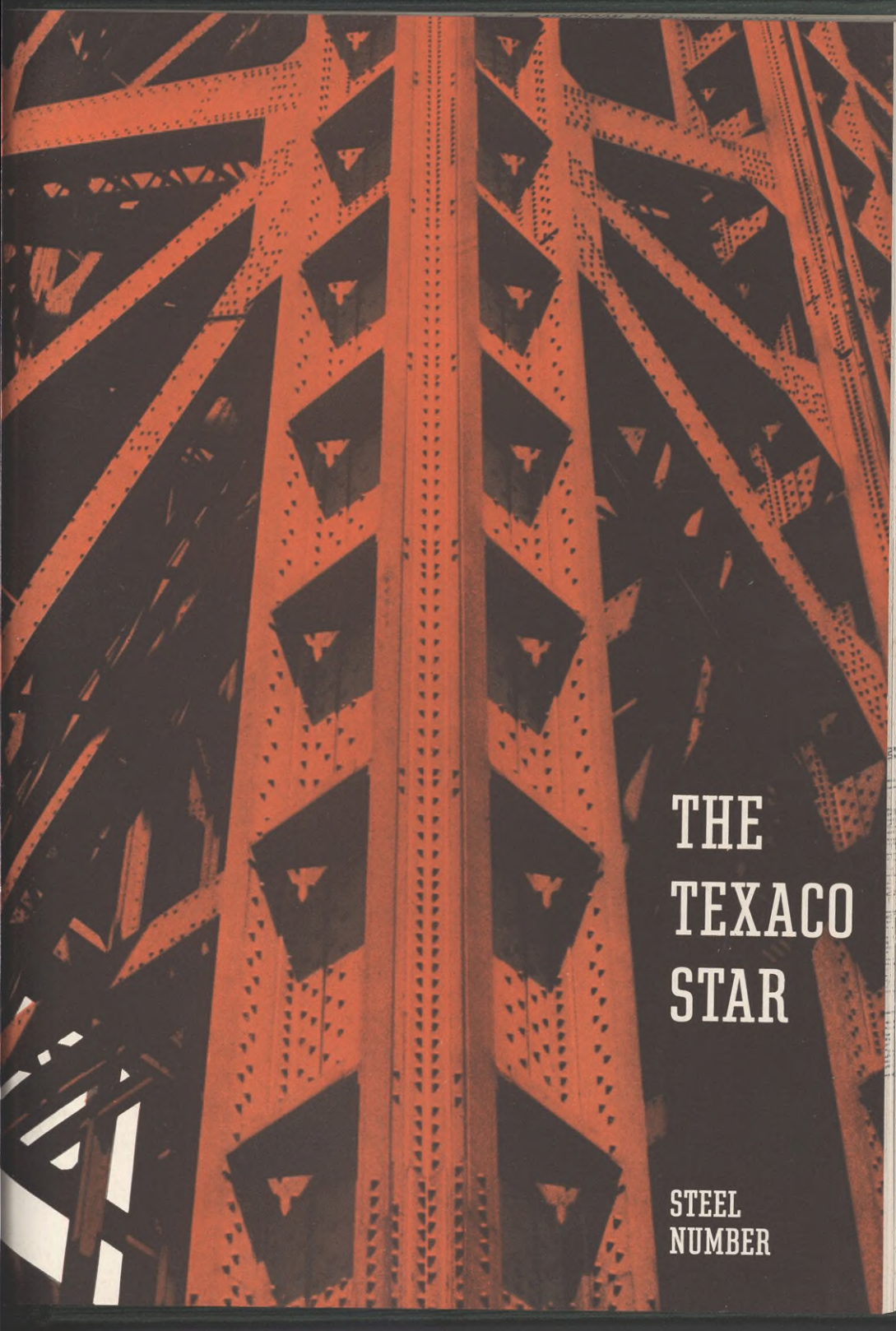
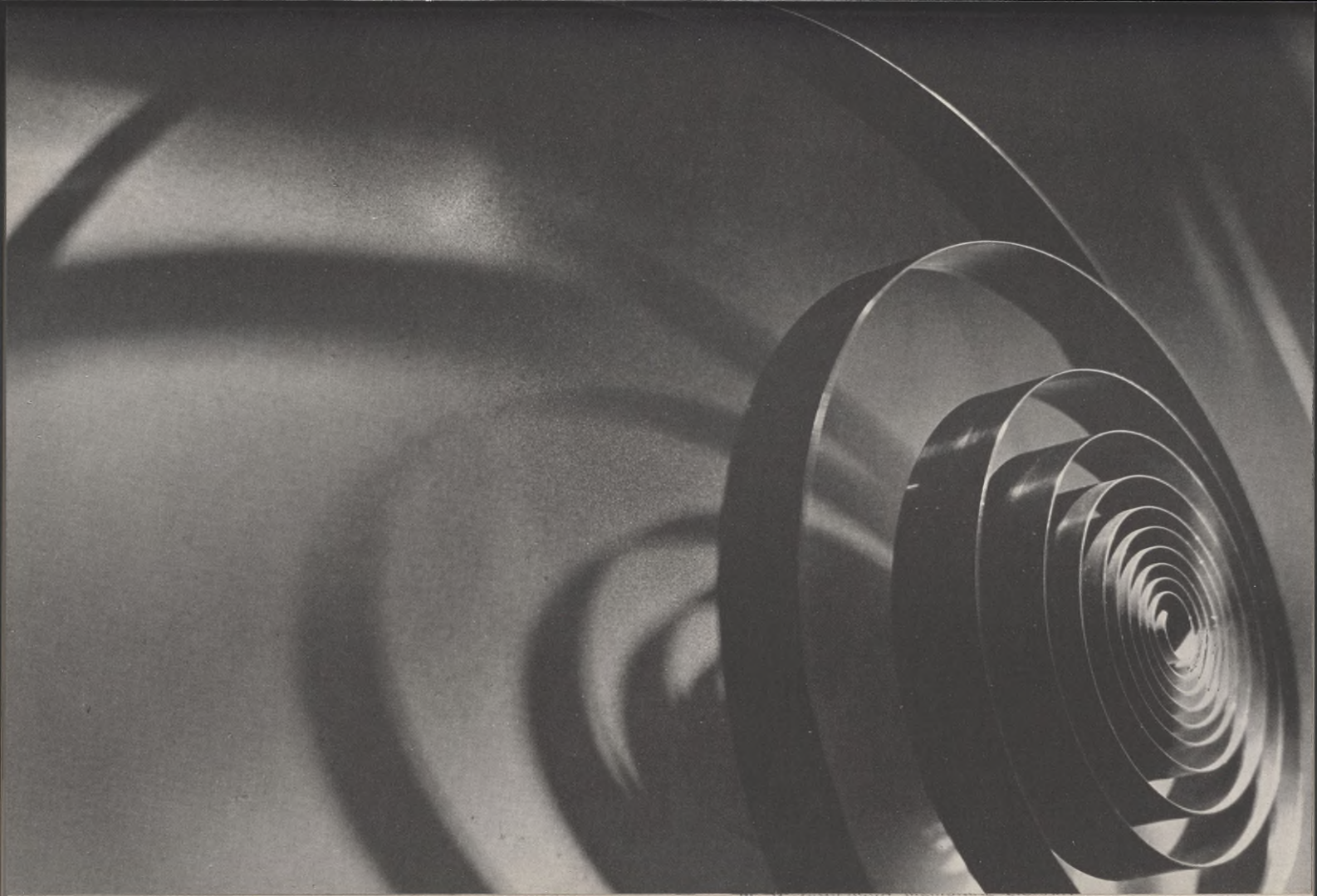


THE TEXACO STAR

STEEL NUMBER



THE TEXACO STAR

Steel Number

VOLUME XXIII NUMBER 4

Front cover illustration
BY HARRY TABOR
Inside front cover illustration
FROM R. I. NESMITH & ASSOCIATES

A PUBLICATION OF THE TEXAS COMPANY

For distribution to employes and stockholders. To others interested, the subscription price is one dollar per year

DIRECT ALL COMMUNICATIONS TO THE EDITOR OF THE TEXACO STAR
135 EAST 42ND STREET, NEW YORK CITY

★ Sheet and strip steel production in 1935 was the highest in the steel industry's history. Combined output of these products last year was 45 per cent higher than 1934 production.

★ About 27 million tons of steel are in service today in the buildings and transportation facilities of Manhattan Island, New York City.

Brief
AND TO THE POINT

★ Nearly half a million men and women own steel-company securities in this country. Sixty-four per cent of these stockholders, many of them employes, own less than 20 shares each, while nearly 88 per cent hold less than 100 shares each.

★ The steel industry today is providing employment for nearly 48,000 more men than in 1929. Average wage rates in the industry are currently higher than the 1929 level.

★ Steel is produced today in the form of more than 500 different products, manufactured in as many as 100,000 combinations of shape, size, finish, and analysis.

★ Total payrolls of the steel industry during the first six months of this year amounted to more than $344,000,000—about 28 per cent higher than the payrolls in the first half of last year.

★ Iron ore is found in nearly every country in the world. The supply in the United States is so vast that estimates of the quantity vary by billions of tons.

★ It takes about two tons of iron ore, a little less than two tons of coal, and about 400 pounds of limestone to produce one ton of steel.

★ The amount of steel in use today is about one billion tons—17,000 pounds for every man, woman, and child in the United States. In 1900 the figure was only 2,600 pounds.

ROBERT DUDLEY SMITH

The value of the steel industry's products last year was more than a billion and a half dollars

Armor of King Henry VIII in the Tower of London BROWN BROTHERS

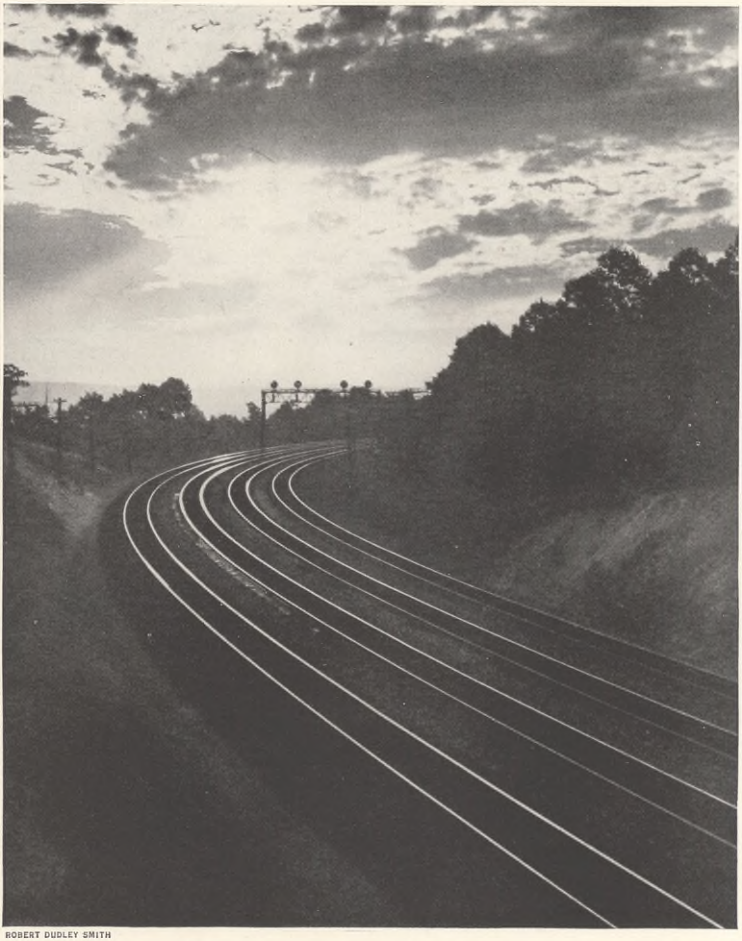
STEEL

I—History and Development

OUR OLD friend, primitive man, has left no record as to where, when and how he discovered the properties and uses of iron. Perhaps he built his campfire on an outcropping of red earth—iron ore—and was mystified to discover rough, metallic nuggets reposing in the ashes along with his roast potatoes. Possibly he stumbled on a meteor and found it malleable under the blows of his stone hammer.

At any rate, archaeological remains of nearly every country of the Old World tell of the manufacture and use of iron. The Bible relates that Tubalcain, seven generations from Adam, was a "forger of every cutting instrument of brass and iron." The three oldest pieces of wrought iron in existence are thought to be a sickle blade found under the base of a sphinx in Karnak; a sword blade, probably 5,000 years old, found in one of the pyramids, and a portion of a saw found at Nimrod and made about 880 B. C.

Iron, in the form of small bars, was used for currency in England in the second century B. C. The fame of Damascus blades and Moorish armor of the Middle Ages still lives. There is no evidence that the North American Indian was familiar with smelt-



ROBERT DUDLEY SMITH

The growth of the railroad afforded an important outlet for America's iron and steel

ing iron or in any way extracting it from the ore. The Indians did know meteoric iron, and the Aztecs of Mexico possessed knives, daggers and arrow heads made from it.

The history of iron and steel in America begins in 1585 with the discovery of iron ore in North Carolina by an expedition fitted out by Sir Walter Raleigh. Iron was not made in North Carolina, however, until after several other colonies had begun to make it.

In 1608 iron ore was first exported from America by the Virginia Company. In 1619 the Virginia Company sent John Berkeley with a company of 22 skilled iron workers to set up iron works in the colonies. They built a forge at Falling Creek, Virginia, but before the project was completed Berkeley and all his men were slain by Indians. No further attempt was made until 1645 when an enterprise was established at Saugus, Massachusetts, by the "Company of Undertakers for the Iron Works," consisting of 11 English gentlemen under John Winthrop, Jr. The furnace erected in Saugus made about eight tons of iron per week. Soon forges sprang up throughout eastern Massachusetts, and for nearly a century after its settlement in 1620, the Bay State was the chief center of iron manufacture in America. In 1724 probably the first steel manufactured in America was made in Connecticut by one Samuel Higley of Simsbury.

Widely credited with being America's first in-

R. I. NESMITH & ASSOC.

Boned and sinewed by steel, the skyscraper is a triumph of modern engineering

dustrial development, a lonely, mountainous section which is today within view of New York's skyscrapers was the birthplace of many inventions which helped the steel industry to its present eminence. About 1737 iron was being mined in the Ramapo Mountains on the New York-New Jersey border, a few miles west of the Hudson River. Twenty-five years later a group of British capitalists considered the location a good source of iron for the United Kingdom, formed the American Iron Company, and employed a German, Peter Hasenclever, to work the mines.

By 1765 more than 500 Germans were scattered over 50,000 acres about the mines at Ringwood, New Jersey. Practically lord of a feudal estate, "Baron Hasenclever" lived in regal elegance surrounded, according to half-legendary tales, by numerous servants and eating from gold plates.

The American Iron Company failed before the Revolution, and Robert Erskine, who became George Washington's surveyor general, succeeded Hasenclever.

A few miles from this spot, at Ramapo, three men who bore the names of Josiah, Jeremiah, and Isaac Pierson set up a foundry in 1795. Jeremiah is credited with the invention of cut nails, and developed a machine for heading and slotting screws by a process which remained in use until the twentieth century.

The skill which American iron makers achieved

YOUNGSTOWN SHEET & TUBE CO.

Before the development of the Bessemer process in 1856, steel was so costly that it was used only for cutlery, tools, and other articles requiring small quantities

and the importance of the industry to the colonies were demonstrated in the Revolutionary War by the great chain made in 1778 at the Sterling Iron Works near West Point, New York. This chain, weighing 180 tons and nearly a mile long, was stretched across the Hudson River at West Point to prevent the passage of British men-of-war. It did so, successfully.

Up to 1824, the American industry had been suffering from severe competition from European furnaces, but in that year the first real protective tariff favorable to the steel industry was passed. This added protection and the increasing growth of the home market did much to establish the industry securely.

But there was need for some great outlet for the iron and steel which America was producing. That outlet appeared in the form of the railroad. In 1834, the first heavy iron rails produced in this country were rolled at the Mount Savage Rolling Mill in Allegheny County, Maryland, and for a number of years railroad construction consumed the greatest tonnage of iron produced.

The discovery of high-grade ores in New Jersey, Pennsylvania, and New York started the industry in its westward march from New England. Pittsburgh began to emerge as a natural iron manufacturing center about 1800, and soon afterward the rich beds of Pennsylvania coking coal were opened.

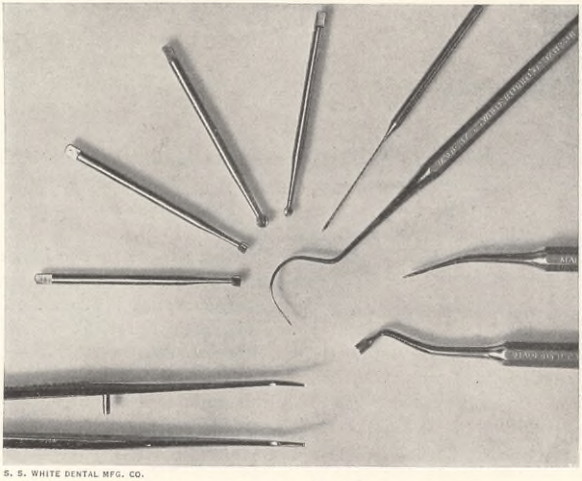
The nationwide industrial expansion of the 1870's and '80's caused the steel industry to surge forward rapidly. Prior to 1860, only a small part of the pig iron produced in the United States was converted into steel by the expensive crucible process. Steel was so costly that its use was limited to cutlery, tools, and other articles requiring small quantities. With the development of the Bessemer process after 1856, the price of steel became so low that its use expanded greatly, and the railroads began to lay their new tracks with steel rails.

The financial history of the iron and steel industry is much like that of any other industry. In the early days, companies were privately owned. Later, when it became necessary to secure additional capital, bonds and preferred stock were issued. When the modern corporation came into existence and efficient methods of manufacturing and distribution were developed, common stock was offered to investors.

The importance of steel in our every-day life is often overlooked. Yet almost without exception, the necessities, conveniences and luxuries of modern life are either made of steel or made possible by steel.

Our daily home life is intimately connected with steel. We rise in the morning from a bed of steel springs, take a shower in water brought to us part of the way by steel pipes, dress in clothes made on steel machinery, sit down to breakfast, most of the ingredients of which were preserved in a steel refrigerator, cooked on an enameled steel gas or electric stove, served on a table made by steel machinery, and perhaps even eaten with steel knives and forks.

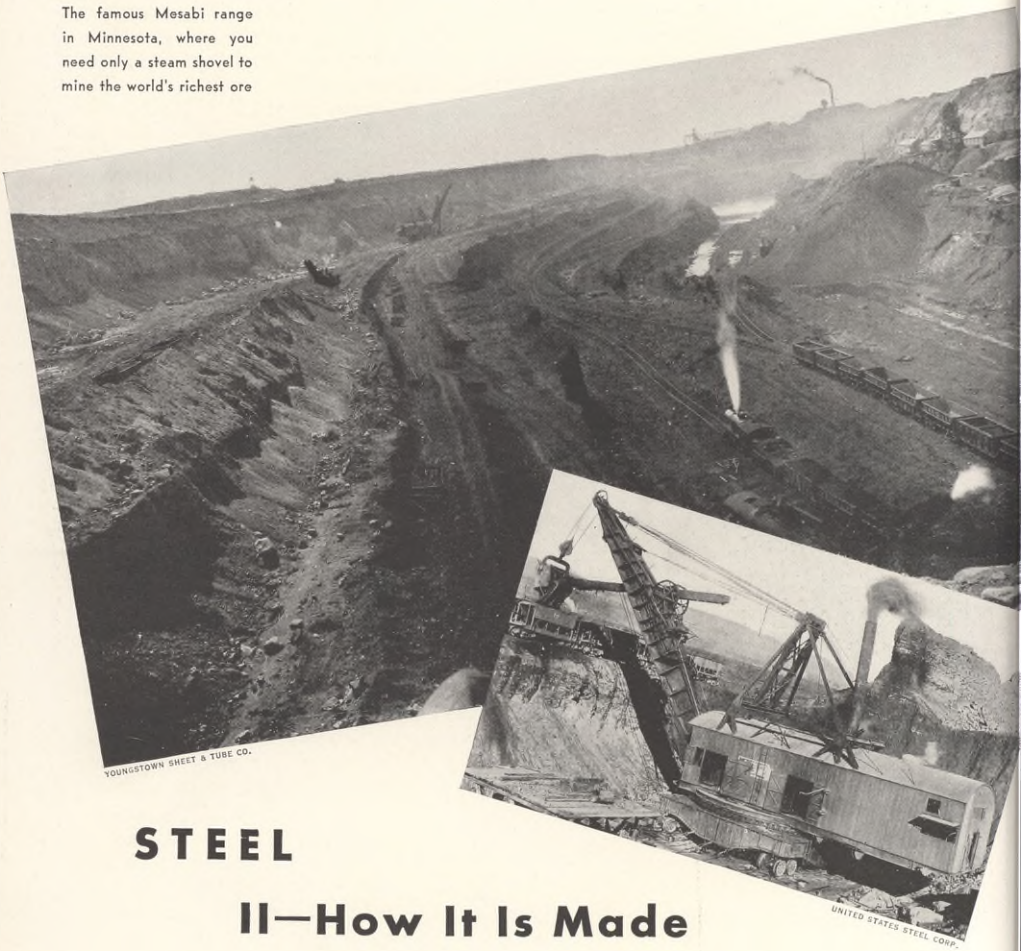
The direct economic value of steel is important. There is nearly $5,000,000,000 invested in the industry and the value of its products last year was more than a billion and a half dollars.



S. S. WHITE DENTAL MFG. CO.

Your dentist uses tools of the finest surgical steel

The famous Mesabi range in Minnesota, where you need only a steam shovel to mine the world's richest ore



YOUNGSTOWN SHEET & TUBE CO.

UNITED STATES STEEL CORP.

STEEL

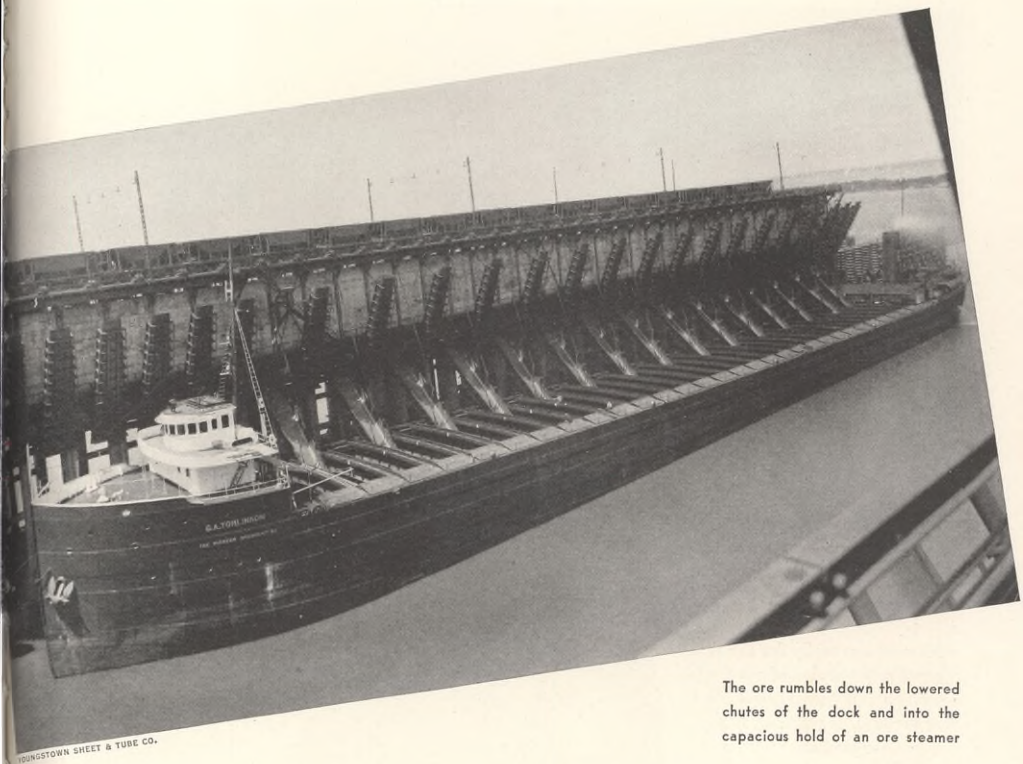
II—How It Is Made

TO MAKE STEEL you must have iron. To make iron you need iron ore. And having found your iron ore, all you need is a few million dollars and several thousand of the most highly skilled workmen in the industrial world today to set yourself up in the steel business.

The world's supply of iron ore is plentiful. About 80 per cent of the ore used in this country is a reddish-brown substance called hematite. This ore is oxide of iron (really iron rust) mixed with dirt. Iron ore is mined in 28 states, but for many years the most valuable deposits have been those of the Lake Superior district in the so-called "ranges" of Michigan, Wisconsin, and Minnesota. The famous Mesabi Range in Minnesota yields more ore than any other deposit in the world. Moreover, Mesabi ore averages between 50 and 60 per cent iron. Two tons of this ore, smelted, produce one ton of iron.

Secondly, Mesabi ore lies close to the surface, so that to mine it you need nothing more complicated than a steam shovel. Thirdly, Mesabi ore deposits are only about 50 miles from the Great Lakes, which means that the ore can be moved cheaply.

Iron was discovered in the Mesabi Range in 1889. Today Mesabi supplies nearly 60 per cent of all the ore mined in the United States. Since 1902, nearly 900 million tons of ore have been taken from this range. Mined by steam shovel, it moves by rail to Duluth and Superior, thence by boat to the lower lake ports.



The ore rumbles down the lowered chutes of the dock and into the capacious hold of an ore steamer

YOUNGSTOWN SHEET & TUBE CO.

The area around Birmingham, Alabama, is the second largest commercial ore reserve in the United States. Birmingham lies in a narrow valley between two hills. Under the city is limestone, and on the west are coal fields. To the east is Red Mountain, with a billion or more tons of iron ore.

But ore alone will not produce iron in a blast furnace. Limestone must be used to free the ore from silica. Coal, in the form of coke, frees the ore of its oxygen, and more coal (or fuel oil) converts the iron into steel. Thus, four tons of coal, iron and limestone must be brought together to produce one ton of steel.

Your ore, having been mined, is now ready for the blast furnace. You can build a very nice blast furnace for about three and a half million dollars. But to convert your iron into steel you need an open hearth furnace, which can be built for as little as half a million dollars. Then, if you want to roll continuous strip sheets of steel, set aside another 15 million dollars for a rolling mill.

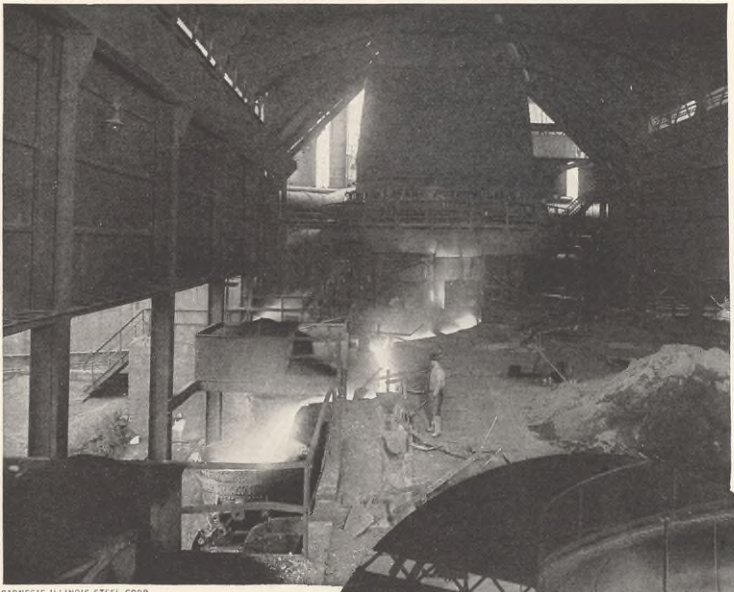
But let us return to the blast furnace. Here iron ore, coke, and limestone are "cooked" together. The scum which lies on top of the molten mass is called slag—it is calcium silicate, a product of the limestone and the silica from the ore. This slag must be drawn off before the flow of molten iron itself is tapped.

In some mills the iron is drawn from the blast furnace and cast in the form of bars (pig iron) but in most steel mills today the iron goes directly to the open hearth in a molten state.

At the open hearth furnace the iron loses most of its remaining impurities—silicon, phosphorus and sulphur. Later, carefully measured quantities of these and other substances will be put back into the furnace to give the steel the character desired.

Molten steel from the open hearth is poured into ingot molds. The ingot is to steel what a bolt of cloth is to a tailor—an unfinished material from which to make a finished, useful product. From the ingot is fashioned the hundreds of shapes and sizes the finished steel product is to assume.

The filled ingot molds are moved to a shed where the molds are stripped off and the ingots go to "soaking pits" to be heated to a uniform temperature.

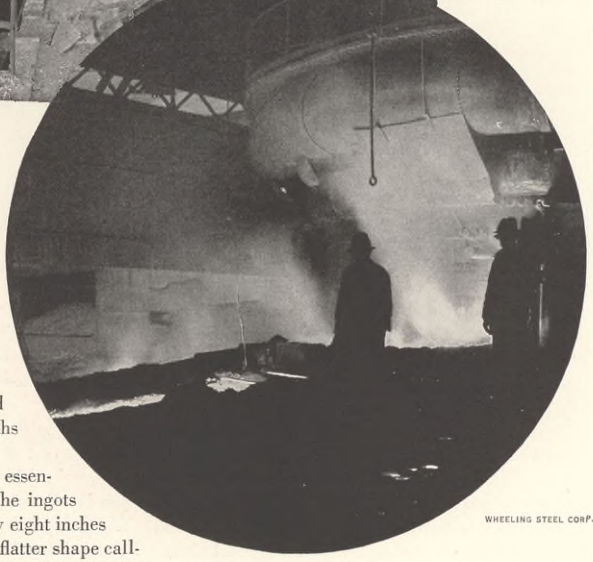


CARNEGIE-ILLINOIS STEEL CORP.

(Left) The ore is "cooked" with coke and limestone in the blast furnace and then the molten iron is tapped

★

(Below) In some mills the iron is drawn from the blast furnace and cast in the form of bars (pig iron)



WHEELING STEEL CORP.

Now we are ready for the rolling mills, the series of processes by which red hot slabs of steel pass through one pair of heavy rollers after another, each set of rollers so grooved and spaced that the steel is squeezed smaller and smaller until it reaches the desired shape and size. Sometimes an ingot of steel 25 or 30 inches square will be transformed into a length of wire three thousandths of an inch in diameter.

All rolling mills are alike in the essentials of this process. They crush the ingots into either a "bloom" (about six by eight inches in cross section) or into a thinner, flatter shape called a "slab." The rest of a steel mill consists of hundreds of similar rolls, interrupted only by furnaces where the steel is re-heated.

What has been termed the most important technological advance in steel making during the present century is the so-called "four-high continuous strip" rolling mill developed about 10 years ago. In old-style mills the sheets are rolled separately, passing back and forth between the rolls. The continuous mill is straight-line production applied to steel. An unbroken ribbon of steel passes through one stand of rolls after another, emerging thinner and longer after each successive set of rolls. The whole process must be perfectly synchronized. A roll going too fast will pull the steel out too thin and snap it; if it goes too slowly the ribbon of steel will bunch and buckle.

A continuous strip mill is expensive, but it rolls more than half a million tons of steel a year, and reduces costs from six to eight dollars a ton.

Any breakdown in the cost of steel must take into account the factor of human ingenuity, human labor, and human skill. The only workers in a steel mill

(Above) Charging molten pig iron into the open hearth furnace

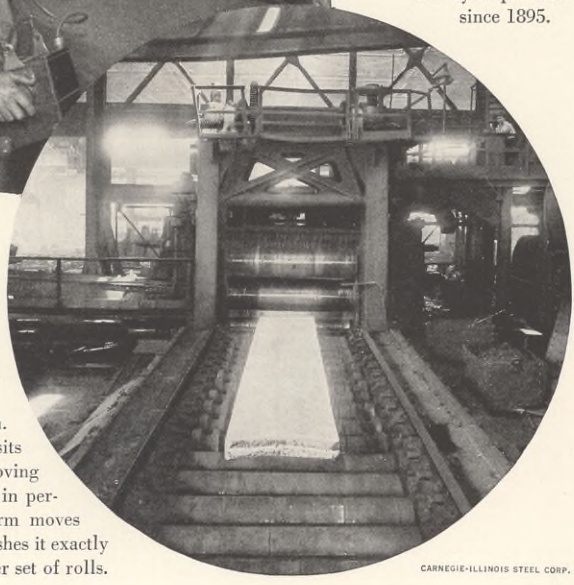
★

(Right) The ingot enters the first set of rolls as an observer reads its temperature

★

(Circle) The ingot is now a slab and moves to another set of rolls

BETHLEHEM STEEL CO.



CARNEGIE-ILLINOIS STEEL CORP.

who can properly be called "unskilled" are the sweepers and janitors. Semi-skilled workers nurse the moving steel as it slithers through the mill, operate the charger which rolls the bars into a re-heater furnace, or clip the steel into lengths as it leaves the rolls.

Above them come the real steel men. For example, the mill table operator sits at a control board and keeps six moving platforms of red- and white-hot metal in perfectly synchronized flow—one platform moves the steel into a set of rolls, the next crushes it exactly when it is ready and moves it to another set of rolls. Another man, the heater, must deliver the steel to the rolls at the exact temperature for rolling, neither too hot nor so cold that it will break the rolls. The aristocrat of the mill is the roller, whose skill is acquired only after years of work in a minor position. In the back of the mill, the head roller puts the rolls together, adjusts their openings to the exact shape the steel is to assume after each rolling.

As steel has contributed increasingly to higher standards of American living, it was only natural that the men who make steel should benefit accordingly. In 1895 steel men worked 12 hours a day. In 1911 the industry initiated a campaign to reduce the hours of work. In 1923, a basic eight-hour day was introduced, and in 1933, a maximum six-day week and eight-hour day were adopted as part of the steel code. Since the termination of the code, these provisions have continued in effect.

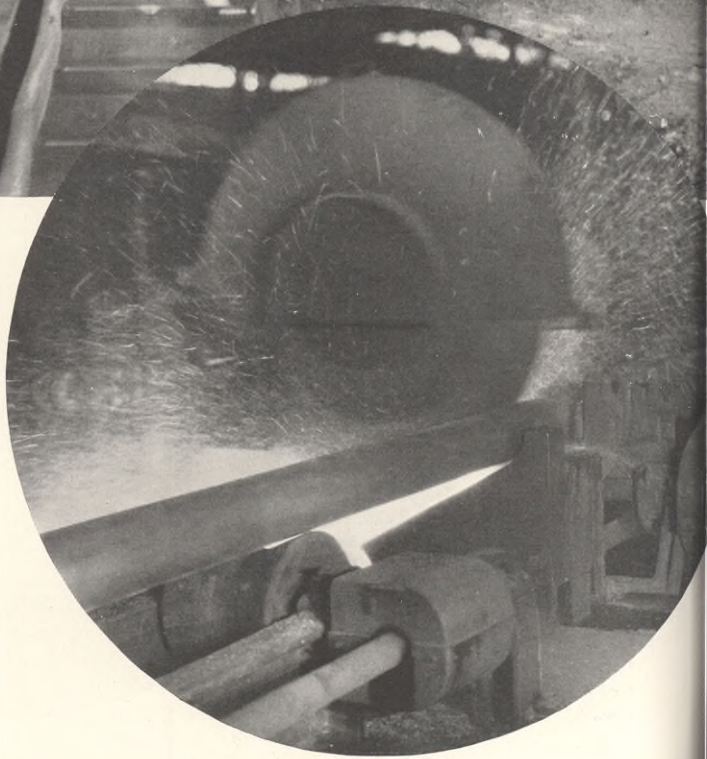
The years have brought similar improvements in wage rates. In 1895 the average hourly rate for United States steel workers was about 21 cents. From that day to this the rate has steadily risen. Today the hourly rate is 66.9 cents, an increase since 1895 of about 218 per cent. By comparison, the cost of living has risen only 82 per cent since 1895.

GULF STATES STEEL CO.

(Above) In the blooming mill the red-hot ingot of steel is crushed into a "bloom" (about six by eight inches in cross section) or into a thinner and flatter shape which is called a "slab"

★

(Right) Hot saws bite into seamless pipe, cutting it to the proper length with as little effort as a housewife would use in cutting a slab of butter

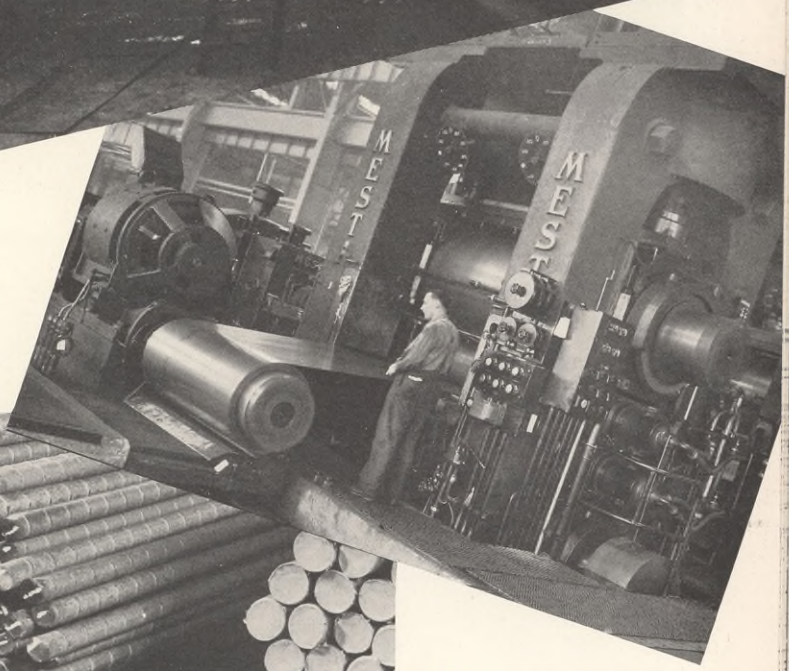


YOUNGSTOWN SHEET & TUBE CO.

THROUGH THE MILL

E-ILLINOIS STEEL CORP.

Steel railroad rails are sawed into lengths while they are still red hot



STEEL CORPORATION

(Above) A thin, gleaming ribbon of steel emerges from the cold strip mill of the Youngstown Sheet and Tube Company

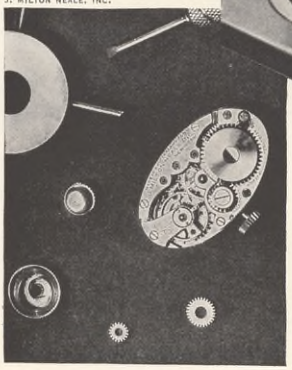
★

(Left) Products of steel mills range from huge 15-ton ingots to springs for wrist watches: Photo shows bar stock in storage

ALLEGHENY STEEL CO.

Thanks to stainless steel the modern kitchen bears little resemblance to the place where grandma bent her aching back

J. MILTON NEALE, INC.



(Left) Inside the gold case of your wrist watch are tiny miracles of steel construction

ALLEGHENY ST

FOR LADIES ONLY

New uses for stainless steel are being found constantly. At the left is shown a cocktail set, ash tray, and cigarette box made of this material

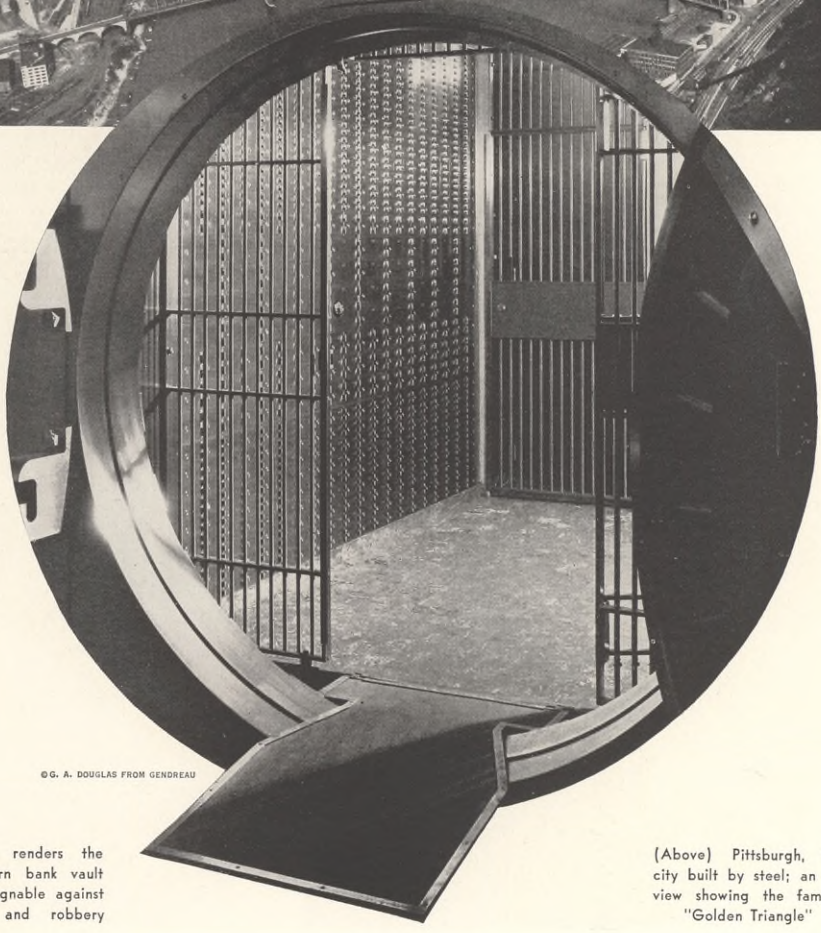
ALLEGHENY STEEL CO.

R. H. MACY & CO.

(Above) This attractive table ware is made entirely of stainless steel

★

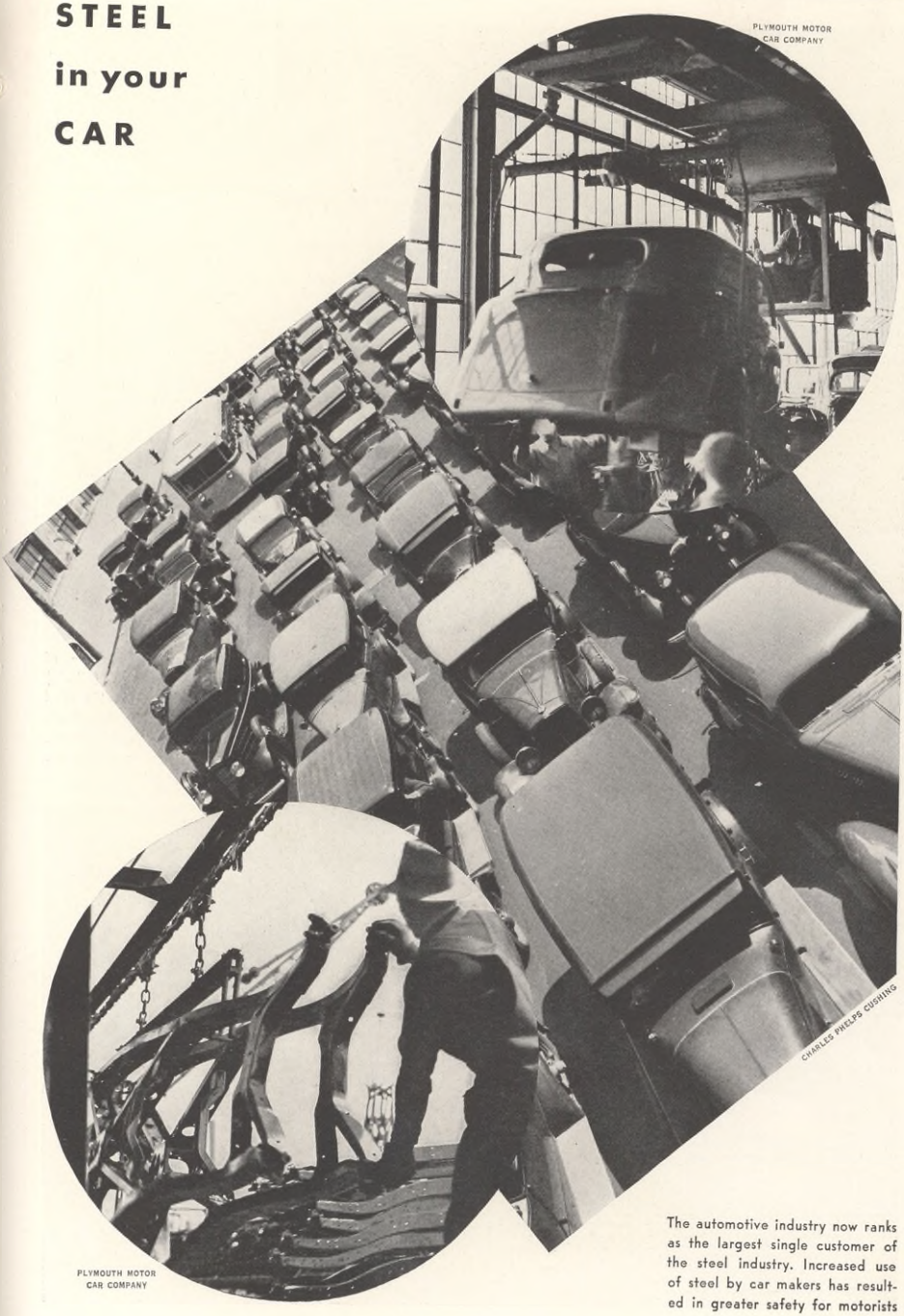
(Left) Not so many years ago steel needles and scissors were priceless



Steel renders the modern bank vault impregnable against fire and robbery

(Above) Pittsburgh, the city built by steel; an air view showing the famous "Golden Triangle"

STEEL in your CAR

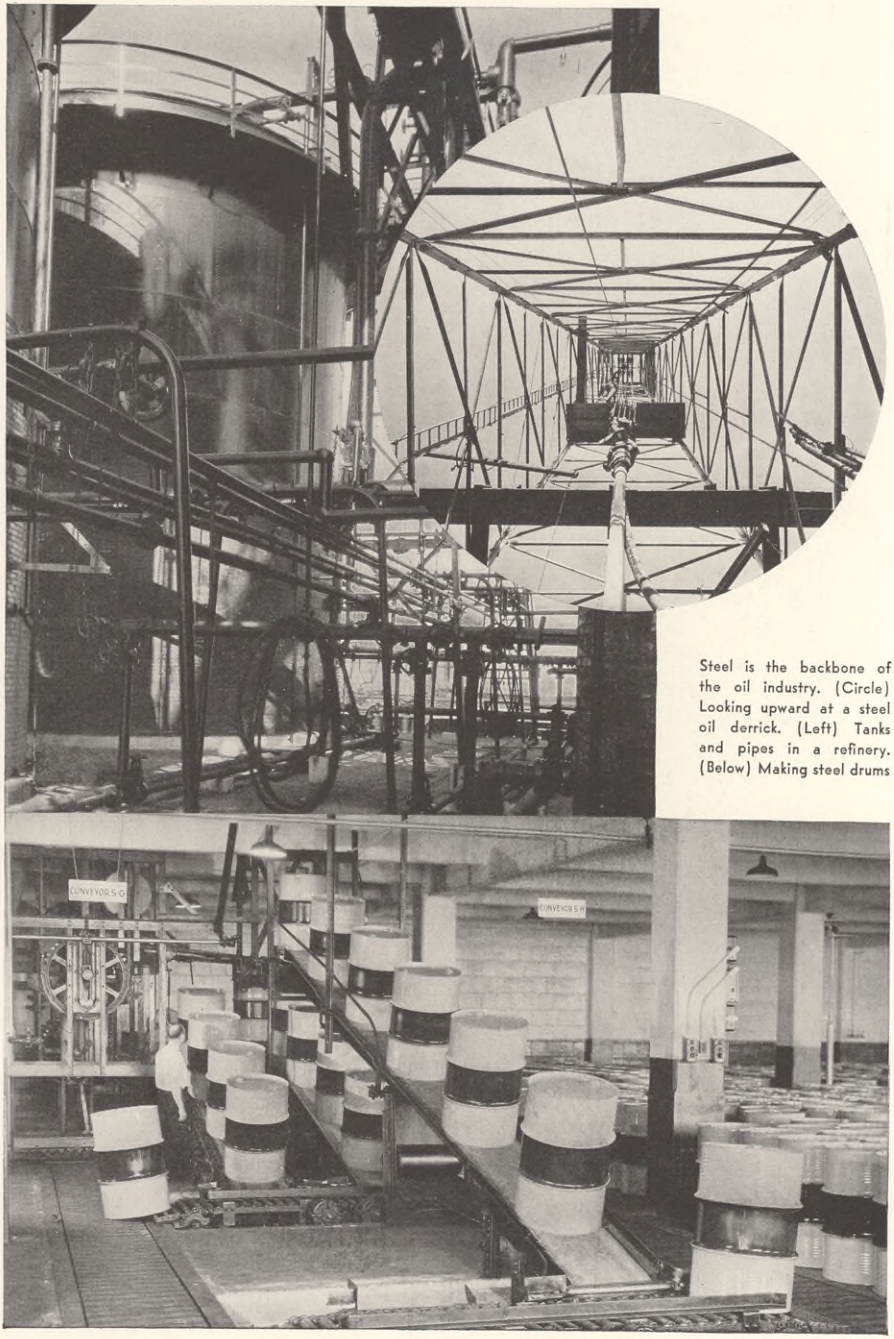


PLYMOUTH MOTOR CAR COMPANY

CHARLES PHELPS CUSHING

PLYMOUTH MOTOR CAR COMPANY

The automotive industry now ranks as the largest single customer of the steel industry. Increased use of steel by car makers has resulted in greater safety for motorists



Steel is the backbone of the oil industry. (Circle) Looking upward at a steel oil derrick. (Left) Tanks and pipes in a refinery. (Below) Making steel drums

ROBERT DUDLEY SMITH

NESMITH

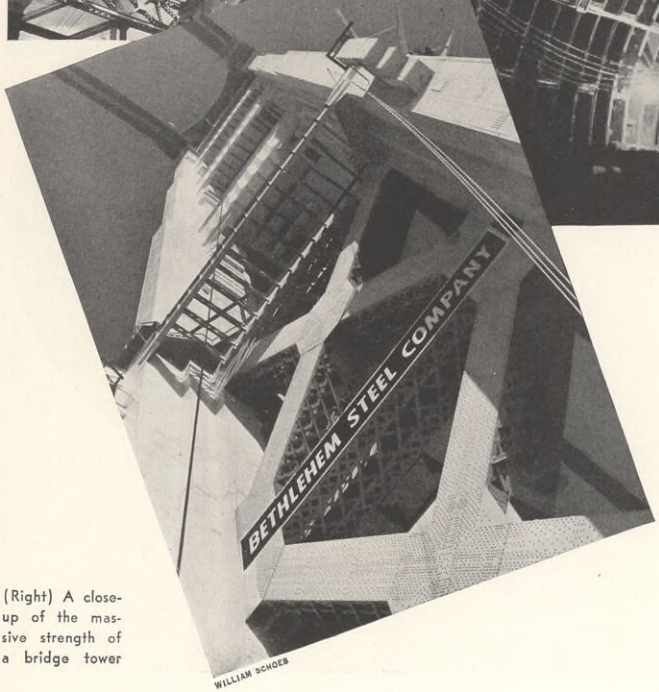
Railroad progress has been due in no small measure to the increased use of steel

NATIONAL STEEL CORP.

(Below) Against a background of fleecy clouds the framework of an arched bridge is swiftly spun

H. W. FECHNER

The steel ribs of New York's new mid-



WILLIAM SCHOEB

(Right) A close-up of the massive strength of a bridge tower

AMERICA WITH

WILL R. BECK

town tunnel under the Hudson River

BUILDS STEEL

Perched on the steel frame of a new skyscraper these men observe the city which they helped build

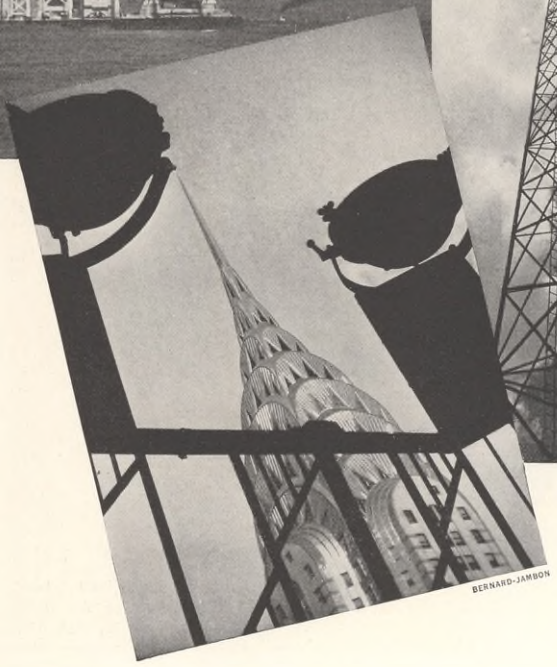
R. I. NESMITH & ASSOC.

R. I. NESMITH & ASSOC.

(Left) Interior of the ventilating shaft of the mid-town tunnel

WILLIAM SCHOEB

NESMITH



BERNARD-JAMBON

(Top) The graceful framework of the Golden Gate Bridge. (Center) A radio tower. (Left) The steel spire of the Chrysler Building

ODIE MONAHAN

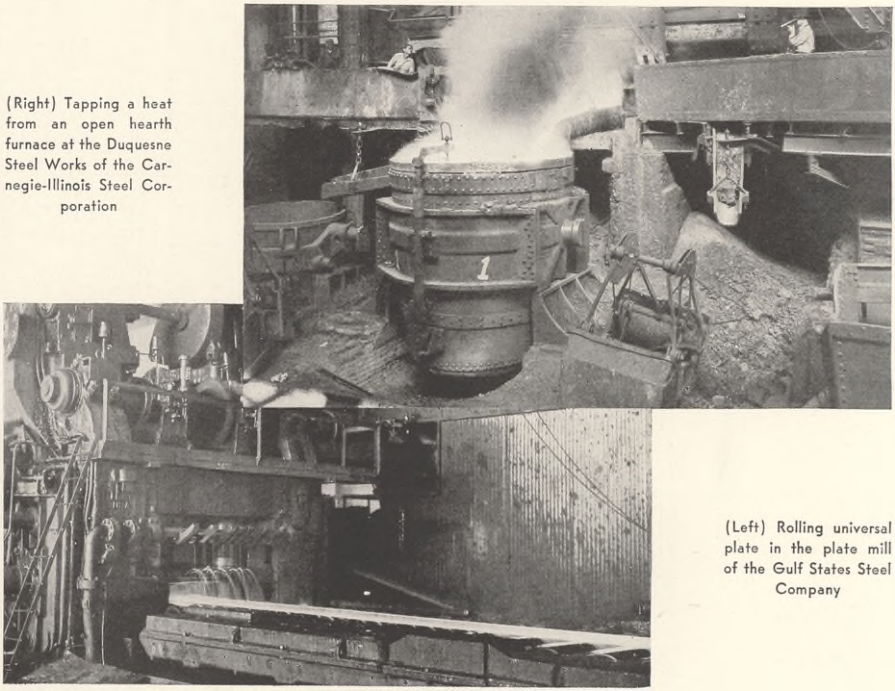
BETHLEHEM STEEL CO.

(Top) The steel prow of a stately ocean liner heads out to sea. (Right) Blast furnace stoves silhouetted against the sky

Oil for the Men of Steel

NOWHERE are lubrication requirements so exacting as in the nation's great steel mills. Here giant machines, flexible as human hands, work day and night, shuttling tremendous burdens sometimes from areas of intense heat to freezing cold.

Destructive abrasives, extreme temperatures, corrosive fumes and terrific friction—against these hazards steel mills throughout the world depend upon TEXACO products for protection. After testing and comparing, the men who make the world's steel have found that specialized TEXACO lubricants best meet their specialized needs.



(Right) Tapping a heat from an open hearth furnace at the Duquesne Steel Works of the Carnegie-Illinois Steel Corporation

(Left) Rolling universal plate in the plate mill of the Gulf States Steel Company

Users of TEXACO *products in the steel industry include the following:*

American Can Company
American Car & Foundry Company
American Chain Company
American Rolling Mill Company
American Sheet & Tin Plate Company
Babcock & Wilcox Company
Bethlehem Steel Company
Boyle Manufacturing Company
Chapman Valve Manufacturing Company
Chicago Bridge & Iron Works
Consolidated Steel Corporation
Fairbanks Company
Fairbanks Morse & Company
Graver Tank & Manufacturing Company
Grinnell Company
Gulf States Steel Company
Haskell Manufacturing Company
Ingersoll-Rand Company
Inland Steel Company
Jones & Laughlin Steel Company
Kilby Car & Foundry Company
McIntosh & Seymour Company
Minneapolis-Moline Power Implement Company
National Enamelling & Stamping Company
National Steel Corporation
National Supply Company
National Tube Company
Petroleum Iron Works Company
Reading, Pratt & Cady Company
Reeves Manufacturing Company
Republic Steel Corporation
Rheem Manufacturing Company
Scully Steel Products Company
Sheffield Steel Corporation
Standard Brass & Manufacturing Company
Steel Pipe & Tank Company
Superior Gas Engine Works
Tennessee Coal, Iron & Railroad Company
Timken Roller Bearing Service & Sales Company
Timken Steel & Tube Company
United States Steel Corporation
Wackman Welded Ware Company
Walworth Company
Weirton Steel Company
Wheeling Steel Corporation
Winton Engine Mfg. Corporation
Youngstown Sheet & Tube Company

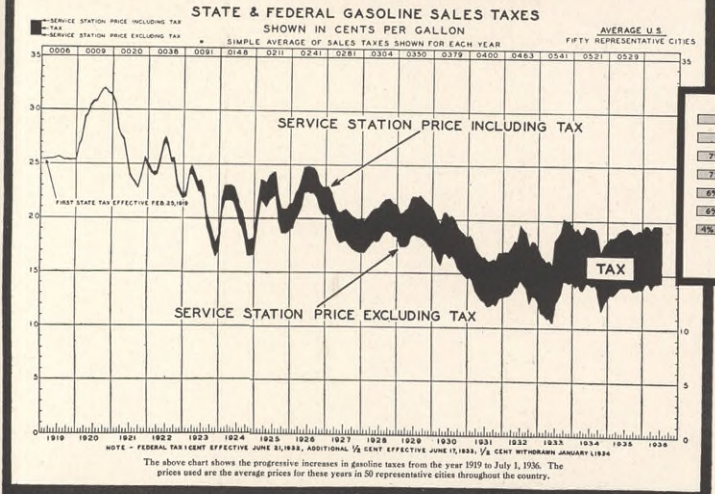
PRINTED IN U. S. A.

THE TEXAS COMPANY IS DOING ITS SHARE

Despite the increase of 138% in Petroleum Taxes since 1928, The Texas Company has:

REDUCED	INCREASED
its gasoline price	its total payroll
20%	14.8%
below 1928 levels	above 1928 levels

GASOLINE IS CHEAP – ONLY THE TAX IS HIGH



The above chart shows the progressive increases in gasoline taxes from the year 1919 to July 1, 1936. The prices used are the average prices for these years in 50 representative cities throughout the country.

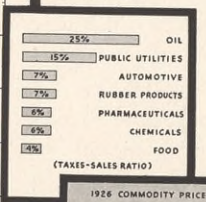
Since 1928 the Tax on Gasoline alone has gone up **75%**

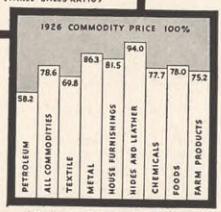
PETROLEUM THE MOST TAXED OF ALL INDUSTRIES

A study recently completed by the National Association of Manufacturers shows that taxes on petroleum products and operations were almost twice as burdensome as the taxes on public utilities; almost four times the taxes on the automotive and rubber industries; over four times the taxes on pharmaceutical and chemical industries; and over six times greater than taxes levied on the food industry.

Taxes on petroleum products amount to *11% of ALL Federal, State, and local taxes.*

There is no reason why users of petroleum products should be singled out to bear this exceedingly high rate of taxation.





Wholesale Prices of Petroleum Products Show a Greater Reduction Than Those of Any Other Commodity

Petroleum products show a 41.8% reduction in price since 1926—being now only 58.2% of that year's level. None of the commodities listed above has been reduced so low in price or is taxed so high.

The above chart, comparing the commodity prices of 1926 with those of today, is based on data published by the United States Department of Labor.

Since 1928 the taxes on gasoline have increased 75%. The result is that to purchase one dollar's worth of gasoline you must now spend $1.37½ —the 37½ cents representing the taxes on the dollar's worth of gasoline.

At wholesale, gasoline is one of the lowest priced commodities on the market . . . without the double (in some cases triple) taxation . . . it could be one of the cheapest commodities sold and its benefits could be enjoyed by many more people.

It will pay you to note The Texas Company's statement on top of this page . . . to spend a moment or two studying the charts that show how this type of taxation is costing motorists many millions each year.

The Texas Company is doing its share through efficient management to keep the price of its products low—its standard of wages high. It will endeavor to continue doing so even in the face of the ever increasing burden of taxation.

You, as motorists and consumers, can do your share by asking your political representatives to view your side of the picture—by seeking complete revision and the abolishment of unfair gasoline taxes.

THE TEXAS COMPANY · 135 EAST 42ND STREET · NEW YORK, N. Y.

BETTER LUBRICATION

a Texaco Service to Industry

The design of improved lubricants to meet the strenuous needs of modern steel mill equipment is as important as the efficient design of the machinery itself.

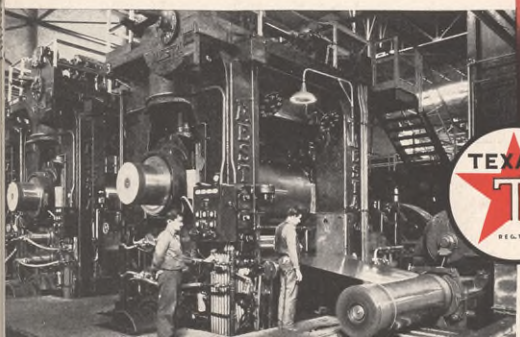
Continuous economical production of finished steel products throughout the mill depends in large measure on effective lubrication.

In providing new and better lubricants and developing improved lubrication practices, Texaco has given helpful cooperation both to the builder and user of steel mill machinery.

Texaco Crater in the early days solved an almost impossible problem of heavy gear lubrication under the most adverse conditions of heat, pressure and dust.

Today, the modern continuous strip mill again introduces new problems. And again Texaco engineers have come forward in developing new oils to meet the conditions. These oils are proving their efficiency in many of the country's largest plants.

The Texas Company will be glad to provide practical engineering coöperation in the selection and use of lubricants by the steel industry.



TEXACO

THE TEXAS COMPANY

TEXACO PETROLEUM PRODUCTS

135 East 42nd Street, New York City