December 1935

TECHNOLOGY REVIEW

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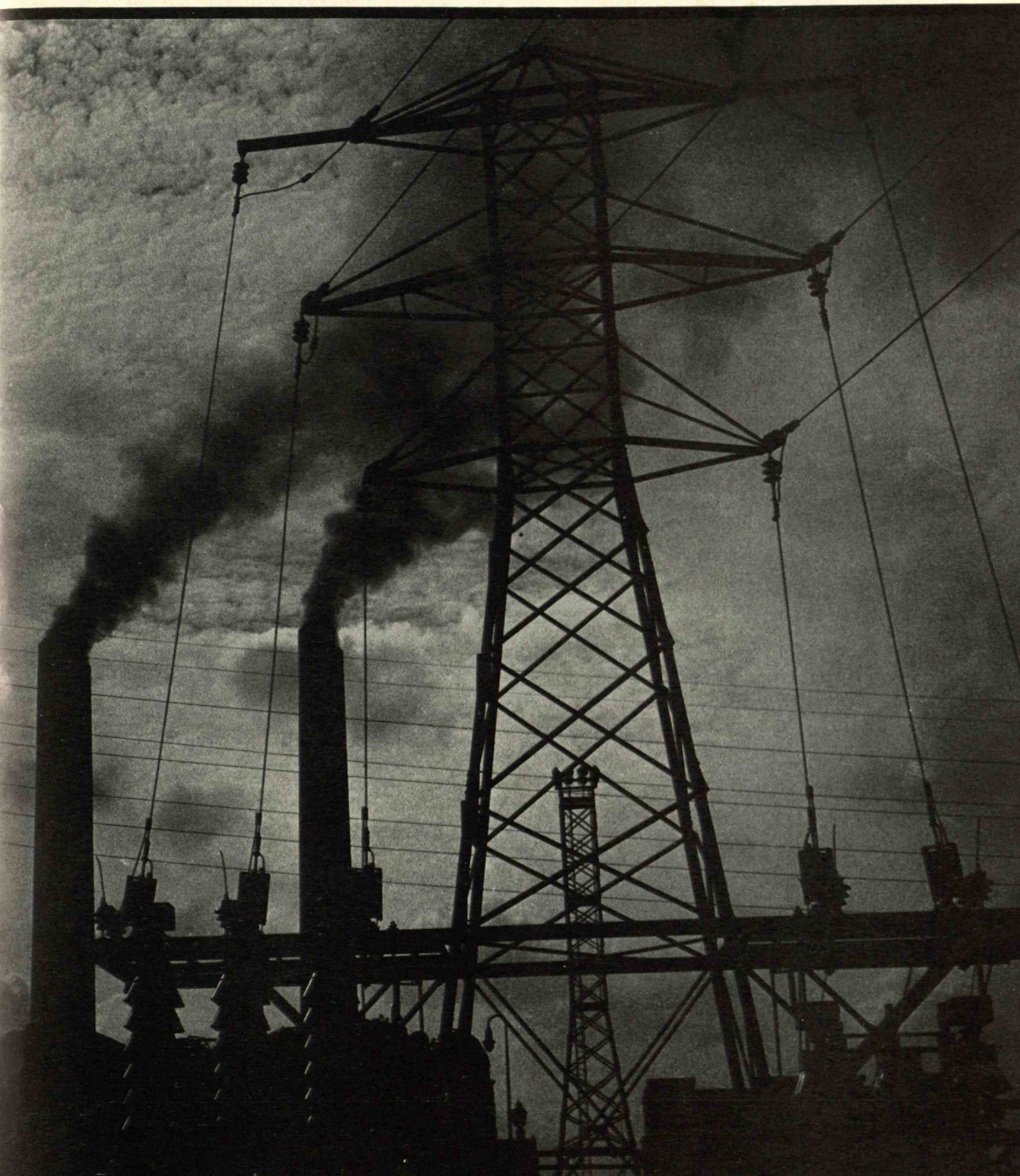

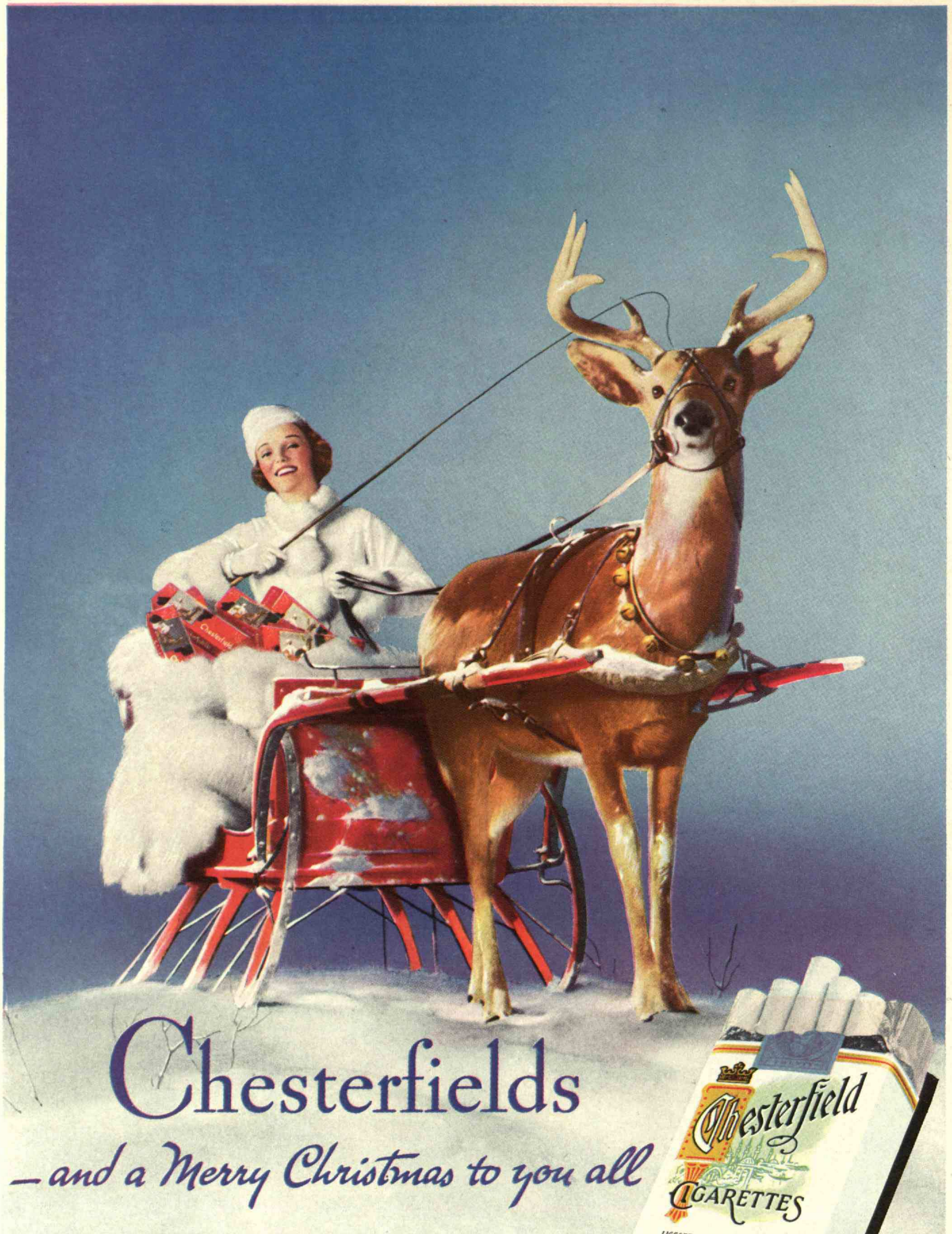

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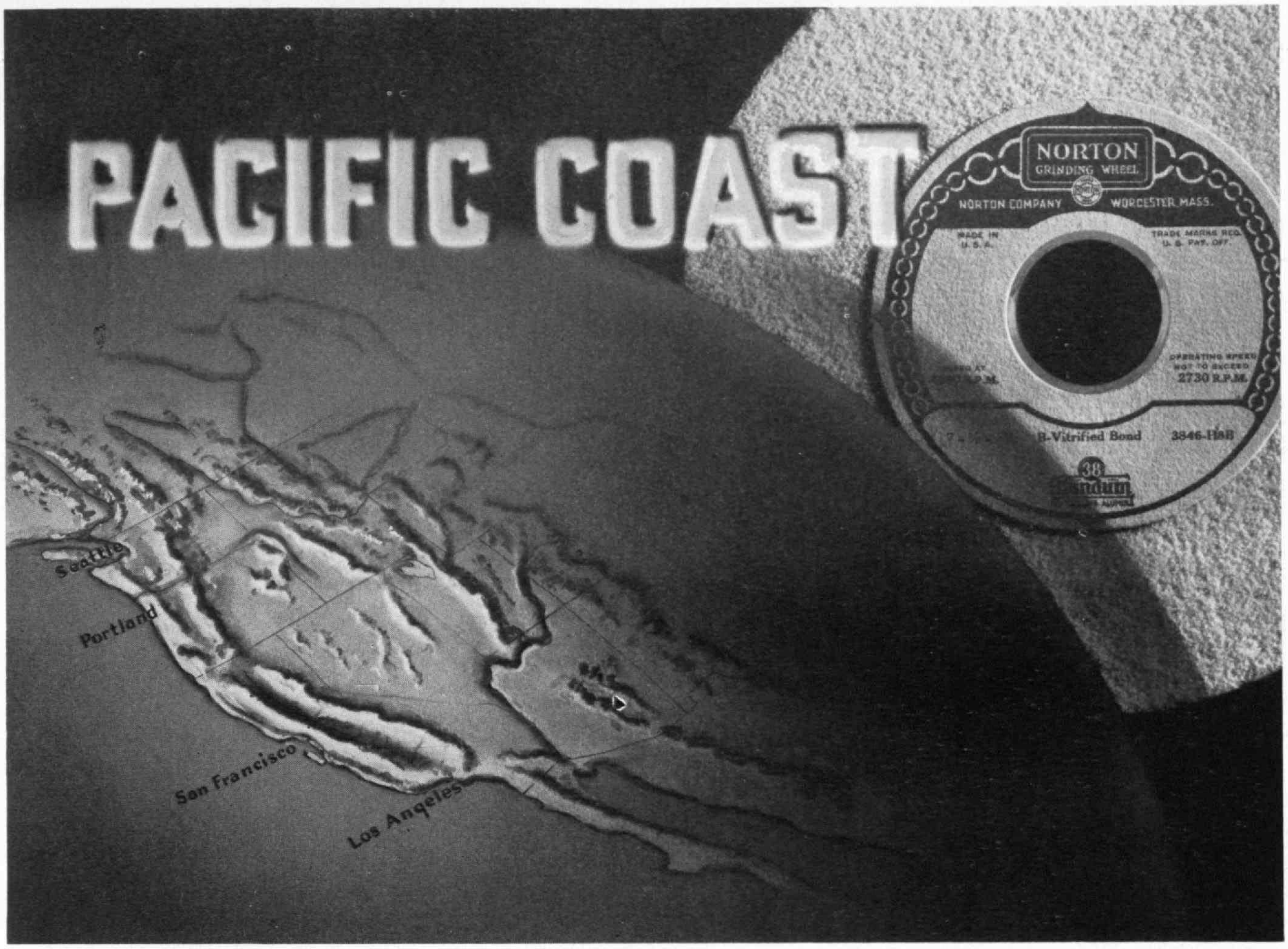
THE TABULAR VIEW

AS indicated in his article, CHARLES CAMSELL, '09, has more than a professional interest in the Canadian Northwest. He was born at Fort Liard and, early in his career, explored and prospected the Mackenzie River basin, experiencing all the privations and disappointments that fall to the lot of prospectors in the far North. He joined, in 1900, a geological party to Great Bear Lake as a handy man, and it was on this expedition that were first seen and reported the rocks stained with cobalt blue and copper green which later were to point the way to the discovery of the great radium ore deposits at Great Bear Lake. His able work on this expedition assured his success and he progressed rapidly, until, today, he is Deputy Minister of Mines of Canada. In recognition of his contributions to the development of the Dominion, His Majesty King George V recently made Dr. Camsell a Companion of the Order of St. Michael and St. George.

BORN in London and educated in Switzerland, France, and England, DR. LYDIARD H. W. HORTON received his A.B. from Williams College in 1901 and graduate degrees from Columbia University. Besides medical study at Harvard and the University of Pennsylvania, he worked with the late William James. From 1912 to 1920 he collaborated with Dr. Morton Prince on the *Journal of Abnormal Psychology.* At the present time, he is a consulting psychologist in Boston.

AS a research associate in electrical engineering at the Institute, J. WARREN HORTON, '14, is now working coöperatively with a Boston hospital on certain electrical problems related to medical diagnosis. For over 20 years he has been engaged in electrical engineering; 12 of these years were spent with the Bell Telephone Laboratories working on carrier telegraphy and telephony problems, frequency measurements, and television development, and, before coming to the Institute, he was chief engineer at the General Radio Company. ℂ Since the earliest known bookplate was presented to the Carthusian monastery at Buxheim, Germany, in 1480, there has probably been no greater enthusiast for the art of bookplate designing than ELISHA BROWN BIRD, '91, some of whose bookplates appear on page 104 of this issue. Mr. Bird commenced his serious work on bookplates soon after his graduation from the Institute, where he was on the editorial board of *Technique.* His first job was as cartoonist with the Boston *Herald,* and he was the first artist in America to sketch baseball games while they were in progress. Some 16 years ago he went to New York, where, in addition to his bookplate work, he is promotion designer for the New York *Times.* In 1934 a book containing a complete description of some 400 bookplates designed during his career for the libraries of book lovers the world over, together with reproductions of the most distinctive, was published in Washington. For over a decade Mr. Bird has been President of the American Society of Bookplate Collectors and Designers.



COAST to COAST—New England to the Northwest, Southwest—the Grinding Wheel has cut its trail. Follow Norton Abrasives to the virgin forests of the Northwest, to the great shipyards of the Pacific, to every lumber camp and every machine shop up and down the coast.

In the making of the great tractors and log handling machinery of the forests the Grinding Wheel has done its part. Giant ten-ton Pulpstones (Norton Abrasives) are converting logs into wood pulp, your daily newspaper. Grinding Wheels and Sharpening Stones are servicing the giant saws and the keen axes that work up the huge timber. It would be an interesting story could we relate here in detail how Norton Abrasives serve the metal industry and the glass industry as well as lumber, how Norton Refractories aid in handling heat in the great heat treating plants, how Non-slip Floors and Stair Treads provide safety in the modern buildings of modern cities.

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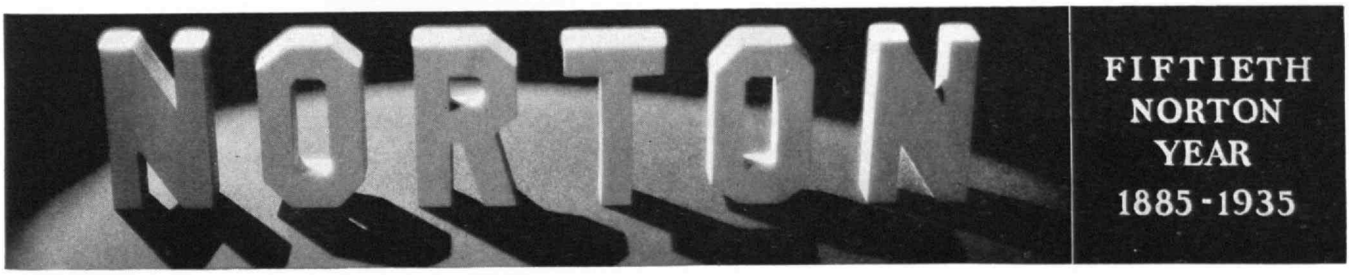

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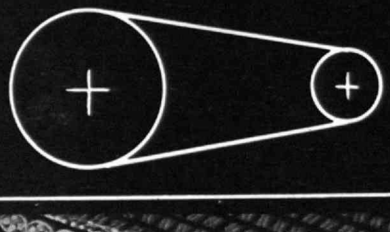
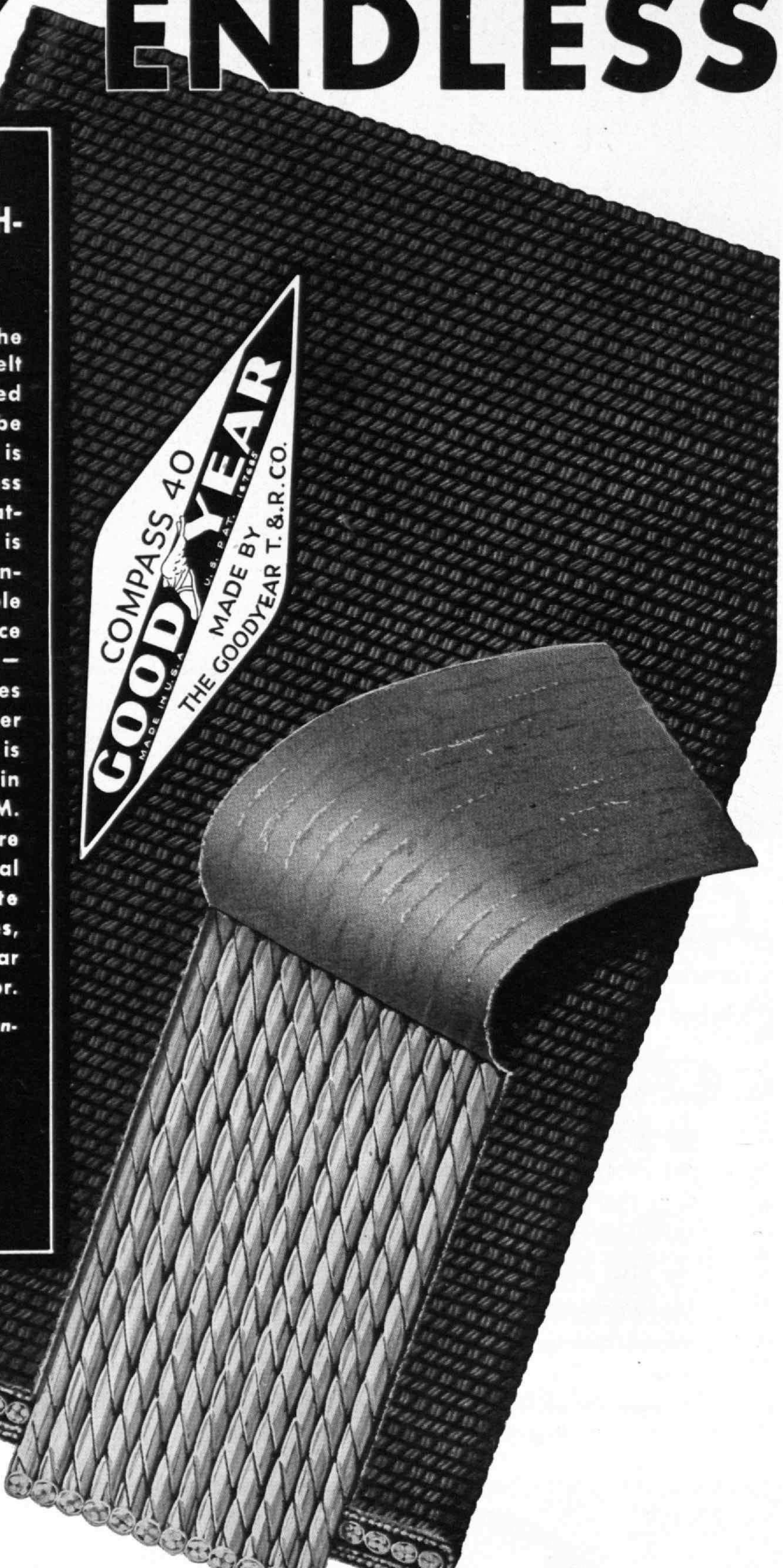
—THE PERFECT BELT FOR HIGH-SPEED INDUSTRIAL DRIVES

This photograph shows you why the Goodyear COMPASS (Cord) Endless* Belt stands alone on modern high-speed drives where STRETCH and SLIP cannot be tolerated. It has no splice! The load is carried by a layer of heavy endless cords, spiralled continuously — a patented Goodyear construction that is PRACTICALLY STRETCHLESS! The cords are encased in a sturdy fabric envelope, double on pulley side, that takes the surface wear. No more flexible belt is made — even on high-speed, small pulley drives COMPASS often lasts up to 10 times longer than other belts. And every COMPASS is individually specified to your drive, in the correct size and weight, by the G.T.M. — Goodyear Technical Man — to insure perfect performance. Let this practical belting expert advise you — write Goodyear, Akron, Ohio, or Los Angeles, California — or the nearest Goodyear Mechanical Rubber Goods Distributor.

**Goodyear Compass Belts can also be vulcanized endless right on the job.*





BELTS
MOLDED GOODS
HOSE
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MADE BY THE MAKERS OF GOODYEAR TIRES

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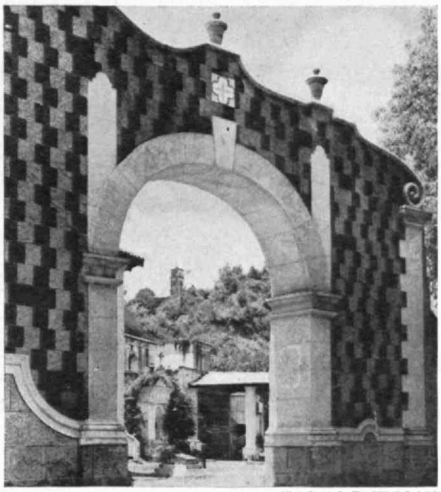

Frederick B. Wolf, '28

Gate to the yard of the church on Sacre Monte, Amecameca, Mexico

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THE COVER

From a photograph by Alexander Piaget

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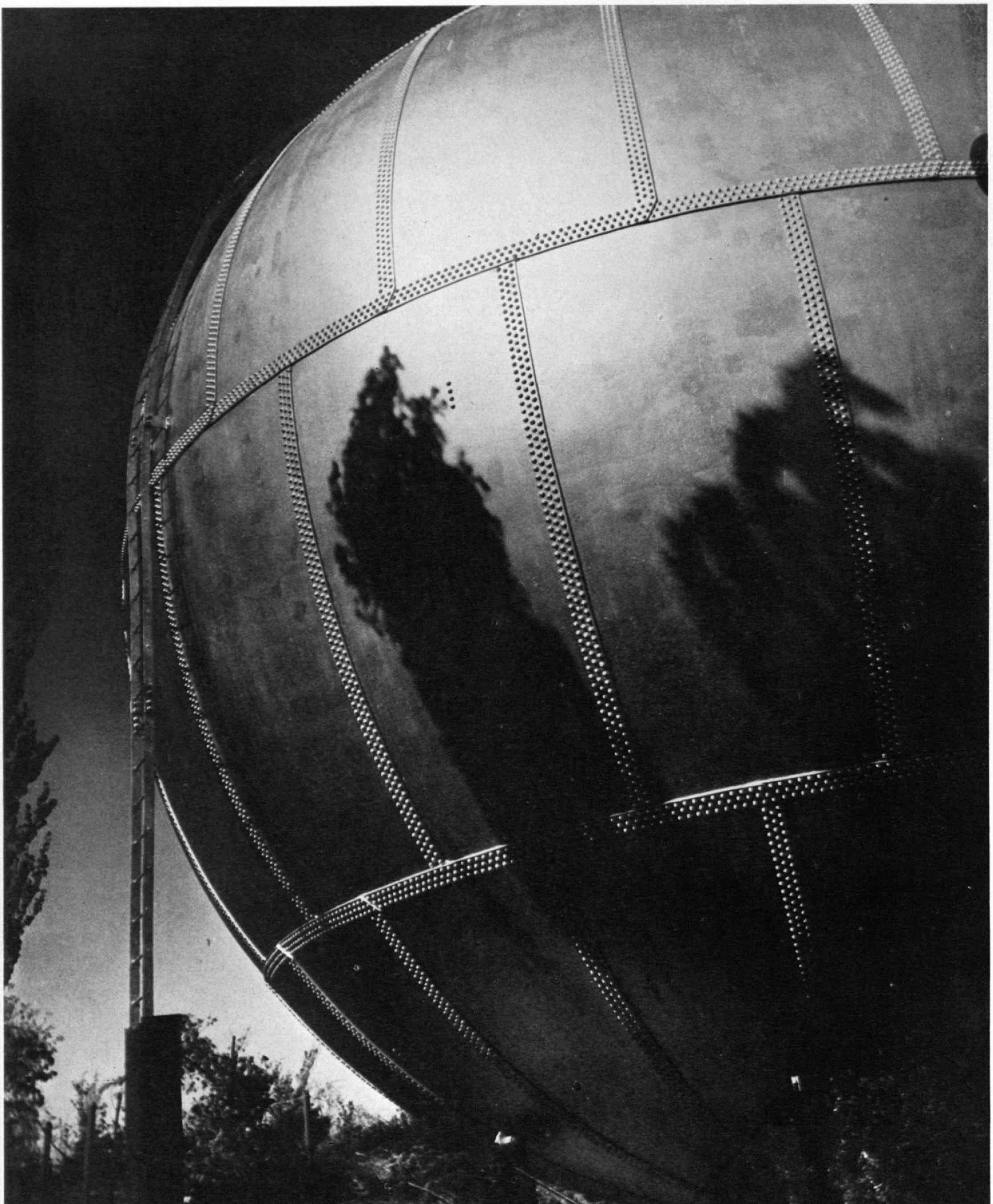

Spherical Gas Reservoir, University City, Mo., from a photograph by Alexander Piaget

THE

TECHNOLOGY

REVIEW

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The Trend of Affairs

Waterproof Mortar

A DUCK'S back is proverbial for its ability to shed water. The roof of a house also sheds water, but nevertheless, it is wetted by the rain. The remarkable thing about the duck's back is that the water doesn't wet it.

A number of common things have the property of not being wetted. Mercury doesn't wet glass and water doesn't wet oiled silk. It doesn't wet lycopodium powder or zinc stearate, which can be purchased at the drug stores in shaker-top containers and has now become a familiar material in the household where it is used for toilet purposes. Water doesn't wet fats, which are mixtures of glyceryl stearate, palmitate, oleate, and similar substances; and it is well known that it doesn't wet the stearates, palmitates, and similar salts of the common metals, such as zinc, copper, and lead. It is lead oleate which causes surgeon's plaster to stick to the skin and, at the same time, makes it resistant to the effects of moisture.

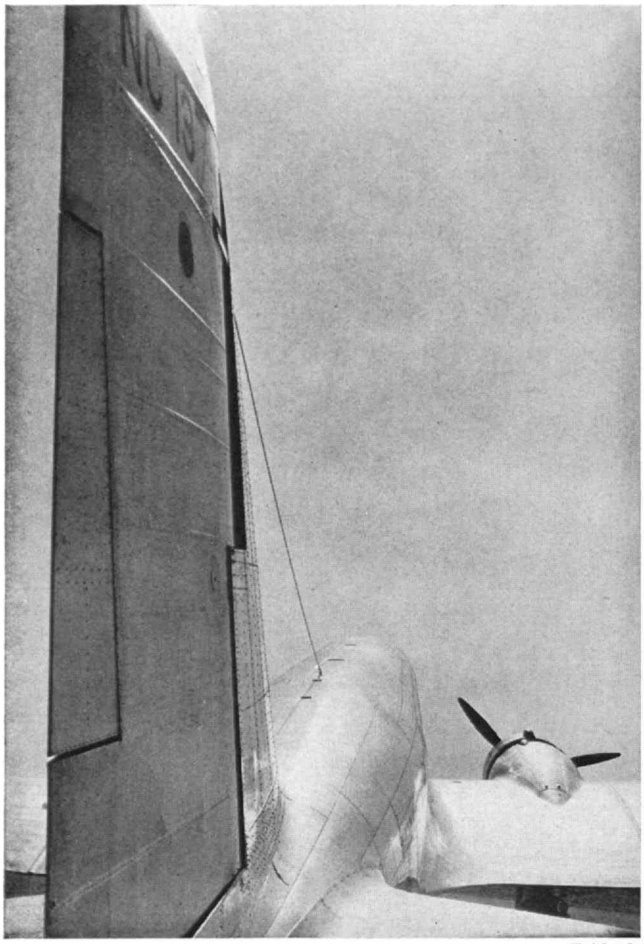
To pick up a silver dollar from the bottom of a pail full of water without wetting the fingers or hand while doing it is an amusing experiment. The feat may be accomplished easily if a generous amount of lycopodium or of zinc stearate is sprinkled on the water before the attempt is made.

The fact that brick walls absorb water presents a serious problem to the architect. Moisture gets through them. The bricks, made from burnt clay, are always somewhat porous and contain capillary passages which retain moisture and transmit it into the interior of the wall. The mortar, which commonly comprises about 20% or 25% of the wall, is made from lime and water with the addition of sand and, sometimes, of hair or other binder. It is wet to start with. During the process of setting, the water evaporates and the quicklime combines with carbon dioxide from the air to form calcium carbonate, a dry substance, but one, however, which may be wetted. More than 50% of the water which gets through a brick wall is reported to be carried by the mortar.

Architects have met the difficulty by what might be called mechanical devices: by building into the walls, behind the outer course of brick, flashing of lead or other metal, or, as in certain recent construction, a flashing of waterproofed canvas. They have lately combated the difficulty by chemical means — by a waterproof mortar (it sounds like a contradiction in terms) which contains calcium stearate or calcium soap, a material which sheds water like zinc stearate or the back of a duck.

Fats, being mixtures, as already noted, of glyceryl stearate, oleate, palmitate, and so on, are attacked by hot solutions of alkali; glycerine is liberated and the fatty acids combine with the alkali to form soap. If the alkali is soda, the result is hard soap; if potash, soft soap; if lime, calcium soap. Now, quicklime produces much heat when it reacts with water — here is our hot alkaline solution — and the slaking of quicklime with water is precisely the process of the preparation of mortar. *Et puis, voilà.*

While the burnt lime is being ground for shipment, an atomized fat, animal or vegetable oil, is introduced in small amount and mechanically mixed with it. When the lime is slaked at the site of the building operations, the fat is converted into calcium soap. When the mortar sets, it is waterproof. The procedure is as simple as the egg trick of Christopher Columbus, so simple, indeed, that one wonders how it happened to be thought out. It constitutes another example of that simplicity which in science and invention is closely akin to genius.



Fairbanks

The beauty of functional form in engineering design. ABOVE. *The modern transport plane.* RIGHT. *Shaping a blower rotor for a Diesel engine*

Toward Quicker, Stronger Concrete

AS the chemists improve mortar, other investigators are aggressively studying ways of producing concrete that dries more quickly and that is stronger and more dense. By conventional methods the water used in mixing concrete is eliminated only by initial hydration and subsequent drying, a process which always causes shrinkage, and frequently induces cracking and weakening in the structure of the concrete. The time required for hardening, which is so directly related to water loss, is, furthermore, an economic factor of great importance in the speed and cost of construction.

The trend of research is toward elimination of coagulation of the fines, which causes insufficient hydration of the cement used, and the elimination of "water gain" around the aggregate. The methods of attack include three possibilities: elimination of excess water either by dispersion, evacuation, or pressure.

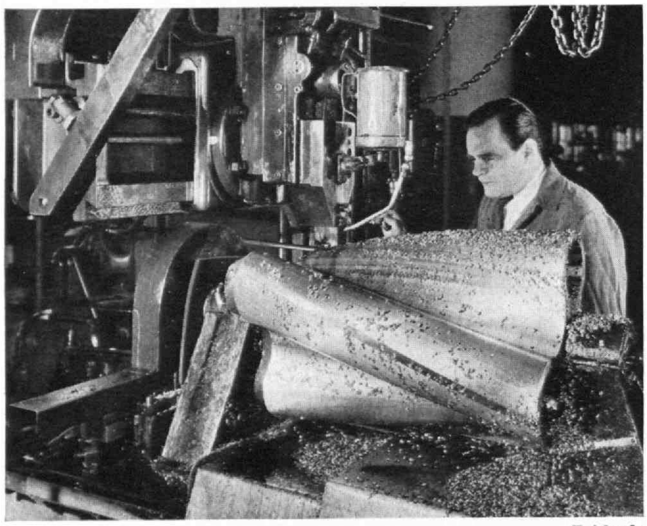
Successful results have already been accomplished by dispersion methods, and recently Karl Paul Billner, a civil engineer of New York, demonstrated at Yale University a method of extracting water from concrete by a vacuum process. Concrete made by this method is said to harden in less than half an hour and, because of the pressure induced by vacuum withdrawal of water, is compacted to a mass of unusual density. The densifying of concrete by pressure, the third possible method, is an old process, yet worthy of further study.

In the Billner method, which must face the tests of practical field operations and the scrutiny of the chemist, an air-tight cover is placed over the concrete mixture immediately after it is cast and a vacuum created between the concrete and the cover. The excess water thus drawn from the plastic mass is disposed of in a collecting tank. Concrete produced by this method is claimed to be from 30% to 100% stronger than that made by the conventional methods of slow drying.

Many engineers, despite the Billner demonstration, still feel that dispersion holds the greatest promise for practical field use, and extended research is under way to determine feasible ways of applying it.

Tomorrow's Shingles

FROM Britain comes a new development in the asbestos-cement field which, if costs are reasonable, may be of importance to the building industry. In spite of all their good qualities, thin asbestos-cement sheets, as now made, are unquestionably brittle. The British invention, by a Mr. Cyril Froude Langworthy, undertakes to correct this by the use of a central core of 28-gauge, normal, galvanized steel. This core is stabbed with holes on one-quarter inch centers and then dipped in bitumen. Asbestos-cement composition is performed by the usual methods. While wet it is applied to both sides of the stabbed steel core and the whole is subjected to a pressure of two tons per square inch. Colors and textures usual in the industry are, of course, readily obtainable.



Fairbanks

The product has emerged from the laboratory and costs have been tested on a commercial-sized plant, but are not yet quoted. It will be marketed in Great Britain under the name Durasteel, beginning this month. No effort has yet been made to introduce the product commercially in this country, but advance samples are strong and most attractive and indicate that the sponsors have quite likely obtained a fireproof, acidproof, noncorrodible, and permanent roofing