden as it does in cans, and even if the cap is left off only the small portion in the neck hardens and is easily squeezed out.

Extrusion press, showing the punch and die, and (right) Dip-It, Inc., finds lead tubes well adapted to packaging twenty-one different colored dyes

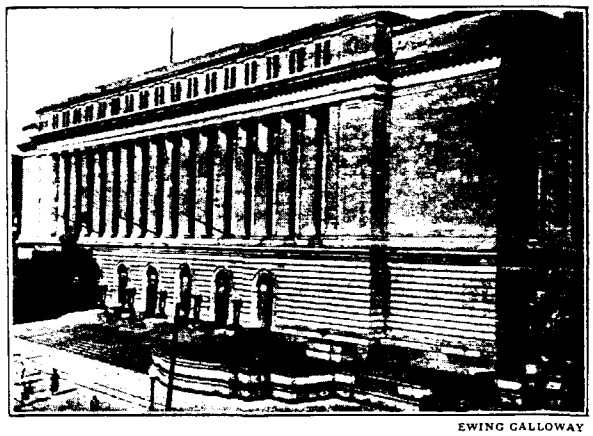
Collapsible tubes offer a number of advantages, among which are immunity to breakage, savings in freight and space, keeping the product air-tight, ease of filling and closing the tube by the manufacturer of the product, and the ease with which the tube can be carried around by the user without danger of breakage. They also protect those products upon which light has a deteriorating effect.

Lead collapsible tubes are usually made of about 98 per cent lead and 2 per cent antimony to stiffen and strengthen the walls. They are manufactured by casting lead in slabs and rolling the slabs into sheets. Blanks are punched out of these sheets, and the tubes are extruded from the blanks in presses. Recent patents combine all this into one operation, the pig lead being melted at the press, slugs or blanks formed and tubes extruded in a continuous operation. Lead tubes are made in a wide variety of sizes from 2 to 10 in. in length and ⅜ to 2 in. in diameter.



The U. S. Rubber Co. has found these lead tubes very handy for packaging patching cement

Good quality tubes retain their neat appearance and brightness almost indefinitely. Great advance has been made in the lithographing of lead tubes. New processes have eliminated the cracking of the coating ink or discoloration of light colors. It has also been found possible to increase the gloss of coatings used on lead tubes.



EWING GALLOWAY

Hamilton County Court House, Cincinnati, whose interior was completely painted with pure white lead and oil

LIA25125

Lead Safety Treads Economical for Street Cars

FOR many years the Maintenance Department of the Public Service Coordinated Transport of New Jersey has equipped the steps of its street cars with treads made of lead. These treads are cast in ribbed form and are set in a recess in the wood along the outer edge of the step. They serve the double purpose of protecting the edge of the step from damage and of preventing passengers from slipping in clear or rainy weather when boarding or leaving the car.

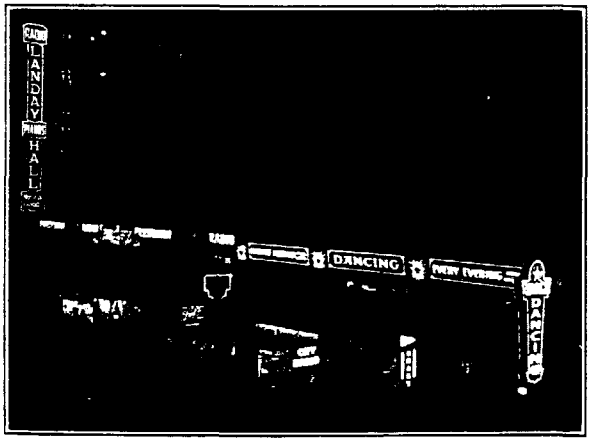
The treads are about 2 in. wide, 18 in. long and ⅜ in. thick. Lead was chosen for this purpose because it offers more friction than other metals when stepped upon. The treads are screwed in place and can be renewed when worn down. The old treads are melted down and recast to be used again, thus affording a minimum of waste.

Lead is often used because of its anti-slip characteristics. Many types of safety treads other than the simple and economical ones mentioned here employ lead in combination with some hard material to increase wear. The glass in sidewalk lights is often surrounded by a ring of lead to prevent slipping, and elsewhere in this issue lead-backed rugs are described.

A Public Service street car equipped with lead safety treads and (above) a detail of the treads

Wider Use of Neon Lights Requires More Lead-Glass

THE rapid growth in the use of neon signs has created an additional demand for lead by glass manufacturers. So great has been this expansion that the Corning Glass Works last summer erected and opened a new plant in Corning, N. Y., devoted entirely to the manufacture of glass tubing for electrical purposes. The glass used in neon signs, and also in radio tubes and lamp bulb stems, known as lead or electrical tubing, is a medium lead content glass containing 22 per cent of lead in the form of litharge (lead oxide).



COURTESY CLAUDE NEON LIGHTS, INC.

Neon lights are widely used, not only for display, but for airway beacons, illumination, and other purposes

This tubing is extruded from a continuous melting tank, as shown in the cover illustration, in lengths up to 200 ft. It is drawn from the mandrel on rollers and is automatically cut into short lengths. This lead-glass is extremely tough and capable of standing wide temperature ranges without injury.

A recent demonstration showed the practicability of achieving daylight illumination by the use of neon tubes on ordinary 120-volt circuits, which forecasts still wider future development of these lights.

These low-voltage tubes give many times more light than their high-voltage brothers and are opening the field of home and industrial lighting to the neon tube. For display purposes, neon lights are not only used for commercial signs but often for decorative effects and defining the architectural features of buildings. In the aviation industry they are used as beacons, to outline flying fields, to illuminate wind indicators and as obstruction markers. The visibility of this light has shown itself to be remarkable.

British Tests Demonstrate Lead's Superior Durability

THIS table is reproduced from a paper of the Institute of Metals, London, by J. Newton Friend, head of the Department of Chemistry, The Technical College, Birmingham, England, entitled, "The Relative Corrodibilities of Ferrous and Non-Ferrous Metals and Alloys." It summarizes the results of his study. The specimens used were cylindrical bars 2 ft. long and 1⅛ in. in diameter. They were exposed to the city air of Birmingham, an industrial center, for seven years on the roof of the Birmingham Technical College. Similar tests were also carried on at Weston-super-Mare, where the samples were exposed to sea water. The relative percentage losses shown in the last two columns of figures reveal that antimonial lead and soft lead stand first and third respectively in the atmospheric corrosion tests and fourth and fifth in the sea-water tests, being only exceeded by tin and nickel, much more expensive metals.

SUMMARY OF RESULTS OF EXAMINATION OF THE BARS EXPOSED TO CITY AIR AT BIRMINGHAM FOR SEVEN YEARS, 1922–1929

No.	Metal	Composition* Per cent.	Surface Condition Prior to Exposure	Original Weight Grm.	Loss in Weight Grm.	Loss as per Cent of Original Weight	Relative Percentage Losses†	Relative per Cent. Losses in Sea Tests at Weston‡	Remarks
20	Copper, "arsenic free"	As 0.01	Polished	3526.4	8.1	0.230	58	...	Green stain under black coat; tenaciously adherent.
1	" ordinary	As 0.10	"	3536.9	6.5	0.184	47	73	
21	" arsenical	As 0.25	"	3535.6	5.9	0.167	42	...	
19	" "	As 0.43	"	3481.2	7.7	0.221	56	...	Metal surface in excellent condition
2	" "	As 0.45	"	3502.9	6.3	0.180	46	68	
3	Nickel-copper	Ni 1.75	"	3508.9	6.6	0.188	48	61	
4	Nergandin brass	...	"	3373.5	13.3	0.394	**100**	**100**	Closely adherent red stain underneath black layer.
5	Naval brass	...	"	3305.5	11.4	0.345	88	112	
6	Muntz metal	...	"	3314.1	12.4	0.374	95	57	Metal surface in excellent condition
7	Screw metal	Pb 1.37	"	3311.2	11.7	0.353	90	29	
8	Aluminum	Si 0.25 Fe 0.32	"	1057.7	1.2	0.113	29	89	White deposit under black coating; tenaciously adherent
9	Lead, soft	Pb 99.96	"	4394.3	3.8	0.086	22	13	Perfect
10	" antimonial	Sb 1.6	"	4375.7	0.5	0.011	3	10	"
11	Nickel	...	"	3552.5	16.8	0.473	120	9	Greenish underneath black layer. Incipient pitting
12	Tin, English common ingot	Sn 99.2	As cast	2793.3	2.8	0.100	25	1	Closely adherent; white deposit under black coating
13	" high-grade, pure	Sn 99.75	"	2855.5	2.0	0.070	18	2	
14	Zinc	Zn 98.82	Polished	2819.4	15.2	0.539	137	94	Small pinhole pitting
15	Wrought iron (mean of 11–12 bars)	...	As rolled, with scale	*c.* 3000	201.2	6.71	1703	**100**	Surfaces roughened and slightly pitted
16	Mild steel (mean of 7 bars)	...	As rolled, with scale	*c.* 3000	308.5	10.28	2609	112	" "
18	Stainless steel (mean of 3 bars)	Cr 12–13	Polished	*c.* 3000	3.0	0.10	25	49	Excellent condition

*For full analyses, see *J. Inst. Metals*, 1928, 39, 115, Table I. †Taking nergandin brass as standard since it lost the same percentage amount in weight as the wrought irons taken as standard in the sea-action tests at Weston. ‡Calculated from data in Table III., *J. Inst. Metals*, 1928, 39, 122.

ASSOCIATION EMBLEM HAS HISTORICAL SIGNIFICANCE

IN the minds of the ancients, the metals were intimately associated with the sun, moon and planets. Reasons for these associations are obscure and authorities differ on the subject, but it is nevertheless certain that gold was associated with the sun, silver with the moon, tin with Jupiter, iron with Mars, copper with Venus, quicksilver with Mercury, and lead with Saturn. The alchemists, predecessors of modern chemists, used the planetary symbols to represent the metals. Thus the symbol for Saturn, ♄, also meant lead.

Why lead was associated with Saturn is not known. The alchemists thought it was because it was the oldest of the metals and Saturn the father of the gods; others because Saturn is the most distant and slow moving of the planets, the impression given by lead's cold, dull gray color. Other reasons are also advanced, but whatever the reason, it is well established that Saturn symbolically represented lead.

Hence the selection of Saturn, the planet with the belt around it, as the background for the emblem of the Lead Industries Association. Crossed in front of it are the pick of the miner and ladle of the refiner and fabricator, representing the all-inclusive membership of the Association. On the belt is the slogan, "Rely on Lead," deemed appropriate owing to the centuries of reliable service rendered by lead in its various forms.

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

LIA25127