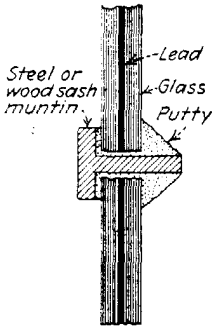
New Type of Hand Wrought Lead Grilles



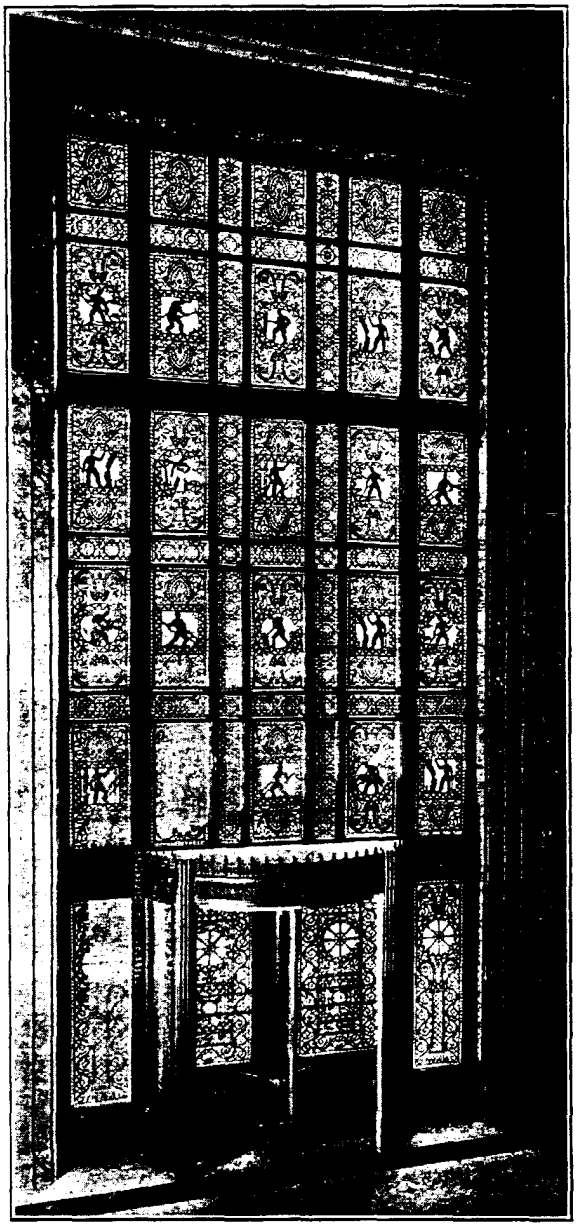
AN interesting variation of leaded windows and ornamental grilles is the lead cut-out, which has recently been used on a number of buildings. Illustrated here is the main entrance to Trustees System Service Building, Chicago, which is very happily and unusually decorated by lead cut-outs.

This effect is produced by tracing the design on thin sheet lead and cutting it out by the use of a knife, or chisel and mallet if the lead is too heavy to be cut with a knife. The lead is then mounted between two sheets of glass. It must be well puttied on both sides as shown in the sketch and the edges all around must be thoroughly sealed with putty. This is to prevent sweating and access of dirt to the space between the panes of glass.

The accompanying photograph shows how attractive this type of work can be. It is not only applicable to large buildings but may be chosen for door panels and other work on residences. It has two important advantages so far as cost is concerned—first cost is lower than that of other methods and the cost of cleaning is materially reduced because two flat glass surfaces are all that need be cleaned. In first cost the architect saved the owners about $8,000 by this method over ordinary bronze grille-work on Trustees System Service Building, and at the same time gave them something thoroughly different and beautiful. Thielbar and Fugard of Chicago were the architects, while the lead cut-out, which depicts the various forms of man's labor, was the work of Edgar Miller, Chicago artist.

TROWBRIDGE

Trustees System Service Building, Chicago. Thielbar & Fugard, Architects



TROWBRIDGE

Lead cut-out entrance grille representing the various forms of man's labor. Executed by Edgar Miller, Chicago

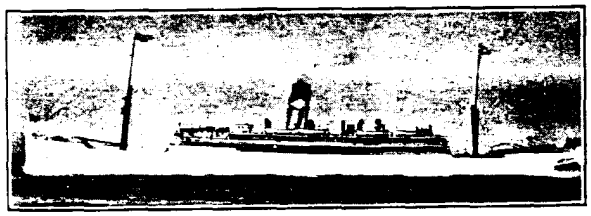
Lead cut-outs are also used to make many other types of ornaments. In combination with other materials than glass they have formed the decoration for fire-place fenders, flower boxes and hot pot mats. Other applications suggest themselves readily, and the simpler ones provide interesting work for the layman who likes to work with tools, while the lead cut-out in all its forms is a profitable field for the craftsman.

White Lead Paint for Heat Reflection

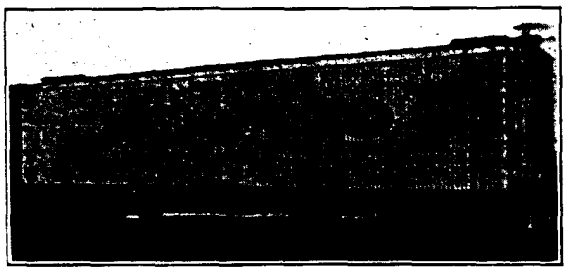
LIGHT and heat reflection of paints is a very real item, often misunderstood, and is of distinct monetary value. Light and heat waves behave exactly alike, heat waves being essentially light waves of greater length which makes them fall beyond human visibility. Coefficients of heat reflection and light reflection are identical for any paint, and depend upon color.

White paint, such as pure white lead paint, has a reflection factor of about 78 to 80 per cent. Paints of metallic lustre, generally gray in color, have reflection factors similar to any gray paint such as white lead tinted gray, the factor being about 56 per cent. As the gray color becomes darker the reflection factor becomes lower, reaching approximately 4 to 8 per cent for black paint. Other independent tests have shown about the same difference in reflection factor for white paints and for paints of metallic lustre, bearing out the figures quoted above. In addition it has been shown that the reflection factor for metallic paints decreases much more rapidly with age than that for white paint. After eleven months the reflection of white paint on metal gasoline tanks had fallen only about 10 per cent while the value for metallic paints had decreased about 51 per cent.

Obviously there are many instances where these factors must be considered. Containers for volatile liquids should be painted white to avoid evaporation losses. Cars and ships that transport food or other perishables should be white to keep the temperature down and lower refrigeration costs. Walls and roofs of houses, painted white, will effectively aid in keeping interiors cooler and more comfortable—witness the general practice of painting buildings white in the tropics. There are many such applications and people responsible for specifying paint should not be misled by the metallic lustre and should rely on white paint for its heat reflection.



One of United Fruit Company's "Great White Fleet," painted white as an aid to interior coolness



COURTESY NEW YORK CENTRAL LINES

White-painted refrigerator car of the Merchants Despatch Dairy Line as used on the New York Central

Because white lead paint on wood structures, or white lead finishing coats over red lead or blue lead priming coats on metal surfaces, give the utmost durability and paint economy, white lead paint is the ideal material to use where both protection and heat reflection are desired. The importance of light reflection will be discussed in an early issue of *Lead*.

Lead Resists SO_2-CO_2-Air Atmosphere Best

BECAUSE sprayed lead coatings are so widely used to protect steel against corrosive fumes containing mixtures of sulphurous and sulphuric acid and because the supremacy of lead over other metals for this purpose is sometimes questioned, Dr. Leopold Pessel, Technical Director, Metals Coating Co. of America, Philadelphia, recently conducted experimental work to test out this theory. His results are published in full in the Proceedings of the American Society for Testing Materials, Vol. 31, Part II, 1931. "Accelerated Corrosion Test of Sprayed Molten Metal Coatings Applied on Steel in a SO_2-CO_2-Air Atmosphere" is the title of the paper. His synopsis is quoted here and clearly demonstrates lead's superiority as found by an impartial worker.

"The relative resistance of various sprayed molten-metal coatings, applied on steel, against the attack of the corrosive agents occuring in flue gases was determined in an apparatus, in which this attack is considerably accelerated and in which uniform corrosion results are obtainable. Sprayed molten-lead coatings were found to be practically unattacked. Twenty-two other metals and metal combinations, applied in sprayed molten form, indicated lack of suitability for service under conditions similar to those developed in this apparatus."

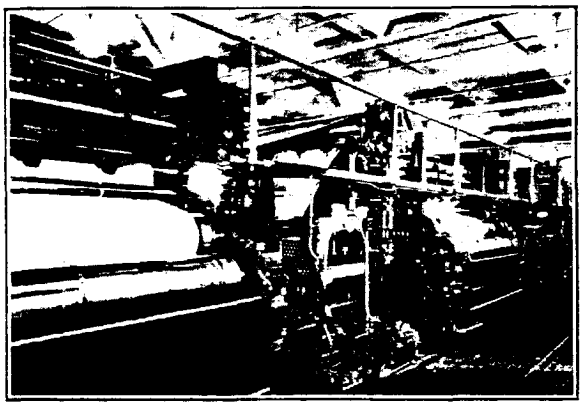
Lead Anti-Vibration Pads for New York Herald-Tribune

THE New York *Herald-Tribune* in its New York plant and the New York *Herald* in its fine new building in Paris, France, have taken great care to avoid, by use of lead-asbestos pads, transmission of vibration from the press room machinery to other parts of the buildings. Vibration is both annoying and inimical to the efficiency of workers as well as injurious to machinery and buildings themselves. In Paris there is an additional feature: the law is very strictly opposed to the transmission of noise and vibration where it may effect other people, several large law-suits having been lost on that account and one factory actually having to move from the city.

The presses in the *Herald-Tribune* building insulated with these pads weigh from 60 to 70 tons each and rest on cast iron bed plates about 6 in. thick and 10 in. wide. It is between these bed plates and the concrete foundation that lead-asbestos pads were inserted. Unit load on the pads is about 30 to 35 lb. per sq. in.

At the center of each pad is a sheet of 10 gage steel. On each side of this is a layer of ¼ in. asbestos. Completely enclosing these materials is a covering of 8 lb. sheet lead, with the edges burned together to make a tightly sealed envelope of lead. Pads were subjected to a hydraulic pressure of 100 lb. per sq. in. while they were being made in order to remove all play and provide an even bearing surface. Pressure was applied after some of the lead-burning had been done but before it was finally completed. The finished pad is about ⅞ in. thick.

Presses were installed and supported with the bed plates about 2 in. above the concrete floor on wedges, being set level and true before the pads were placed. Then alternate pads, each 30 in. by 10 in. in size, were slipped under the bed plates, supported by wedges, and stiff mortar driven under the pads with a hammer so that the pads were forced firmly up against the bed plates. When the mortar had set



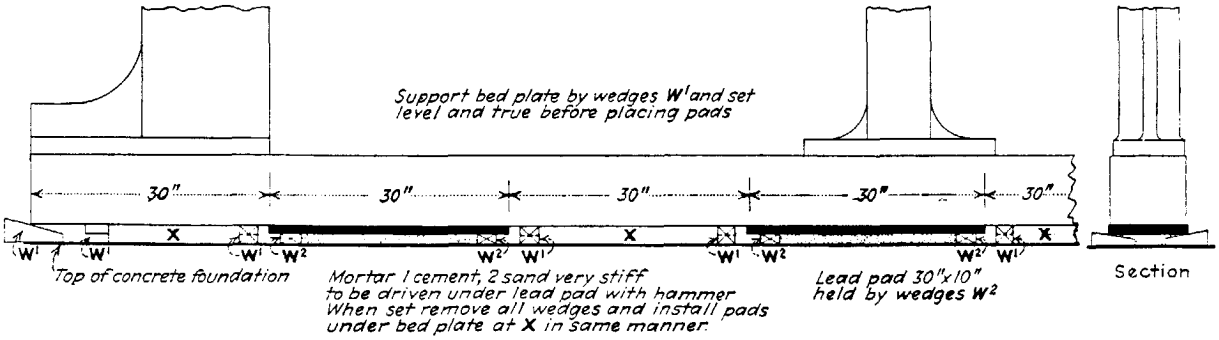
Some of the New York Herald-Tribune presses resting on lead-asbestos anti-vibration pads

all wedges were removed and the remaining pads placed in the same manner. No bolts are required to hold the huge presses in place, so the machines are entirely isolated from the building by pads.

These presses operate at speeds of 300 to 450 cylinder revolutions per minute. For this reason the tune of vibration from these machines is relatively high and the lead pads effectively destroy or distribute the vibrations. They are driven by 250 H. P. motors, which are also isolated by similar pads, except that the motor pads measure 25 in. by 12 in.

In another installation in the New York *Herald-Tribune* building a concrete wall which supports another type of press is also insulated with these pads. A line of pads was simply placed along the floor at the base of the wall and the concrete for the wall poured into forms on top of these pads.

With this type of vibration insulation, no vibration can be felt elsewhere in the building, even though the presses are on the third floor in the case of the New York building. These pads never deteriorate because of the permanent nature of the materials, are not adversely affected by grease, ink or



Method of installing lead-asbestos pads under press bed-plates

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other liquids that may get on them, and stand higher unit loading than most other types of vibration insulating material. Mr. A. H. Burns, Mechanical Superintendent of the *Herald-Tibune*, was responsible for this installation and the pads were constructed by John F. Abernethy & Company of Brooklyn, N. Y.

Anti-vibration pads for machinery are essentially the same, except in size and thickness, as those developed some years ago and now extensively used to isolate buildings from vibration set up by street traffic, subways or railway trains in the vicinity. Both types have been described in detail in past issues of *Lead*, which will be supplied upon request.

Lead's Record in a Sulphuric Acid Plant

THE Grasselli Chemical Company last year dismantled the Beaver Falls, Pa., plant manufacturing sulphuric acid by the chamber process. This furnished an excellent opportunity to examine the condition of the lead lining of the chambers after some thirty-two to forty-seven years' exposure and use in contact with sulphur dioxide gas and sulphuric acid, the original plant having been built in 1884.

In constructing the chambers 6 lb. chemical lead was used for the curtain and top; 8 lb. lead for the bottom and 10 lb. lead for the pan.

Patching had been necessary on approximately 15 per cent of the area in the intervening years. When local corrosion damages certain parts of lead equipment it is rarely necessary to go to the expense of replacing the lead entirely, because lead is so easily and cheaply repaired or patched.

Samples of the original lead from the tops and sides of five chambers were taken. Visual inspection showed the lead still to be in excellent condition. The small loss in thickness of the lead over the years during which the chambers were operated is roughly indicated by the following table, in which the "present weight" was calculated from samples referred to above:

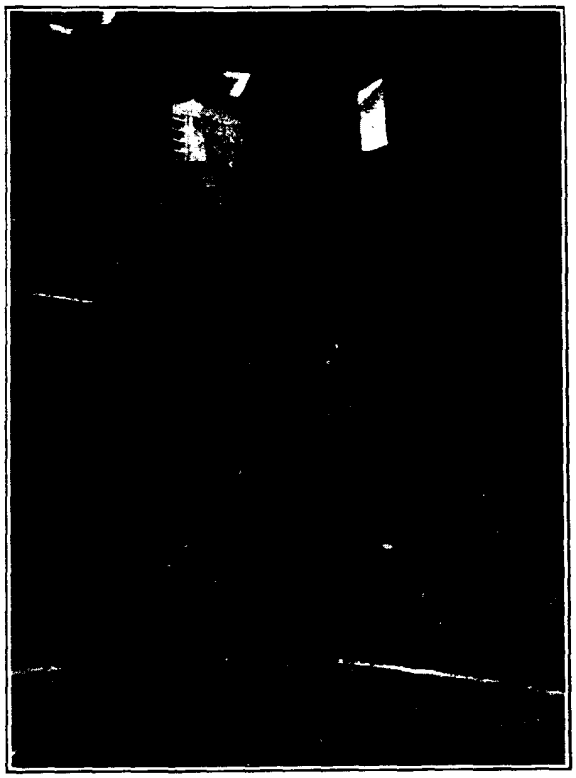
		TOP		SIDE	
Chamber	Built	Original Weight	Present Weight	Original Weight	Present Weight
1	1899	6 lb.	5½ lb.	6 lb.	6 lb.
2	1899	6	5¼	6	5¼
3	1884	6	5¼	6	6
4	1884	6	5½	6	5¾
5	1884	6	5¾	6	6

Present weights were only taken to the nearest ¼ lb.

A chemical grade of lead was used having the following composition:

Sb	0.007	Fe	0.0034		
Bi	none	Zn	Trace	Pb	99.927
Cu	0.0617	Ni	0.0074		

The plant was originally constructed to burn iron pyrites but in 1919 this was discontinued and brimstone was used as a crude for the balance of the time.



Interior of old sulphuric acid chamber of the Grasselli Chemical Company at Beaver Falls, Pa.

Lead—particularly chemical lead—has long been notable for its high resistance to corrosion by sulphuric acid and is a standard material for handling that common industrial chemical. It is readily obtainable in many sizes of sheet and pipe, can easily be burned and may be made to conform to any desired shape. Moreover, it has a relatively high salvage value. Repairs are also easily made with lead.

Hundreds of tons of lead are used annually by the industries making or consuming sulphuric acid. Grasselli's experience can be duplicated again and again by the record of other plants.

Lead-Lined Garden Pools Present Natural Beauty

GARDEN pools may now be made to appear entirely natural and at low cost by lining with sheet lead. Excavations of any desired shape are dug and completely lined with lead. Seams are soldered and the pliable sheets of lead made to conform to the surface of the excavation. Around the edges a shelf is made about six inches below the surface of the ground and extending back about a foot. The lead is brought back over the shelf and the space thus left on top of the lead landscaped with rocks, bog or other plants. Cylinders of lead may be soldered to the bottom at various points, filled with soil and lilies grown in them. Brooks leading into or out of the pool may be constructed in the same manner. Such pools may be stocked with any kind of fish whereas aquarium authorities agree that concrete pools must be aged before fish can be put in without harmful effects. Lead has no ill effect on marine life as is evidenced by the fact that lead pipe is used in aquariums in preference to other pipe.

Lead-lined garden pool on an architect's estate

A constant flow of water can be provided at very low cost by using the same water over and over. Water is piped from the outlet end and returned to the inlet through buried pipes by means of a small pump. As no leakage of water occurs through the lead, the only water lost is by evaporation and capillary action in the soil at the edges, a very small amount.

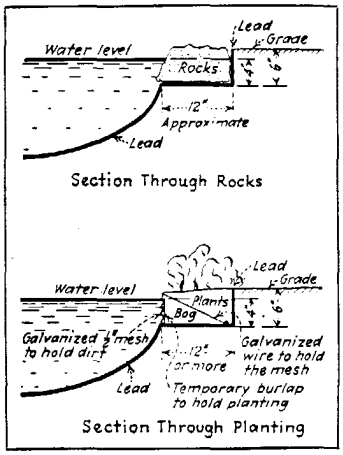
Such pools, if well done, look exactly like natural pools for the lead does not show around the edges and makes the water appear naturally dark in the pool. Any irregular shape may be used because the lead is so amenable. Concrete pools are subject to cracking due to both frost and settling, neither of which effect the lead pools. Should any damage occur to a lead pool it is quickly and cheaply repaired by soldering. Lead pools require considerably less excavation than concrete pools and can be installed in much less time.

Lower cost is an important item in favor of lead lined pools in addition to the above mentioned natural advantages. Taking a hypothetical case, it will cost approximately 18 per cent more to have a pool, roughly 20 ft. by 20 ft. by 3 ft. deep, lined with concrete than with 4 lb. sheet lead.

Pools like this have many applications and can be made in any size. One illustrated here is in a tiny New York City back yard and shows how they

Lead-lined stream with artificial spring bubbling through rocks at its source

Artificial lead-lined pool beautifying a small New York City garden



Details of shelf construction for lead-lined artificial pools

may be used to beautify places so difficult to decorate. Of course, there is room for one on almost any country place, large or small, and pent-house gardens are other places where they could be used to great advantage, since lead weighs but 4 lb. per sq. ft. whereas even 6 in. of concrete will weigh 60 lb. per sq. ft., and as space on roof terraces is often limited, the lead pools have the advantage of saving space.

The design was developed by Mr. F. H. Leubuscher, of the Fels Engineering Corp., Essex Fells, N. J., and he was responsible for all the installations illustrated here.

Value of White Lead Recognized

THAT good paint is an economic necessity is forcibly demonstrated by the fact that building and loan associations recommend the use of pure white lead paint. To quote *The Building Loan*, publication of The Railroad Co-operative Building and Loan Association, "Paint of proved quality, pure white lead and linseed oil, alone is worth while to put on, because when poor paint is used the protection and investment are lost." This statement should carry weight because it comes from an impartial organization whose sole aim is to see that investments in homes are properly and securely protected.

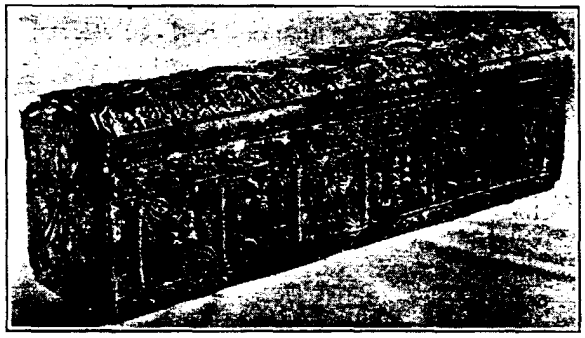
Economically, the application of pure white lead paint has a number of advantages to the homeowner. The value of the property is maintained as near to the original value as possible, because wood is protected from rotting, cracking and warping, and metal from rusting. This means that the owner can get a higher resale price and also larger loans on his property. It has been estimated by bankers that they will loan approximately 20 per cent more on well painted property. Well preserved and well painted property is also more readily saleable.

All these items are aside from the greatest saving of all. If pure white lead is used the paint lasts for the longest possible time, distributing the cost over a longer period and making the cost per year lower. Likewise, because white lead paint does not crack or peel, scraping or burning off old paint is eliminated at repaint time and a good foundation is left for repainting so that one less new coat is required than if the old paint has been removed, leaving bare wood.

A Lead Casket 1800 Years Old

THE Metropolitan Museum of Art in New York City has recently acquired a well preserved leaden sarcophagus which museum authorities estimate as having been built in the second century. It was found in Syria and like other ancient lead caskets discovered in Asia Minor and in Europe, indicates that lead at one time was a popular metal for burial purposes. The fact that the example in question is some 1800 years old is an eloquent testimonial of lead's extraordinary durability particularly considering that the long time in which the casket was buried has had little effect upon the sharpness of the design used by the artist who fashioned it.

Who was he? How did he work the lead? No one knows. Unfortunately the use of lead in antiquity has not been studied as intensively as the



COURTESY METROPOLITAN MUSEUM OF ART

Highly ornamented lead casket of Second Century origin, found in Syria

use of bronze and other metals. Probably the artist molded his design in sand or clay using carved wooden stamps for imprint purposes and finally casting the sides of the sarcophagus in lead. The very ease with which lead could be worked by the ancients and remelted for conversion into shot or weights for military use is possibly one reason why not more of the beautiful as well as practical lead work of ancient times has been handed down to us. Occasionally, however, a famous man's remains are found preserved in a lead casket. The May, 1931, issue of *Lead* described the one used for Christopher Columbus.

The Metropolitan Museum's beautiful specimen is 68⅝ in. long, 16½ in. wide and 21 in. high, showing it could not have been used for anyone of large stature.

X-Ray Insulation in New Cornell Medical Center

NEW YORK HOSPITAL-CORNELL MEDICAL CENTER illustrates the proper kind of protection that should be given where X-ray apparatus is installed. In this fine new hospital lead is used exclusively to confine the X-rays, which are injurious unless applied only where needed. Lead is the only material which can be relied upon to give exactly the protection planned.

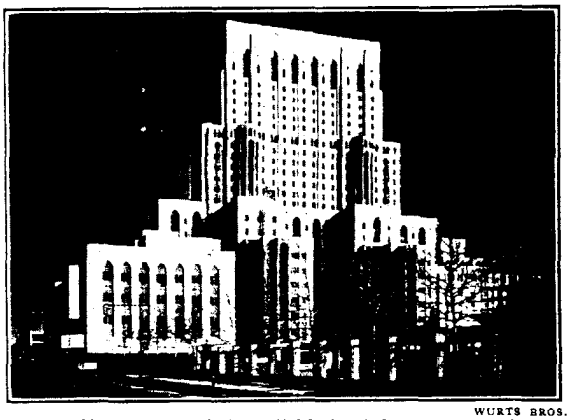
The Advisory Committee on X-ray and Radium Protection has published its recommendations in United States Bureau of Standards Handbook No. 15, entitled "X-Ray Protection." It states:

> "All X-ray rooms (except for dental radiography) or booths shall be lined throughout with sheet lead or equivalent material of assured quality, uniformity, and permanency, care being taken that there be complete overlapping of all joints. 'Protective plasters' and lead rubber wall board are considered to be unsatisfactory for providing protection exceeding 1 mm. lead equivalent."

It also recommends the following lead equivalents:

X-rays generated by peak voltages not in excess of kv	Minimum equivalent thickness of lead mm	X-rays generated by peak voltages not in excess of kv	Minimum equivalent thickness of lead mm
75	1.0	225	5.0
100	1.5	300	9.0
125	2.0	400	15.0
150	2.5	500	22.0
175	3.0	600	34.00
200	4.0	900	....

It is well recognized that lead is the only means of getting sure protection, for protective non-metallic plasters crack due to settling or other cause, and no one can ever be sure how well or uniformly mixed they are. Likewise when a thickness of plaster is used giving protection equal to a certain amount of lead, the plaster occupies much more space than lead and is just as heavy or heavier.



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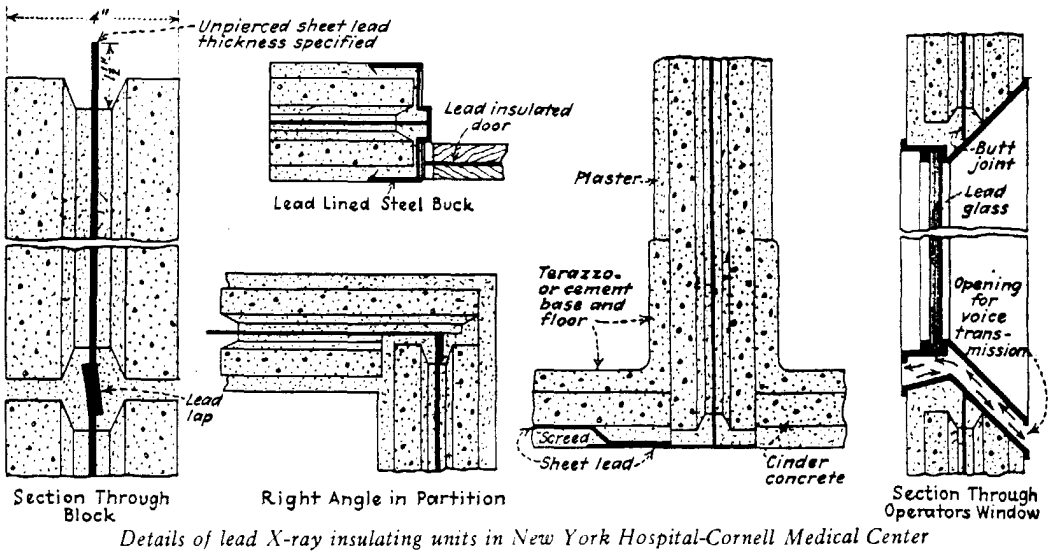
New York Hospital-Cornell Medical Center. Coolidge, Shepley, Bulfinch & Abbot, Architects

There are twenty lead-insulated X-ray rooms in the Cornell Medical Center's new building. Floor lead is 1/4 in. thick where deep therapy equipment is installed, while walls and floors are lined with 1/8 in. or 1/16 in. lead for other work.

Drawings show the type of cinder-concrete blocks with lead centers used for the walls and the method of lapping wall lead with lead sheets on the floors. Anchors around which the concrete is cast are cemented to the lead so that it is held in the blocks without being punctured. These blocks are simply installed in one operation using the same mortar as for any other partition block.

Lead-lined doors, lead window-frames and lead glass windows used, as well as the blocks, are products of Bar-Ray Products, Inc., Brooklyn, N. Y.



Details of lead X-ray insulating units in New York Hospital-Cornell Medical Center

The Lead Industries Association invites inquires on any subject relating to lead and will be glad to cooperate without obligation in the solution of your lead problems.

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