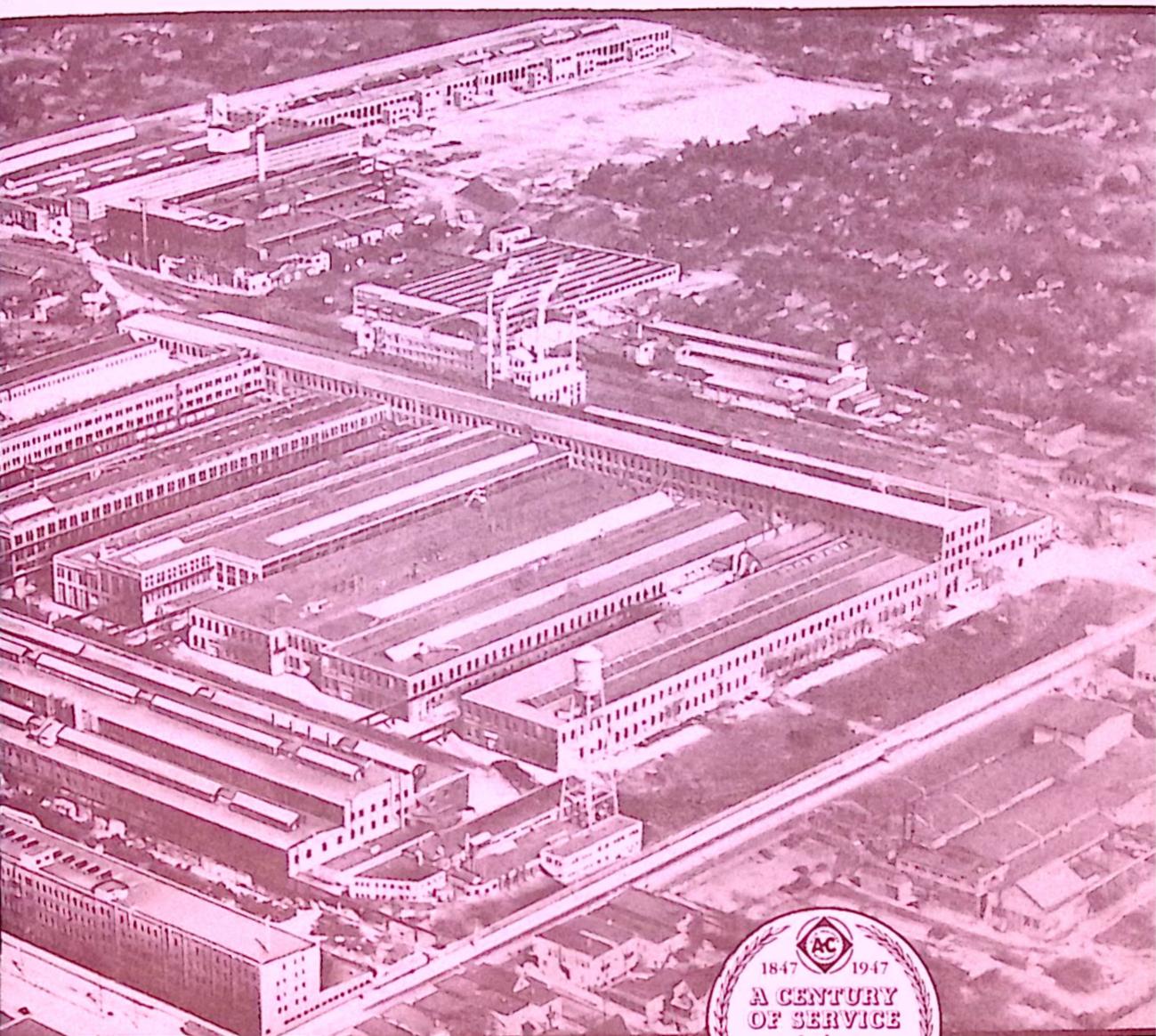
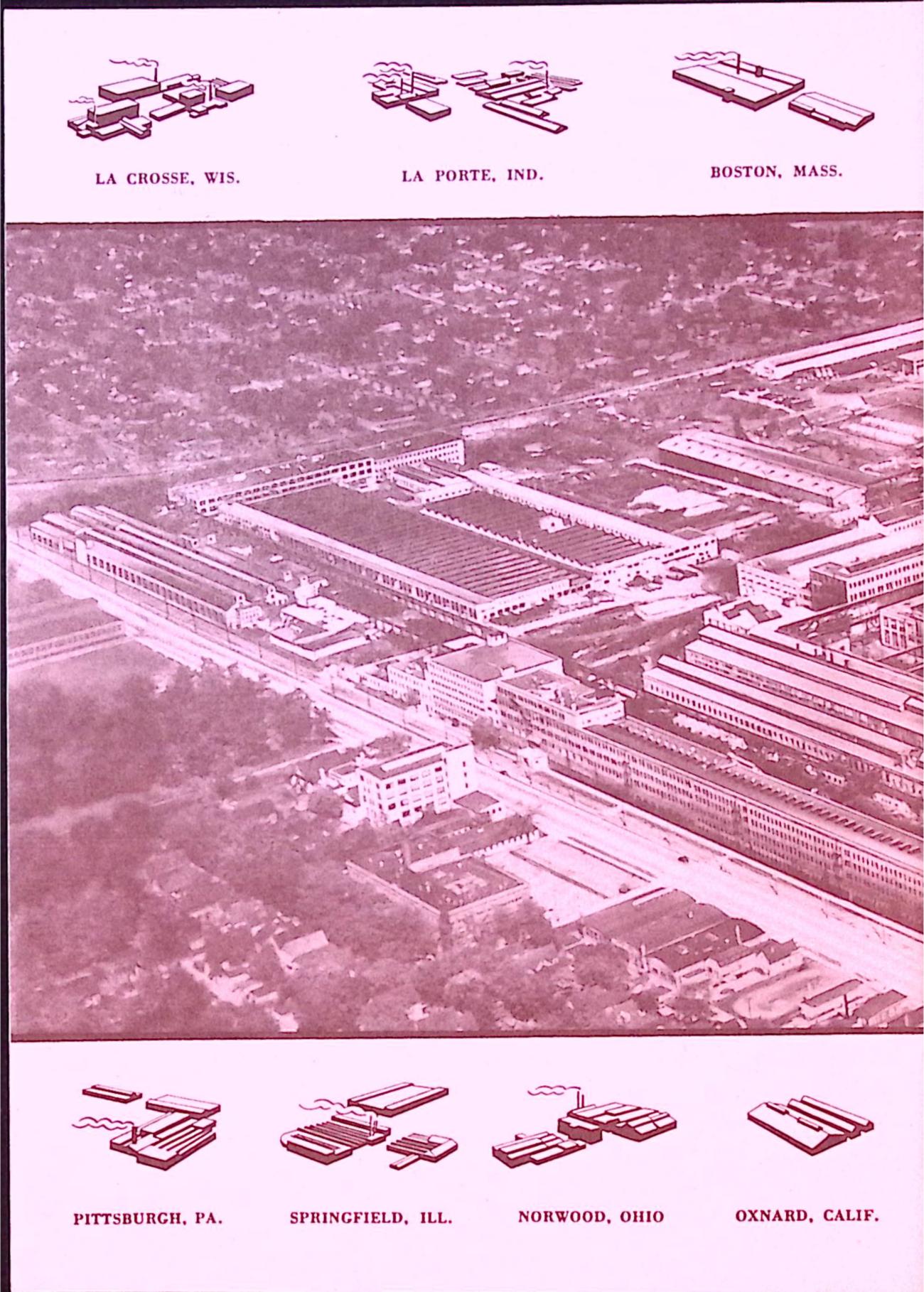


# GUIDE to the west allis works ★★★★



ALLIS-CHALMERS MFG. CO., MILWAUKEE, WIS.

25L6888



# ★ facts ★

## you can quote

The West Allis Works employs in manufacturing, engineering, administration and sales more than one-half of the 30,000 men and women of Allis-Chalmers.

The plant is valued in excess of \$40,000,000. There are 4,143,623 square feet of building floor area within the 160 acres.

The main office building is 1550 feet long. It houses research and engineering departments as well as general sales, manufacturing and administrative offices.

In daily use throughout the West Allis Works are 29,000 pieces of office furniture and 1800 telephone instruments.

Utility services required are equal to those needed to supply a city of 40,000 to 50,000 people.

The hot water heating system at the West Allis Works is the largest in the world. Water circulates at the rate of 6,000 gallons per minute.

There are 14 miles of railroad tracks and 4 miles of roadways within the plant.

In use throughout the shops are 30,000 power tools ranging in size from the giant 40-foot boring mill—largest in the Western Hemisphere—to small precision machines.

Materials may be transported by any of 208 traveling cranes. The largest has a 100-ton capacity. Heaviest lift, a 250-ton casing for a Hoover (Boulder) Dam turbine, required 4 cranes.

Quality of equipment produced in the plant is controlled by a chief inspector and 370 inspectors.

Four hospital units are equipped to give first aid. The main hospital also offers complete physical examinations. The firm also maintains an emergency ambulance unit.

The company has a fire department with 3 pieces of equipment and 36 trained volunteer firemen who operate under a fire chief.



## it started with millstones — in 1847

CHARLES DECKER and James Seville founded in Milwaukee, in 1847, the first firm west of the Alleghenies making French burr mill stones. They also supplied shafting, gearing and other equipment to the growing flour milling industry of the territory. The business prospered, and in ten years their "Reliance Works" employed 75 men, and was the largest iron works in Milwaukee.

During the depression years prior to the Civil War, however, Decker & Seville got into financial difficulty. In 1861 the business was taken over by a successful young Milwaukee business man — Edward P. Allis. Under his leadership, the Reliance Works made rapid growth, and greatly expanded its line of products. By 1870 Edward P. Allis & Co. employed 200 men — did a \$350,000 business — manufactured complete flour and lumber mills, water wheels, steam engines and all accessory equipment, together with general iron work of many types.

But even more dramatic growth followed. By 1874, Edw. P. Allis & Co. had cast the first pipe and built the giant pumping engines for Milwaukee's city water works, and won national recognition. In rapid succession: The company introduced the roller reduction method of flour milling into this country and became world's leading manufacturer of flour mill equipment. It developed the band

saw mill and won world leadership in the saw mill field. It became the world's foremost builder of giant steam engines, through the engineering genius of Edwin Reynolds, who joined the company in 1877, and perfected the famous Reynolds-Corliss engines.



By the end of the century, the firm, reorganized after the death of Mr. Allis as the Edw. P. Allis Co., was doing a business of more than \$3,000,000 annually, had a payroll of 800, and its machinery was serving almost every basic industry.

### *four parent companies merged, 1901*

In 1901, the Allis-Chalmers Manufacturing Co. was formed. It was a merger of Edw. P. Allis Co. with the Fraser-Chalmers Co., of Chicago, the Gates Iron Works of Chicago and the Dickson Mfg. Co. of Scranton, Pa. That same year ground work started on the great West Allis Works.

Expansion continued at a rapid pace. In 1904 Allis-Chalmers acquired the Bullock Electric Mfg. Co. of Cincinnati, Ohio, and entered the electrical field. The Bullock plant became the present Norwood Works. At the same time Allis-Chalmers was developing the steam turbine and the hydraulic turbine. It has set many world records in hydro-electric power, including installations at Niagara Falls and Hoover (Boulder) Dam.

### *enters tractor and farm field, 1914*

Under the leadership of Gen. Otto H. Falk, Allis-Chalmers entered still another basic industry when it introduced its first farm tractor in 1914. General Falk, president of the

firm at that time, foresaw the possibility of replacing the inefficient 20-ton steam engine tractors with a lighter tractor powered by a gasoline engine. Production of farm tractors showed continued growth and a broader line of tractors and farm equipment gradually was added.

The first of several big additions was purchase of the Monarch Tractor Co. of Springfield, Ill., in 1928. It became the Springfield Works, producer of crawler-type industrial tractors and road-grading machinery. In 1929, the LaCrosse Plow Co., of LaCrosse, Wis., was added. Plows and other tillage implements, planters and mowers are made in this plant, now known as the LaCrosse Works. The Advance-Rumely Co. of LaPorte, Ind., was added to the organization in 1931, became the LaPorte Works, and manufactures the remarkable "All-Crop" Harvester and other grain and hay harvesting machinery. The Brenneis Manufacturing Co. of Oxnard, Calif. — makers of special deep tillage farm implements for the Pacific Coast — was added in 1938. It is now the Oxnard Works.

There were other Allis-Chalmers plant additions during this period. The Pittsburgh Transformer Co. became the Pittsburgh Works in 1928 and produces power and distribution transformers. The Condit Electrical Manufacturing Co. of Boston was obtained in 1935 and now is the Boston Works. This plant is used to manufacture circuit breakers. Both plants added to the company's electrical manufacturing facilities, and helped round out what is now considered the world's largest line of major industrial equipment.



# this is the plant today

First buildings of the West Allis Works were erected in 1902 according to plans of Edwin Reynolds, chief engineer of Allis-Chalmers and noted designer of Reynolds-Corliss engines. The early general machinery shops were laid out for continuous parallel flows of material eastward from pattern shops to foundries through machine shops to the erecting floors and shipping platforms. The master plan has permitted expansion to the north without interference with existing flows of materials. Tractor shops, which followed, were also planned for ease in handling materials.

## *foundries and pattern shops*

Pattern shops are located on a portion of the ground floor of the main office building. In these shops, both wood and metal patterns are built for all sizes of castings. Since all patterns are stored for possible future use, the pattern inventory has risen to approximately \$6,000,000.

An outdoor crane runway separates the pattern shops from the No. 1 foundry, where castings as heavy as 135 tons are poured. Metal is heated in cupolas here to temperatures as high as 2900 degrees F. An average of 45,000 tons of iron is melted in this foundry annually.

Several mechanized molding units adopting the production-line technique are a part of the modern foundry equipment. Three cupolas are equipped with mechanical charging units to enable continuous supply of hot iron for these molding units.

Generally speaking, smaller castings are poured in the No. 2 foundry. The major portion of this building was constructed in 1920 shortly after the first tractor shop was erected. Seventy percent of production in No. 2 foundry is tractor castings.

Up-to-date equipment operating in this foundry includes a molding unit into which, during one 8-hour shift, 80

tons of metal were poured and 6,000 molds were produced.

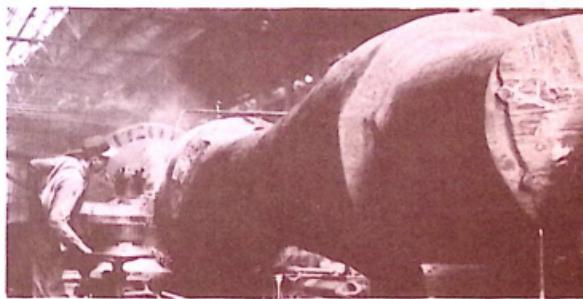
Considerably smaller operations take place in the brass foundry. An average of 4,000,000 pounds of metal are melted here annually, while the record high was 8,357,297 pounds. The brass foundry produces 27 conventional types of metal plus many types of special alloy which may be called for in engineering specifications.

The centrifugal casting department turns out small castings, for many kinds of equipment, ranging in weight up to 600 pounds. In use are five high-frequency induction furnaces developed by Allis-Chalmers engineers.

## *general machinery shops*

A vast number of operations are carried on in the many general machinery shops before materials are ready for assembly on the erection floor. The following paragraphs describe work seen in these shops.

No. 1 shop machines parts for hydraulic turbines, condensers and rock crushers. There is also a complete pump line where all machining and assembling operations are performed for large centrifugal pumps. Other products of

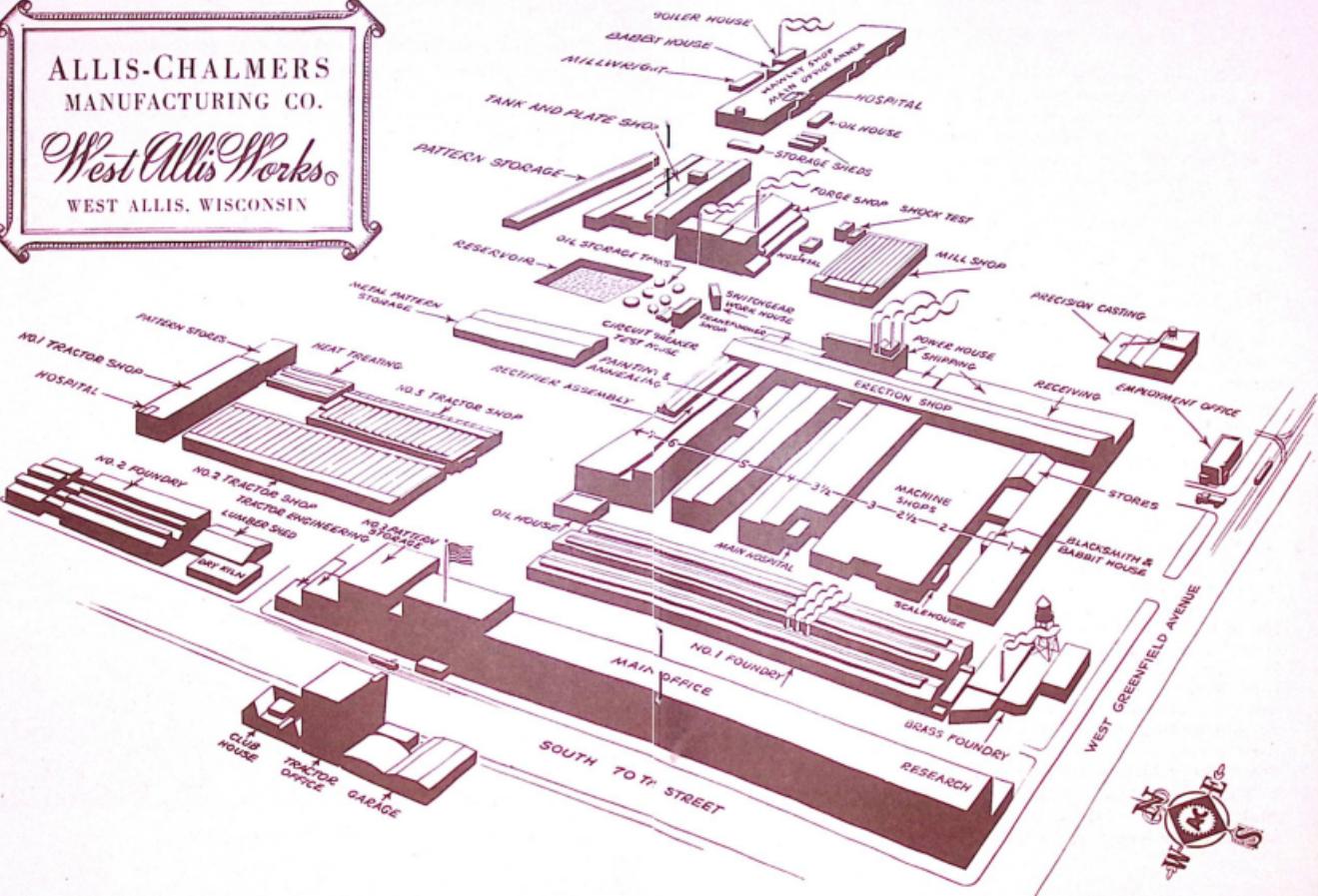


★ Machining of spindle forging for steam turbine.

ALLIS-CHALMERS  
MANUFACTURING CO.

*West Allis Works*

WEST ALLIS, WISCONSIN



No. 1 shop include sheaves and speed changers for Texrope drives.

No. 2 shop machines condenser tube sheets and support plates, and large shaftings. Small parts for turbines and other machinery are machined in the gallery.

No. 2½ shop turns propeller shafting and turbine spindles. There are large gun boring lathes with capacities to hollow-bore shaftings up to 26 inch outside diameter for a length of 50 feet.

No. 3 shop manufactures parts and machinery for the mining, cement and coal industries.

No. 3½ shop machines parts for steam turbines and other large machinery.

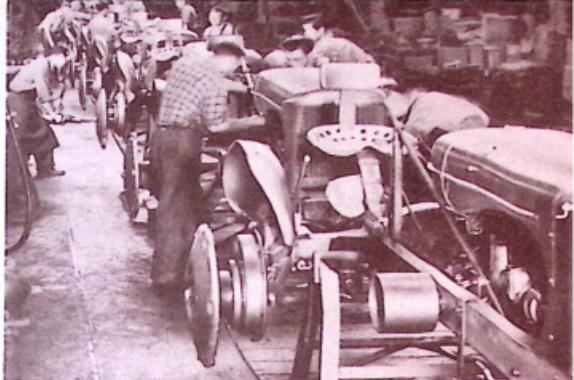
No. 4 shop machines and blades cylinders and spindles for steam turbines. Turbine blades are manufactured in the galleries of No. 3 and 4 shops.

No. 5 shop machines yokes and shafts for large electric motors and generators. This shop contains some of the largest machine tools in the West Allis Works, including a 96 inch by 44 foot (56 foot if extended) lathe, a 14 foot planer and a 28 foot boring mill. In the gallery above, tools and jigs are manufactured and plant equipment repaired.

No. 6 shop has four floors of manufacturing operations. On the ground floor are punch presses for armature, field and core stampings. On the second floor coils are wound and taped for electric rotating machinery and transformers. On the third and fourth floors, large quantities of small component parts for many products are manufactured.

No. 7 shop is divided into sections for assembly and testing of large transformers, and for manufacture of moderate size electric rotating machinery. In the transformer section is a large vacuum tank measuring 24 by 16 feet, and 24 feet deep. Windings for large 230,000 volt transformers must be dried for 2 weeks in this tank under vacuum ranging up to 30 inches of mercury. As a part of the transformer tests the equipment is subjected to as much as 3,000,000 volts of electricity to learn its resistance to lightning.

The tank and plate shop uses 4,000,000 pounds of plates and bars per month in the fabrication of kilns, coolers, transformers, tanks, mills and weldment parts. At normal



★ Farm tractor assembly line.

production, 50,000 pounds of welding rod are used monthly. This shop contains the largest positioning device in the Western Hemisphere. It will handle a 50-ton load—and can be positioned from the horizontal to the vertical and rotate a piece 30 feet in diameter.

The forge shop has steam and drop hammers with a force up to 8,000 pounds and presses which exert a pressure up to 2,500 tons. The largest ingot that can be forged heat treated is 82 inches in diameter. Largest forged ingot weighed 108,000 pounds. Largest casting at present weighed 96,000 pounds. The shop contains 70 heat treating furnaces. Normal production of drop hammers is 700 to 800 tons per month and for heavy pressure open hammers is 800 to 1,000 tons per month.

The mill shop manufactures flour mill equipment which includes gyratory sifters, grinders, flaking and rolling machines and such items as packers, purifiers, dust collectors and aspirators.

A precision casting shop produces many small castings. Maximum weight of each casting is 15 pounds, but the average weight is less than a pound.

The Hawley shop manufactures control systems,

gear, motor starters and electronic induction heaters. Offices and drafting rooms for several engineering sections are also located here.

The main erecting shop is 1250 feet long (longer than the Empire State Building is tall) and four stories high. At the south end of this shop is a vertical boring mill which is the largest in the Western Hemisphere. A piece of work 200 inches high can be placed on the mill and turned or bored to a diameter as great as 40 feet. It is unique in its ability to bore as well as turn such large pieces, and its entire capacity is scheduled more than two years in advance.

In the erecting shop abreast of No. 1, 2, and 3 shops, condensers are assembled and tubed, and hydraulic turbines and mine, sawmill and paper mill machinery are assembled. East of the main floor are hydraulic test pits where all centrifugal pumps are tested before shipment. Here also, machinery casings are tested by hydraulic pressure for strength and tightness. The hydraulic laboratory has unique facilities for testing propellers under cavitation conditions. Controllable pitch propellers for hydraulic turbines have been developed through comprehensive tests of 30 inch diameter prototypes. Abreast of No. 4 shop are pits where steam turbines are assembled and tested with steam. In the north section of the erecting shop, electrical machinery is assembled and tested under load.

### *tractor shops*

The manufacture of farm tractors was commenced at the West Allis Works in 1914. The first model was a 3-wheel unit built for family farm use. Although crude by comparison with modern standards, it was the forerunner of today's fast, streamlined, rubber-tired tractors designed for the family-operated farm and first introduced to farmers by Allis-Chalmers in 1932.

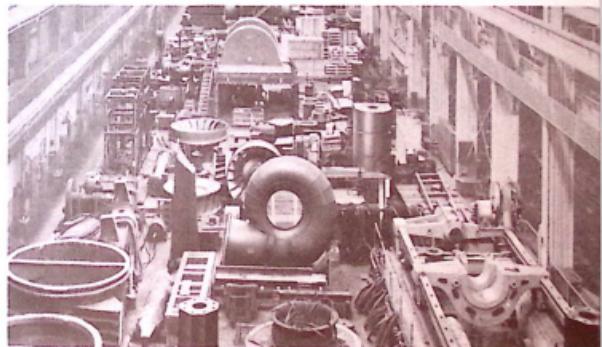
From this small beginning in 1914, tractor production at the West Allis Works has been steadily increased under the constant pressure of a demand which has never ceased to tax the capacity of our shops. From nowhere in

1914, Allis-Chalmers has emerged as one of the major manufacturers of tractors in the world today.

Tractors were first produced at West Allis in one of the original plant buildings, but it became necessary in 1918 to build what is now known as No. 1 tractor shop. In 1929, capacity was nearly doubled by the erection of No. 2 tractor shop, and this capacity was further augmented in 1937, when No. 3 tractor shop was added.

In addition to the manufacture of complete farm tractors, now concentrated in 5 models, the tractor shops also produce 5 models of stationary power units ranging from 15 to 130 horsepower in size, and also turn out more than 12,000 tons of replacement parts annually.

The remarkable growth of the company's tractor division is attributed to its early recognition of the existing need for mechanization on family-operated farms, and to the success of its engineers in originating new designs that placed the tractor within reach of all farmers. Today, tractors produced at the West Allis Works are found on farms in every part of the globe.



★ Looking north over erection floor.

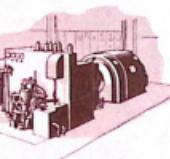
# machinery for good living

Production activities at the West Allis Works include a broad range of equipment which affects the daily lives of all people. Manpower, machines and metals combine to manufacture equipment which aids in providing such needs as food, clothing, shelter and transportation.

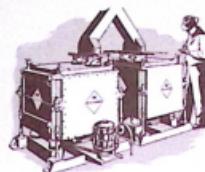
Largest single group of products in volume of production is the farm tractors. These tractors supply power to farm implements for plowing, planting, cultivating and harvesting. They enable a farmer to increase his total production while easing his individual toil.



Also occupying a large space in the production picture of the West Allis Works are the many types of electrical equipment—equipment which generates, controls and utilizes electric power. In these shops are produced hydraulic turbines and generators for the nation's largest dams. Also built in these shops are steam turbine-generator equipment, used in power stations throughout the nation, and the recently developed gas turbine.

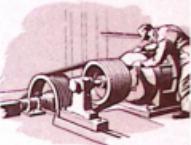


The list of electrical equipment also includes large transformers, unit sub-stations, switchgear, voltage regulators, large motors and pumps and electronic heaters. Some of the largest transformers in use today are products of the West Allis Works. Switchboards and other controls also are a part of the equipment utilized in every industry for handling electric power requirements.



Then there are the many machines which are a direct part of the manufacturing process in every basic industry. Flour milling machinery built at the West Allis Works furnishes flour for about nine of every ten loaves of bread. There is machinery for mining, ore-processing, and oil refining. There is sawmill machinery, kilns and other equipment for cement plants, equipment for extracting food oils from soybeans and cottonseed.

The list here is not complete. But it portrays the part that the men and women of the West Allis Works, and the product of their efforts, play in the nation's production. It gives meaning to the statement that practically every product manufactured in the United States is aided somewhere along its course by Allis-Chalmers equipment.



The purpose of this booklet is to acquaint you with our West Allis Works — to give a brief description of the magnitude of the plant and the varied operations carried on.

I should like to point out that in planning production for these many shops, we make use of all the engineering "know-how" available. In selecting materials, in machining of parts and in assembly of parts we put into our equipment the best obtainable.

But we are not easily satisfied. Our research never stops. We are always seeking new ways to manufacture products which do a better job. This, we feel, is a part of our duty to America and its citizens. In this way, we can improve our contribution to good living for all.

W. GEIST, PRESIDENT.