This is Shenango!

W. P. Snyder & Company

The Shenango Furnace Company

Shenango Penn Mold Company

Snyder Mining Company

Printed in U.S.A.

William Penn Snyder
Founder

This is Shenango

. . . is the story of a group of companies that devote all their efforts to serving the steel industry. And because it covers more than a half century of progress, the story necessarily becomes a documentation of free enterprise and of the industrial and economic history of the last decade.

The Shenango story would be inanimate and incomplete without a prologue dedicated to the man whose single effort conceived and consolidated the Snyder-Shenango Companies—William Penn Snyder.

Mr. Snyder was born in the backwoods country of Hollidaysburg, Pennsylvania in 1860, the son of Edmund Bowman Snyder, a Methodist-Episcopal minister, and his wife, Mary McCoy Snyder. The modest circumstances of his early home life prompted Mr. Snyder to enter the business world while still in his teens.

Early in his life he became associated with the great industry in which he was to achieve signal success and honorable distinction . . . iron and steel. He was first employed as an office boy by a Pittsburgh iron merchant. Promotion followed promotion. In 1880, at the age of 19, he formed a partnership with John G. A. Leishman and together they carried on a successful iron brokerage business as Leishman & Snyder.

Mr. Snyder purchased the holdings of his partner when Mr. Leishman joined Carnegie Steel Company. Mr. Leishman later became president of Carnegie, and Mr. Snyder, at 27 years of age, launched his own firm, W. P. Snyder & Company in 1888. It wasn't long before he expanded this iron brokerage business and later established his own iron ore mining operation.

As a close friend and business associate of Henry W. Oliver, he was instrumental in helping develop large-scale production of Lake Superior iron ore. He acquired holdings in the Mesabi Iron Range District and was among the first to mine and ship this ore to the expanding steel industry. To Oliver and Snyder, this industry has given credit for being the first men to use 100% Mesabi ore in a blast furnace when others thought it impossible.

Snyder and Oliver also were accorded great prominence in the production of fine coking coal, and at one time ranked second only to the H. C. Frick Company in total production in the fifth bituminous district of Pennsylvania.

In 1894, W. P. Snyder was made vice president of the McClure Coke Company, and in 1904 was elected president of the Clairton Steel Company, a subsidiary of Crucible Steel Company of America. After completing the building of the large steel plant at Clairton, he devoted more of his time to developing his own smaller company, The Shenango Furnace Company.

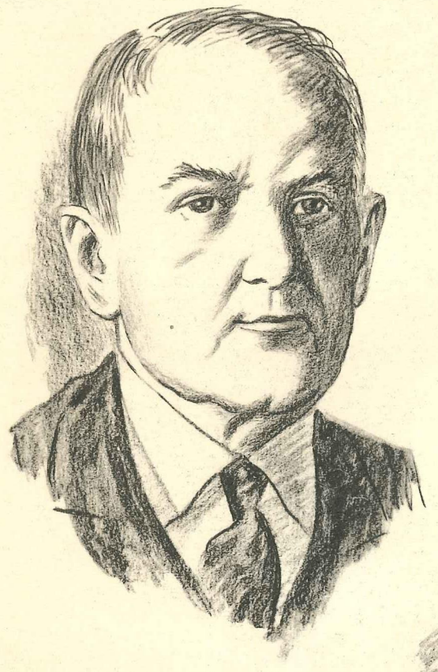
With extensive ore holdings in the Northwest, a fleet of ore freighters plying the Great Lakes, blast furnaces, coal mines and coke works in western Pennsylvania, Mr. Snyder had the nucleus for an integrated iron company. By consolidating these interests into The Shenango Furnace Company, he controlled one of the strongest independent companies in operation at the time.

Rather than lose touch with the firms that he had developed, Mr. Snyder at one time declined the presidency of the United States Steel Corporation.

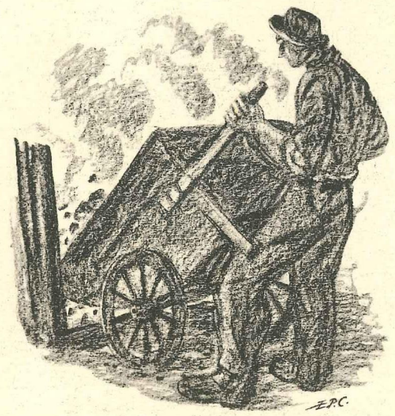
Mr. Snyder died in 1921 at the early age of 60. But his firms continued to operate and grow —as they are today—under the guidance of his son, William P. Snyder, Jr.

Now that all the merchantable ore has been removed from the original Shenango Mine near Chisholm, Minnesota, underground water has formed where the hustle of ore mining was seen for more than 50 years.

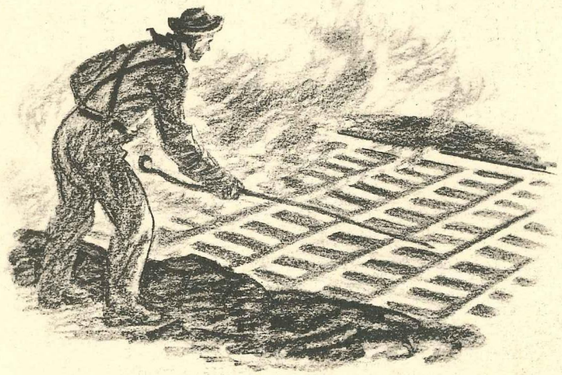

E.P. Couse



GEORGE L. COLLORD
Vice President (Retired)
The Shenango Furnace Company



Ore was hand-charged into Shenango's first blast furnace



Molten iron was cast into hand-fashioned sand molds

At the turn of the century, a growing America began to feel the impact of the steel industry on its economy—began to see the possibilities of expansion under the leadership of steel. Tall buildings were given a backbone of steel for the first time, marine craft was now using a skin of steel to toughen them against the ravages of the sea, long lines of steel drill pipe punctured the earth's crust to tap black, rich oil. It was steel that quickened America's pulse.

Vast quantities of rich ore from Mesabi range were urgently needed to meet steel's demands. The iron ore shipped from the new Snyder mines was sold on the open market to the numerous independent iron and steel companies that were wrestling to become factors in this new industry. Hundreds of blast furnaces were in operation; all needed thousands of tons of iron-bearing ore. With an abundance of the vital ore, the Snyder Companies took their first plunge into the iron-producing field by purchasing two blast furnaces. These were the two Douglas blast furnaces operated at Sharpsville, Pennsylvania, by the Pierce-Kelly Furnace Company.

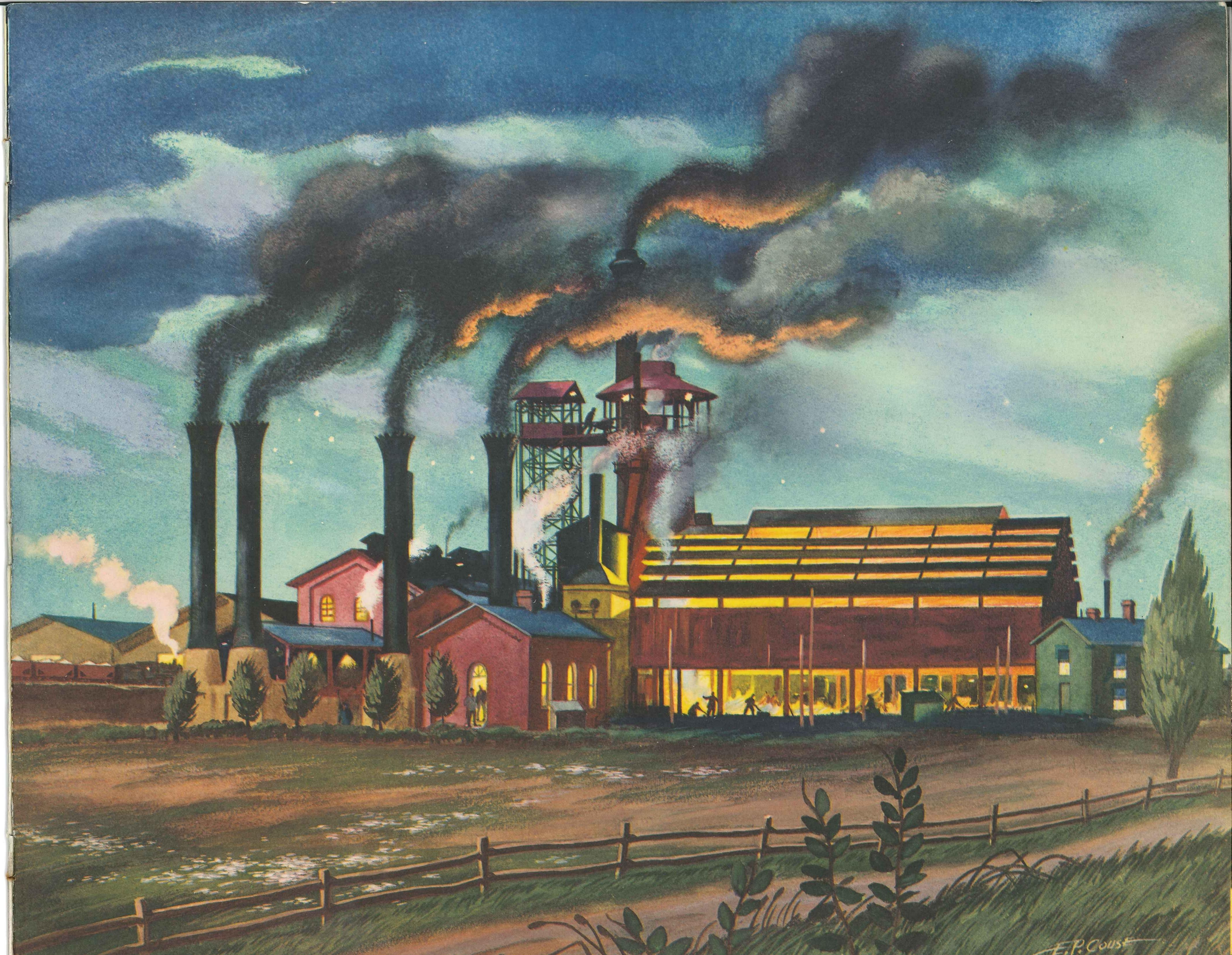
These two furnaces were known as Shenango No. 1 and 2, and each had a capacity of from 150-200 tons a day. For their day and their purpose, they were highly efficient furnaces, although 50 years later they are considered part of America's antiquity. Their crude method of operation included hand filling of the furnaces by wheelbarrow, horse-drawn ladle cars and hand-cast sand pigs.

What happened in the Snyder Companies at this time was typical of the fast-expanding iron and steel industry—consolidation. While Shenango continued to integrate its resources and equipment into a self-sustaining firm, other producers sold out or combined. The hundreds of small producers were reduced to dozens, and from the combines that were left, grew the giant corporations of today.

Snyder's expansion included the purchase of a blast furnace from the Spearman Iron Company in 1904, and the Mabel Furnace from the Perkins Furnace Company in 1905. By 1906, The Shenango Furnace Company was organized with W. P. Snyder as the principal owner. The four existing blast furnaces were transferred into the new company along with the ore mines. As the ore boats were built, they also became a part of the new company.

In adopting Shenango as a company name, Mr. Snyder paid tribute to the fertile valley that played an important role in the early industrial development of Pennsylvania. At one time the Shenango Valley was a teaming industrial center boasting a total of 14 blast furnaces. Later, the center of the iron and steel world gravitated southward toward Pittsburgh and northward to Lake Erie leaving only the two Shenangos and a few other blast furnaces operating in the valley.

Shenango's first blast furnace was typical of the many small plants that were in operation more than 50 years ago. The daily capacity of pig iron was hand cast in sand molds, and sold to the surrounding consumers.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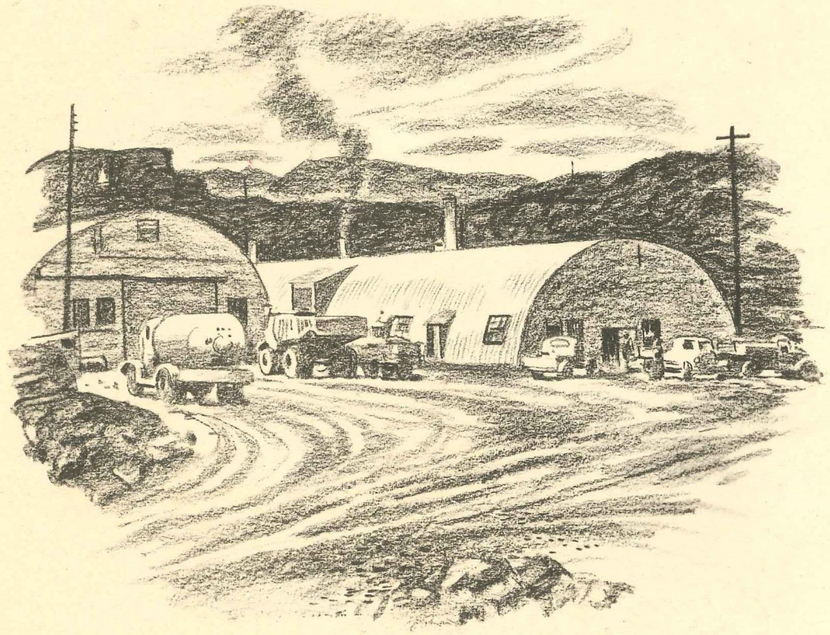
William P. Snyder, Jr.
Chief Executive Officer,
the Snyder-Shenango Companies



Maintenance shops for heavy equipment at Snyder's Webb Mine

Although the Snyder companies had begun to diversify, the sustaining prop continued to be the ore mining operation. As this ore is the life blood of the steel industry, it was a dominant factor in the development of the Snyder-Shenango Companies.

First ore to be shipped out of the Lake Superior District, the greatest iron mining region in the world, was in 1854. Because the ore in the area was virtually inaccessible, and shipment to the far-flung iron industry presented a mammoth problem the district developed slowly. But later in the century, when it was realized that these ore ranges were far richer than any other on the continent, the great expansion and exploitation began.

W. P. Snyder took the calculated risk to obtain considerable holdings in the Mesabi and Cuyuna Ranges. The first shipments of ore were made from the Shenango Mine in the Mesabi Range near Chisholm, Minnesota. This mine was one of the most prolific for its size on the Range: covering an area of 80 acres, shipments of 17,354,778 tons of ore were made between 1904 and 1952. The Shenango Mine was operated principally by the open pit method although some tonnage was removed from underground workings. Shipment of all merchantable ore has been completed from this mine as well as from the smaller operations of the Tioga and Virginia mines.

Snyder's Webb Mine, located at Hibbing, Minnesota in the immediate area of the world-famous Hull-Rust-Mahoning open pit mine, has been another sizable Shenango mining property. Covering an area of 120 acres, shipments of 15,400,000 tons have been made from this mine since 1905. Ore reserves remaining in the Webb Mine will continue to support a mining operation for years to come.

All the Shenango ore properties and reserves were transferred in 1929 to the Snyder Mining Company; at that time the Crucible Steel Company of America purchased a sizable interest in the new company. This arrangement still provides Crucible as well as Shenango with a steady flow of iron ore for their blast furnaces.

In 1929, William P. Snyder, Jr. purchased for The Shenango Furnace Company a small interest in the Mahoning Ore & Steel Company, which operates the Mahoning Mine on the Mesabi Range, one of the largest open-pit iron ore mines in the world.

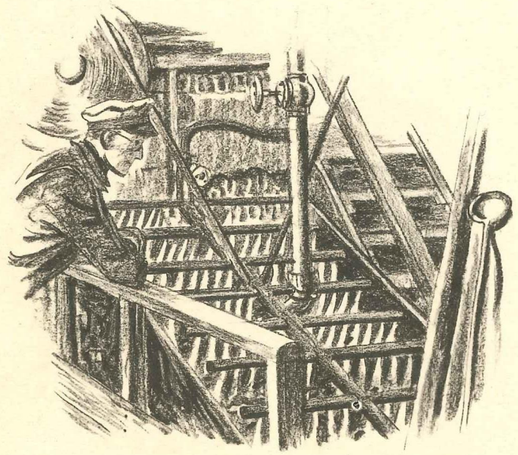
The Whiteside Mine at Buhl, Minnesota was developed with the beginning of stripping operations in 1951. This property is being mined along with the Oliver Iron Mining Company's adjacent Kosmerl reserve by the Snyder Mining Company and represents the company's most recent large-scale development.

So for more than 50 years, ore has been mined continuously from the Snyder holdings. During that time some mines were exhausted, others continued to operate, and new reserves were developed. The future of ore production in the vast Lake Superior District remains healthy in spite of the millions of tons that are mined annually.

Modern electric shovels dig into the banks and come up with 8 tons of red ore per bite. Thirty five-ton capacity, twin-engine diesel trucks are specially designed for transporting ore and other materials over the rugged terrain.

EDWARD J. MANEY
For many years prior to his death,
General Manager of the Duluth operations

ODIN A. SUNDNESS
Vice President, Snyder Mining Company
and director of all ore mining operations



Crushed ore is washed to improve its physical properties

During the past fifty years, constant improvements in mining techniques have expedited the economic removal of iron ore. Time was when horse-drawn scrapers and wagons were employed; later followed the cumbersome steam shovels and locomotives. Today, large electric shovels and mammoth ore carrying trucks lend a speed and efficiency to the operation undreamed of in the early days.

Snyder Mining Company has been quick to utilize each new improvement in mining equipment and technique. The use of modern, twin-engine diesel trucks for haulage, continuous conveyors and counterbalanced electric skips for hoisting the ore to the surface, and high speed crushing, screening and washing plants for putting the ore in the best possible condition for the furnaces, has been rapidly accepted and at times pioneered by Snyder.

The operating practices employed at a Snyder mine differs little from any other operation on the ore ranges. Blasting crews stake out the ore bank to be removed. They drill holes about six inches in diameter and 25, 40 and even 50 feet deep, depending upon how much ore is to be loosened. With succeeding charges of dynamite, they jolt the compact ore formation in preparation for the shovels to move in. These giant shovels dig in at the bottom of an ore bank, steadily grind their way up through alternating soft and hard formations, and finally fill the 6-yard capacity dipper bucket. In one wide swing, the long boom centers over the waiting truck or ore car and dumps its load. When all the loose ore is removed from one bank, the shovel moves to another location where the blasting crews have again been busy.

While a small proportion of Mesabi Range ore can be loaded directly into hopper cars for shipment to the docks, most of it must first be screened and crushed. Ore which is high in silica must be washed before it is suitable for iron making.

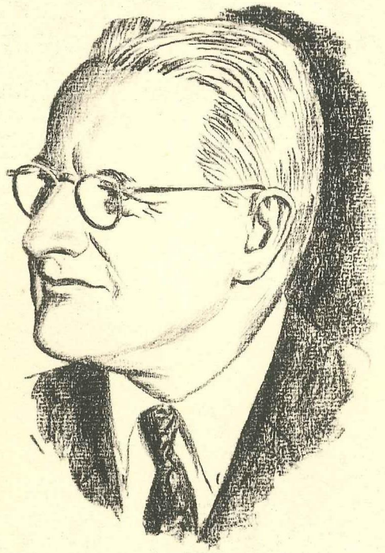
The ore to be screened or washed is dumped on a long, continuous conveyor belt, or into an electric skip hoist, and carried up to the screening plant located on the rim of the mine. Vibrating screens size the ore, and large boulders are crushed to a minus 3-inch size for uniformity in shipping and smelting. At every step of the operation, engineers check and test ore samples for proper grading.

Under the discharge end of the crusher, side-dump hopper cars are positioned to receive the clean ore. In one steady pour, from 50 to 70 tons of ore are loaded in 30 seconds. Total output of the average Snyder mine is from 6 to 10 thousand tons a day.

Expertly mined, thoroughly screened and washed, the conditioned ore is sampled and classified as Bessemer or non-Bessemer by its phosphorous content, and the long ore trains are made up for their 100-mile trip to the docks in the Duluth, Minnesota area.

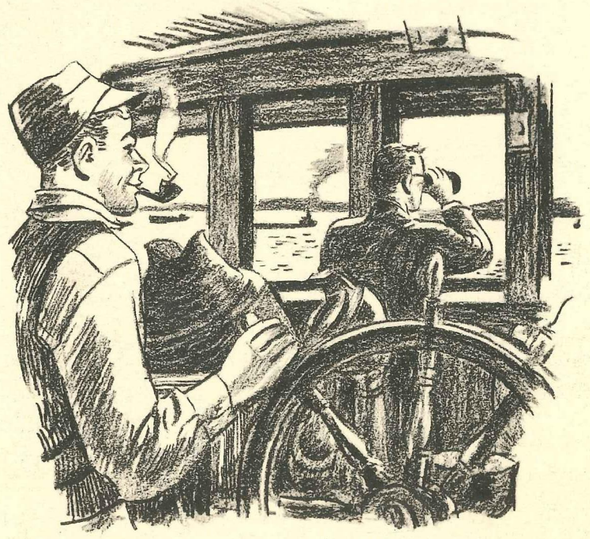
On the rim of the ore mine is the screening plant where a series of rotary and jaw crushers reduce the ore to uniform size. The ore is rough graded, loaded into hopper cars, and shipped to the Lake Superior docks.


E. P. COUSE



CLAUDE J. PECK
Vice President,
The Shenango Furnace Company
and since 1912, head of Shenango's
Lake Transportation Division

PETER J. RILEY
Fleet Superintendent
Successor to his father, William F. Riley,
in charge of Shenango's freighters



Wheelsman and mate on duty in the pilot house of a Shenango freighter

And now the ore enters one of the most important phases of its travel—the long haul through the Great Lakes to the docks on lower Lake Erie.

It was the Senior W. P. Snyder's decision back in 1906 to build a fleet of ore freighters—a tremendous risk at that time. He began by building the William P. Snyder in 1906; then came the Wilpen in 1907, the Shenango in 1909, and in 1911, startled the industry by announcing plans for the Col. James M. Schoonmaker, a bulk freighter 617 feet long, with a beam of 64 feet and a molded depth of 33 feet. It was rated as the largest bulk freighter in the world.

So successful was this carrier that a year later, Mr. Snyder decided to build a sister ship to the Schoonmaker, the W. P. Snyder, Jr. This tremendous ship-building program gave the Shenango Companies two of the largest ore vessels on the lakes between the years 1912-1937.

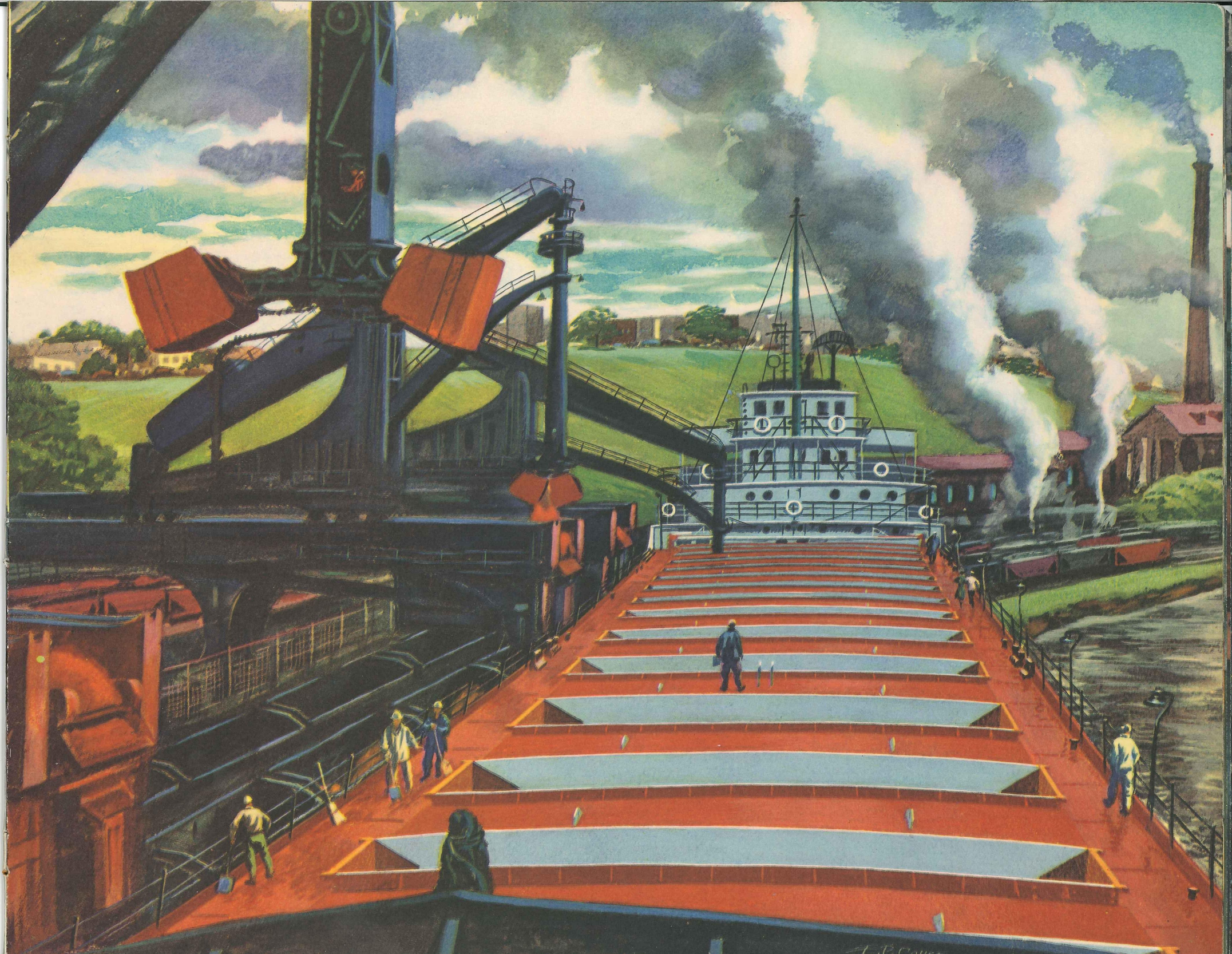
The movement of ore from the mines, to the loading docks, to the boats, to the unloading docks and to the blast furnaces follows a rigid schedule. Ore that has been previously "balanced out" to have the proper iron, silica, and phosphorous content is dumped into pockets at the Duluth docks according to instructions given by the ore graders. Although dozens of mines send their carloads of ore to these docks, the contents of each railroad car is carefully traced to see that it gets into the proper pocket and aboard the proper boat.

The long trip through the Lakes is usually uneventful. The modern boats are loaded in 4 hours' time and quickly head for lower Lake ports. They travel at 13 or 14 miles per hour and make the journey from Duluth to Cleveland—a distance of 837 miles—in two-and-one-half days. The boats travel through Lake Superior, the Soo Locks, Lake Huron, and finally via the Detroit River into Lake Erie. Most Snyder-mined ore is unloaded at the railroad docks in Cleveland or Ashtabula, Ohio. Unloading time is usually 6 hours, and is a tedious and exacting task as the clam shell buckets of the Hulett unloaders are almost as wide as the boat hatches, from which the ore is removed.

Shipping in the Great Lakes District is one of the busiest industries in America. The greatest mass movement of material in the world travels through the Soo Locks each year. These locks pass more material in their 8-month operating period than the Suez and Panama Canals combined pass in a full year. A total of 265 boats carried more than 95 million tons of iron ore from the docks at Duluth to the lower lake area during 1953. Record cargoes of the Shenango lake freighters are "William P. Snyder, Jr."—15,682 gross tons; "Schoonmaker"—15,868 gross tons; and the "Shenango"—13,172.

The Shenango fleet is still among the most modern operating on the Lakes. All freighters were recently completely overhauled and repowered. The W. P. Snyder, Jr. now has automatic, stoker-fed boilers with a 4,500 horsepower Uniflow engine. The Schoonmaker and The Shenango both have been equipped with oil fired boilers and steam turbines. The speed of all of these vessels has been substantially increased as a result of the repowering. The modernization program, which was completed in 1952 at a cost of more than $4 million, included the addition of radar devices, new hatches and covers and a replacement of all service facilities and furnishings.

At the railroad dock in Cleveland, Ohio, the 15,000 ton ore cargo of the Str. "Col. James M. Schoonmaker" is unloaded. The Schoonmaker makes from 35 to 40 round trips between the Duluth and Cleveland areas each shipping season.



HERBERT M. WILSON
Executive Vice President,
the Shenango Companies

A transfer car
is loaded with various grades
of ore on its way to the blast furnace

Preparing to cast one of the blast furnaces at the Sharpsville plant

The mammoth size and complexity of the production equipment used in the manufacture of iron and steel is symbolized by the blast furnace because this basic equipment produces the basic metal—iron.

It is this basic metal that has played a leading role in sustaining the Shenango Companies. In June 1899, when W. P. Snyder and Henry W. Oliver combined to establish the Shenango Furnace Company, it was a radical departure from their successful venture in ore mining. But the two small Douglas Furnaces launched the firm into the iron producing business.

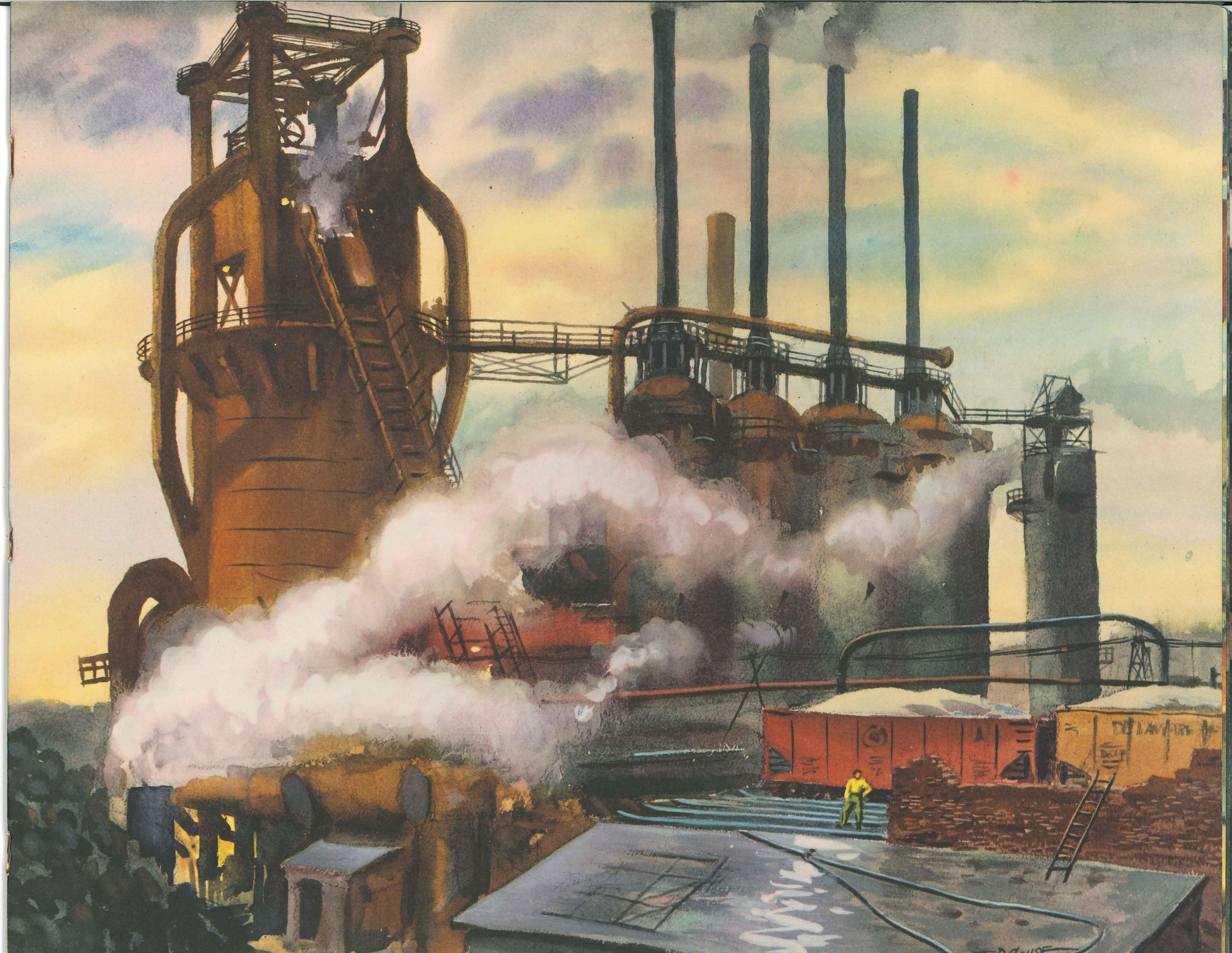
Shortly after the death of Oliver in 1904, Mr. Snyder purchased his interest in this Shenango Company and started a new company, The Shenango Furnace Company with headquarters in Pittsburgh. Additional blast furnaces were acquired at Sharpsville when the stock of the Spearman Iron Company and the Mabel Furnace of Perkins & Co., Ltd. were purchased. During the years that followed, these old furnaces were rebuilt and enlarged into modern and well-known furnace plants.

The constant flow of ore from the Snyder mines in Snyder boats—plus the abundance of Snyder coke—placed the company in a comfortable competitive position. To the two blast furnaces with their combined capacity of 330 tons per day in 1899, were added three additional furnaces in 1904, 1905 and 1906. All five of these furnaces were subsequently dismantled over the years.

The present No. 1 Shenango furnace was built in 1908 between the old Douglas furnaces. With the addition of modern auxiliary equipment, the capacity of this furnace has been increased. The present No. 3 Shenango furnace was built in 1915 on the site of the old Spearman furnace and now has a capacity of 700 tons per day.

As the fast pace of the iron-conscious world gained momentum, heavy demands were made on every producer of the basic metal. Increased production, better pig iron and profitable by-products were the key to success. To stay in the running, each producer had to seek out the new customers and sell tonnages, then rush back to the furnace plant and expand and rebuild to meet the demands. For in the early part of this century, most independent producers—no matter how large their physical plant facilities—operated their companies with the uncanny intuition of one or two key men. Hence, the unparalleled reputations of Carnegie, Gary, Schwab in steel making; and to a degree, W. P. Snyder in ore mining and iron making.

Blast furnaces at Sharpsville produce a continuous supply of iron for the adjoining ingot mold foundry. Production in excess of mold requirements is sold to other consumers of pig iron.


DELAWARE

JOHN K. FOSTER
Director and Treasurer,
the Shenango Companies

Workman hand-casts an iron sample for use by the laboratory

The Shenango Furnace Company had become firmly entrenched in the pig iron business prior to World War I. The two relatively small blast furnaces were smelting iron ore at a record pace and the resultant iron was sold principally to the surrounding steel companies for defense production.

Prior to the war, the second generation of Snyder's joined the Shenango companies when William P. Snyder Jr. began his apprenticeship. Snyder Jr. devoted considerable time in each of the various departments of the companies, learning actual operations at the ore mines in Minnesota, blast furnaces at Sharpsville, the steamship offices in Cleveland and the general offices in Pittsburgh.

With this valuable working knowledge of the companies that his father had founded, Mr. Snyder Jr. became vice president of The Shenango Furnace Company, and in May, 1918 was elected president. The elder Snyder continued as chairman of the board until his death in 1921.

Shenango continued its growth along much the same lines under the leadership of the younger Snyder; additional ore properties were obtained and new outlets for its iron products were sought. These new outlets were necessary to keep the furnaces operating at capacity since more and more of the steel companies had built and were operating their own blast furnace plants. Beginning in 1910 and continuing until 1926, Shenango shipped an ever increasing percentage of its iron output as molten metal in ladle cars direct to adjacent mold foundries.

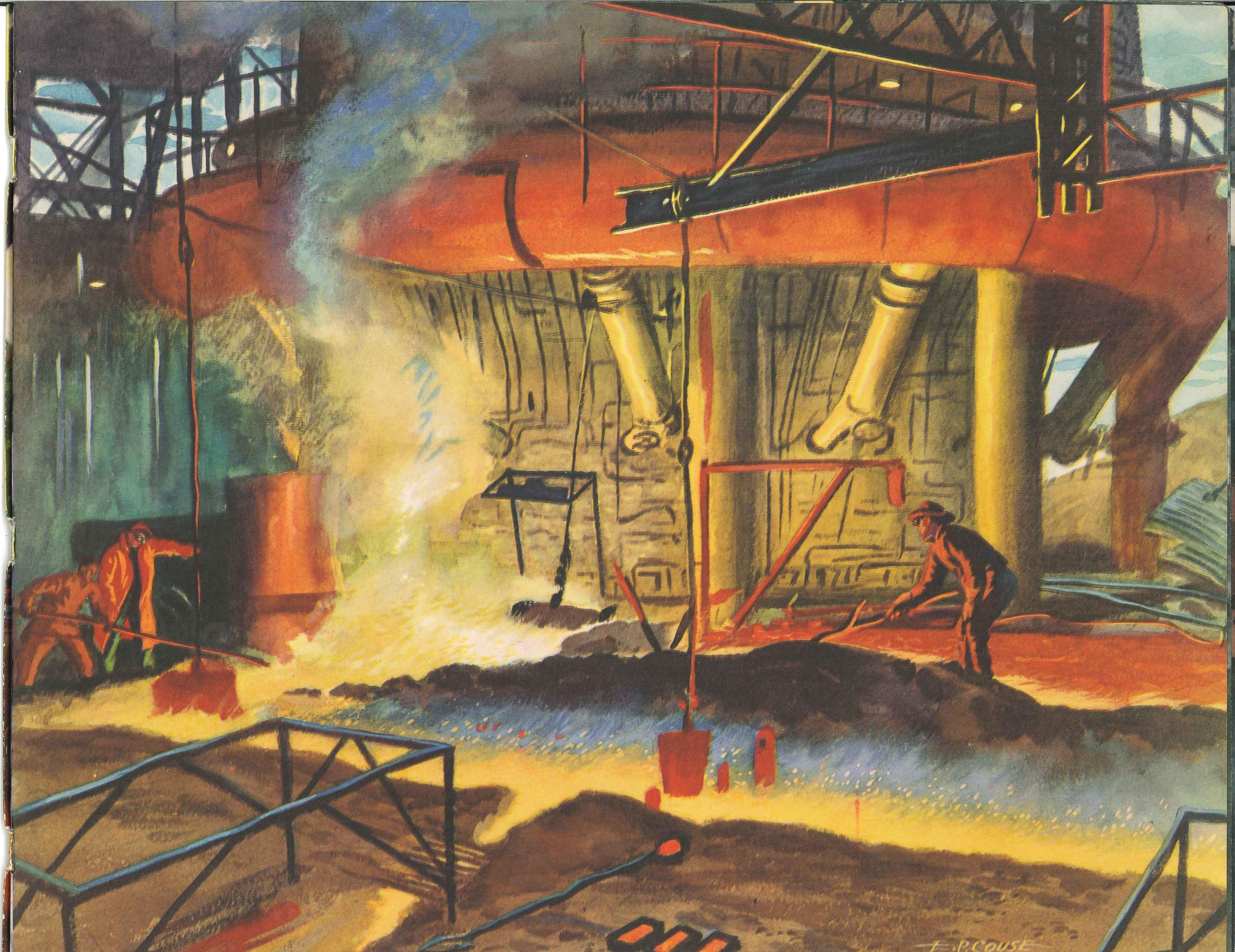
The experience gained in producing and shipping molten iron for ingot molds led Mr. Snyder to purchase the Penn Mold & Manufacturing Company in 1926. He immediately moved the ingot mold operations from Dover, Ohio to Sharpsville, Pennsylvania, where the Shenango furnaces were located, and began the manufacture of ingot molds and stools. This phase of operations—along with the centrifugal casting division housed at Dover—was incorporated as the Shenango-Penn Mold Company.

Such broadening of interests and products took the Shenango companies out of the "one man executive" class that was typical when the elder Mr. Snyder began building his companies. Although the younger Snyder maintained close contact with each of the companies, he surrounded himself with men of long experience and proven ability. One of these is H. M. Wilson who has completed a half century of service with the Snyders. Mr. Wilson, whose career closely paralleled that of Mr. Snyder's, is now executive vice president of the Shenango companies.

Another man whose experience and leadership helped immeasurably to develop the Snyder Companies is George L. Collord, well-known in the iron-making field. Mr. Collord, who is now retired, was for many years general superintendent of the Sharpsville operation, and later was operating vice president of The Shenango Furnace Company.

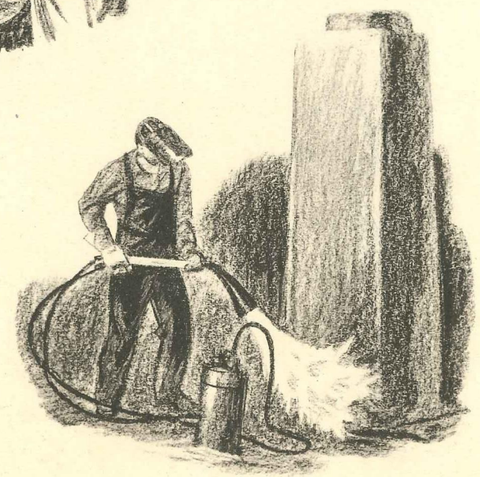
And thus the second generation of W. P. Snyders entered the iron and steel industry . . . and with the aid and encouragement of his father's associates . . . expanded and further diversified the company's interests.

At the iron notch on the casting floor, workmen divert the slag and guide the molten iron through troughs to the ladles. Shenango's two furnaces have a capacity of over 1,000 tons a day.



HARRY S. BRADLEY
President (Retired),
Shenango-Penn Mold Company

Cleaning an ingot mold
on the chipping rack



Drying core bottom preparatory
to casting an ingot mold

Things were settling down in the great iron and steel industry by the end of World War I. The great corporations had been established and the battle of the survival of the fittest had waned; it remained that only the strong, established, well-integrated firms could continue to operate.

If diversification of industries began at the turn of the century, then it reached its climax in the twenties. The problems were many; Shenango had its share.

The merchant pig iron market dropped drastically when the steel companies themselves integrated their facilities. The natural move for Shenango was to find an end-use for its molten iron—preferably within the company framework. The formation of Shenango-Penn Mold Company was Mr. Snyder's answer.

For many years the Penn Mold Company had been a heavy producer of quality ingot molds, stools, and centrifugal castings. When the new company was formed, a modern foundry was erected at the Sharpsville plant and all the experience and "know-how" of Harry S. Bradley and his associates went into placing the new facilities in operation. With the foundry immediately adjacent to the two blast furnaces, the flow of production then was smooth and uninterrupted; hot metal from the blast furnace was quickly transferred by ladle car to the new Mold Company and used directly in the manufacture of molds and tools.

This new company experienced the same good fortune as the other Snyder companies; products readily accepted by the steel industry. Shenango-Penn ingot molds and stools soon reached a place of prominence in the industry; the quality-controlled molten iron and the close proximity of the mold foundry combined to place the company in a comfortable competitive position.

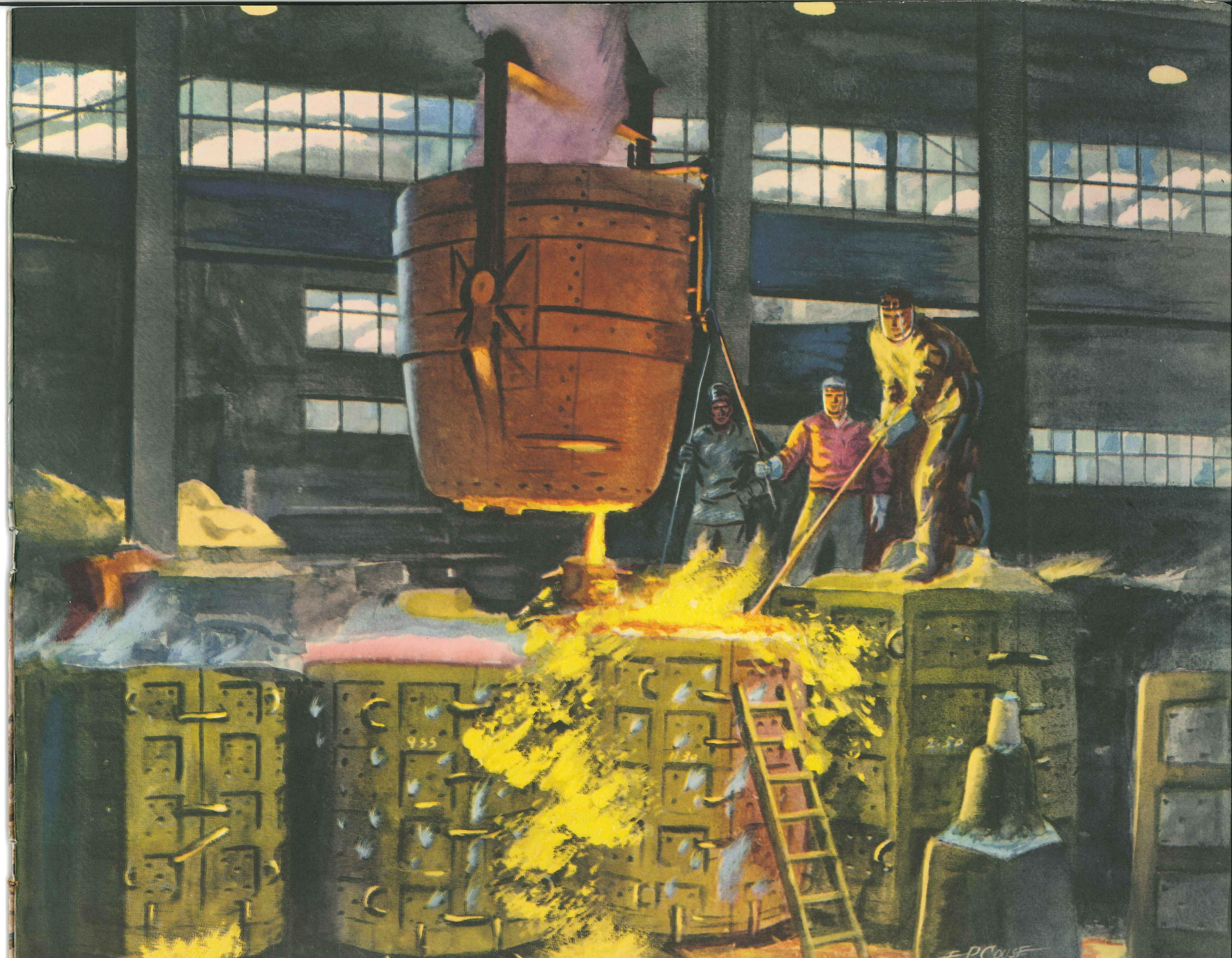
Pouring ingot molds is a highly specialized business requiring equipment and facilities custom-built for this operation. First, experienced foundrymen position a wooden pattern of the ultimate outside dimension of the mold into a large iron flask. The remaining void is filled with a moist mixture of sand by the use of a powered sand slinger. Next, a core bar is rammed with sand to the exact inside dimension of the mold. Thus, the shape and size of the ingot mold is determined.

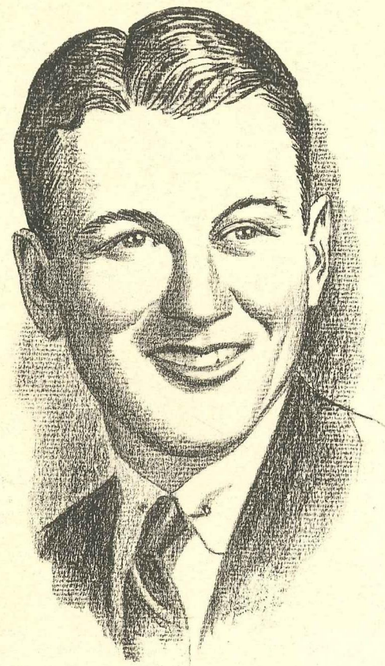
After drying in an oven, the flask and core are removed to the foundry floor and readied for the pouring operation. Hot iron received from the blast furnace is poured from a ladle into this molded form. The ladle moves from one flask to the next, filling each form with molten metal. Once poured, the molds remain in the flasks until they have solidified; while still hot, they are shaken out of the flasks. When cooled, they are transferred to the chipping department and prepared for shipment.

These molds are the culmination of the efforts of ore mining, shipping, smelting and an entire foundry operation. And with them Shenango iron takes its final shape.

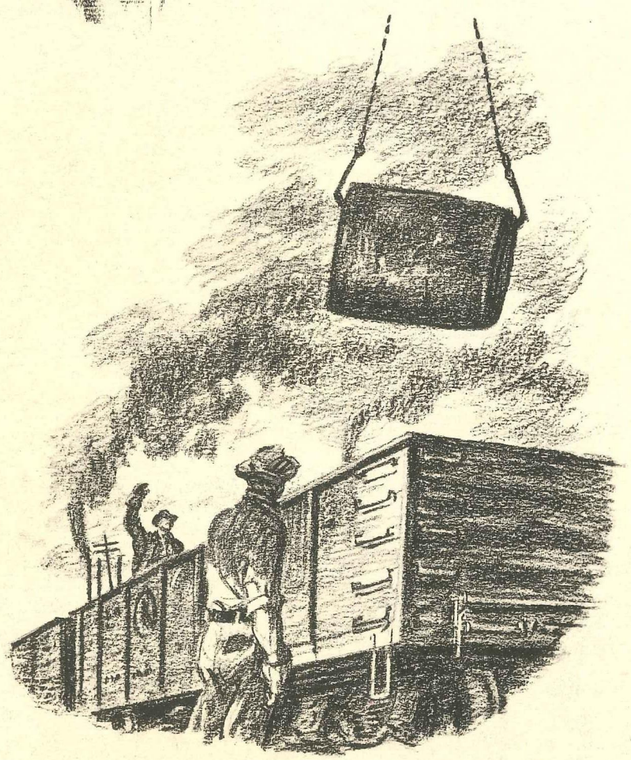
During this time when Shenango was expanding its mold business, it drew heavily on the learned experience of Harry S. Bradley, the president. Mr. Bradley, who also headed the acquired Penn Mold Company, was recognized as an outstanding authority in the mold business and has contributed much to the singular success of Shenango-Penn Mold Company.

An ingot mold set-up which has been made to specifications, is positioned at the casting bench and filled with molten iron. Shenango-Penn's two foundry's produce nearly one-third of all the ingot molds sold to the steel industry.





W. P. Snyder III
President,
Shenango-Penn Mold Company



Loading molds for rail shipment

Shenango-Penn expanded from the start and soon became one of the largest producers in the country supplying molds and stools to the major steel companies.

The Sharpsville operation proved so successful that Mr. Snyder began looking for an additional plant location. Steel companies to the north and west of Pittsburgh were easily serviced from the Sharpsville plant—but at the expense of the vast steel market in the tri-state area. Logic placed the prime location for an additional plant in the Pittsburgh district.

In 1939, Mr. Snyder purchased the plant and property of the Hunter Steel Company on Neville Island, a few miles down the Ohio River from Pittsburgh. After an extensive remodeling program, the new foundry started operation and favorably augmented the Sharpsville production.

The quality control of all ingot molds and stools at the Sharpsville plant was duplicated at Neville Island, for within a few miles of the foundry, a blast furnace produces a constant supply of molten iron that is transferred to the Shenango-Penn ladles. This foundry partially consumes the average daily capacity of this nearby blast furnace.

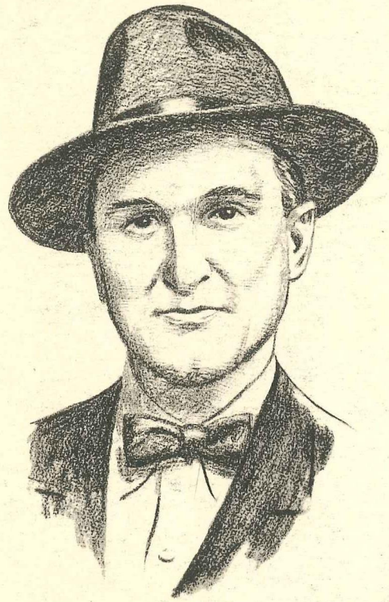
An additional reason for choosing the Neville Island site was the unique advantage it offered in shipping. A barge can be moored at the company dock and loaded with the same crane that travels the entire length of the foundry. Loading time is greatly reduced and shipping costs cut considerably with this waterways shipping. Barges loaded at Neville Island travel up or down the Ohio River, down the Mississippi River, through the Intercoastal Canal to Texas or along the Gulf of Mexico coast—thereby saving considerable freight to customers along these shores.

The combined production of Shenango-Penn's two foundries is approximately 2,000 tons of ingot molds and stools a day; this averages 125 molds and stools at Sharpsville and 80 pieces at Neville Island.

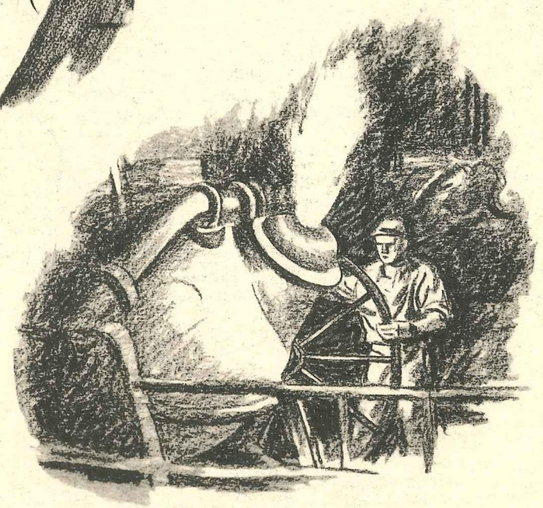
This youngest of the Snyder Companies maintains an enviable position in the industry by supplying approximately one-third of all molds and stools purchased on the open market. It was the first departure for the Snyder family from the mining and pig iron business, but was a great step of progress in a long history of business success.

At the time Harry S. Bradley, former president of Shenango-Penn Mold Company, entered into semi-retirement in 1951, the third generation of Snyders assumed a top management position in a Snyder Company. William P. Snyder III, president, had been trained for his new position from the time he began his tour of duties with the Shenango enterprises in 1935. At the outset, he spent a number of years in each of the operating departments of the companies, and ultimately became plant manager of the Neville Island operation. Upon his return from the Naval service at the conclusion of World War II, he was elected vice president of the firm, and in 1951, was elected president. In addition, he serves as a director of each of the Shenango-Snyder companies.

Shenango-Penn's ability to ship ingot molds direct by barge from the Neville Island foundry has been of tremendous advantage to many customers. Molds are loaded into barges and transported to steel plants along the river.



HERBERT H. ZOLLAR
General Manager,
Centrifugal Casting Division
Shenango-Penn Mold Company



Smaller melting unit
at the Dover foundry

Final test measuring of a large centrifugal casting

At the time Shenango acquired the Penn Mold and Manufacturing Company of Dover, Ohio, the process of casting metal centrifugally had proven itself as commercially sound. For several years Shenango had pioneered in the casting of the red bronzes and once the process had been proved and accepted by industry, this phase of the Shenango-Penn Mold Company became another successful operation.

All the plant facilities at Dover were turned over to centrifugal castings when the mold division was moved to the company's Sharpsville plant. Although the casting machines were few in number and the finishing facilities in the machine shop limited, the acceptance and demand for centrifugal castings forced the firm into continuous expansion and modernization.

Once the technique of casting red bronzes—copper, tin, lead and zinc alloys—had been mastered, the company met the challenge to produce the other types of bronzes including manganese bronzes, aluminum bronzes, silicon bronzes, etc. Monel metal and special alloys were soon added to the expanding program. With the ever increasing demand for the new types of castings, Shenango soon established an enviable position in the foundry industry—a position which they still hold—being among the largest centrifugal foundries in product scope, size range and volume produced.

Shenango centrifugal castings are made by a unique process—a carefully weighed amount of molten metal is poured into a rapidly revolving mold. As the metal is forced against the walls of the mold by centrifugal force, it solidifies; the inside diameter of the mold becoming the outside diameter of the casting while the amount of metal used determines the wall thickness or inside diameter. Castings, which weigh from 100 to 15,000 lbs., are made in machines which revolve at speeds from 400 to 2,000 r.p.m. depending on the diameter and length of the casting, wall thickness and alloy.

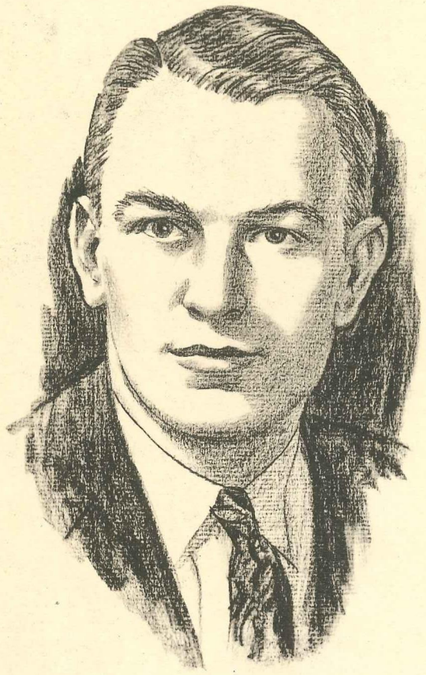
Although a uniform inside diameter must be maintained, variations such as flanges or other protuberances can be obtained on the external surface.

There are many advantages in the use of centrifugal castings. This unique process produces a fine, even-grain structure in the casting with the inherent qualities of greater density, increased physical properties, etc. There are no sand inclusions, blowholes or porosity, which results in a very high quality product. There is no need for the customers to furnish patterns. Since nonferrous metals are in the semi-precious class, the advantages obtainable in centrifugal castings reduce material costs.

In addition to the nonferrous metals, Shenango's Dover operation includes centrifugally cast alloy irons, Meehanite metal and Ni-Resist. Meehanite metal is a controlled cast iron that is known for its uniformity of strength and hardness, wear and corrosion resistance. Ni-Resist is corrosion-resistant high nickel cast iron that is produced in many types for varied uses.

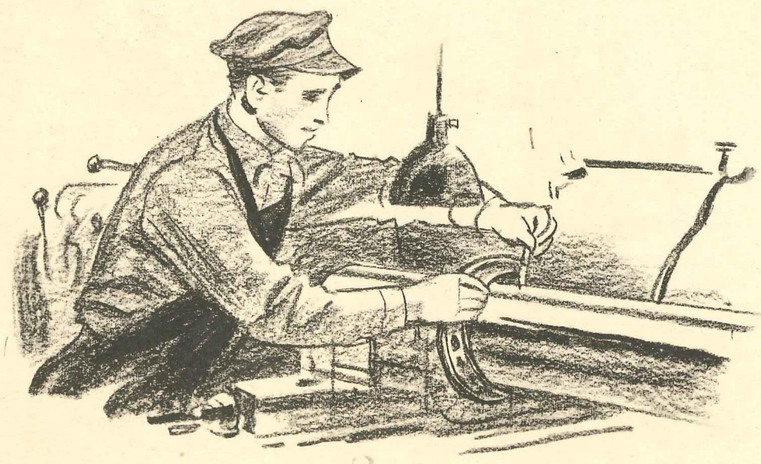
This large centrifugal casting machine is turning at 2,200 r.p.m.'s. Into it is poured a carefully weighed amount of molten bronze for a propeller shaft sleeve which will be installed on a large merchant marine vessel.


E.P.Couse



G. Whitney Snyder,

younger son of W. P. Snyder, Jr., is a member of the Board of Directors of the Shenango Companies. Mr. Snyder served with the U.S. Army during World War II, and after completing his engineering studies, entered the employ of Crucible Steel Company of America at their Midland plant.



Final check on centrifugally cast printing press roll

Centrifugal casting of metals and alloys imparts an inherent high quality. However, to obtain the full benefit of centrifugal force, a minute and precise control of each operation must be followed. Shenango does this in its research and engineering facilities, its laboratory control, testing and close supervision of all phases of its process.

To accurately reflect the high standards of craftsmanship shown in the making of centrifugal castings, the very best in finished facilities must be employed. That's why the machine shop at Dover has been expanded many-fold, over the last decade; that's why only thoroughly trained, skilled employees operate the numerous modern machine tools.

Since Shenango supplies either rough cast, semi-machined or precision-finished parts and assemblies, finishing facilities have to be modern and complete. Machines of many types are used including engine lathes, turret lathes, horizontal boring lathes, milling machines, boring mills, grinders, shapers, and other special equipment. They finish castings ranging from 2″ O.D. to 48″ O.D. in any length.

Prime market for quality-controlled centrifugal castings is the maritime field. Bronze propeller shaft sleeves for hundreds of ocean going and inland waterways vessels have been cast and machined by Shenango. From small merchant vessels to large aircraft carriers, centrifugally cast sleeves are specified as standard equipment. Other industries that rely on the rigid uniformity of centrifugal castings include: paper making, textile, printing, steel, rubber, oil, plastics, chemical, power, aircraft, machine tool, engraving, heavy machinery and many others.

Shenango Furnace Company pig iron is used as a base for all ferrous castings and for the 40-ton a day capacity of the small ingot mold foundry at Shenango's Dover plant. These special ingot molds range from 300 to 6,000 lbs. in weight and are used principally by the tool steel industry.

The Centrifugal Casting Division of Shenango-Penn Mold Company turned in a highly commendable record during World War II. More than 90% of the plant's production was ear-marked for war use, with most of that total being bronze sleeves and bushings. The plant supplied approximately 35% of all the sleeves and bushings needed during the war by the Maritime Commission and the U. S. Navy. This outstanding record earned the Army-Navy "E" Award for the plant in 1943 and was later followed by four additional stars for Excellency.

The precision machining required on centrifugal casting calls for the latest and most modern in machine shop facilities. The Dover operation is constantly being modernized to keep these facilities among the finest in the country.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This is Shenango

. . . does not end on the last page of this book; the story will go on as the companies continue to progress.

Shenango's continued success has been dependent upon the cooperative spirit and dedicated service of its employees. The early years of growth were greatly influenced by W. A. Barrows, P. O. Menke and W. J. Menke, former General Superintendents of the Sharpsville plant; C. H. McKee, Legal Advisor; Henry Irwin, Jr., Treasurer, succeeded by F. A. Demms (retired); C. D. Dyer, Vice President; and W. D. Evans, General Counsel.

Several employees who continue their invaluable contribution to the active management of the Company include: L. B. Perrin, Secretary; D. H. Bugher, Assistant Treasurer; W. C. Sherlock, Manager of Sales; H. Stockton Ream, Plant Superintendent, Dover; and A. W. Reno of the Cleveland office.

In looking to the future, a younger group of management men will have the responsibility of continuing the Shenango tradition. This group includes, among others, A. L. Fairley, Assistant Vice President; W. L. Davis, Assistant Secretary; J. P. Stutsman, Director, Industrial Relations; B. W. Norton, General Superintendent of the Sharpsville and Neville Island operations; and Charles Rudstrom, General Superintendent, Ore Mining Division.

This review of the activities of the Snyder-Shenango companies portrays the growth of a one-man firm into a group of companies that employ more than 2,500 people. It is our hope that "This Is Shenango" serves to better acquaint our friends and associates with the company's varied activities.