VOL. 34 NO. 3-4 1971

BATTERY POWER ELIMINATES $200,000 REPAIR BILL
Standby power protects Anaconda smelting operation

As a plant manager, what would you do if you were advised that a 20-second power failure could result in a $200,000 repair bill? Obviously, insure your plant with a standby power system. That is what was done at Anaconda's copper smelter in Anaconda, Montana, where a giant 250-cell lead-acid battery automatically "cuts in" in the event of a power failure. If it didn't, after 20 seconds, the melted charge of copper bearing materials would flow into the tuyeres (the tubes through which air is blasted into the furnace) and solidify. It is reliably estimated that $200,000 would be needed to get the converters back into operation.

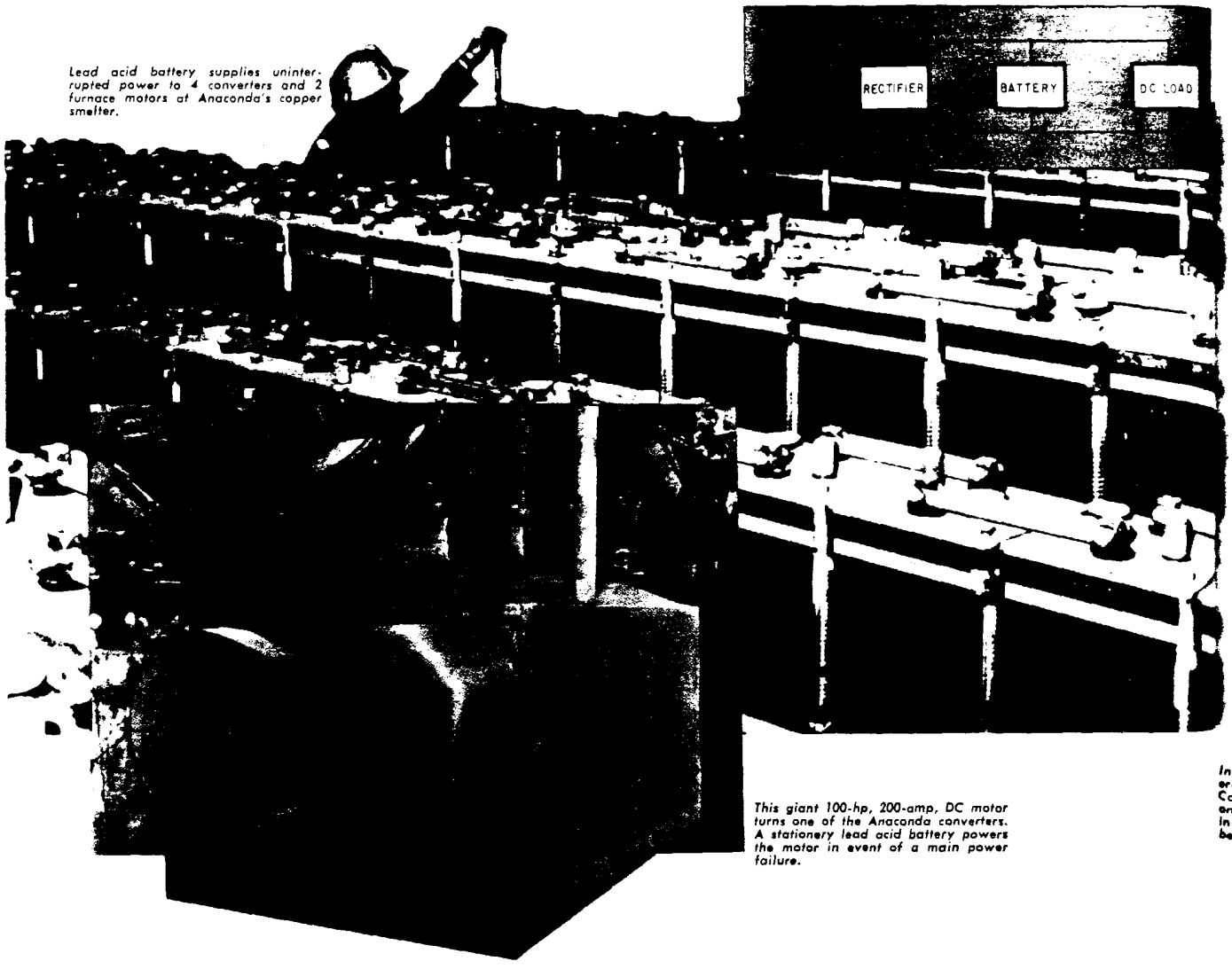
During normal smelting operations compressors force air into the matte through the tuyeres. In the event of a power failure, the compressors would shut down, eliminating the positive air pressure in the tuyeres. The tuyeres must be elevated above the surface of the mattes within 20 seconds or they would be filled and solidification would take place.

Normally, the rectifier changes 2300-v AC power to 520-v DC power to run the 100-hp DC motors needed to elevate the tuyeres. A lead acid storage battery supplies emergency power in case of a main power failure. The battery is in parallel with the rectifier and the load and picks up the load automatically in the event of a power failure.

The emergency power battery at Anaconda is housed in its own building. Cells are arranged in banks of 4 rows each, the rows being connected in series. Cells are inspected weekly. During every fourth week the battery is given an equalizing charge to make certain all cells are fully charged.

The battery serves another purpose beyond its principal one. It continues to supply power to the motors should power from the rectifier be disrupted. During a recent 12-hour breakdown resulting from a yard accident, the battery operated the converter motors as well as the motors of two anode casting furnaces. Loss of power to these motors would also have entailed costly repairs.

Diagram shows how battery is connected into the converter/furnace power system. Battery carries the load in case of a main power failure or an interruption in power from the rectifier.



Lead acid battery supplies uninterrupted power to 4 converters and 2 furnace motors at Anaconda's copper smelter.

This giant 100-hp, 200-amp, DC motor turns one of the Anaconda converters. A stationery lead acid battery powers the motor in event of a main power failure.

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LIA26618

COAX-22 BLAZES TRAIL ACROSS CONTINENT

A new telephone communications pathway is gradually stretching its way across the United States. The latest in coaxial cable, Coax-22, is currently being laid from Brigham City, Utah westward. The cable ultimately will have a transmission capability of 90,000 simultaneous two-way telephone conversations. Or in combination, it will relay telephone conversations and up to 300 picturephone messages, high speed digital data, or color television data.

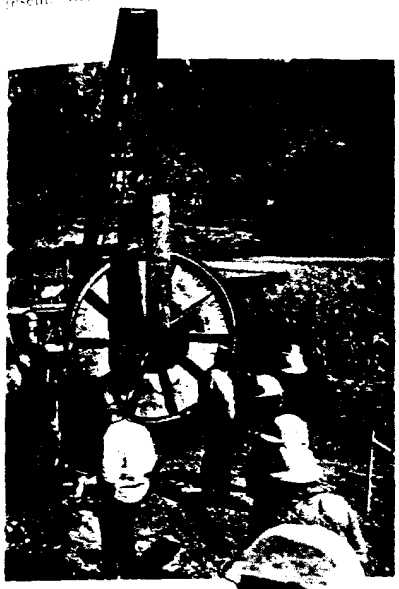
Coax-22, designed by Bell Telephone Laboratories and manufactured by Western Electric Company's Baltimore Works, represents the latest in coax cable engineering. (For prior developments see LEAD, Vol. 27, No. 4, 1963, and Vol. 30, No. 3, 1966.)

Security and reliability favor coaxial cable for this vital communications link. Compared with microwave towers, the cable is less subject to propagation changes and interference.

Coax-22 is 3-in. in diameter and contains 22 coaxial tubes (solid copper conductors within copper tubes). Conductors are separated from tubes with insulating discs positioned at 1-in. intervals. In making the cable, the 22 tubes are stranded around a core of wire pairs used for signal circuits by a machine almost half the size of a football field.

As with prior cables in the system, Coax-22 is protected by a lead sheath and polyethylene jacket. The lead sheath is extruded around the cable core to a thickness of 7/64-in. The sheath alone weighs 4,688-lbs. per 1000-ft. Although lead sheathes can be extruded in almost any practicable length, it is limited in this installation to 1,300-ft. reel capacities.

The cable is being buried to a depth of 4-ft. as still further protection from the elements, man-made damage, and other forms of potential attack. Cable laying is under the supervision of AT&T's Long Lines Department with the cooperation of the Pacific, Nevada Bell and Mountain Bell Telephone Companies.



AT&T Long Lines are supervising the laying of Coax-22 from Brigham, Utah, to Oakland, California. Cable is being laid in every conceivable type of terrain.

In-the-field splicing operation on the Coax-22. Cable men are shown in one of the 4-ft. trenches in which the cable is being laid.

Close-up of Coax-22, the lead sheathed coaxial cable being used with a coast-to-coast transmission system designed by Bell Telephone Laboratories.

LIA26619

HEARTBEATS HEARD MILES AWAY!

A new acoustic coupler made of cast leaded vinyl now makes remote computer access possible by telephone since the leaded vinyl serves to block out all extraneous sound.

This coupler, made by TransCom, Inc., Bloomfield, Connecticut, of a material developed by the Ferro Corporation, Norwalk, accommodates a standard telephone handset which serves as the transmission device.

Using a key punch unit similar in appearance to a typewriter, the operator can "converse" electronically with a main computer bank thousands of miles away. The telephone is set into the acoustic coupler; signals originating in the key punch are audibly transmitted over the phone lines to the main computer. The computer, in turn, can reply to the key punch, then the response is printed out.

Any extraneous sound, of course, would make accurate data transmission impossible. Lead's sound barrier properties provide the necessary sound blockage. Users can "converse" through the acoustic coupler even in such normally noisy situations as may occur around a pay telephone or near a plant telephone. The cast leaded vinyl efficiently blocks such sounds from entering the mouthpiece. Non-leaded materials would require up to twice the thickness of this coupler in order to achieve equivalent noise insulation.

Other immediate uses for the acoustic coupler include transmissions by copy phones and the rapid transmission of documents, photographs and other graphic data. A fascinating potential use of the acoustic coupler is the transmission of electrocardiograms from one locale to another. Here, a life could depend on the immediate transmission in a completely noise-free environment.

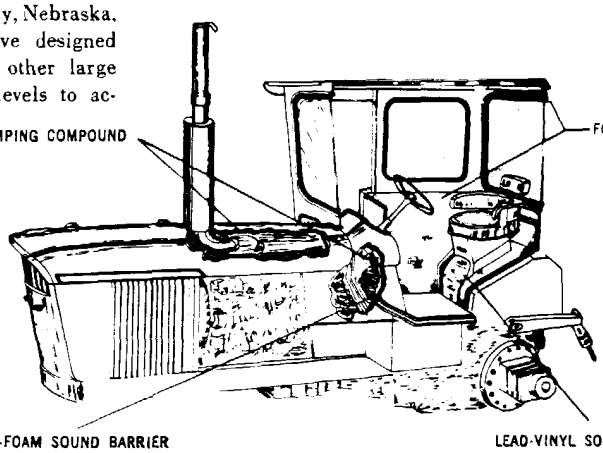
LEAD MAKES TRACTOR ENGINE NOISE TOLERABLE

Dawn-to-dusk hours at the wheel of a huge, heavy-duty tractor are normal in the agricultural industry. These protracted hours mean long exposure to tractor engine noise and the possibility of unhealthy effects on the driver's hearing and nervous system.

The Egging Company, Gurley, Nebraska, sound control specialists, have designed systems for agricultural and other large tractors that reduce decibel levels to acceptable and safe ranges, even with long exposure.

Egging uses a sheet lead polyurethane foam sandwich material to block engine noise from entering the tractor cab. The material is installed under the operator's platform and on the back side of the firewall. Using other techniques in conjunction with the lead/foam combination Egging effectively reduces noise transmission by as much as 10 db "A" scale within the cab (approximately 50%).

The system illustrated is designed specifically for tractors. Other systems are adaptable to many different types of normally noisy machinery.



LIA26620

ARTWORK . . . indoors and out
A Major Museum Goes Under Lead Cover

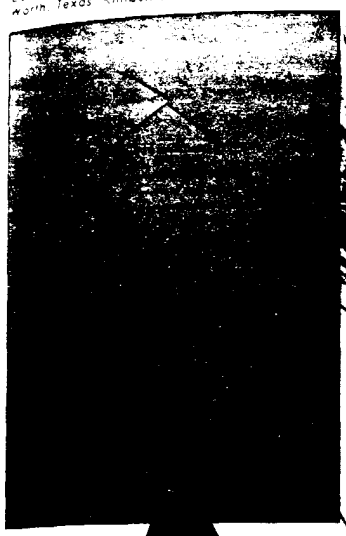
Throughout history graceful works of art have been made of lead or associated with the metal. The terraces of the hanging gardens of Babylon were underlaid with sheet lead waterproofing. Centuries later, the new Kimbell Art Museum in Fort Worth, Texas, has been given a lead roof for beauty and protection.

When famed architect Louis I. Kahn, the 1971 recipient of the American Institute of Architects gold medal, specified sheet lead for the roof of his Kimbell Art Museum, aesthetics entered into his decision. "I expect it to look like pewter and give off a silvery light," he said.

Practical considerations were also a factor. Sheet lead is easily worked, serves as a waterproofing membrane, and is durable.

Exposure to the elements will give the lead roof a soft neutral gray patina that will blend well with the architectural environment and have the rich look one naturally expects of an art museum housing millions of dollars of precious artworks. Sheet lead, alloyed with calcium to improve strength, and weighing 3-lbs. per square foot (3/64-in. thick) was used to cover the cycloid roof. To keep the roof in character with the architectural form, unobtrusive flat locked seams were used.

Details of the roof construction at the Fort Worth, Texas Kimbell Museum.



A sheet lead panel is brought into position to align and interlock with the adjoining panel.

The flat locked seam between the lead sheets is finished by dressing it down. A board is used to prevent scarring the lead.

Overall view of the Kimbell Museum. The foreground shows formwork and rebars in place. Directly behind is a cycloid with plywood in place and felt being applied. Cycloid in right foreground has leadwork completed.

The first fold on the trimmed sheet lead is applied with a hand brake. This method insures uniform folds throughout.

LIA26621

LEAD GOES TO SCHOOL

"We are called upon to make recommendations to architects to preclude sound transmission problems in their projects. Our recommendations must be consistently achievable within reasonable economic parameters. When you consider the low installation costs and the high performance level of lead, you can then understand why we consistently recommend its use in critical areas.

We must, also, when making a recommendation, take into account the "error potential" on the part of the installing mechanic. Reasonable care combined with a minimum of supervision assures proper utilization of the material. In short, you can say that lead is inexpensive, predictable and efficient."

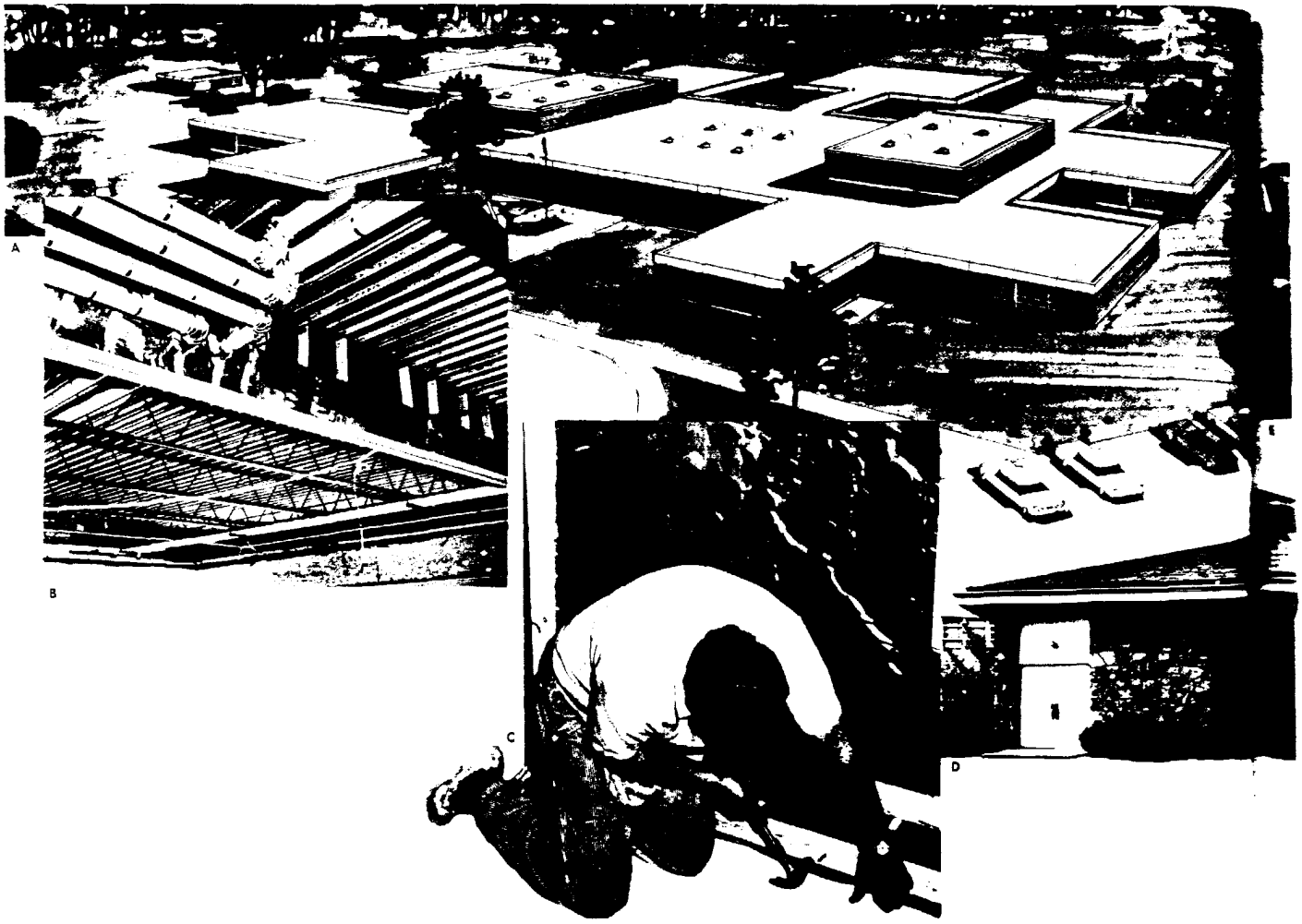
Gilbert L. Phillips, Jr.
President
Gilbert L. Phillips, Inc.
Acoustical Contractors

Population growth and the mass move from the cities to suburbia have necessitated the building of new schools at a phenomenal rate. And the new schools themselves, are frequently designed with multiple use flexibility to help compensate for rising costs and a money supply not always adequate to meet school demand.

These flexible-use schools of the 1970's require noise control systems to avoid cross feed of noise between classrooms and other areas. Privacy and quiet remain essential to school environments, whatever changes may be wrought in school design. A series of schools and educationally-related buildings being constructed on Long Island, New York, illustrate the need for sound control systems and the control methods being adopted. Long Island, of course, offers a highly visible example of population shifts. Suffolk County, once the sparsely-populated haven for farmers, fishermen and duck raisers, grew in population 400% in the two decades between 1950 and 1970 . . . from 276,129 to 1,116,672 population.

Representative of the new school design trend is the Thomas J. Lahey School in Greenlawn. The one-story building is designed with clusters of classrooms around a central core. The core contains administrative offices, gymnasium and a combination auditorium/cafeteria.

Architects Coco & Smith, Hauppauge, New York, created a design that would offer individual classroom privacy combined with the ability to convert classrooms into a large teaching area. Folding partitions effectively divide the area between the floor and the drop ceiling in the classrooms. To prevent noise from passing over the partition, in the area between the drop ceiling and the roof, the space between the partition track and ceiling "I" beam was sealed with 1-lb. (1/64-in. thick) lead.



A *The Thomas J. Lahey Elementary School, Greenlawn, New York. Sheet lead plenum barriers between classrooms assure quiet for the 1,200 pupils, when they want it.*

B *The Lahey installation includes sheet lead between movable partition rails and ceiling "I" beam. Penetrations for piping are made easily with lead.*

C *The entire interior walls of the audiometric room at Lahey were covered with sheet lead so no extraneous noise would affect hearing tests.*

D *The Bellport Junior High School, Bellport, New York. Addition of two wings housing classrooms and gymnasium in one, auditorium in the other, called for 1-lb. sheet lead sound barrier systems.*

LIA26622

The acoustical contractor, Gilbert L. Phillips, Inc., is a strong advocate of lead as a sound barrier material because of its effectiveness and easy workability (see box). At the Lahey School the firm was able to make a speedy installation. The sheet lead was wrapped around 1-in. x 3-in. wood strips which were in turn wedged into place against the lower flange of an "I" beam. The bottom portion of the sheet lead was sealed to the partition track and secured with 3/16-in. wood wedges. Sheet lead joints were easily overlapped and taped. Necessary penetrations for pipes, conduits, etc. were easily managed by slitting the lead sheet and sealing with tape.

Elsewhere at the Lahey School sheet lead was used above the entrances to classrooms as a noise barrier and to completely soundproof an audiometric testing room used for testing pupil hearing prior to enrollment. To obtain the necessary quiet for testing, the entire walls of the audiometric room were covered with 1-lb. (1/64-in. thick) sheet lead. The lead was held in place by 1-in. x 3-in. batten strips on 12-in. centers. After the application of the sheet lead, the walls were finished with an acoustical board with sound absorbing glass fiber behind the board.

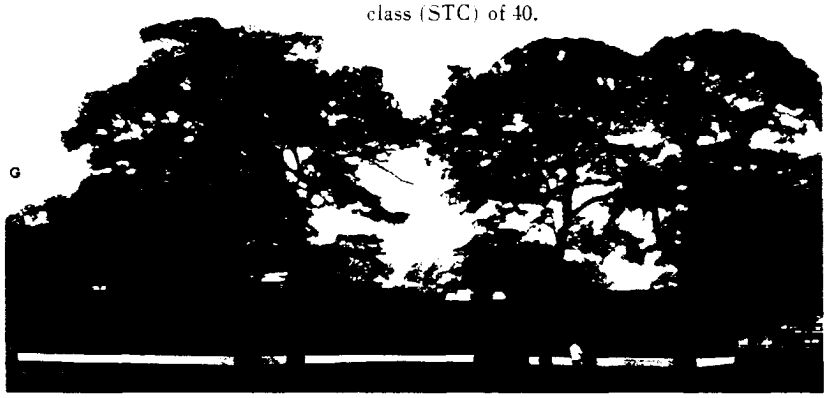
In Bellport, New York, two wings were added to the existing Bellport Junior High School, one wing consisting of a classroom and gymnasium complex, the other, an auditorium. Sheet lead was again used extensively as a sound barrier.

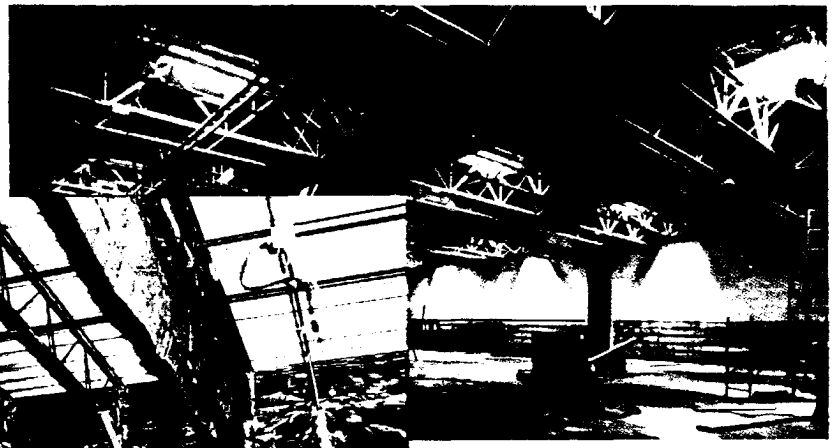
The gymnasium, designed by the architectural firm of Fredrick E. Allardt, Jr., who also did the other additions, may be divided in two by means of a folding partition. Sheet lead was used to block the flanking path over the top of the folding partition.

A similar noise attenuation system was used to block sound transmission over the tops of folding partitions in the new classroom area. Clusters of four classrooms can be opened up into a large single room area by the use of manually-operated partitions.

The new auditorium is also designed with flexibility in mind. A folding partition separates the general auditorium into two areas, one with the stage, one without. Here again sheet lead is used over the motor-driven partition to block sound.

Two other lead acoustical systems from the Long Island area are found at the New Lane Elementary School, Hauppauge, where the music practice room has been engineered for quiet with sheet lead, and the Sayville, New York, School Administration Building. The latter has been designed so that all executive and executive secretary offices, library and board room are outfitted with sheet lead attenuation systems that achieve a sound transmission class (STC) of 40.





E *Acoustical contractor workmen install sheet lead at Sayville with relative ease. Workability of lead provides easy access for piping and other protuberances.*

F *The Bellpart auditorium can be divided into two areas to accommodate two simultaneous functions. Sheet lead is used over the motor-driven partition to block sound transmission.*

G *The Sayville, New York, School Administration Building has been designed to provide a quiet environment for the staff.*

H *The Bellport gymnasium divides in two with a folding partition. Lead blocks the flanking path over the top of the partition.*

I *All executive offices, library and board room at Sayville have 1-lb. sheet lead sound barrier systems that achieve a sound transmission class of 40.*

LIA26623

TERNE CUTS FANCY COST FIGURES IN PARTS

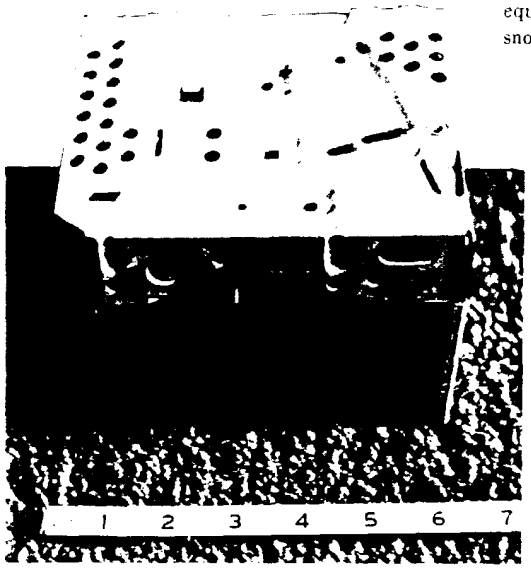
Terne, a lead and tin alloy coated steel, dates back to the 18th century, when it was devised as a less expensive substitute for tinplate. Two centuries later terne has emerged as an old product with a bright future. The combination of steel's strength with lead's corrosion resistance, solderability and paintability have made it an increasingly popular metal for applications requiring deep drawing, detailed configurations, or need for extra resistance to corrosion.

Terne is now available in both sheet and coil form. Terne sheet is made in 12 to 28 gage thicknesses, in widths up to 52-in. and lengths up to 144-in. Terne coil is made in 14 to 28 gage thicknesses, in widths up to 52-in.

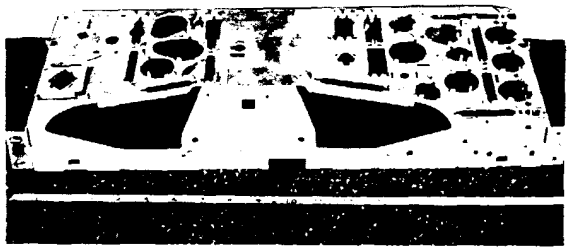
Terne is a "natural" for deep drawing or severe forming operations. The lead-alloy coating acts as a built-in lubricant and is easily welded or soldered.

Gasoline tanks made of terne plate are standard. Other automotive parts, radio and television chassis, parts for outdoor equipment such as tractors, lawn mowers, snowmobiles, outdoor lighting, roofing, all have been made advantageously fr terne. The expected development of a te foil could open important new marke automotive radiator cores, special packa ing, moisture proofing and even minor ra ation barrier applications are a possibili

Predictions are that terne will assu more importance in the future. New dev opments in the metal itself; an awarene that terne improves the life of certain pro ucts; its ease of joining; its paintabili . . . all influence its selection as a desig material.

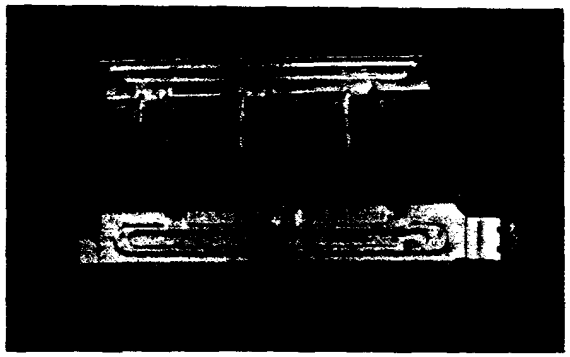


Photos: Courtesy Basic Steel Corp.

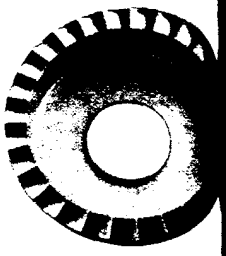


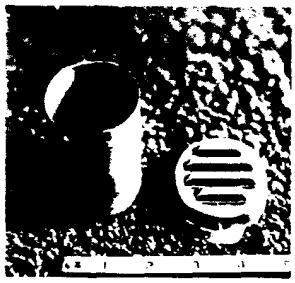
Radio and TV chassis represent one product group that favors the use of tern because of the detailed configurations requirement.

This air defuser for a heav equipment air cleaner is made w with relative ease.

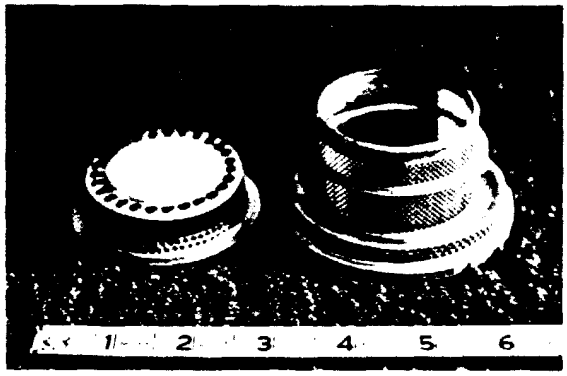


Automotive radiator side mounting brackets, along with gasoline tanks, oil filters and air cleaners are some of the terne applications common to the automotive market.





This deep drawn small engine air cleaner and cap are made of terne. The ruler indicates the small sizes within which terne can readily be formed.



A kerosene stove wick holder utilizes all of terne's special capabilities. The wick holder is both deep drawn and perforated. Terne's corrosion resistance is vital to the part's serviceability.

LIA26624

AT MERCHANTS REFRIGERATING ELECTRICS DO A COOL JOB

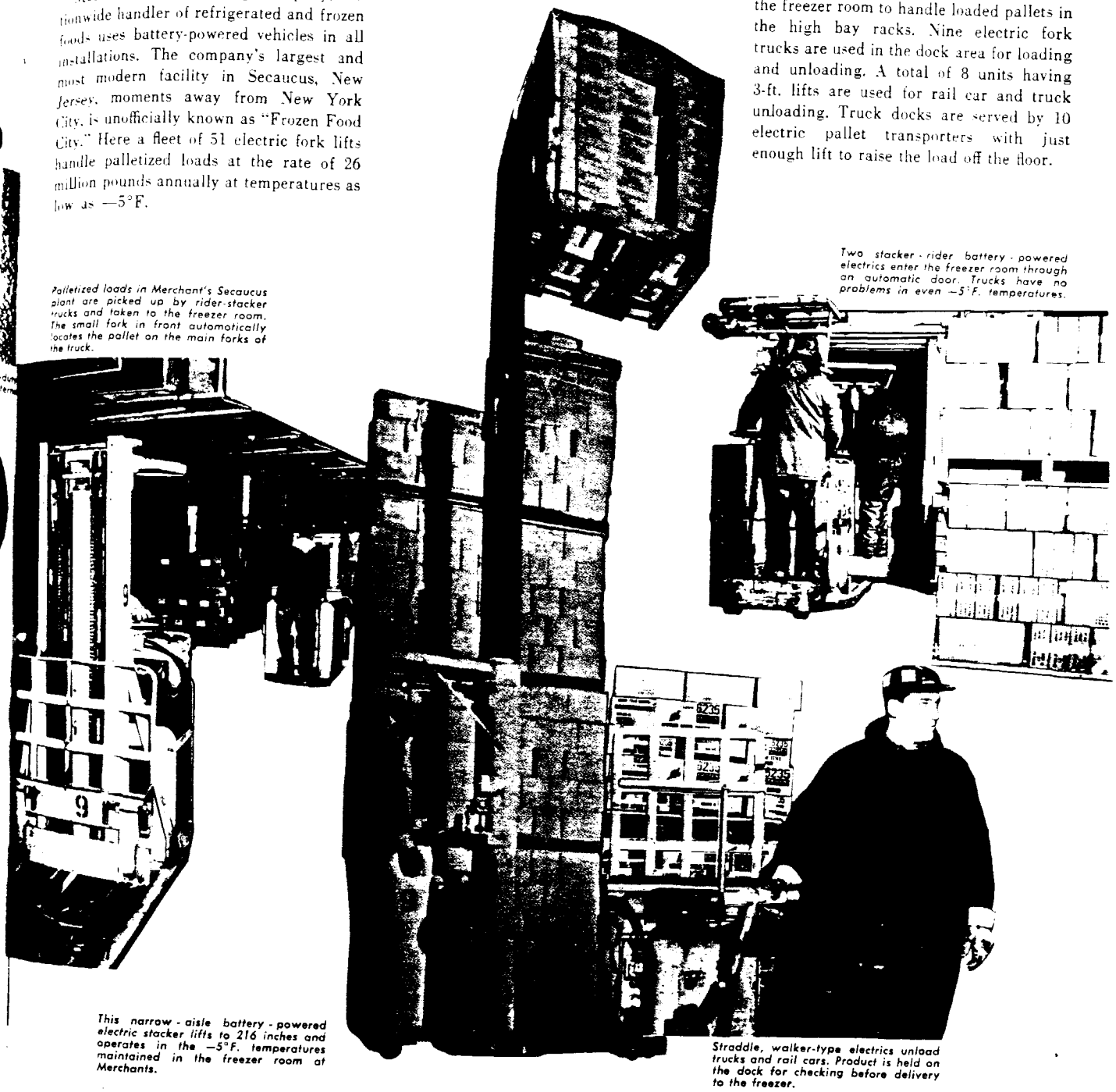
The sight of an automobile radiator spouting steam on a hot summer day is visible evidence of the heat generated by the internal combustion engine. That engine generates the same heat, indoor or out, no matter what the external temperature. For that reason, and because lead acid battery-powered electrics pose no contaminating exhaust problems, they offer many advantages to handlers of frozen foods.

Merchants Refrigerating Company, nationwide handler of refrigerated and frozen foods uses battery-powered vehicles in all installations. The company's largest and most modern facility in Secaucus, New Jersey, moments away from New York City, is unofficially known as "Frozen Food City." Here a fleet of 51 electric fork lifts handle palletized loads at the rate of 26 million pounds annually at temperatures as low as —5°F.

Bill Byrne, Engineering Superintendent of the Secaucus facility, explains Merchant's use of electrics there, as well as at its other plants, as being based on several factors. Because they are handling food, they must use equipment that poses no potential contamination problem. Also, by using electrics, the company avoided the monumental problem of ventilating freezer areas to accommodate internal combustion engine vehicles while maintaining —5°F.

Most communities regulate the distance at which fuel must be stored away from a warehouse for compliance with fire regulations — an added operational expense. And, Mr. Byrne points out, maintenance costs for electrics are low. Electrics are clean in operation. And not least, they have no start-up problems in sub-zero environments and pose no radiator problems.

The fleet at Merchant's plant consists of 24 rider-stacker straddle trucks used in the freezer room to handle loaded pallets in the high bay racks. Nine electric fork trucks are used in the dock area for loading and unloading. A total of 8 units having 3-ft. lifts are used for rail car and truck unloading. Truck docks are served by 10 electric pallet transporters with just enough lift to raise the load off the floor.



Palletized loads in Merchant's Secaucus plant are picked up by rider-stacker trucks and taken to the freezer room. The small fork in front automatically locates the pallet on the main forks of the truck.

Two stacker - rider battery - powered electrics enter the freezer room through an automatic door. Trucks have no problems in even —5°F. temperatures.

This narrow - aisle battery - powered electric stacker lifts to 216 inches and operates in the —5°F. temperatures maintained in the freezer room at Merchants.

Straddle, walker-type electrics unload trucks and rail cars. Product is held on the dock for checking before delivery to the freezer.

LIA26625

COPPER REFINERY CELLS LEAD-LINED AGAINST ACID ATTACK

Southwire Company, the world's largest independently owned producer of copper and aluminum rod, has just opened a new 40,000 ton per year capacity copper refinery in Carrollton, Georgia. The refinery was added to the Southwire complex to assure a continuous supply of copper for the company's manufacturing system.

The 145,000 sq. ft. refinery building houses 520 electrolytic cells, each measuring 4 ft. x 4 ft. x 12½ ft. Approximately 500 tons of 8-lb. ($\frac{1}{8}$-in. thick) and 16-lb. ($\frac{1}{4}$-in. thick) antimonial sheet lead were used to line the cells. The lining gives necessary protection against corrosive attack by the sulphuric acid/copper sulphate electrolyte.

Mr. William Burson, Plant Manager, Copper Division—Southwire, reports that a number of lining materials were tested for the electrolyte cell before lead was selected. "Besides its proven effectiveness in resisting corrosion, the sheet lead installation costs were lower than they would have been for any other rigid lining material. We also favored lead because it can easily be repaired if necessary; and when it becomes necessary to replace the linings, the old lead linings will have a recoverable scrap value."

The electrolyte cell bodies, called shells, are made of concrete and the inside treated with a bituminous coating prior to insertion of the lead linings. This protects the sheet lead from any free lime that still may be present in the cement.

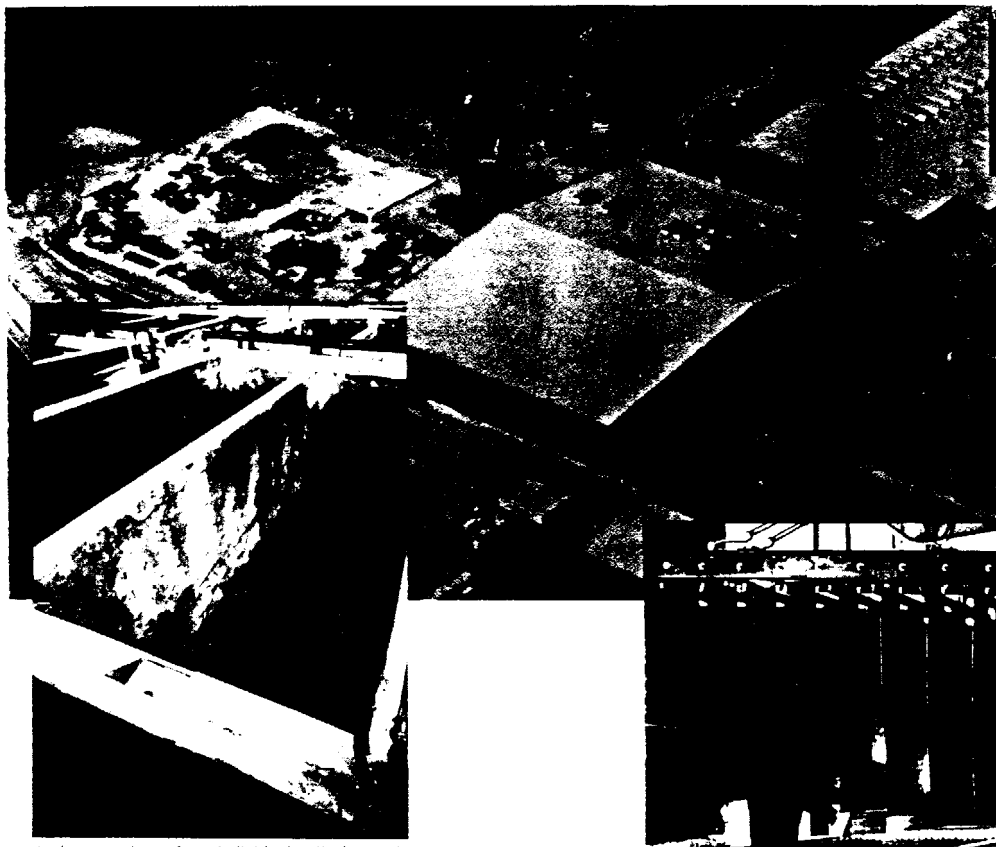
The sheet lead linings are formed over a mandrel: one sheet serving to make the bottom and two ends; two additional sheets make the sides. Once formed, the lining and mandrel, clamped together, are inverted and lowered into the cell. The mandrel is removed; and as a final step, the joints in the sheet lead lining are welded (burned) to form the finished electrolyte container.

The cells at Southwire are supported on tubular columns 12 ft. above grade, so that piping for the electrolyte is readily accessible for maintenance.

Lead is also used at Southwire to line the steel holding tanks for electrolyte storage. These tanks are in a recirculation and filtration bay adjacent to the cells. Again, the lead lining's purpose is to protect the tanks from acid corrosion.

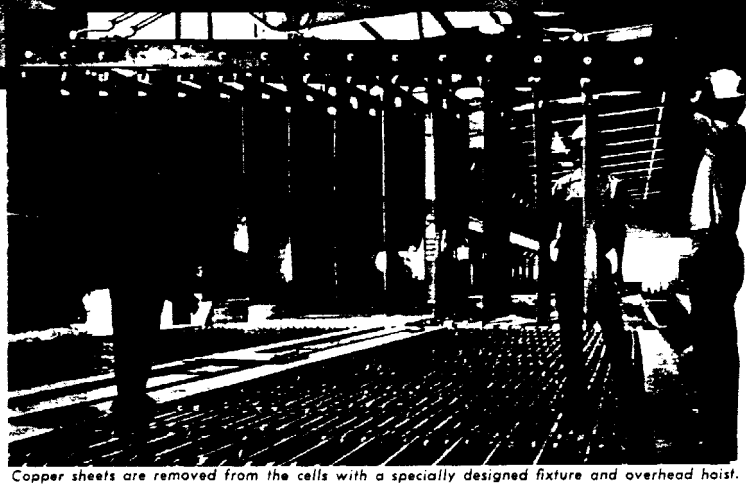
Corrosive sulphuric acid/copper sulphate electrolyte circulates through the 520 electrolytic cells at Southwire at 150°F. Almost 500 tons of lead line the cells as protection against the electrolyte.

The Southwire copper refinery at Carrollton, Georgia, covers 145,000 square feet. The refinery assures an adequate copper supply for the company's copper rod manufacturing needs.



A close-up view of an individual cell shows the lead lining. The inlet for the electrolyte is seen at the back of the cell with the overflow drain in the foreground.

Lead work: Allied Lead, Inc., Chicago.



Copper sheets are removed from the cells with a specially designed fixture and overhead hoist.

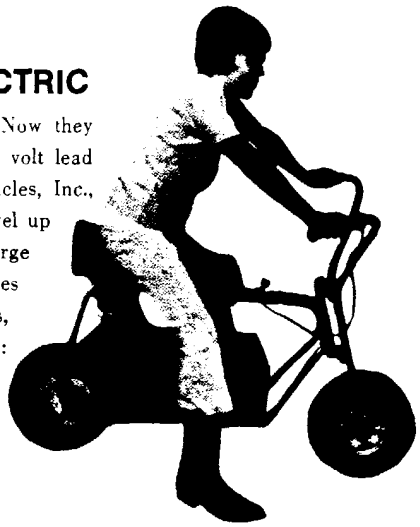
LIA26626

LEAD FEATURES IN WHALE OF A STORY

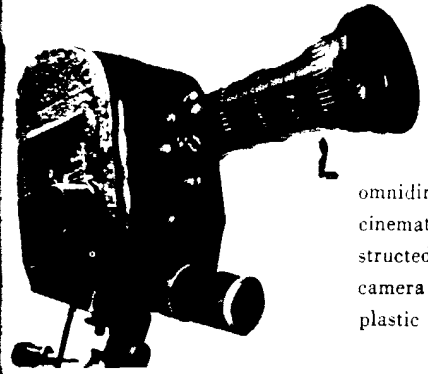
Whale vertebrae, lead and glass are the strange bedfellow materials that make up this unusual and attractive coffee table. The table was designed by Arthur King, prominent New York City jeweler and jewelry designer, at the request of shop patrons. Impressed by Mr. King's use of lead as the major decorative element in his shop, customers commissioned him to design lead decorated furniture. The coffee table is one of his first furniture designs.

JUNIOR JET SET GOES ELECTRIC

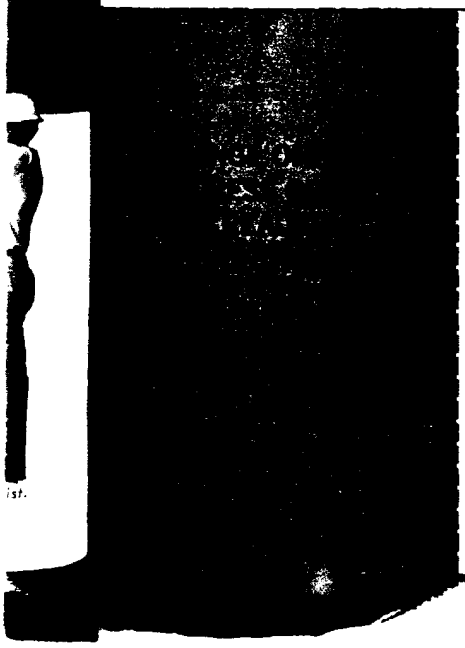
Kids no longer travel under their own steam. Now they can ride an electric mini-cycle, powered by a 12 volt lead acid battery. Manufactured by American Mobile Vehicles, Inc., the mini-cycle can attain speeds up to 30 mph and travel up to 50 miles with as little as one quick pickup battery charge en route. It can't be used on highways; but it provides ideal transportation for campuses, beaches, resort areas, or anywhere else vehicle regulations permit. Not least: it's fume-free and almost noiseless.



A SOUND CAMERA THAT DOESN'T TALK BACK



Film makers have found that the whirring noise made by motion picture sound cameras is a problem with lip-sync close-ups. The noise of the camera's shutter, gears and motor is picked up by closely-positioned sensitive omnidirectional microphones. Ogden Lowell, a New York City cinematographer, solved the problem with leaded vinyl. He constructed a blimp of cardboard and glass fiber to enshroud the camera body and lined the enclosure with powder-filled vinyl plastic sheet. The whirring noise has ceased to be a problem.



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LIA26627

NEW LISTINGS

Lead in glazes

Reprint from American Ceramic Society Bulletin. Six papers on the subject of lead release from ceramic dinnerware glazes. Charts and tables. Twelve pages. **B-10**

Lead a major factor in new machinery noise suppression systems

Description of techniques used to lower machinery noise levels with lead and lead composites. Lists machines that normally exceed noise level allowed by Walsh-Healey Public Contracts Act. Two pages. **J-9**

Sheet lead plenum barriers

Detailed description of acoustical plenum barriers and how to install them. Materials and installation procedures described and illustrated. Eight pages. **J-10**

Techniques for reducing machinery noise

Reprint from Pollution Engineering details materials and solutions for reducing machinery noise to acceptable levels. Specifics given for several machine types in common usage. Illustrated. Four pages. **J-11**

Testing storm drain joints: A research report

Results of tests investigating pressure limits for lead oakum caulked pipe joints in high rise building service. Tables. Two pages. **D-6**

ARCHITECTURAL

Waterproofing with sheet lead

A description of the use of lead as a membrane waterproofing material for lining pools, planters, fountains, shower stalls and floors where positive waterproofing is required. Architectural details and specifications are included. Eight pages. **A-2**

Lead roofing and flashing

Detailed instructions on the simplest and most usual methods for forming or joining lead for roofing and flashing applications. Complete specifications. Diagramatic drawings. Sixteen pages. **A-5**

PAINTS

Follow the safety line with chrome yellow

Formulations and suggested applications for chrome yellow safety paints. Illustrated. Eight pages. **M-5**

PLUMBING

Lead plumbing catalog and specifications

Specifications and details for the use of lead in plumbing. Waste connections, shower and safe pans and chemical laboratory drains are covered. Four pages. **D-2**

CHEMICAL CONSTRUCTION & CORROSION PROTECTION

Corrosion resistance of lead in chemical applications

A chart presentation of the corrosion resistance of lead and its alloys against 188 common chemicals from 0° to 300 °F. Six pages. **H-3**

Lead in modern chemical construction

Reprint from *Encyclopedia of Chemical Process Equipment*. Describes installation, proper design application, and testing of lead linings. Twelve pages, illustrated. **H-1**

BATTERIES

A primer on the lead-acid battery

A condensed story of the principles of the lead-acid battery and its chemistry, including some of the fundamentals and definitions of direct-current electric energy. Two pages. **L-6**

Industrial truck cost calculator

Three nomographs permit estimation of costs for gas vs. battery powered industrial trucks in two or three minutes. Twelve pages, charts and tables. **L-1**

CERAMICS

Facts about lead glazes for art potters and hobbyists

Detailed information on the proper formulation, firing techniques, handling, etc. of lead fluxed glazes used by art potters and hobby ceramists. Illustrated. Sixteen pages. **M-21**

SOUND BARRIERS

Director of acoustic specialties

Summary of available materials for sound insulation by barrier, damping and absorbtion methods. Sixteen page list of materials by brand name and manufacturer. Eighteen pages. **J-4**

ANTI-VIBRATION PADS

Ways to reduce press vibration

Two installations of lead asbestos pads to reduce heavy machinery vibrations. Sectional drawings and loadings are given. Two pages, illustrated. **G-1**

Lead asbestos anti-vibration pads

Specifics on lead anti-vibration pads including design and sizing. Specifications for the sub-contractor, and list of pad manufacturers. Three pages. **G-3**

CABLE SHEATHING

Lead-covered underground cable use increasing

Reprint outlining a major utility's recent experience with lead sheathed underground cable. Details on where this type cable is desirable. Graphs. Four pages. **C-2**

GENERAL

Primary lead production areas in the U.S.

For schools, libraries. 11"x14" map showing locations in U.S. of most lead smelters and refineries, and lead mines. **M-11**

Lead as a modern design material

Design engineering catalog with specifics on lead characteristics, benefits, available forms. Details on lead use as coating, radiation control, sound control, and in soldering, ceramics, etc. Illustrations, tables, graphs. Eight pages. **M-15**

The new lead belt

Reprint of article details operations at the new lead belt in Missouri. Booklet describes activities at four mines, four concentrators and three smelters. Twelve pages. **M-16.**

Use of lead in the automobile

Reprint of article from Metals Week discussing in detail the various applications of lead in the automobile. Four pages. **M-17**

Lead—The "Clydesdale" workhorse in space

Reprint from Space World detailing the applications of lead in space exploration. Illustrated. Four pages. **M-19.**

The U.S. Lead Industry—1970

An annual review of activity within the industry that contains a general summary for the year and a series of charts and tables giving current statistics on lead production and consumption. **M-20**

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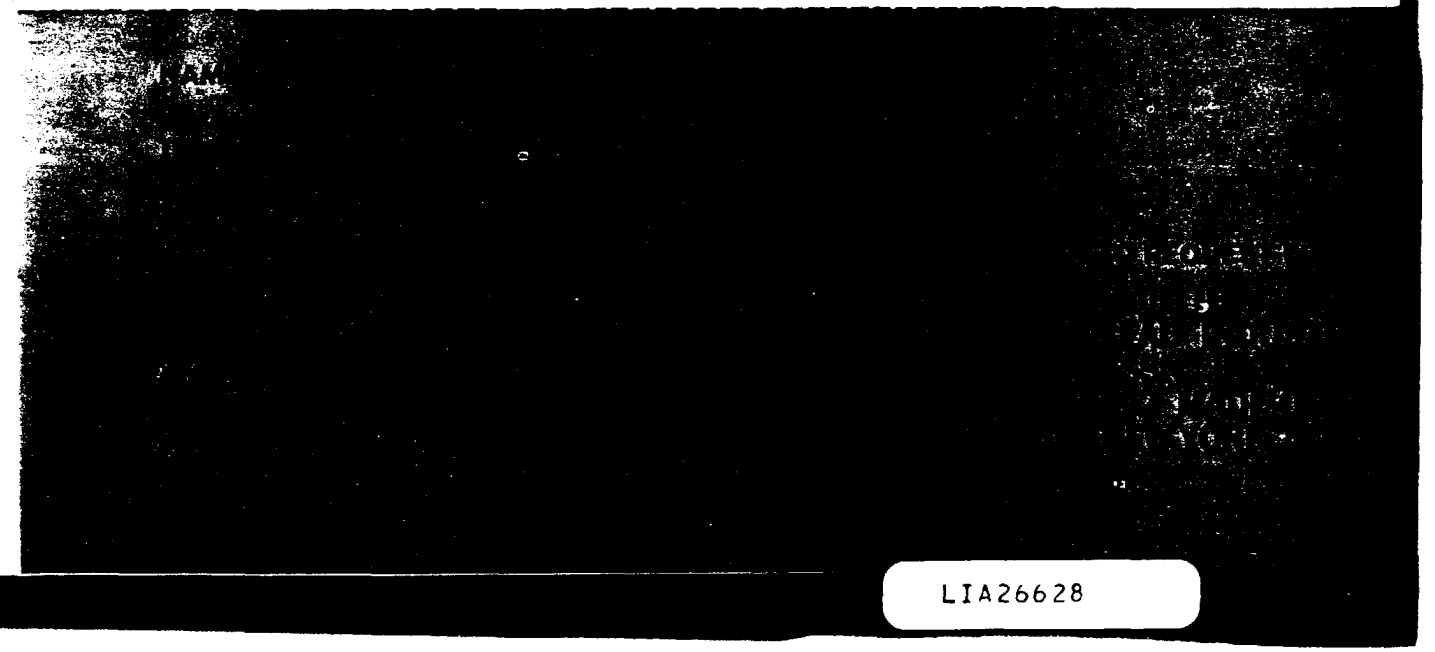

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