THE DOROTHY FOALE STUDIO

A beautiful lead-lined pool and stream on a Newport, R. I., estate, designed by F. H. Leubuscher.

Lead and Spring Combine to Bring Beauty to the Garden

LEAD'S use in the garden ranges from the purely utilitarian to the purely ornamental and is often a combination of both. Lead garden ornaments and fountain figures are age-old uses of the metal. These objects are beautiful additions to a garden with their soft gray color that mellows with age and contrasts nicely with the brilliance of flowers and shrubs. Lead urns and flower pots and boxes have also been used for many years and lead sun-dials are extremely popular. In recent years, the cost of many of these objects has been so reduced that they are now within reach of practically every garden lover whereas they could once only be afforded by the wealthy. Small lead garden ornaments now range from a few dollars up in price.

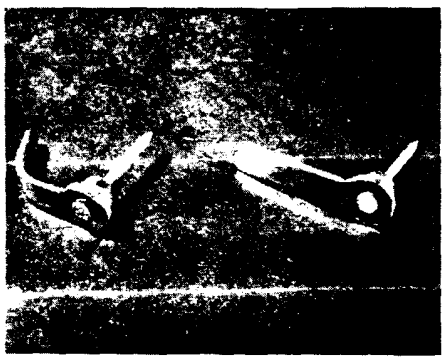
Lead wire is particularly handy for use in gardening. It may be broken easily, when desired, yet has sufficient strength for most garden work. A development from lead wire is a lead-headed nail that has a lead prong about 1½ in. long on one side of the head. These nails are made to be driven into wood or masonry walls and the lead prong is bent back to hold vines or climbing shrubs. Many different designs of inexpensive adjustable lead flower holders for use in bowls or by themselves are available.

Signs made from sheet lead are an excellent means of identifying flowers and shrubs in a garden. They have been used in many public parks and gardens. They are unaffected by weathering and the lettering is easily stamped or incised into the lead.

Lead-lined garden pools may be any size or shape and may be made to look perfectly natural. They are leak-proof and unaffected by frost in winter, require less excavation than concrete linings, need no forms and are durable. Lead edging is frequently used for other kinds of pools and for garden walks or flower beds.

Lead-covered cable is used to provide heat for hot frames and green houses and has many advantages. This method of heating provides positive temperature control at all times and requires little or no attention.

No article about lead in the garden would be complete without mention of lead arsenate, which is one of the most dependable and useful insecticides. It does its share to protect beautiful flowers and plants and to provide fruit and vegetables of the finest quality.



WURTS BROS.

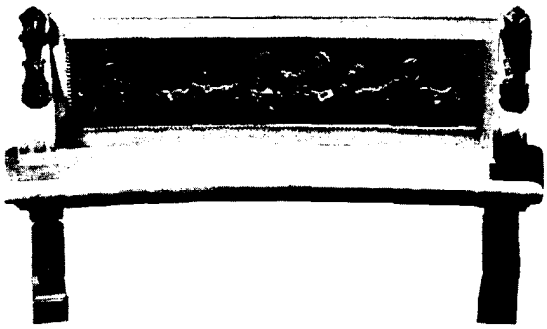
Nails with flexible lead arms used to grip and train vines and shrubbery.

WURTS BROS.

An attractive, inexpensive cast lead fountain figure about 6 in. high executed by Kenneth Lynch, Inc.

Further information on any of the above subjects, which have been treated very briefly here, will gladly be supplied on request.

Past issues of LEAD have dealt more fully with most of them. Garden ornaments have been described on several occasions and reference may be made particularly to the July, 1934, and July, 1936, issues. Detailed information about lead-lined pools was given in September, 1932, and hot bed heating with lead-covered cable was included in the November, 1931, issue. Lead ornamentation on stone, as shown at the right, is adaptable to building decoration as well as garden furniture.



COURTESY THE ERKINS STUDIOS

A beautiful garden bench made of limestone and ornamented with cast lead.

Lead Linings, Lead-Silver Anodes in New Coating Process

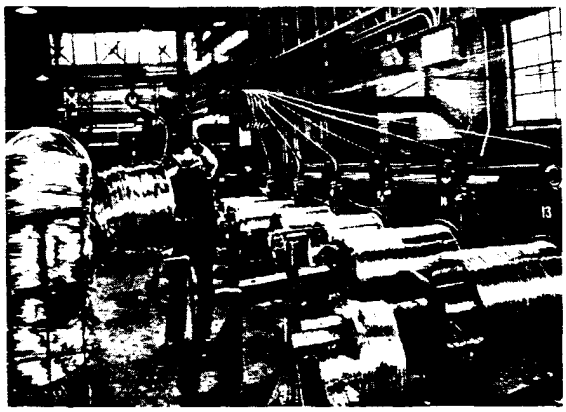
IN a new process for coating steel wire with zinc, lead is used as an acid-resistant tank lining and lead alloy for the anodes in the electro-plating cell. The process, known as the Bethanizing Process, is employed by the Bethlehem Steel Company. Advantages claimed for it are purer zinc coatings (over 99.99 per cent zinc) and uniform thickness, and that greater thicknesses may be built up by the process. Furthermore the perfect bond between the steel and the zinc coating together with the high ductility of the coating results in a product which can be fabricated into any desired final form without danger of the coating cracking or peeling. An interesting feature is that the process starts with zinc ore, and metallic zinc does not appear at any point during the operations until it is actually on the wire.

A roasted zinc ore is used containing about 65 per cent zinc, mostly in the form of oxide. The coating process is carried out in lead-lined electrolytic cells 110 ft. long. At one end of the cells are reels of bare wire, in pairs, so that as the end of the wire on one reel comes along, wire on the next reel is quickly joined to it by welding, thus keeping the process continuous.

In the leaching plant where the electrolyte is prepared from the zinc ore is a series of large wooden tanks, pumping machinery and filters. Sheet lead is an important material in construction of the various units of this novel engineering development. The tanks contain sulphuric acid into which the roasted zinc ore is carefully weighed. Zinc sulphate is formed in the tanks and is purified in succeeding operations, whence it is pumped into the electrolytic cell.

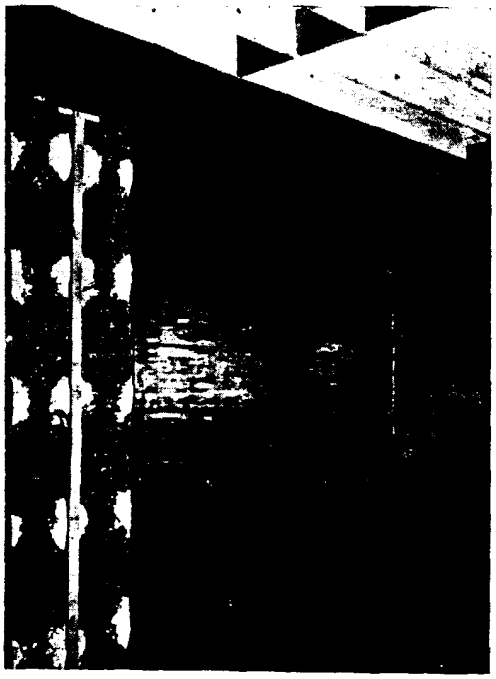
The wire passes through annealing and cleaning units into the cell, 8 to 12 wires at a time, supported on glass rods as it goes through the solution. A current of 15,000 amp. at 4 v. is applied through anodes of lead alloyed with 1 per cent of silver, which have a high resistance to attack by the acid solution. Thus the zinc is plated out of the solution onto the wires. The weight of the coating can, of course, be accurately controlled by the speed at which the wires travel through the cell, and there is no variation in coating because the wires move at a constant speed; the electrical deposition of the zinc is uniform about the circumference of the wire.

Because of lead's resistance to attack by so many of the most common chemicals used in industry, it is widely employed for tank linings, piping, valves, castings and other equipment where these chemicals are handled. It has numerous advantages other than corrosion resistance, including flexibility in making installations, ease and speed of repair, ready availability in all common forms for new and replacement work, and high salvage value.



COURTESY BETHLEHEM STEEL CO.

Coiling reels where finished Bethanized wire is made ready for shipment.



COURTESY CENTRE D'INF. DU PLOMB OUVRE

Two views of lead sound-proofing during application to laboratory walls in the Sorbonne in France.

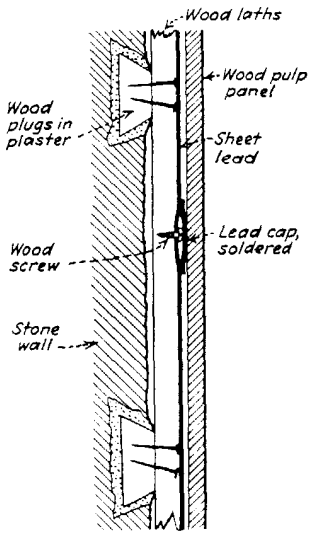
Lead Soundproofing in a Famous French Laboratory

AN exacting problem of sound insulation has been accomplished in the General Physiology Laboratory of the Sorbonne, famed French university, by the use of sheet lead. It was necessary to insulate the laboratory from all outside disturbances so that energy sources within might be accurately determined.

The laboratory is in the basement of the Sorbonne bounded by the front street wall and by millstone piers from 0.6 to 1 m. (1.97 to 3.28 ft.) thick. The ceiling is vaulted stone and the floor an ordinary concrete pavement 0.2 m. (7.87 in.) thick. There are open bays between the piers and air vents connect the basement with the street. Plain brick walls plastered on both sides were built to divide the laboratory into two sections 5 by 3 m. and 5 by 2 m. (16.4 by 9.84 ft. and 16.4 by 6.56 ft.) in size, and to close the bays between piers. A flat ceiling of beams 0.3 m. (0.98 ft.) apart was constructed 2.8 m. (9.18 ft.) from the floor to avoid concentration of sound in the vaulted ceiling. Double doors were provided.

For sound-proofing the rooms were entirely lined with sheet lead 1.5 mm. (0.06 in.) thick, equivalent to about 4 lb. lead. Sheet lead was applied directly to the floor and was screwed to the walls and ceilings. Method of affixing to the walls is shown in the drawing. All joints were soldered to avoid breaks in continuity. Interior doors had double rabbets padded with felt and were covered with lead, and close against a hardwood threshold to insure a good bottom joint.

To avoid resonance phenomena, the lead was entirely covered with an absorbent surface. On the floor linol um 4 mm. (0.16 in.) thick was laid over a wood pulp pad. On the vertical partitions, compressed wood pulp panels 6.3 mm. (0.25 in.) thick were used, and on the ceiling similar panels 12.6 mm. (0.5 in.) thick. To permit ventilation and yet insulate against noise passing through the vents, they were closed with boxes containing balsam wood baffles. Special precautions were taken to prevent transmission of noise through the door handles.



Method of applying lead sound-proofing to the Sorbonne's laboratory walls.

Acceptance tests showed that the problem had been entirely solved and that the results were satisfactory. This installation was fully described by J. Mahul in "Science et Industrie". Messrs. Gonzelle, Sorin and Massé were the engineers and contractors.

A particular advantage of lead is that it concentrates good sound-proofing characteristics in a small space, thus wasting as little room as possible.

A Sprayed Lead Finish on Bathroom Walls

ALMOST unusual application of lead has been made to the walls of a bathroom in a residence at Stanwick, Conn. The walls are constructed of compo board. A coating of sprayed molten lead was applied directly to the compo board to a thickness of approximately 0.03 in.

The effect is said to be especially pleasing because of the soft gray tone of the lead, which also contrasts nicely with the colored bathroom fixtures and woodwork. From the practical standpoint, certain advantages may also be claimed for this treatment. The treated lead coating naturally completely water-proofs the walls so that moisture can not penetrate to damage decorated walls on the other side of the structure itself. Since lead forms the finished wall surface, moisture can not damage the bathroom decoration either as it so often does when other decorative treatments are used in bathrooms.

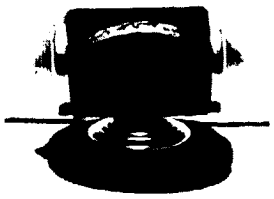
The walls of this bathroom were finished by spraying metallic lead onto them.

Another definite advantage is the reduction in transmission of sound through the bathroom walls. Lead has been used to sound-proof walls before (LEAD, July and November, 1935), but it has usually been concealed behind the regular wall finish. In this case, the lead moisture-proofs and sound-proofs and provides the decorative finish as well.

For the spraying operation, lead wire is fed into a metal spray gun, where it is melted and blown out through the nozzle in fine particles onto the surface to be coated. Because of its low melting point, lead is one of the easiest, most economical and most rapid metals to spray. Sprayed lead may be used for many other lead coating purposes.

The bathroom described here is in the J. Brereton residence at Stanwick, Conn., and the lead finish was applied by Condenser Service and Engineering Co. of Hoboken, N. J.

Lead Used to Weight Bases of Jewelry Displays



A. G. MICHAELSON

An attractive jewelry display the base of which is weighted with sheet lead.

LEAD and diamonds may be strange companions but they are found together in the jewelry trade where lead performs a useful function in the manufacture of jewelry displays. Of course, imitation gems are made of glass containing a high percentage of lead to increase its brilliance, but in displays, lead is used because of its weight and the ease with which it may be worked.

The photographs show one type of display stand for jewelry. These stands may take many forms and are used to set off the jewelry in window and counter displays. Sheet lead is cut the shape and size of the base and secured to it by a screw. The whole display, including the base, is then covered with velvet, which sets the jewelry off nicely. The lead used is 4 lb. and 8 lb. lead (1/16 in. and 1/8 in. thick).

Weight is naturally necessary in the base so the displays will stand upright and not upset easily. Lead supplies more weight per unit of volume than almost any other common material. Another advantage, however, which practically precludes the use of any other material for this purpose, is the ease with which lead may be cut to the size and shape of the base and applied to it. Since these displays take many forms and sizes and are mostly hand work, an adaptable material is essential. Lead answers both these requirements of weight and adaptability admirably.

A. G. MICHAELSON

Jewelry display base with cloth partly removed to reveal lead weight.

The display pictured here in which lead, in a small way, performs an important function, is manufactured by Albert Borgzinner and Co., of New York, for jewelers all over the country. Because of ease of handling and adaptability, lead is able to assist in the solution of many problems in widely diversified fields.

Lead Products Aid in Construction of Demonstration Homes

LEAD in several forms can aid builders of more than 5,000 Demonstration Homes now being erected all over the country in the program sponsored by the National Lumber Manufacturers Association and National Lumber Dealers Association to foster low cost home ownership. These Demonstration Homes will be viewed by thousands of individuals in over a thousand communities in the hope that many others like them will be built. One essential is that the model homes be well painted for faulty paint would discourage the use of lumber. The houses must demonstrate how beautiful and economical lumber can be.

To secure the most durable and satisfactory paint job, sponsors of Demonstration Homes should use pure white lead in oil or the highest grade mixed paint. These will provide paint jobs that will be a credit to lumber under the scrutiny of thousands of eyes. White lead permits top quality jobs at reasonable cost and, because of long life and good surface for repainting, keeps paint maintenance costs within the means of the low income people who will buy these homes. The mixing formulas shown on this page can be recommended for pure white lead paint for exterior wood.

High grade mixed paint should be used in accordance with the manufacturer's directions on the label.

In plumbing, one of the hazards of low cost homes is that unsanitary conditions will develop eventually or even immediately unless good materials are installed by competent licensed plumbers in the first place. Builders of these Demonstration Homes should put the entire plumbing job in the hands of men licensed to do this work to be sure that local ordinances are complied with and that public health is properly protected. These men not only sell and install the best and most sanitary types of fixtures but will put in durable lead pipes for concealed parts of the plumbing system in such a way that health will be permanently protected. Lead plumbing can be installed at little or no extra cost, and its long life and freedom from maintenance are necessary in homes of this type.

FORMULAS FOR PAINTING EXTERIOR WOOD

	Priming Coat	Second Coat	Third Coat
Soft Paste White Lead...	100 lb.	100 lb.	100 lb.
Pure Raw Linseed Oil...	1 gal.	1½ gal.	3 gal.
Pure Turpentine	1¾ gal.	1¼ gal.	..
Liquid Drier*	1 pt.	1 pt.	1 pt.
Gallons of Paint.....	9 gal.	6 gal.	6¼ gal.
Approximate Coverage Per Gallon	600 sq. ft.	700 sq. ft.	700 sq. ft.

* When boiled oil is used, reduce drier to ½ pt.

For the sheet metal work, hard lead sheets that will last as long as the buildings without paint or repair are worth, in ultimate savings, the slightly additional cost at the outset.

Contractors in these lines should keep in touch with this program in their own communities to see that they derive full benefit from it. It offers wide-awake contractors a new market, the approach to which in the past has largely been attempted through pre-fabrication rather than established channels.

The three types of homes sponsored in the low cost Demonstration Home program of the lumber industry.

Store of Peter Jones, Ltd., London, on which lead flower boxes at the second and sixth floors are unusual and attractive architectural features.

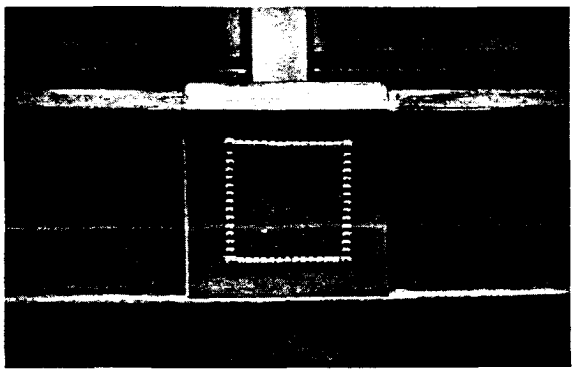
Lead Flower Boxes Are a Feature on a Modern London Store

ON the new department store for Peter Jones, Ltd., Sloane Square, London, England, long lead flower boxes have been combined with modern architecture in a most pleasing fashion. The building is steel and concrete construction with pale green glass window spandrels. Lead flower boxes have, of course, been used for years, but the length of these boxes and the use with modern design are interesting. One lead box practically encircles the building under the second floor windows, while another extends around two sides of the building at the sixth floor, which is a restaurant. There are about 1,000 ft. of lead flower boxes in all.

Expansion and contraction naturally becomes an important factor in the installation of anything as long as these flower boxes, and provision must be made for it. This can be accomplished by making the boxes a series of small boxes, each 8 ft. long. Joints between sections may be concealed by means of removable lead plates slipped over flanges "burned" to the face of the boxes near the joints. Since the boxes should also be supported by a tubing framework, the tubing must penetrate both the bottom and back of the boxes in order to anchor into the building. These perforations may be flashed by lead sleeves around the tubing soldered or "burned" to the lead box just as any pipe penetrating lead flashing would be flashed. This permits expansion and contraction of the lead without hindrance by the tubing.

In the British installation shown here, the front of the box is cast lead and the balance is sheet lead. An antimonial lead alloy was used for added strength. Lead flashing was installed under the windows and overlapped the back of the box. The face of the box is secured to the tubing frame by lead cleats "burned" to the back of the lead. The flower box was executed by the Forge, Ltd. and the construction details were by Austin Crompton Roberts in conjunction with Slater and Moberly, the architects, William Crabtree, associated architect, and Professor C. H. Reilly, consulting architect.

Since building conditions and design of the box will govern the best method of installation, the Lead Industries Association will be glad to cooperate with architects in working out proper installations of this type. Main points to consider are adequate support and sufficient provision for expansion and contraction. Often slight modifications in appearance may make possible much better installations because they permit of more suitable structural design.



PHOTOS COURTESY LEAD INDUSTRIES DEVELOPMENT COUNCIL

Detachable cast lead cover plate that conceals expansion joints in the face of the long lead flower box.

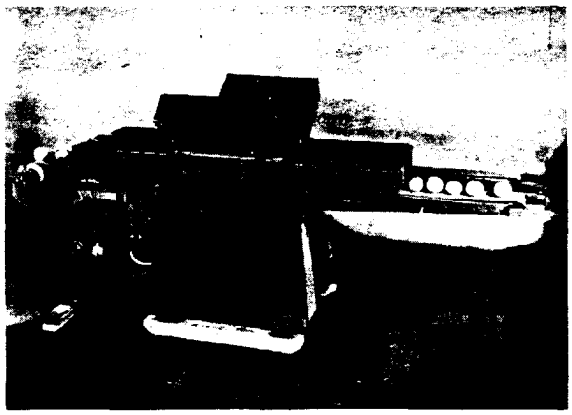
Lead flower box during fabrication, showing sectional construction and flanges on the face over which to slip cover plates.

X-Rays Sort Citrus Fruit While Lead Protects

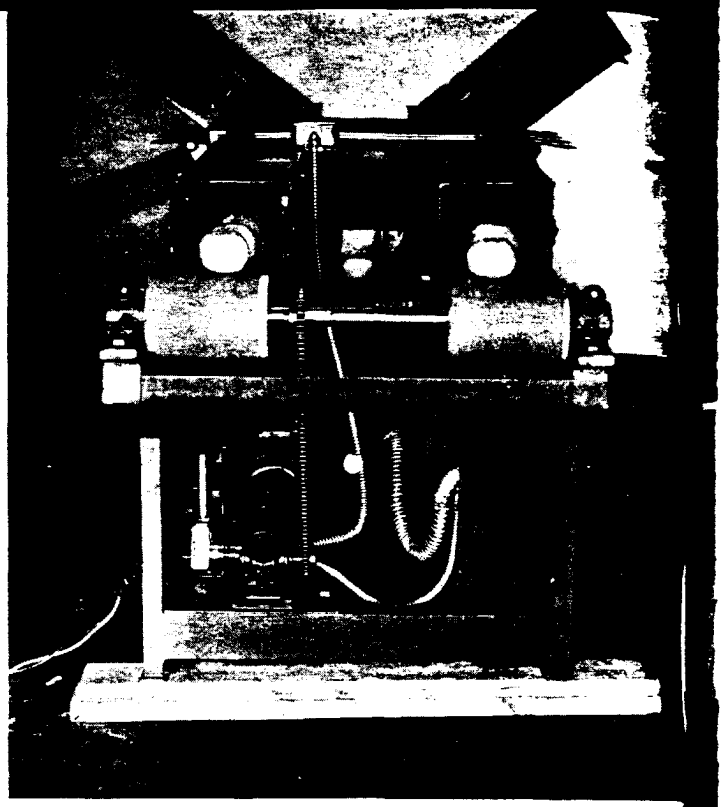
FOR some time the laboratory of the California Fruit Growers Exchange at East Pasadena, Cal., has been experimenting with X-ray machines to sort fruit. The machines were developed by the General Electric X-Ray Corp. and five are in commercial use as this goes to press, and more than fifty will be in commercial use by the last of April. While it is too early to tell just what the commercial success of these machines will be, it appears that they will aid fruit growers and consumers materially.

The machine measures about 4 ft. by 9 ft. An 88,000 to 101,000 v. X-ray tube projects a shadow of the fruit, as it passes along an ordinary conveyor belt, onto a fluoroscopic screen. The operator views the fruit through a $\frac{1}{4}$ in. thick window made of glass containing 57 per cent lead. Good fruit appears dark on the screen and immature, frozen or granulated fruit or fruit low in sugar appears light. Any condition which causes a breakdown of the fruit cells shows up. Four hand-operated kicker arms throw out fruit to be discarded.

In a steel chamber at the bottom of the machine is the X-ray tube, most of which is submerged in oil to cool it. The oil is circulated and a fan draws off heated air from the chamber. A variable speed motor operates the conveyor at any desired speed.



Side view of the machine. The operator examines the fruit, as it passes along the conveyor, through the window, and the ejector arms under the window throw out rejected fruit. An eighth inch of lead protects the operator.



PHOTOS COURTESY GENERAL ELECTRIC X-RAY CORP.

End view of an X-ray machine used to sort citrus fruit, which is fed in on the conveyors, as shown, rejected fruit passing out through the center.

The machine consumes about 1 kw. of electricity per hour. The tube costs $150 and is good for some 1,500 hours.

Safety is well provided by lead insulation against the X-rays. In addition to the lead glass window already mentioned, lead $\frac{1}{8}$ in. thick covers the machine on all sides, top and bottom. The entrance and exit holes for the conveyor belts are curtained with heavy lead-coated rubber. The entire equipment weighs about 2,000 lbs.

It is estimated that the machine will handle about $1\frac{1}{2}$ cars of fruit a day, depending somewhat upon the character of the fruit and skill of the operator. It should save growers considerable money in sound fruit and give the consumer a better product. It indicates another way in which the X-ray machine, already proved in medicine, dentistry, metallurgy and elsewhere, may be of great help. Lead does its share in all uses of X-rays by confining the rays, damaging to humans unless properly directed, to those points at which they are helpful.

Reprints of an article about X-ray room lining with lead, including thicknesses to use with machines of various voltages, will be sent upon request.

PRINTED BY
PUBLISHERS PRINTING CO.
NEW YORK, U.S.A.