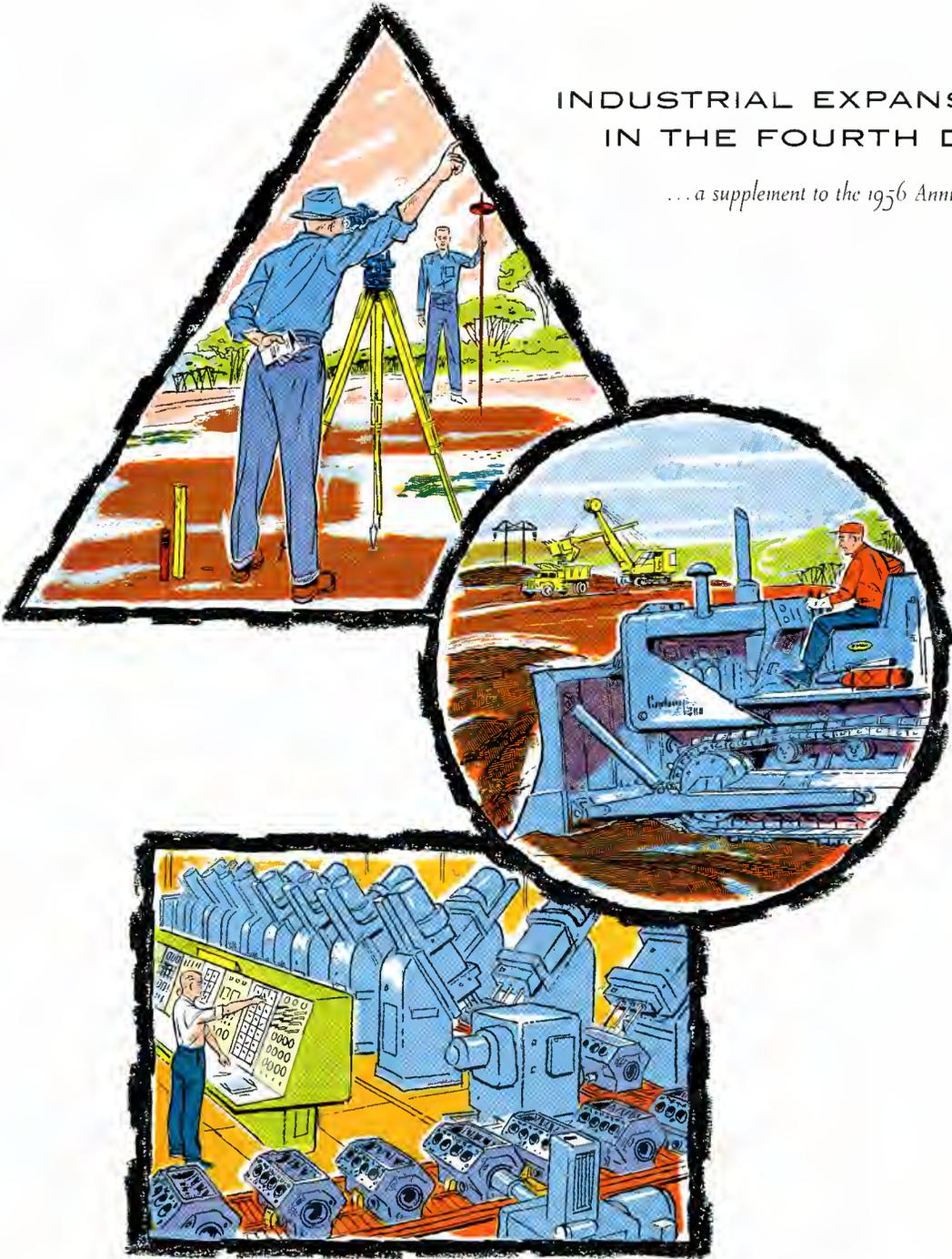


INDUSTRIAL EXPANSION IN THE FOURTH DISTRICT

... a supplement to the 1956 Annual Report



FEDERAL RESERVE BANK

of Cleveland



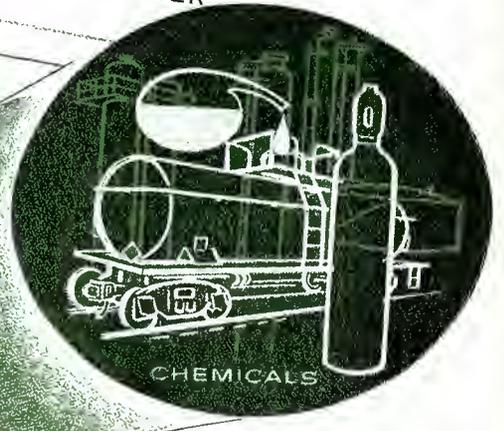
CONTENTS

NEWER AND OLDER INDUSTRIES	3
AUTOS - THE "BIG THREE" INVADE THE FOURTH DISTRICT	5
INTEGRATION ON THE OHIO RIVER	7
CHEMICALS, TITANIUM AND ZIRCONIUM	9
ATOMIC ENERGY DEVELOPMENTS	11
INDUSTRIAL RESEARCH	13
NEW FRONTIERS IN TRANSPORTATION	15
COMMUNITY DEVELOPMENT	17
LONG ESTABLISHED INDUSTRIES CONTINUE TO EXPAND IN THE FOURTH DISTRICT	19

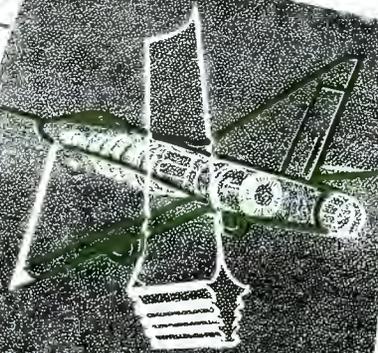




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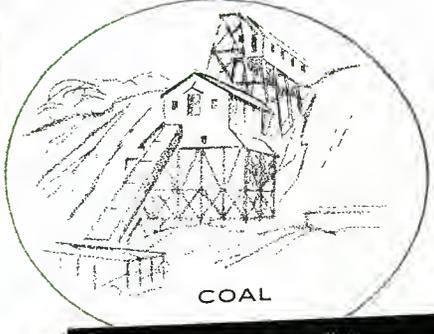
CHEMICALS



TITANIUM



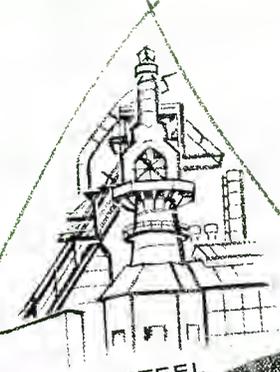
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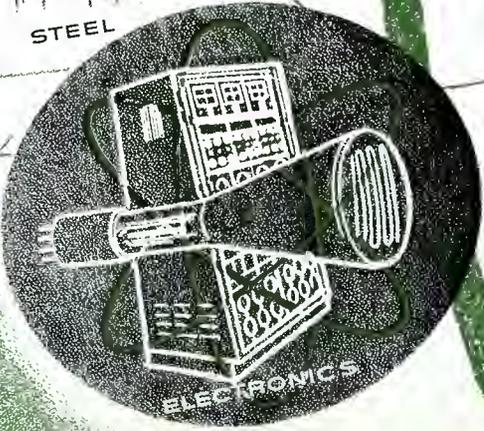
COAL



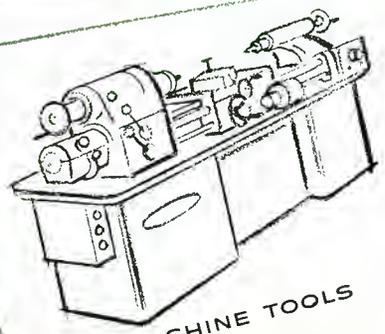
ALUMINUM



STEEL



ELECTRONICS



MACHINE TOOLS

NEWER AND OLDER INDUSTRIES

An outstanding feature of the year 1956 was the acceleration in pace of business investment in new plant and equipment, as was noted in the main body of this annual report.

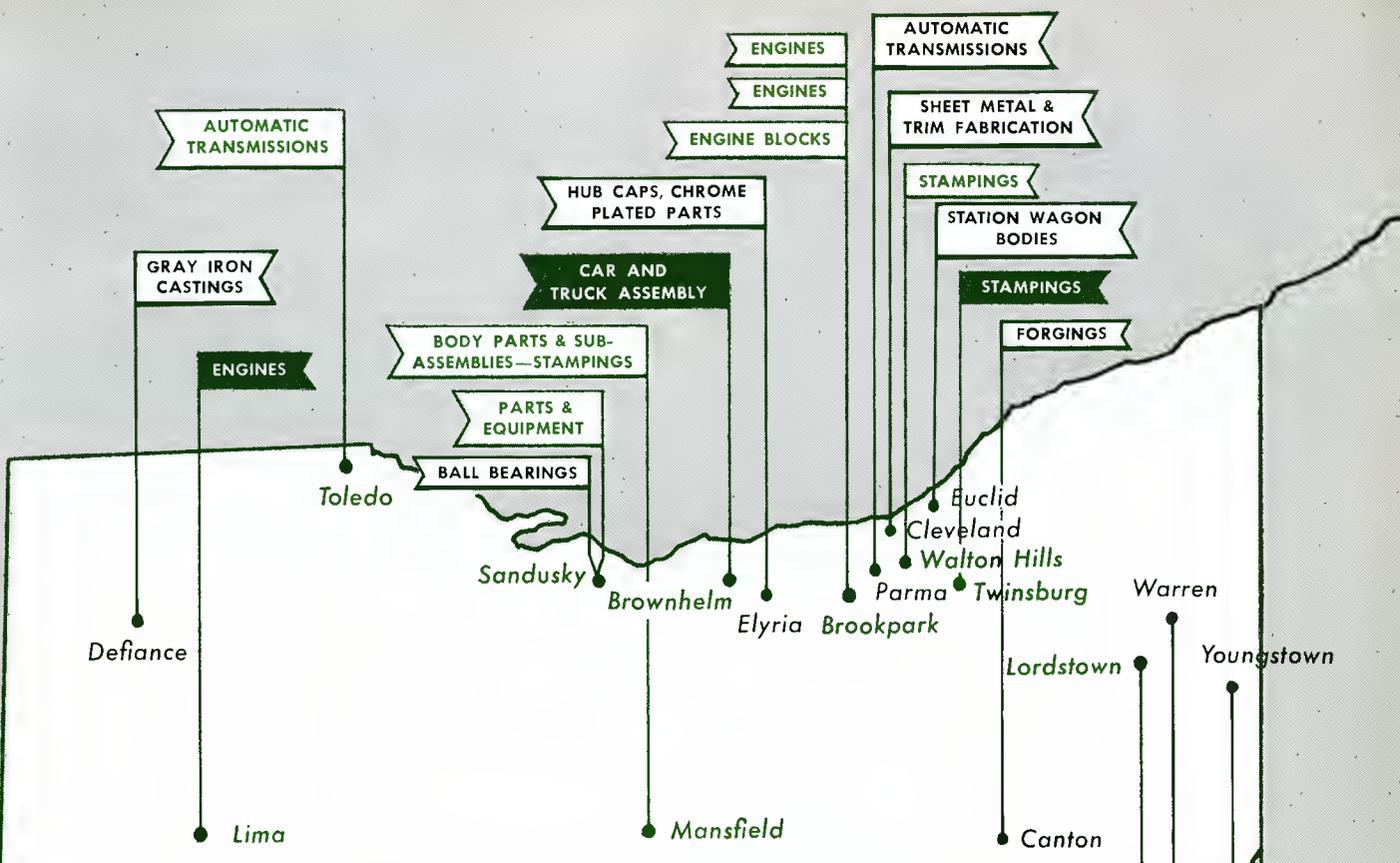
The Fourth Federal Reserve District shared very largely in the surge in industrial expansion. And this was no accident of a single year. *The vigorous momentum of industrial expansion in this District has been under way for some years; many additional developments are in the blueprint stage or beyond.*

The state of Ohio is now the second state in the Union in respect to the dollar values added to raw materials in the manufacturing process. Within the Fourth District is employed one out of every 9 of the nation's manufacturing workers. One out of 8 of the dollars of value added in the manufacturing process is added in the District. These and other broad facts emerge from the latest Census of Manufactures, but they give little feeling of the forward drive of industry in the District.

The richness of variety, as well as the magnitude, of industrial expansion in the Fourth District has probably not yet been fully realized by all members of the nation's business community—let alone by the public at large. The pages which follow suggest at least some of the most interesting facets of the expansion; the complete story cannot be told in short compass.

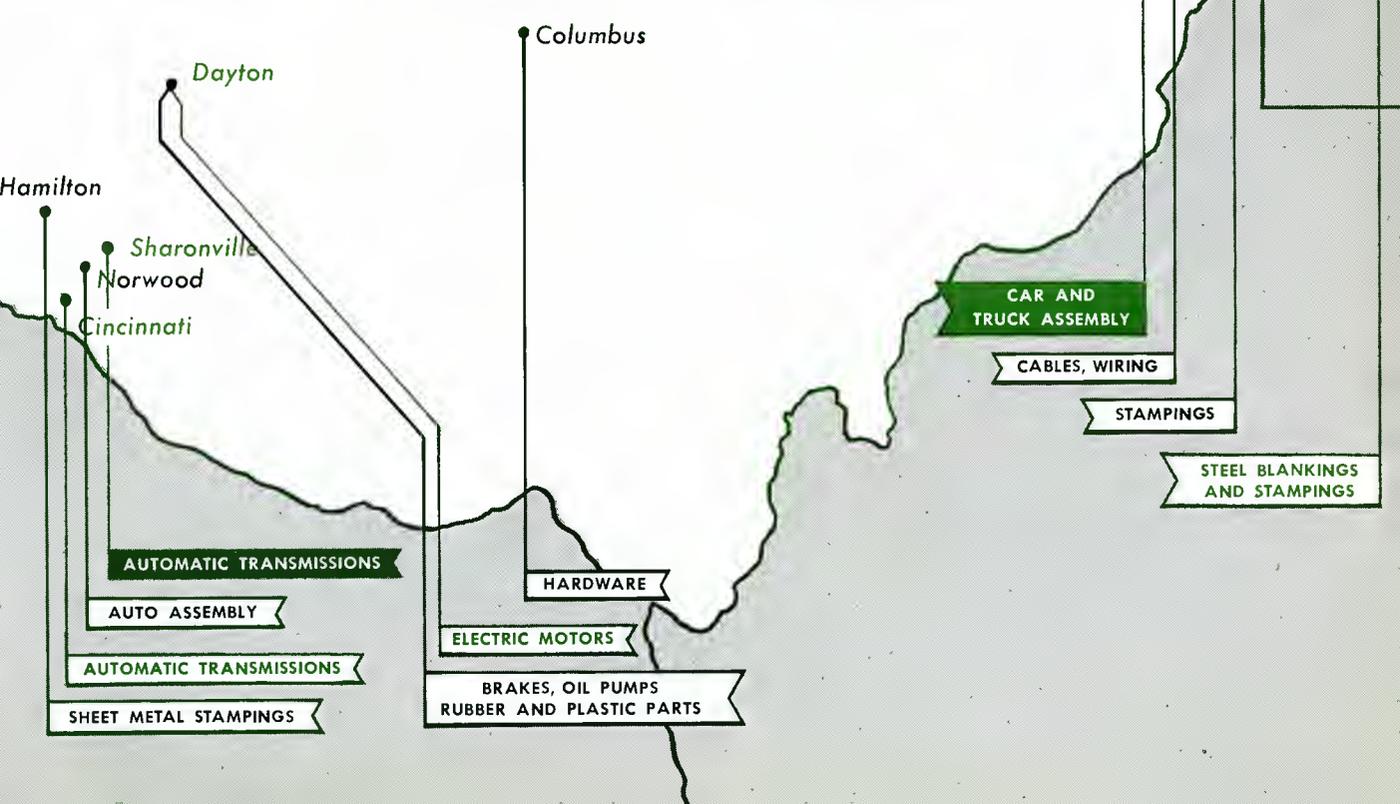
Long known as a stronghold of heavy industry, the Fourth District's place in such industries as steel, machinery, fabricated metal products, rubber products and coal mining, continues to be assured. Well over half of the industrial workers of the District are engaged in the groups of enterprises suggested by the naming of such product lines.

Except for the last two pages of this Supplement, however, attention is being purposely centered upon the *newer* industries. Some of the latter—such as titanium, zirconium or atomic energy in its peacetime applications—can be considered new industries, *per se*. Others such as auto assembly (as distinct from parts manufacture) are relatively quite new to Fourth District locations. Still others, such as chemicals and aluminum, are industries which, although they have strong historic roots in this District, have recently burgeoned here to such an extent that note must be taken of their new place in the industrial pattern of the District and of the nation.



**PLANTS OF THE "BIG THREE" AUTO MANUFACTURERS
IN THE FOURTH DISTRICT**
(excludes independent parts manufacturers)

BUILT BEFORE 1950	BUILT 1950-1956	UNDER CONSTRUCTION
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AUTOS—"THE BIG THREE" INVADE THE FOURTH DISTRICT

The Fourth Federal Reserve District has long been a stronghold of independent auto parts and truck manufacturers as well as the major supplier of such materials as steel sheets, iron, and glass to the Detroit-based auto industry. In recent years the District has been "invaded" en masse by the Big Three automobile producers themselves; the newcomers have been welcome.

This story of the Big Three is not meant to detract from the considerable expansion undertaken by the established auto and truck parts industry or new independent concerns in the field.

The invaders have rolled over the District in three distinct waves since 1946. Between that year and 1948, not less than 8 new plants owned by the major auto assemblers were put into operation. Chief among these were installations to produce ball bearings at Sandusky, sheet metal stampings at Hamilton, chrome plated parts at Elyria, gray iron castings at Defiance, and automatic transmissions in Parma, adjacent to Cleveland.

The second wave brought 10 giant new plants into production between 1950 and 1956. Included among these were automatic transmission plants at Toledo and at Fairfax (near Cincinnati), two engine plants in Brook Park (near Cleveland) which are fed by an adjacent new foundry, steel stampings at Pittsburgh, and a body parts and subassembly plant in Mansfield.

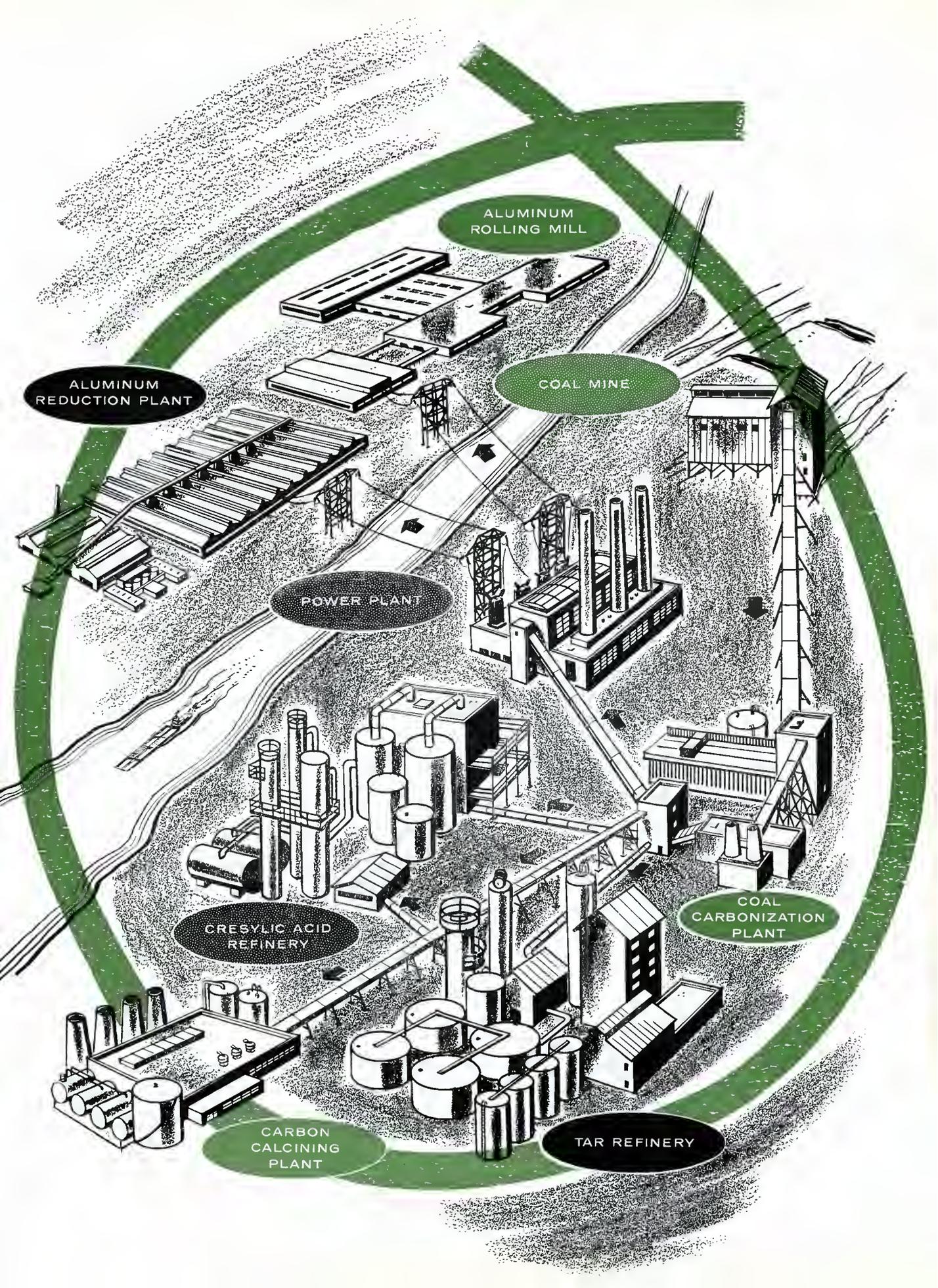
The third wave, now nearing its crest, involves four very large facilities under construction and a fifth on the planning boards. Sharonville, near Cincinnati, will be the home of another automatic trans-

mission plant and Twinsburg (between Akron and Cleveland) will soon reverberate from the presses now being installed in a tremendous stamping shop. A new engine plant will be completed early in 1957 at Lima. Ground also has been broken for a car and truck assembly plant at Brownhelm (near Lorain). A site has been obtained for a similar factory at Lordstown (near Warren, Ohio).

When all of these facilities are completed, it is estimated that employment in plants of leading auto manufacturers will be one-third larger than at present and roughly double the 1950 total. Altogether, the post-World War II expansion program in the District will have added (without allowing for further enlargements) more than 100,000 new employees.

The broadening of an existing industry on such a scale is equivalent in every economic respect to the establishment of a major new industry in the Fourth Federal Reserve District.

The reasons behind the broad shift of the Big Three into the District, following their decision to decentralize operations, are not hard to find. A glance at the adjacent map reveals that transportation facilities must have been a major factor in locating the string of new plants in northern Ohio: the trunk-line railroads, the new turnpike, and the coming seaway. Equally important, perhaps, were the attractions of the expanding District steel industry, nearness to the major markets for finished cars, a skilled labor force, and the necessary supporting industries to feed the complex auto assembly plants.



ALUMINUM ROLLING MILL

ALUMINUM REDUCTION PLANT

COAL MINE

POWER PLANT

CRESYLIC ACID REFINERY

COAL CARBONIZATION PLANT

CARBON CALCINING PLANT

TAR REFINERY

INTEGRATION ON THE OHIO RIVER

The once placid Ohio River industrial valley—stretching from Pittsburgh to Cincinnati—is literally exploding with giant new industrial projects. The in-rush of new industry is concentrated chiefly in chemicals, ferro-alloys, and nonferrous metals.

The reasons behind the wave of expansion are not hard to find: cheap raw materials such as coal and salt, unlimited supply of fresh water, low-cost river and rail transportation, nearness to major consuming markets, and a pool of resourceful and dependable labor drawn from southern Ohio, West Virginia, and Kentucky. All of this is supported by what is probably the world's largest concentration of privately owned electrical generating plants, clustered along the Ohio river, and located virtually on top of their fuel supply.

One of the most amazing industrial complexes straddles the river at Clarington, Ohio. It was initiated through the joint effort and cooperation of four major companies: a coal company, a chemical company, a nonferrous metals producer, and an electric utility. More recently, an oil refiner and a ferro-alloy producer have joined the complex. Total cost of the project, which is now under construction, will be close to \$300 million.

On the Ohio side of the river will be a 180,000-ton aluminum reduction plant and, nearby, an aluminum rolling mill capable of processing 64,000 tons of aluminum a year. The balance of the aluminum will be available for processing elsewhere—chiefly in Midwest and East Coast areas.

Across the river at Cresap, West Virginia, a coal company is developing a deep shaft mine with an annual capacity of

three million tons. The mine will feed a coal carbonization plant using the fluidized low temperature technique which will process the coal into two basic products: char and tar. The char will be conveyed to a new power plant to be burned as a very low cost fuel.

The tar will be refined in adjacent refineries into a wide range of tar acids and tar chemicals. Included in this chemical complex will be a tar acid refinery, a carbon black plant, a delayed coker, and a coke calcining plant.

The coal company has joined forces with an oil refiner to operate a carbon calcining plant with a yearly output of 165,000 tons. The output of the calcining plant will be used chiefly as electrode material for which the aluminum reduction plant will be a major customer.

The new 675,000-KW power plant (jointly owned by an electric utility and the aluminum company) will provide very low cost power for the reduction works and chemical processors. It is equipped with three 225,000-KW generators with provision to expand by addition of two 450,000-KW generators when needed. The power plant is tied into a state-wide grid to assure continuous service.

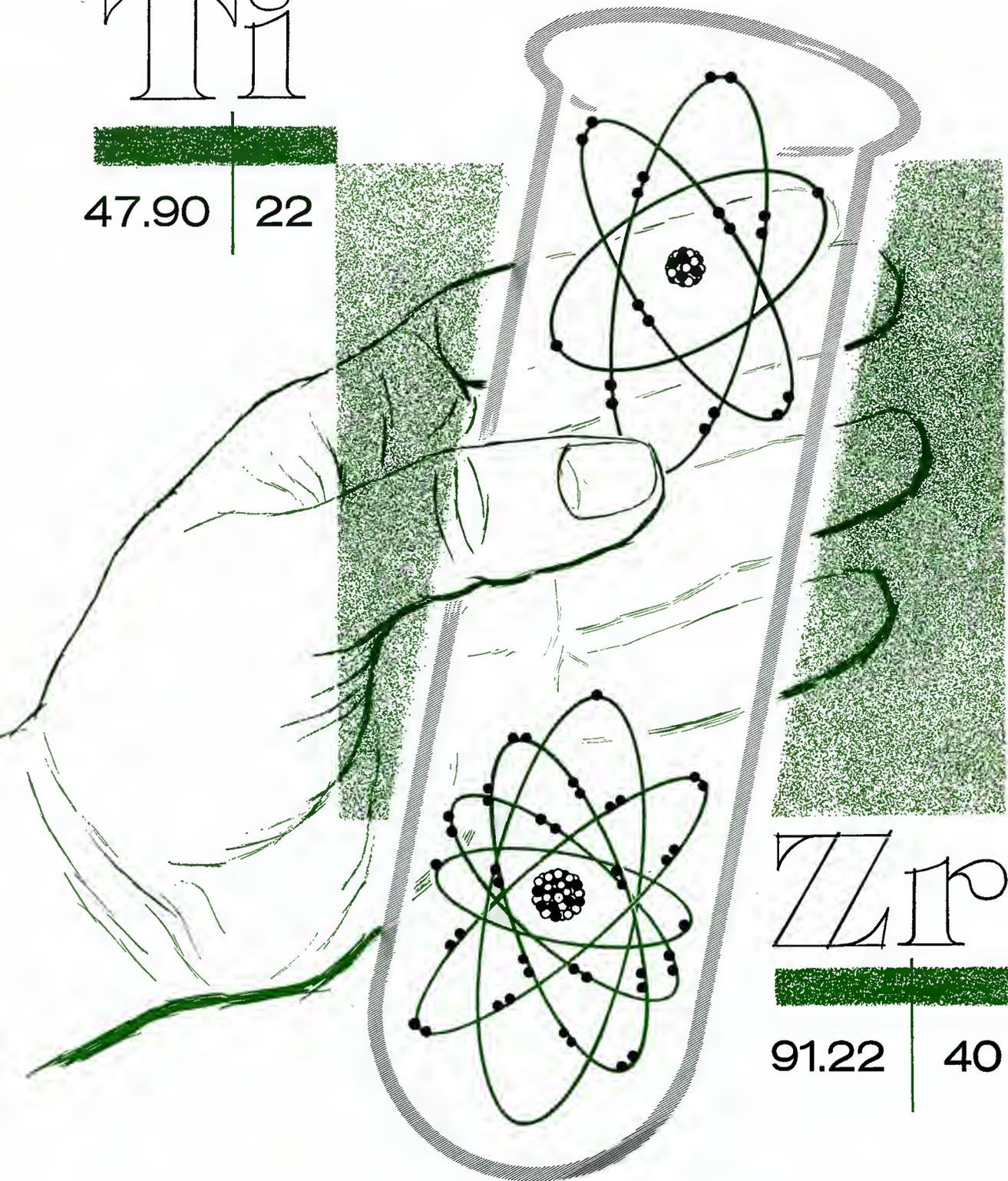
In 1957 a new plant, with electric furnaces, will be built adjacent to the power plant to produce silicon alloys in electric furnaces to serve the new aluminum industry.

Other offshoots of the complex are the extension of railroad service down the northern side of the river and the new town of Wilson with 1,200 homes planned to house part of the influx of workers.

Ti



47.90 | 22



Zr



91.22 | 40

CHEMICALS, TITANIUM AND ZIRCONIUM

The chemical industry has become one of the fastest growing industries in the District. In association with this development, the area is becoming the leader in the production and fabrication of the new wonder metals—titanium and zirconium.

Chemical production is centered chiefly in two sections: along the “chemical shore” of Lake Erie (just east of Cleveland) and in the Ohio River Valley. In both sections, plentiful supplies of salt, limestone, coal, water, and cheap electric power, as well as nearness to markets, have been important factors stimulating growth.

The Lake Erie growth has centered around the cities of Painesville and Ashtabula. In each, initial primary chemical facilities have spawned a host of related chemical plants, connected by a network of pipelines that exchange chemicals and by-products. In a sense, each area has become a vast chemical plant. Leading products include alkalis, soda ash, caustic soda, chlorine, sulfuric acid, acetylene, metallic sodium, polyvinyl chloride, solvents, fatty alcohols, and rayon.

The Ohio River growth in recent years has, perhaps, been even more rapid and spectacular than Lake Erie developments. No less than 40 major chemical facilities are now located between Pittsburgh and Cincinnati; the bulk of these have been established since 1950. Major products include titanium tetrachloride, silicones, chlorine, caustic soda, chloromethanes, sulphuric acid pharmaceuticals, aniline, vinyl chloride, synthetic fibers, and coal chemicals. The area around Parkersburg is

now called the plastics center of the world. (The city of Parkersburg, West Virginia, is located in the Fifth Federal Reserve District, near its boundary with the Fourth District.)

Titanium and zirconium production in the Fourth District is an outgrowth of the chemical development.

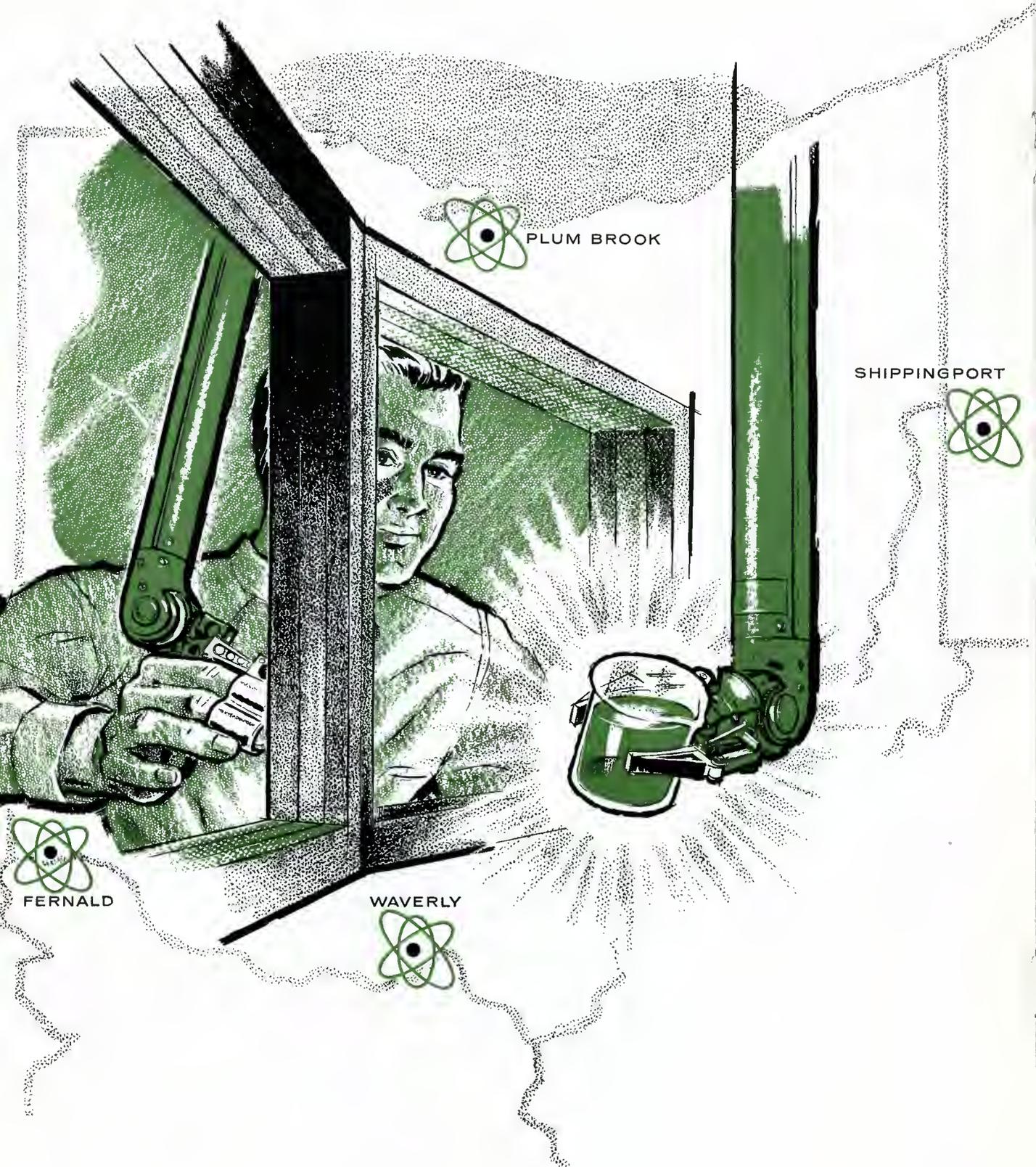
In the production of titanium, chlorine is used to convert the ore to titanium tetrachloride; then, either magnesium or metallic sodium processes are used to convert the titanium tetrachloride to sponge. Zirconium is produced through a metallic sodium process.

Titanium, which is used extensively in jet aircraft and missiles, is stronger than aluminum but lighter than steel. It has the ability to resist corrosion and withstand very high temperatures.

By late 1957, Ashtabula will be the largest titanium sponge producing center in the world, with two producers having an annual capacity of 12,500 tons, or nearly 40 percent of the U. S. total.

The District has also become the leader in processing titanium sponge into ingots, sheets, and wrought mill products. Major processors are rapidly expanding their facilities at Niles, Massillon and Toronto (Ohio) as well as at Pittsburgh and Midland (Pennsylvania).

Zirconium, an extremely tough metal, is used in atomic reactors because of its great resistance to heat and corrosion. A new facility at Ashtabula will soon produce 1,500,000 pounds a year and another near Parkersburg will turn out 1,175,000 pounds.



PLUM BROOK



SHIPPINGPORT



FERNALD



WAVERLY

ATOMIC ENERGY DEVELOPMENTS

The race to harness the atom for peacetime purposes, as well as to expand and improve its use for national defense, finds Fourth District private industry among the leaders in the field.

The most spectacular project in the District is America's first commercial nuclear power plant which will begin operation by the fall of 1957 at Shippingport, Pennsylvania. The heat will be provided by splitting uranium atoms.

The power plant will have a capacity of 100,000 kilowatts and the total cost of \$85 million will be borne in part by the Government and in part by a private utility. The generated power will be fed into the network already serving metropolitan Pittsburgh with conventional coal-generated electricity.

The reactor vessel, built and designed in the District by a leading electrical equipment manufacturer, is a steel vessel 33 feet high, 10 feet wide, and 8½ inches thick. It will be sunk deep in the earth in a water-filled canal and surrounded by concrete walls of five-foot thickness. Water pumped through the reactor in stainless steel pipes will pick up heat and when piped to the boilers will convert the boiler water to steam. From that point, the generation of electricity follows the conventional pattern.

Experience and knowledge gained in the construction and operation of the initial nuclear power plant will go far in determining actual costs of nuclear generated power, and will represent a long step forward in the effort to make this type of fuel competitive with more conventional types of fuels.

At the other extreme, in terms of size of

power plant, the City of Piqua, Ohio, has virtually completed all the necessary steps to obtain approval from the Atomic Energy Commission to build an organic moderated reactor for a 12,500-KW power plant. It may demonstrate the feasibility of small-sized nuclear power plants.

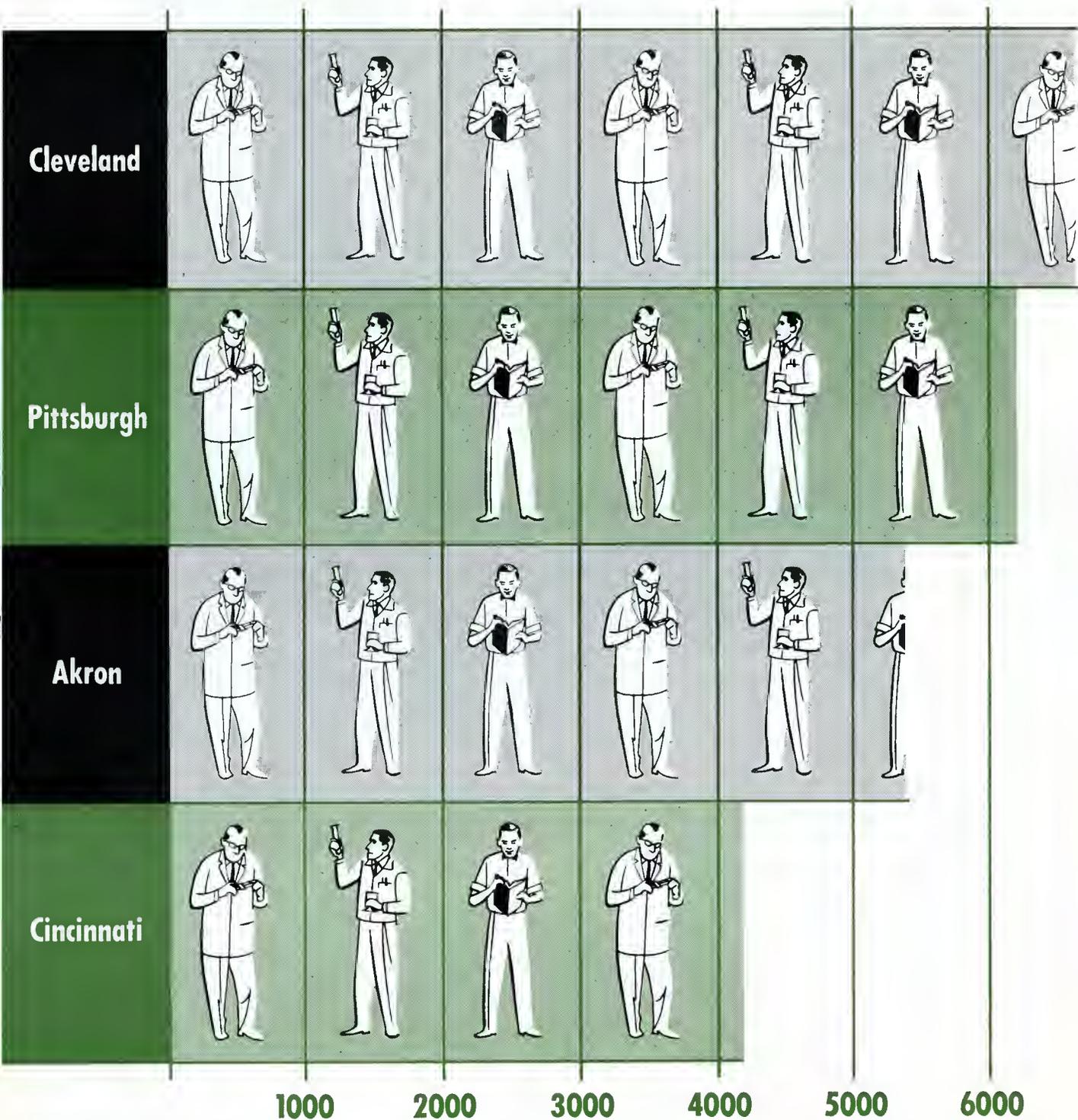
The range of privately financed efforts to explore the uses of the atom is enormous. It includes such projects as the recently completed 1,000-KW nuclear reactor in Columbus by a world-famed research agency. This is the largest of the "swimming-pool" type of reactor put into service in the U. S. and will be used for a wide variety of experiments.

At Cheswick, Pennsylvania (near Pittsburgh) the first privately financed atomic reactor parts plant was put into service in 1955 to test parts under simulated operating conditions. Nearby is the center which built the reactors for the U.S.S. Nautilus and the Shippingport project.

Government-owned atomic projects, operated under contract by private companies, have continued to expand in the District. At Waverly, the billion-dollar diffusion plant has begun to operate with a permanent staff of more than 3,000 people. In Fernald, Ohio, a uranium feedstock plant continues to expand. It processes uranium ore into high purity uranium which is used as the raw material, for example, for the Waverly project.

Other recent government ventures include a \$4,500,000 experimental laboratory under construction at the Plum Brook Ordnance Works, near Sandusky, Ohio. Its assignment is to develop an aircraft nuclear power plant.

RESEARCH LABORATORY PERSONNEL



INDUSTRIAL RESEARCH

Industrial research has become a major industry in the District. Private industry in the area is probably spending \$350 million a year on this vital function. From the investment in industrial research are expected to flow the new products and processes, the new uses for old products, and the lower costs that will keep industry on the upward course of expansion and diversification.

The chart depicts the number of research workers employed by industry and by private research laboratories in four of the large cities of the District. The tally includes scientists, engineers and supporting personnel such as laboratory assistants and clerks. It does not include research personnel working in colleges, medical centers or government agencies; nor does the chart include research workers in social sciences, in quality control, or in market research.

Cleveland appears to be the leading research center in the District, with 119 companies operating 130 laboratories, and employing a total of 6,700 workers. Pittsburgh has 55 research centers which employ 6,100 workers. Employment in Akron's twelve research laboratories approximates 5,600. Cincinnati has 47 research laboratories staffed by 3,100 employees. From a national point of view, Cleveland and Pittsburgh are the fourth and fifth largest industrial research centers in the country, when ranked according to the number of research workers.

But research activity is by no means

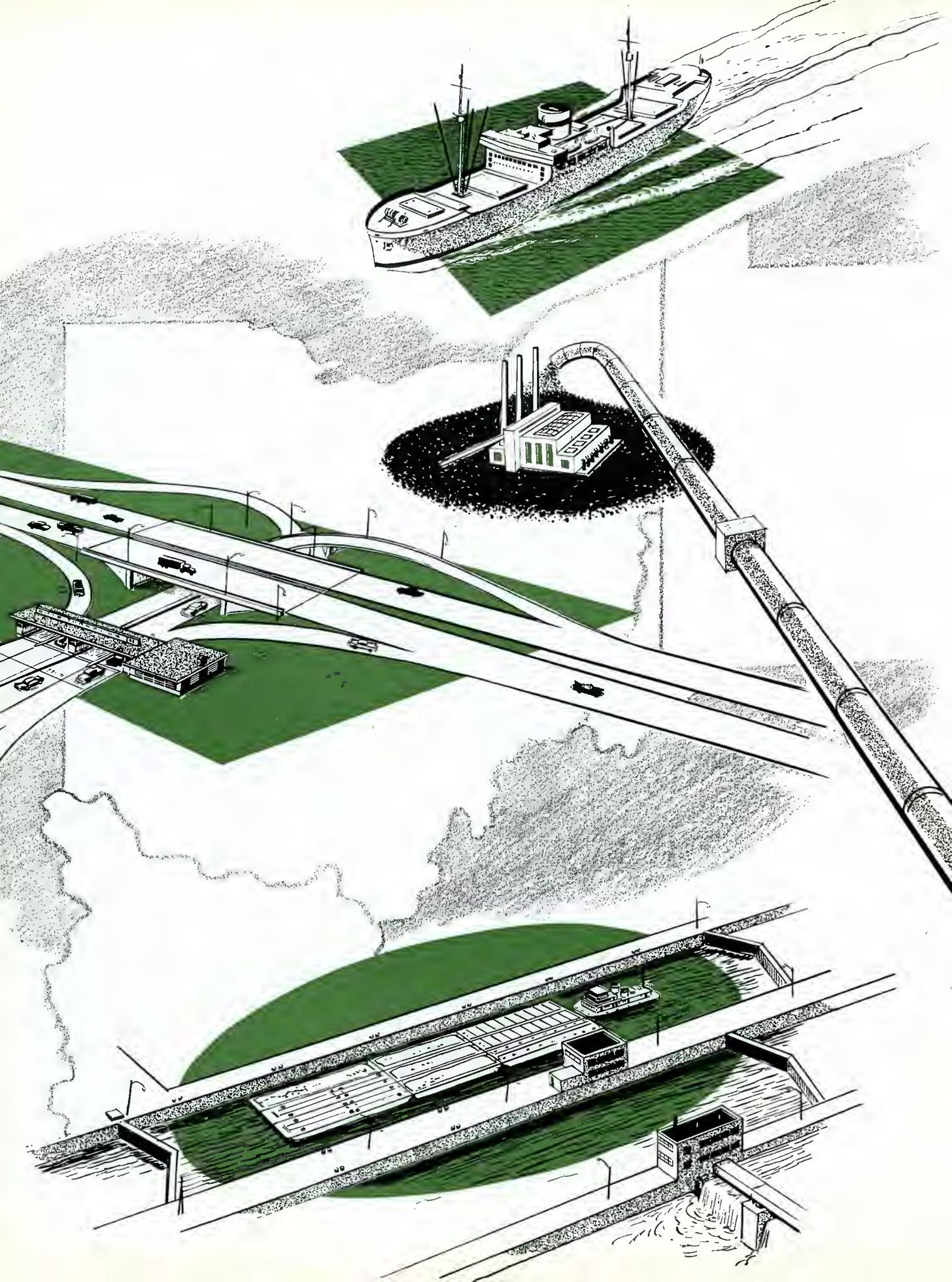
limited to these large cities. Altogether there are 510 research laboratories located in the Fourth District, employing 33,400 people, according to the listing of *Industrial Research Laboratories of the United States*, compiled by the National Academy of Sciences. (Washington, 1956, tenth edition.) On this basis, the Fourth District accounts for nearly 11 percent of the 4,850 laboratories of the United States.

Some idea of the varieties of research now in progress in the District may be had from a partial review of major laboratories which have been established quite recently or which are now in the planning stage.

In Pittsburgh, which was the site of the first industrial atom-smasher and which has become a leader in atomic research, laboratories have recently been opened for work on radiation, atomic and nuclear reaction, and testing of nuclear fuel elements. Other new projects in Pittsburgh are exploring steel, glass, aluminum, paint, petroleum, coal, chemicals, and food products.

Around Cleveland and Akron, new laboratories are working on metallurgy, petroleum, jet engines, solid-state physics and electrochemistry, graphite, electronics, synthetic and natural rubber, radiation, and guided missiles.

Other important new research facilities are those which have located in Toledo for glass, in Dayton for business machines, in Miamisburg for atomic research, and in Cincinnati for chemicals and gas turbines.



NEW FRONTIERS IN TRANSPORTATION

Adequate and low-cost transportation is a major factor governing the growth and development of industry and commerce in a given geographic area.

Although the Fourth District is already served by a large network of railroads, pipelines, highways and airlines, both public and private agencies are making notable strides toward improving and reducing the costs of established transportation, as well as innovating cheaper modes of transportation. Expanded or improved transportation facilities have a triple impact upon industry: markets for finished goods are enlarged, the cost of raw material assembly is reduced, and new resources of materials become available.

The prospective completion of the St. Lawrence Seaway in 1959 is already having a marked impact upon the economy of the Fourth Federal Reserve District. The prospect of obtaining rich Labrador iron ore to supplement dwindling Lake Superior supplies has favorably influenced the plans for expansion of steel mills. Inquiries from chemical manufacturers have multiplied. Lake Erie ports of Toledo, Cleveland, Ashtabula, and Erie are planning, or have under way, the improvement of general cargo docks and port facilities, and the assembling of waterside tracts of land to offer industry.

In another part of the District, improvements in the Ohio River are being pushed vigorously. Construction of the Markland dam, down-river from Cincinnati, was started in the spring of 1956. This new high level dam and one set of modern locks will replace five existing dams and locks. An 87-mile pool will have a minimum 12-

foot channel instead of the existing 9-foot depth.

Work has started also on the locks for a new high dam at Greenup (near Ashland, Kentucky) which will replace four existing structures. In early 1957, two similar projects will get under way at Opossum Creek and Pike Island dams near Wheeling.

The opening of the new Ohio Turnpike in October 1955, linking the Pennsylvania Pike and the now completed Indiana Turnpike, must be regarded as a major step in speeding and reducing the cost of both auto and truck transportation. The sprinkling of new multimillion-dollar auto assembly and parts plants along its length, with easy access to both the road and coming seaway, is a testimony to the magnetic pull of these transportation facilities. Nor is this the end to improved roads: a north-south throughway is on the drawing boards to link Conneaut and Cincinnati and another between Pittsburgh and Erie. These will likely be free roads. In addition, the states of Ohio, Pennsylvania, West Virginia and Kentucky have multimillion-dollar highway programs under way as a part of the accelerated Federal road plan.

Another frontier in transportation methods is the private 11-inch pipeline to carry coal 108 miles from a mine at Georgetown, Ohio, to an electric utility at Eastlake. It is expected to begin operating at full capacity this spring. It is designed to deliver 1,200,000 tons of coal a year as a 50-50 mixture of coal and water. After being dried out, the powdered coal will be blown into boilers for fuel. The pipeline will cut coal transportation costs by more than 40%.

PARKS AND RECREATION

INDUSTRIAL

COMMERCIAL

RESIDENTIAL

**MASTER PLAN
FOR ORDERLY
COMMUNITY GROWTH**



COMMUNITY DEVELOPMENT

Although the growth, development, or redevelopment of a city has often, in the past, been a haphazard process, in recent years it has more likely been the result of conscious planning. The kindling spark may be a railroad, electric utility, Chamber of Commerce, newly organized citizens' committee, planning commission, or an Industrial Development Corporation.

Today, planning is almost universal among the cities and towns of the District. Three of the more interesting programs are operating in Pittsburgh, Toledo and Lexington.

The District's most widely publicized and most comprehensive community improvement-development program is being carried out in the greater Pittsburgh area under the leadership of the Allegheny Conference on Community Development. This nonprofit agency has coordinated the work of Federal, state and many municipal agencies.

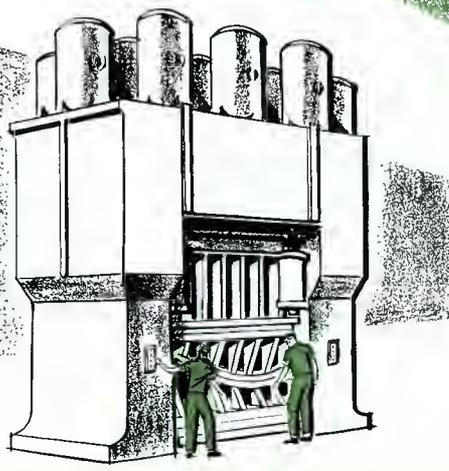
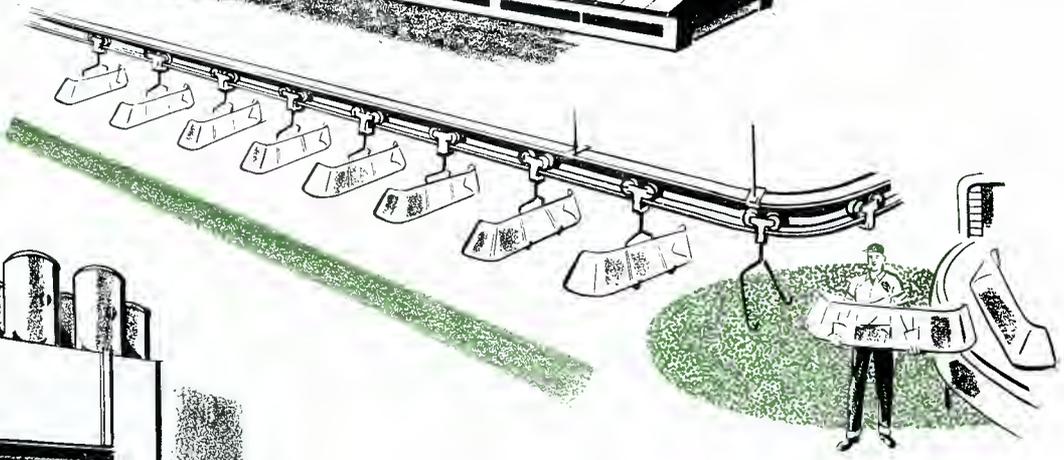
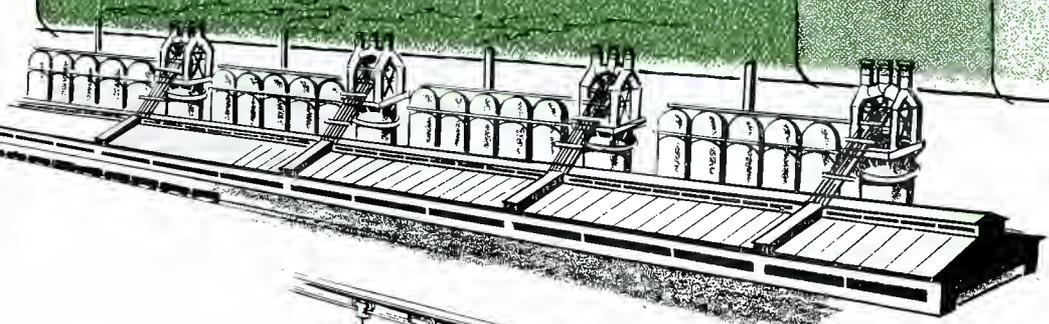
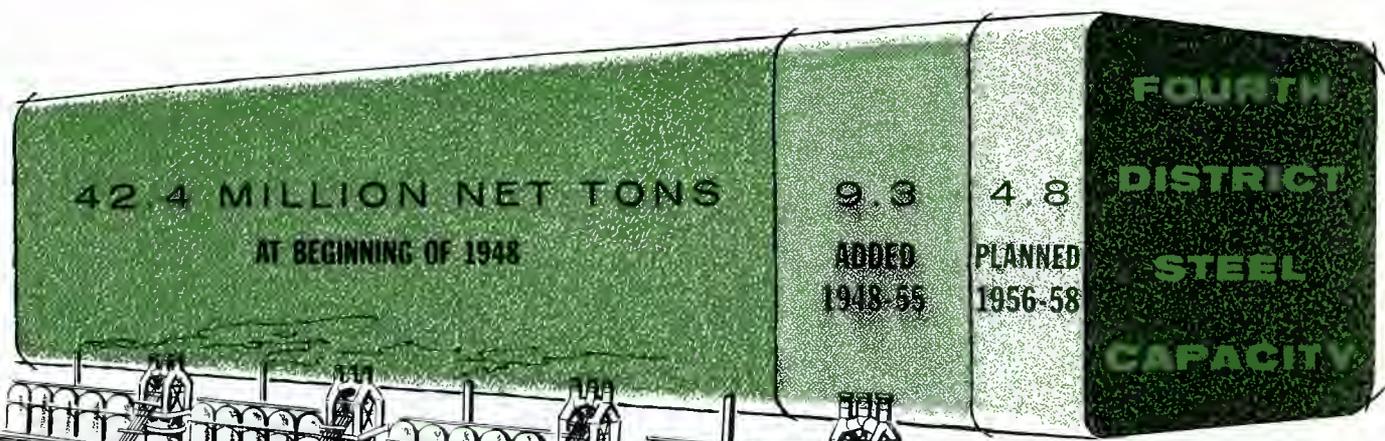
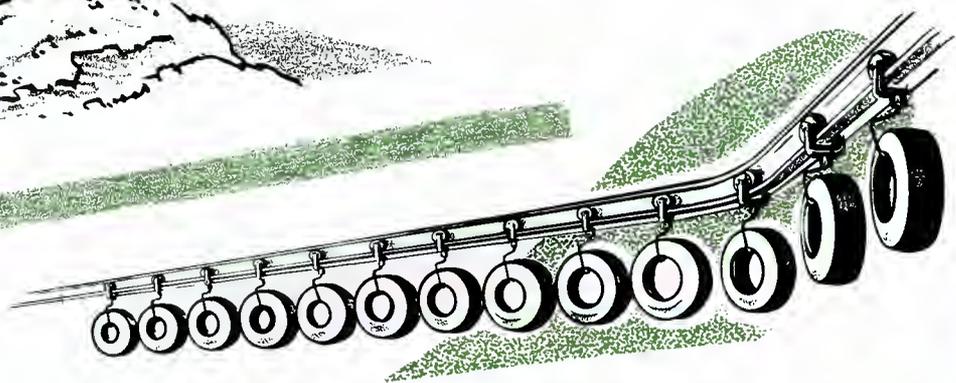
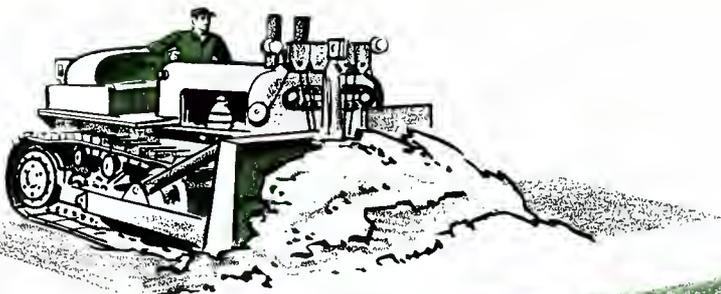
Altogether, a \$2.5 billion program (much of it already spent) has been undertaken to revitalize the Pittsburgh area. It includes a 36-acre Point Park at the junction of the Allegheny and Monongahela rivers; 25-acre Gateway Center adjoining the park; 5 new office buildings with two more under construction; 1-acre Mellon Square Park in the heart of the Golden Triangle; 5 new parking garages; a new airport; and a network of new expressways. At the upper end of the Triangle, 106 acres of blighted slum are being acquired to be transformed into a civic center.

Toledo, also, has been a leader in community development. In 1945, its pioneering Labor-Management-Citizens Com-

mittee was organized to promote peaceful settlements of labor disputes as an aid to industrial growth. By 1955, man-days lost from strikes were the lowest of any major city in Ohio. In early 1954, the Toledo Industrial Development Council was formed and jointly financed by the business community, labor unions, and a local newspaper to promote industrial diversification and expansion.

In a community that has, in the past, been largely dependent upon the automotive industry, the two-year record of achievement in Toledo is impressive. Expansions or new plant locations by 24 companies in 16 industries have been announced. An 89-acre planned industrial district has been opened at a projected interchange of the Detroit-Toledo Expressway. A Port Authority has been created by the city and county to develop port facilities for the coming seaway.

Lexington, Kentucky, has tackled the problem of attracting new industry in a somewhat different manner. The Lexington Industrial Foundation, a nonprofit corporation, was organized in early 1955 as a department of the Chamber of Commerce. Local businessmen subscribed \$221,000 to purchase a 138-acre tract of land strategically located. The tract was provided with roads, sewers, etc. and then offered to industry at actual cost. Since then, three companies have taken up 89 acres and commenced construction, while two others have located nearby. Within two years, these new companies will employ 11,000 persons, as compared with total manufacturing employment in the county of 6,600 at the end of 1954.



LONG ESTABLISHED INDUSTRIES CONTINUE TO EXPAND IN THE FOURTH DISTRICT

The growth of new industries in the Fourth Federal Reserve District, as depicted on the preceding pages, should in no way detract from the impressive gains scored in recent years by the well established and leading industries of the area: machinery, primary metals, fabricated metals, clay and glass, and rubber products.

The District's steel mills, which account for 40 percent of the nation's steel-making capacity, are in the midst of a very large expansion program which will increase capacity by the end of 1958 to 56.5 million tons, or one-third above the 1948 level.

The increase in capacity to pour hot metal is not being achieved by the construction of entirely new steel works. Instead, it is being accomplished by the enlargement and improvement of existing properties as well as by the adoption of technological improvements. Included are new and enlarged blast furnaces, open hearths and electric furnaces; the adoption of oxygen converters and high pressure blowers; the upgrading of ore by beneficiating taconite; and the doubling of iron ore sintering capacity.

Metal processing capacity has also been substantially enlarged by the addition of new, faster and larger rolling mill equipment. In addition to expansion of facilities to produce the usual hot and cold rolled carbon sheet and strip, there has been a marked trend toward specialty or high valued products such as galvanized sheets, tin plate, alloy and stainless steels, silicon sheets and clad steels of various kinds.

The recent and prospective increase in the availability of steel has stimulated the

construction of new metal fabricating and machinery plants as well as growth in capacity of existing manufacturers. Now under construction near Hudson, Ohio, is a large plant to produce giant diesel tractors. Home appliance manufacturers have also recently completed major installations at Clyde, Columbus and Marion, Ohio. Machine tool builders have completed, or are working on, major additions in Cleveland, Cincinnati, and New Philadelphia.

The stone, clay and glass industries are also vigorously expanding. Toledo is the home of a giant plate glass factory, incorporating the new twin-grinding process, and a windshield-bending plant. Pyrex ware will be manufactured at Greenville, Ohio, and television tubes in Columbus. A pressed-glass plant will be erected in Somerset, Kentucky. Other additions to glass facilities are being made in Connellsville (containers), Greensburg (windshields), and Arnold, Pennsylvania (non-glare glass). A basic refractories plant has just been completed at Columbiana to serve the steel, glass and cement industries. Cement mills have major programs under way at Wampum and Bessemer, Pennsylvania, and at Lorain, Ohio.

The District's rubber industry is energetically pushing a diversification program and expanding the capacity of recently acquired plants for the production of synthetic rubber. Non-tire items now account for more than one-half of the industry's sales. These include such diverse products as foam rubber, flooring, industrial goods, toys, and basic resins for a wide variety of purposes.

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195

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1957

1961

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1961

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