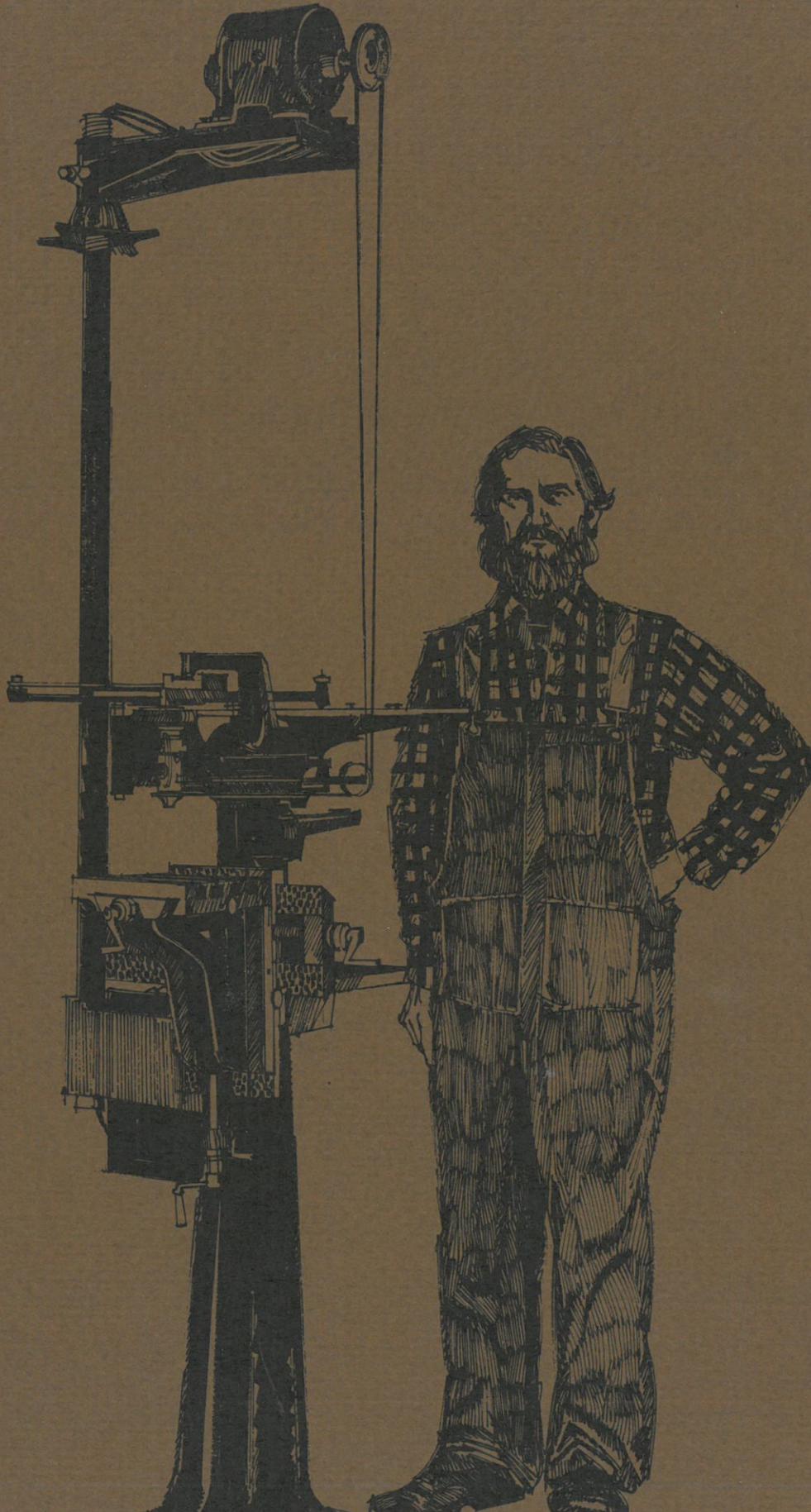


75 YEARS OF BUILDING GOOD MACHINE TOOLS

1893

1968



GORTON



Born in 1865, George Gorton II, pictured below, first saw the light of day in a modest little cottage in Racine. He was born just six weeks before the close of the Civil War. Mr. Gorton passed away in 1955 at the ripe old age of ninety.

Of himself, Mr. Gorton said, "During my lifetime I have had just one major interest and desire — to build machines and tools which were better than those in use at the time. In the old days, I was the owner of a machine shop. Later I became a machine tool builder. However, the work I did in both cases was the same. Changing times and conditions caused the adoption of the term 'Machine Tool Builder.'

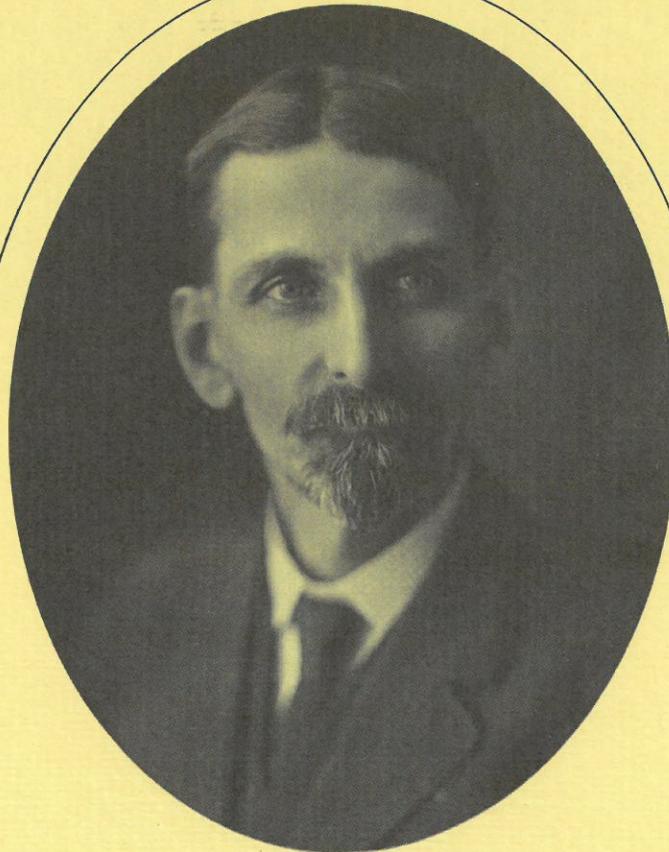
"I found myself often designing and building equipment because I was asked if I could do it and, of course, I had to try it, if only to satisfy my own curiosity. At the same time, such work was creative and called for inventiveness and ingenuity. Naturally such jobs appealed to me, as they would to most anyone who likes to build something new and better."

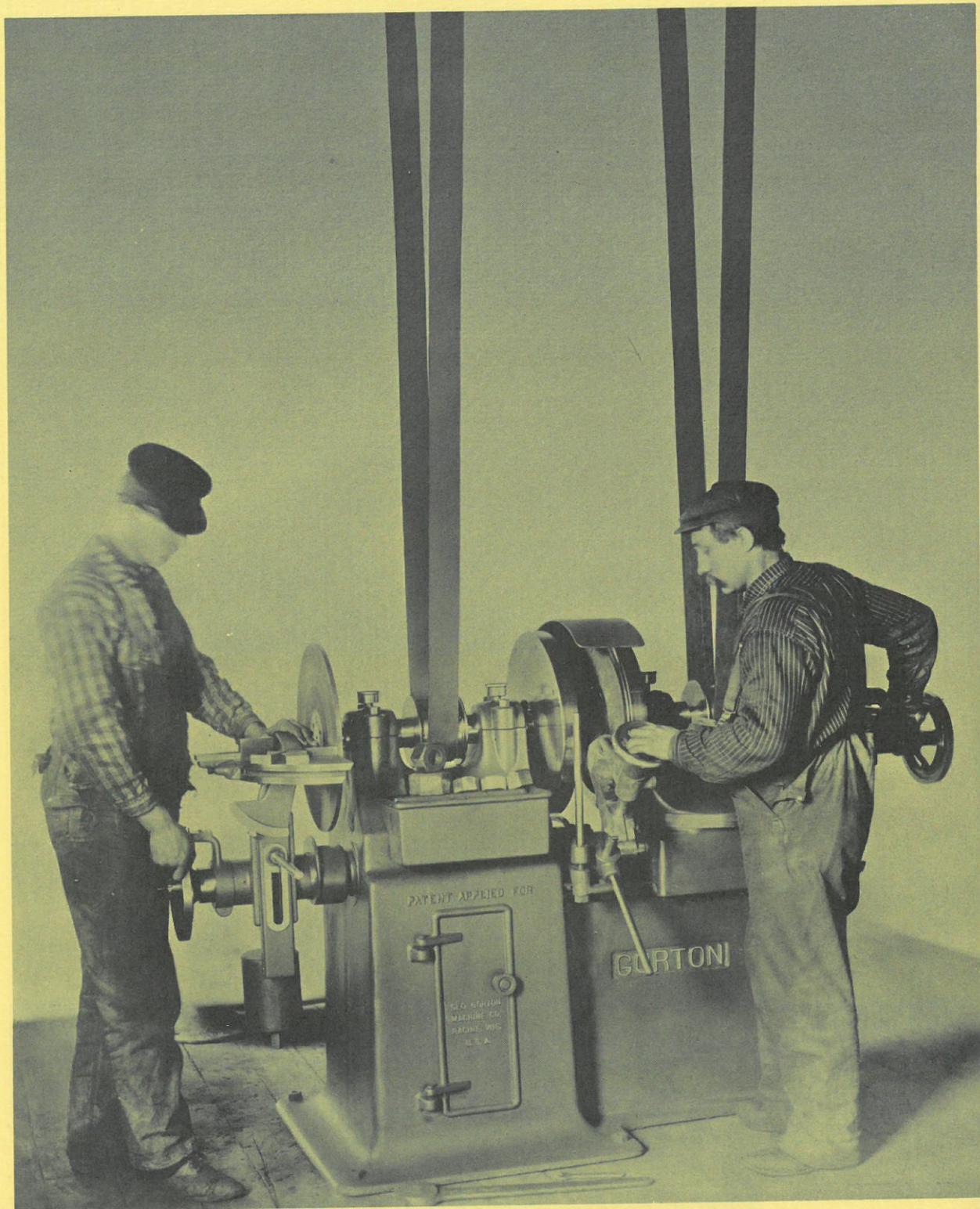
The Gorton family greenhouse shown at left, measuring 12 feet by 15 feet, was the first shop building which he occupied in 1893. This building faced Racine Street and is now occupied by Twin Disc, Inc. Early products consisted of wood patterns and special wood working machines.

Mr. Gorton said of this era:

"The first substantial order I received was from the Stewart Hartshorn Shade Roller Company of Muskegon, Michigan. I was commissioned to design and build an improved wood slotting machine for making the wood slats for the bottom of an ordinary window shade.

"After delivery, this machine did such a good job that it was soon returned to me as unsatisfactory. It seems that it did as much work as six men had been performing previously, and most of these men were relatives of the foreman of that department. Incidentally, this was one of the earliest machines to make use of anti-friction bearings."





In the late 1890's, Mr. Gorton's biggest problem was finding a product, or preferably a product line, to build . . . one that would provide a stable source of income for his little company. At that time he had five men working for him and he wanted to keep them busy and on the payroll.

A customer suggested that he develop a line of disc grinders, similar to one he had built 10 years previously. By 1904, these grinders represented a complete line. Shown at left was one of the very first grinders developed. Within a few years he built one of the first disc grinders to incorporate direct motor drive and enclosed electrics.

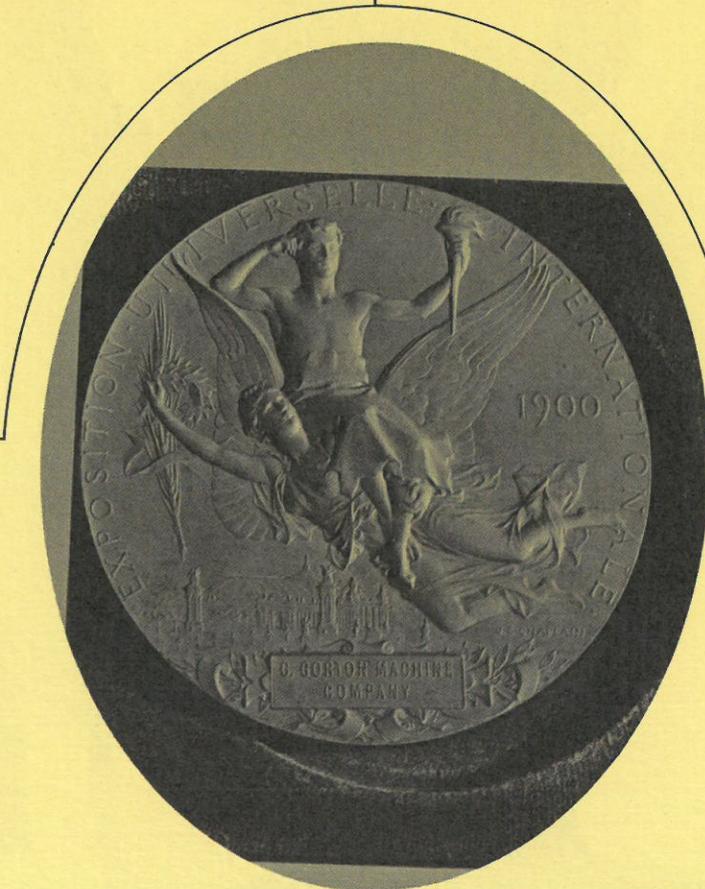
A bronze medal of merit for Excellence in Design (shown below) was awarded George Gorton by the Paris Industrial Exposition in 1900 . . . just seven years after the old greenhouse

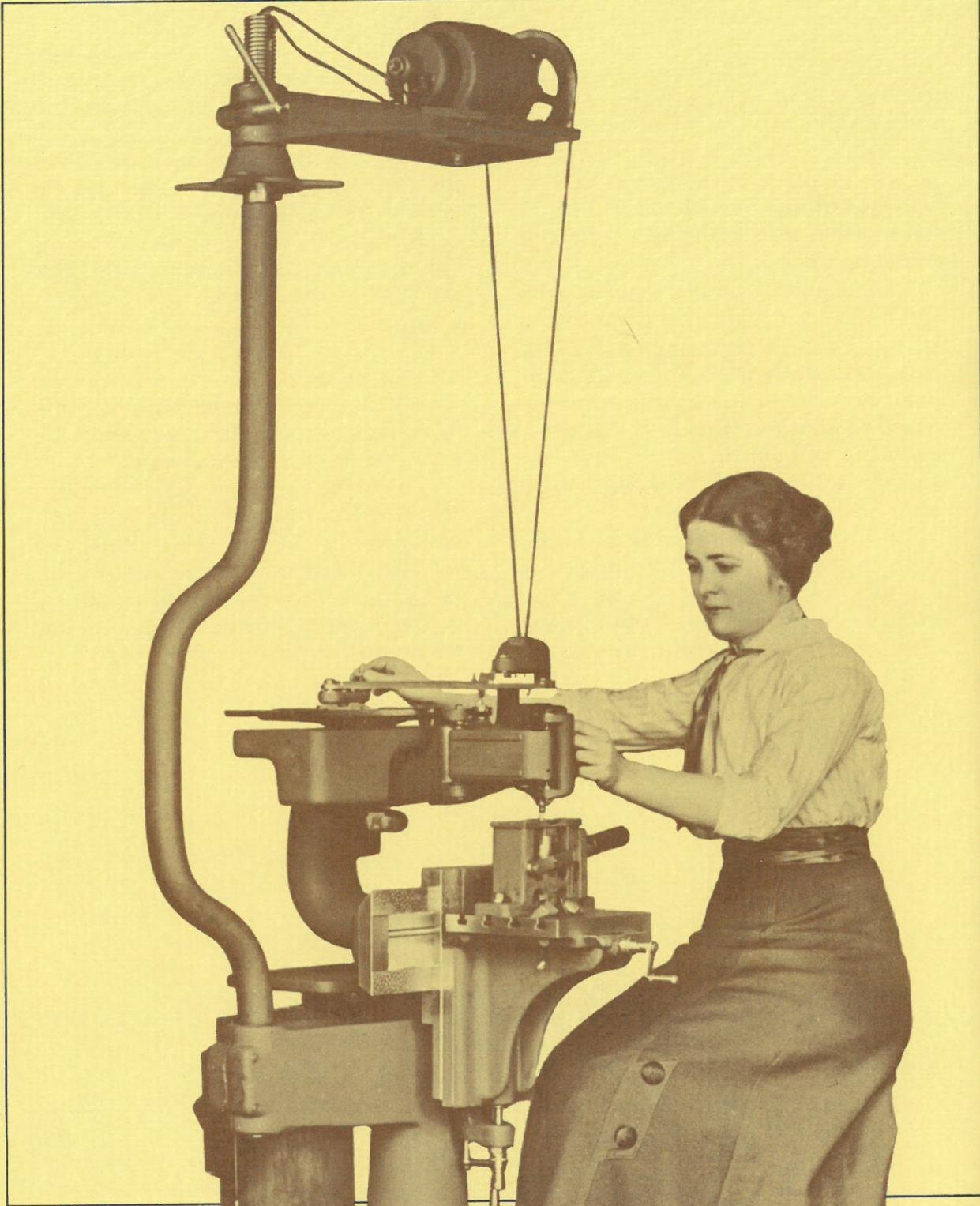
doors were opened for business. Through the years many more awards followed.

Everything was going along fine. Business was good, when in 1903 he became ill of a kidney disease and doctors gave him six months to live. In light of this, Mr. Gorton sold the disc grinder business to Diamond Machine Company of Providence, Rhode Island, and went to Saugus, California . . . possibly to die.

While there, he developed a machine for panning gold in the desert using the principle of recirculating water.

By 1904, Gorton made a complete recovery from his illness and was back in Racine at the old shop. When he sold the disc grinder business, however, he had agreed to stay out of that particular endeavor. Now he had a shop but no product to manufacture.





653-B.
GEO. GORTON MFG. CO. NEW YORK

Again, after some basic research, he decided to develop a pantograph . . . a line that is one of Gorton Machine's principal products today. The first pantograph built is shown at left.

Even in 1906, there was a thing called "cheesecake". This photo was taken for a "Gorton Girl" ad . . . one of the first advertisements placed by Mr. Gorton. The machine's price? \$350.00!

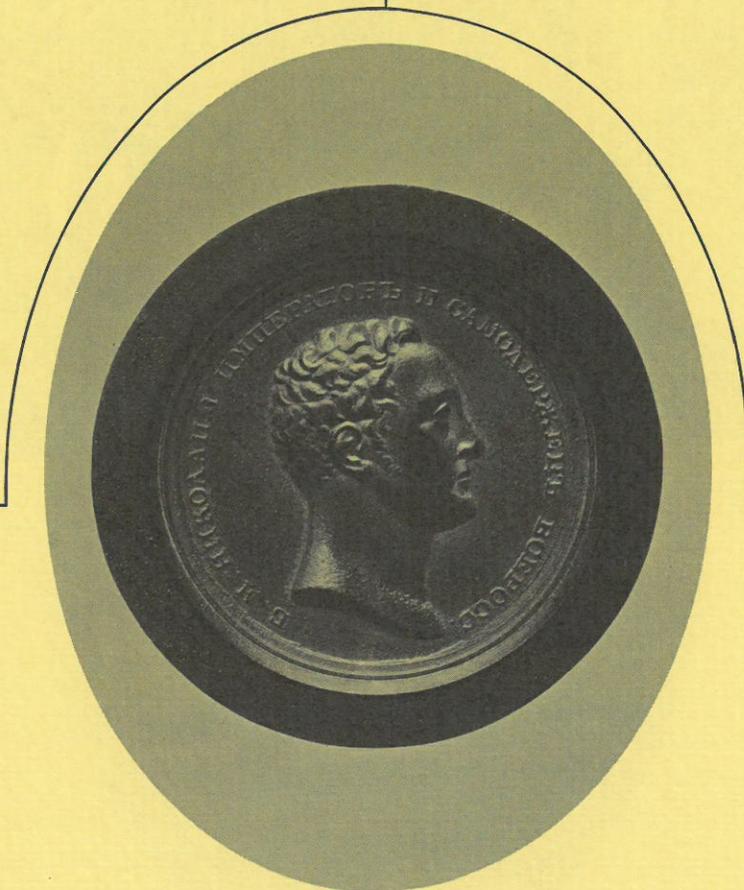
An interesting sidelight on this first engraving machine was that George Gorton learned years later that his grandfather, William Buffham, while living in Rochdale, England before coming to the United States, had in 1825, designed a pantograph engraving machine for the British Government.

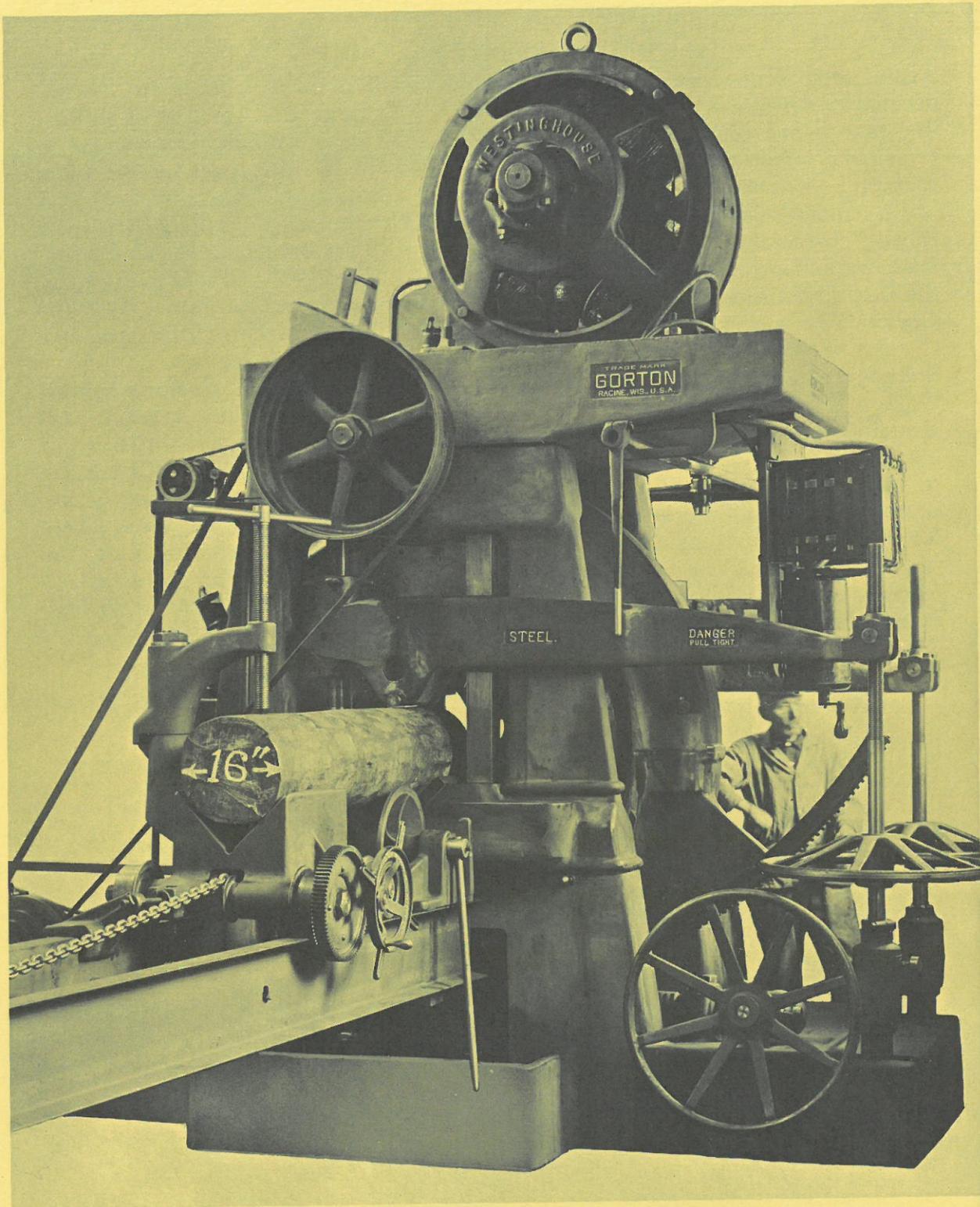
This particular machine was used for engraving medallions. One of the many jobs handled on this machine was

a medallion for presentation to "Nicholas I, Emperor and Autocrat of all Russia". A reproduction which was cut in rosewood by that machine 143 years ago is shown below.

Next in a long line of machine tools was a Rotary Broaching Machine developed around 1908 and sold to the Kelly Axe Company of Charleston, West Virginia. It was used to form steel axe heads from rough forgings.

An off-shoot of Gorton's experience with the broaching machine was the design of an Internal Tooth Cut-Off Saw. In the late '90s George II became interested in the methods then in use for cutting or sawing bar steel. There were two types of machines on the market at that time: the power driven hack saw and the external tooth cutting-off saw.





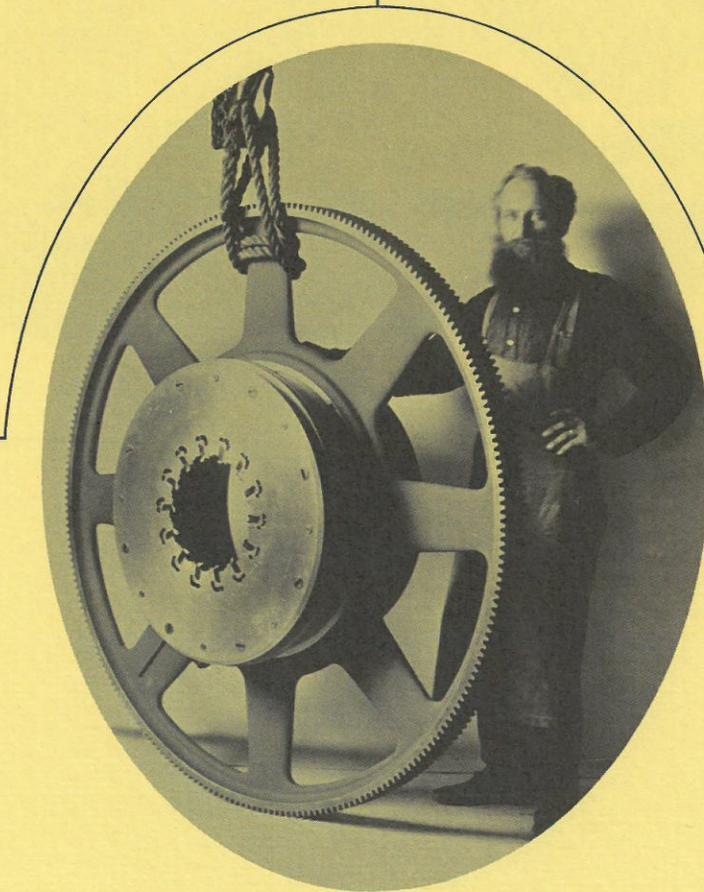
Both of these tools were slow and far from efficiently designed. George II believed the circular cutting off saw had the best possibilities for improvement so he spent some time in analyzing the existing designs from a functional viewpoint. He soon discovered their principal weakness. As an example: for every 1,000 pounds of driving power transmitted to the saw from the power source, only about 333 pounds of cutting power was delivered to the cutter blades. As George said, "This reminds me of an old pet expression of mine which I had heard years before, 'You have hold of the wrong end of the crowbar'."

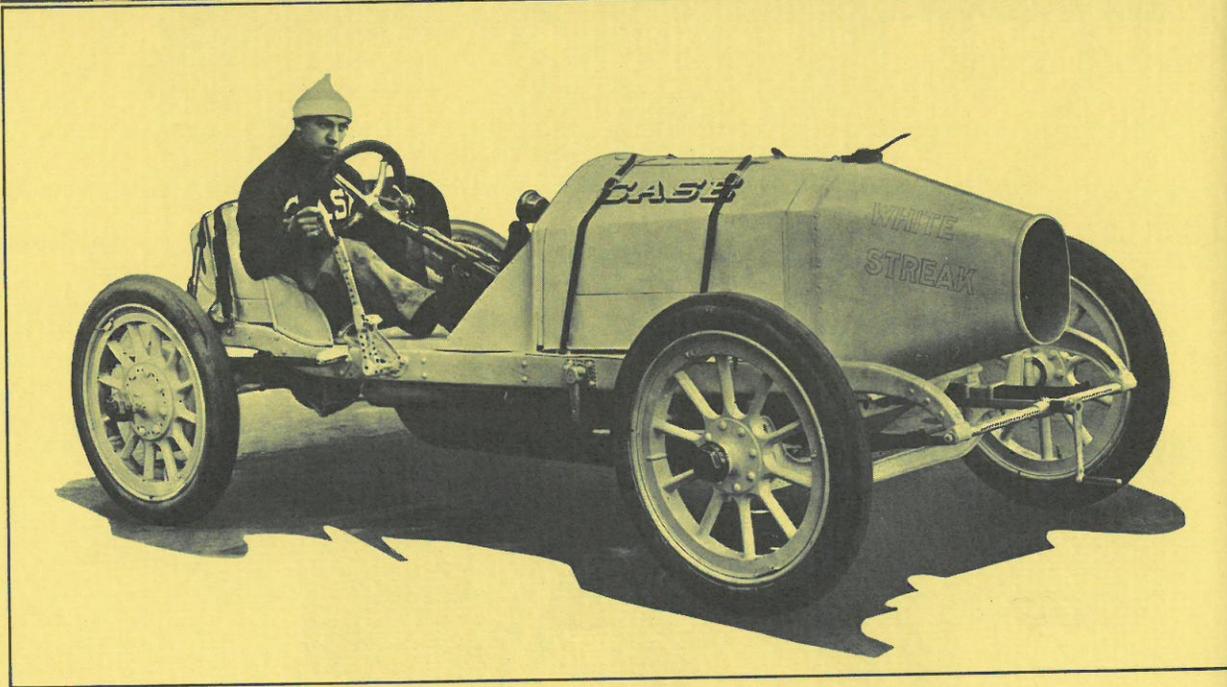
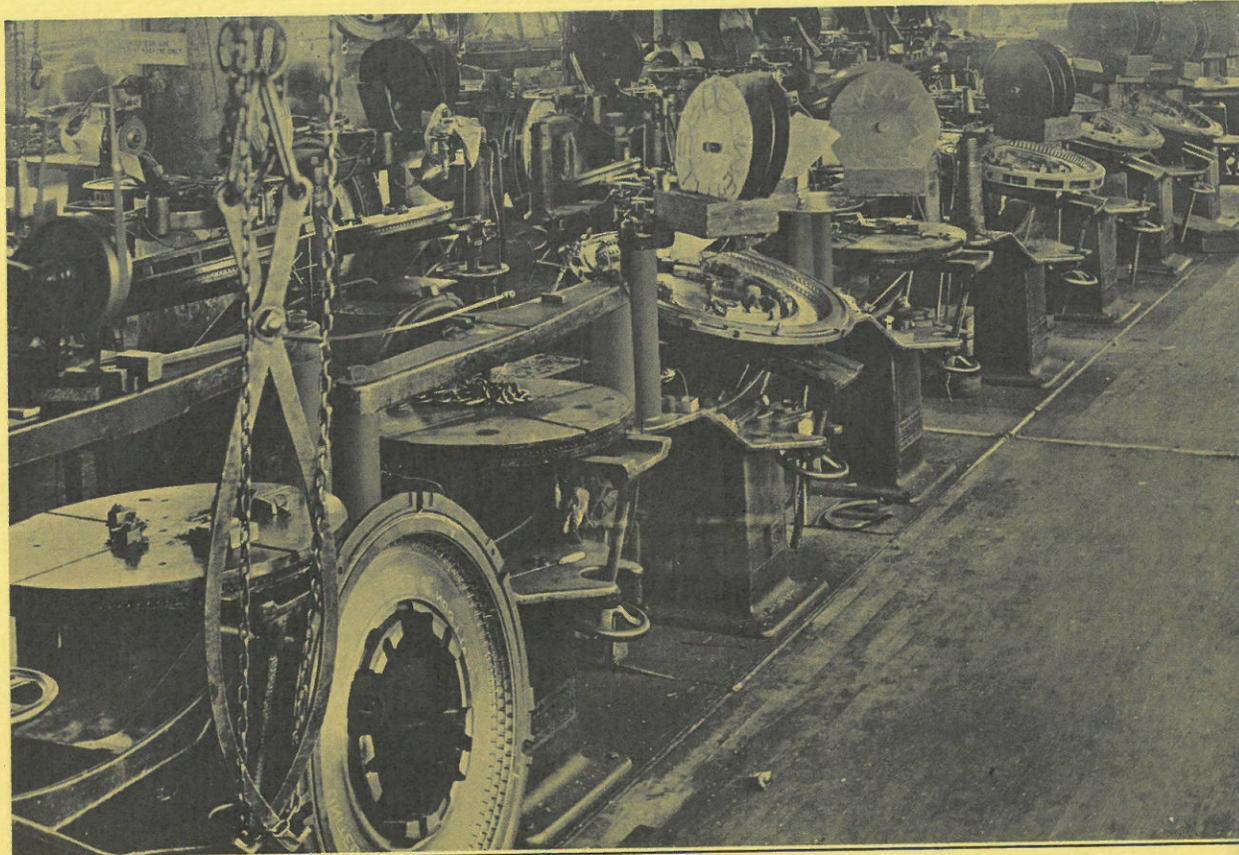
George II decided to design a cutting off machine with *internal* teeth, or cutters, which would reverse the then inefficient power-to-cutter ratio. Actually, he was able to do better than that because the Gorton Internal Tooth Cut-

ting Off Machine worked at a ratio 1 to 5 instead of 3 to 1. In other words his machine was eventually 15 times more powerful and efficient than the external tooth type machine. This machine is shown at left. In later years a large number of these machines were sold, particularly during the first world war for cutting artillery shell stock.

Below you see the blade and cutter for the cut-off saw. Tremendous pressure at the cutter point was developed through use of a small pinion gear. The air cylinder and toggle clamping device held the bar firmly. A 6" diameter low carbon steel bar could be severed in 6 seconds.

George Gorton then invented a special grinder for sharpening the cutters in this blade. To the company knowledge, this was the first grinding machine to utilize an oscillating wheel





Another Racine company, J. I. Case, entered two racing cars in the Indianapolis race of 1912. One is pictured at left. Both were built completely by Gorton Machine Company. Both attained the qualifying speed of 112 miles per hour and finished well in the race although neither car won. The crankshafts in the engines were machined from solid billets . . . a process unheard of today, but necessary then.

During these years the Gorton shop also built several Gnome radial type aircraft engines.

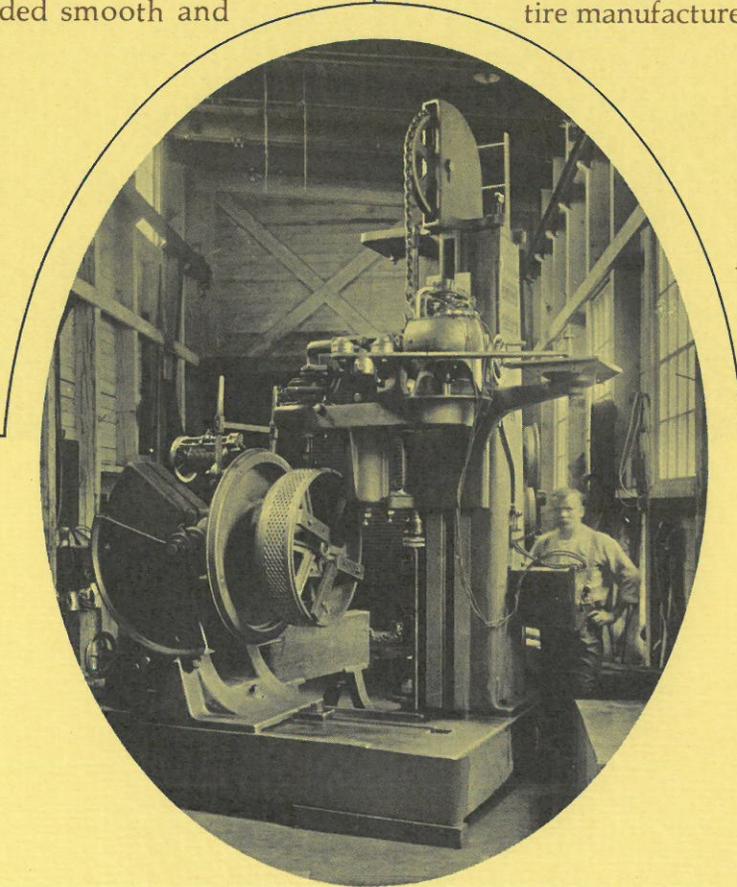
"In those days," Mr. Gorton wrote, "we used coal stoves to heat our plant. The first aircraft engine was tested with a large two-blade propeller . . . and it was tested in an open doorway. The propeller sucked all the air from the shop and *down* the chimneys until it was billowing out of the stoves' fire doors, and the building looked like it was on fire. Everyone coughed a little and laughed a lot, and further testing was done outside."

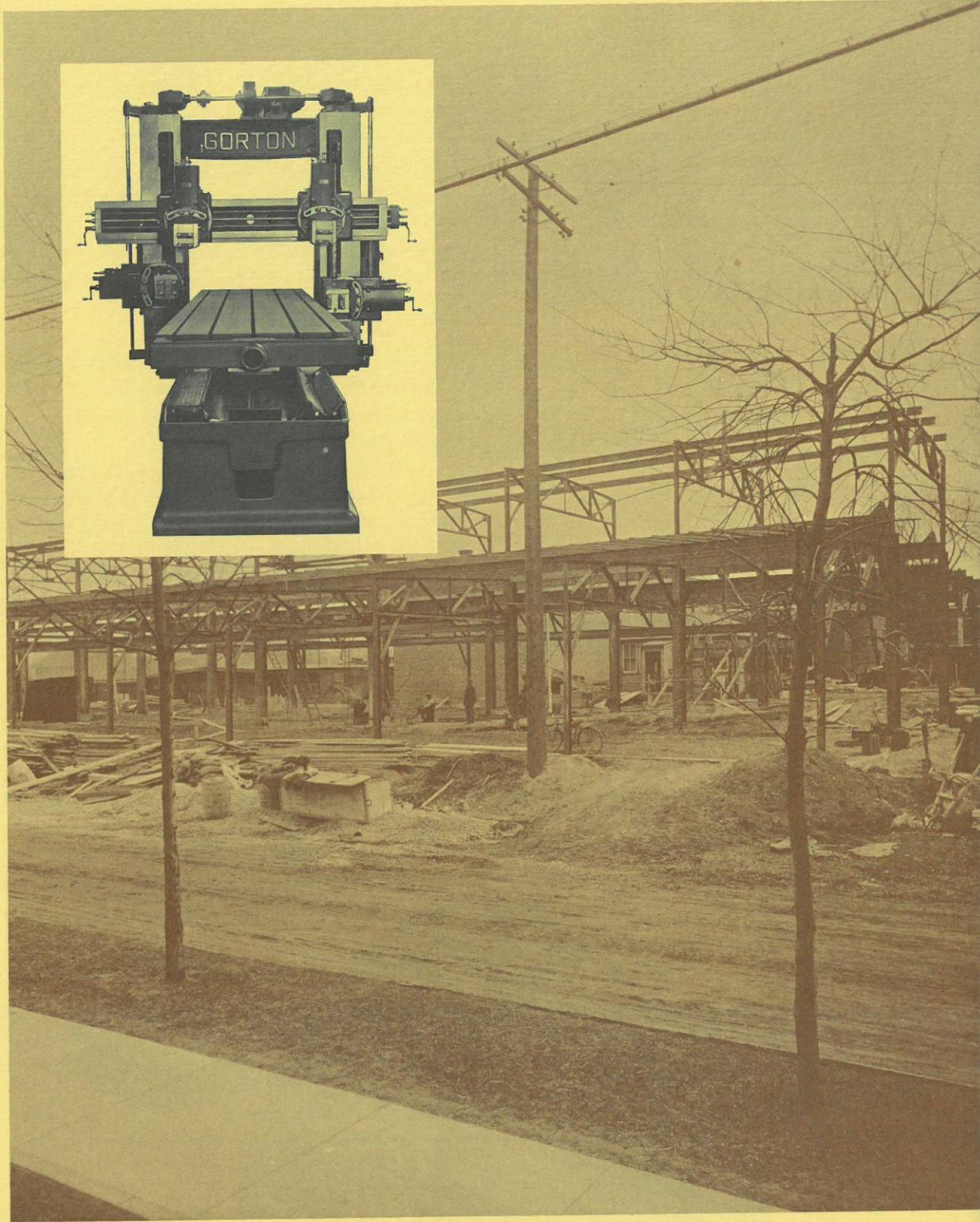
From airplane engines, Mr. Gorton moved into the automotive industry. In these same years, 1912-1913, automobile tires were molded smooth and

then the treads were vulcanized on the surface. This led to the research and development of what Mr. Gorton called the 1M Tire Mold Engraver.

The first machine, shown below, was sold to Morgan & Wright, which is now Goodyear Tire & Rubber Company. The price quoted for this machine to the plant superintendent was \$5,000.00. He wrote, "Your price is fantastic that I am coming to Racine out of pure curiosity just to see what you have built which you think is worth so much money."

On his arrival, George Gorton demonstrated the machine, showing how a semi-skilled operator could cut the tread design in a fraction of the time normally required. While the machine was being demonstrated, the superintendent was doing some figuring on a piece of paper. After a few minutes he looked up and said, "The way I have figured it, this machine can save us the purchase price by the time your invoice becomes due." He bought the machine off the floor, and shortly thereafter, eight more. In two or three years Gorton sold tire mold engravers to every major tire manufacturer in the country.





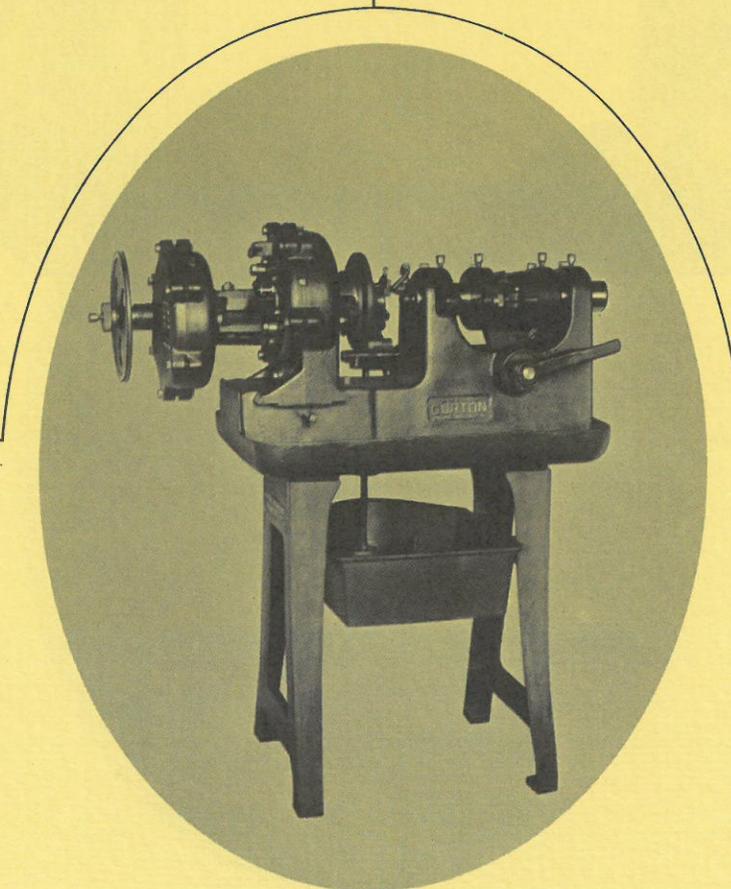
Pictured below is a Fuse Ring Router. Over 1,000 of these machines were built on a "crash" program during World War I for routing the powder train grooves in the fuse heads of shrapnel and high explosive shells. The groove had to be cut with watch-like precision to insure uniform burning of the powder train. Practically all of the fuse heads used by the Army in that war were cut on Gorton machines.

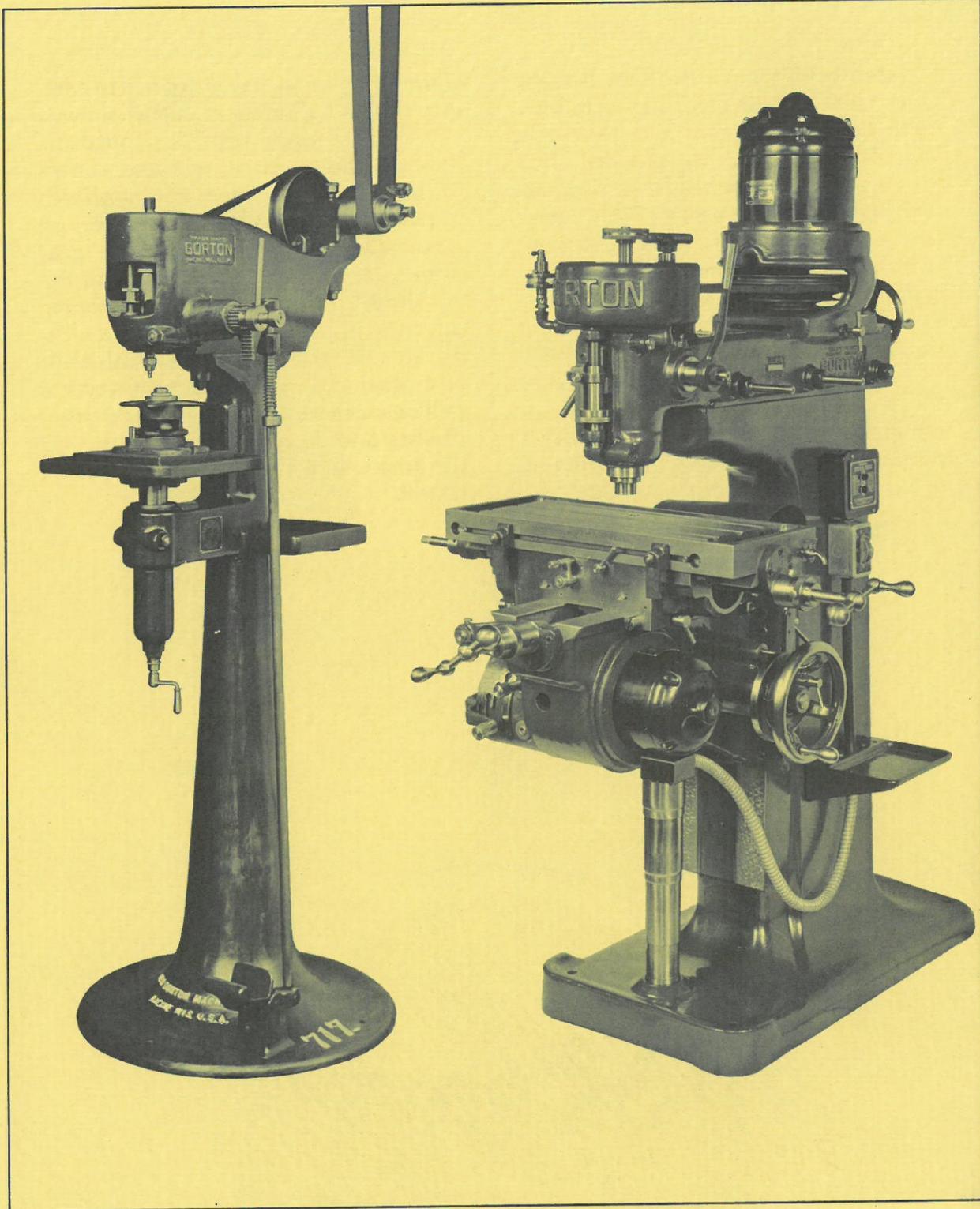
In 1916 it was time to move out of the greenhouse to larger and more modern manufacturing facilities. The larger photo to the left pictures the beginning of Mr. Gorton's first real shop building.

Upon completion, it was decided to enter into the manufacture of metal planers.

By 1921, Gorton had developed and built the Double Housing Planer shown in the upper left corner. It was offered in two sizes. One of the big features on these planers was a herringbone gear drive . . . at that time, new to the industry.

In 1926, looking for a marketing direction, it was decided that specializing in the development of Pantomills and other die, mold and light vertical milling machines to serve the then infant plastics and die casting industries, was the area where Gorton could grow the fastest.





1928 saw the introduction of one of the first such machines, the 8-D, a high speed vertical milling machine, that provided the kind of spindle speeds necessary for this new market. Pictured at the right is the 8-D and its forerunner the 8-A, left, built around 1915. It was a high speed machine driven from overhead line shaft belts and could be fed either by hand or a foot treadle.

Then in 1932 a visitor/customer came to the Gorton plant seeking a more efficient means of cutting die cast and plastic molds. A design study was started and evolved into the 8-D Manual Duplicator — a tracer-controlled 2-dimensional production profiler, and a 3-dimensional machine for die-sinking. This machine was the first of the Gorton line of tracer controlled milling machines and met with quick acceptance from industry.

Mr. Gorton recalls,

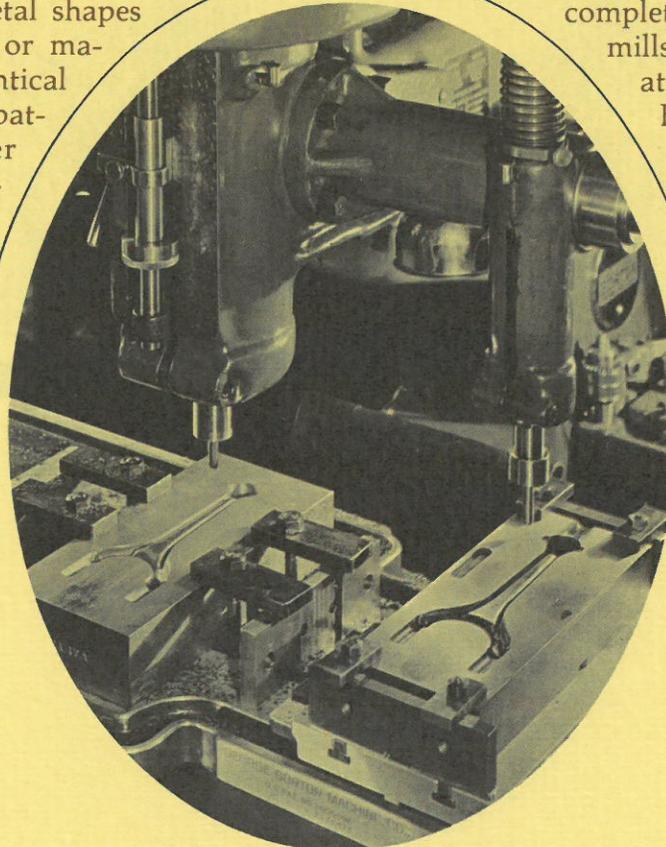
"I think it was in 1932 that a man came in and talked to one of my sons. During the course of their conversation, this visitor expressed his idea of what was needed right then for die and mold shops and departments. He believed that a method could be worked out whereby metal shapes could be milled or machined from identical size masters or patterns. In other words, a duplicating process. He thought such an operation could

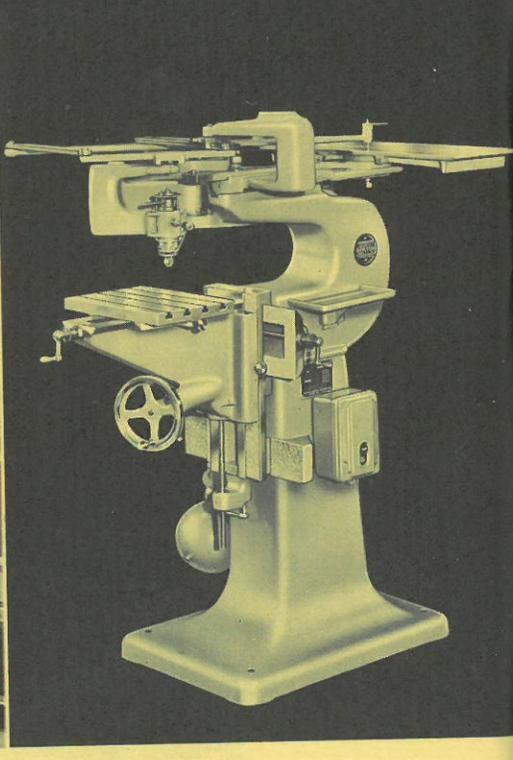
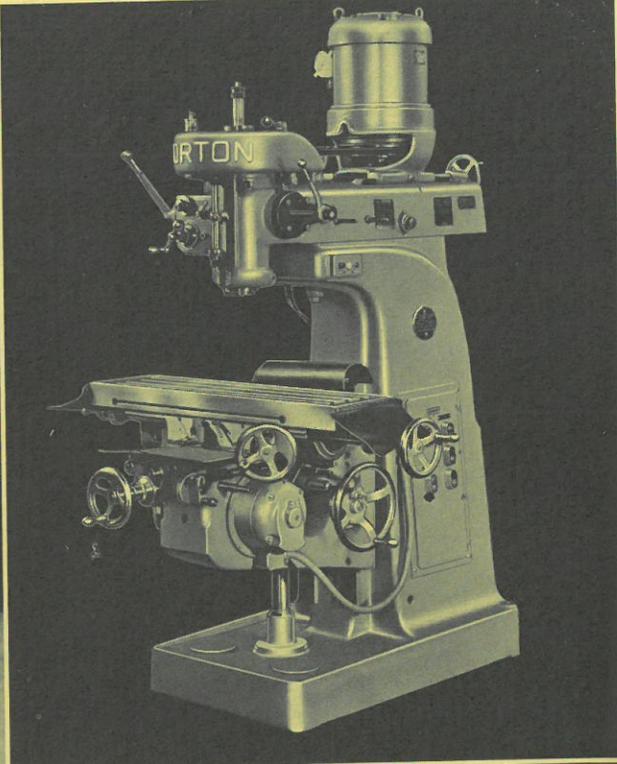
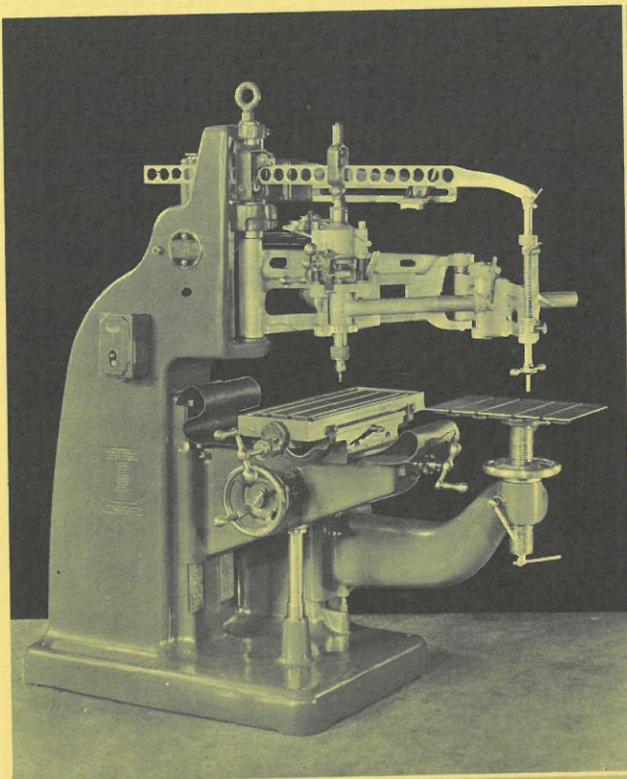
best be done with a vertical milling machine as the basic unit and by designing proper attachments to accomplish the results desired.

"Well, that wasn't much of an idea to work with, but my son seemed to take a special interest in it and enlisted the help of our engineering and experimental departments. After several false starts, the idea jelled into a practical solution. This solution was to attach a rigid tracer head to the ram of one of our vertical mills and install an auxiliary table on the machine table. This auxiliary table moved in two directions horizontally and was controlled by an upright hand lever. The complete assembly — vertical milling machine, tracer head, and auxiliary table — we named the Die and Mold Duplicator."

The 8-D Duplicator shown below and subsequently the 8½-D Duplicator, now both discontinued, were the first manual (1 to 1) duplicators operated by means of cross and longitudinal ball slides controlled by a lever. This was in combination with a lever-operated tracer connected to the spindle with rack and pinion.

In 1935, Gorton introduced a complete line of pantomills and vertical mills at the Machine Tool Builders' Show in Cleveland, Ohio. These basic designs, since modernized, are in the Gorton line today.





The 3-U Pantomill, shown lower right on opposite page, was a 2-dimensional Pantomill for general engraving, die, mold or stamp cutting and light duty profiling; The 3-Z Pantomill, another 2-dimensional machine designed for heavier cutting, was used for general engraving, die, mold, stamp cutting or high speed profiling; The 3-L Pantomill, shown extreme left, was a large 3-dimensional Pantomill for die and mold duplicating and light milling.

The vertical mill line at that time included the 8-D, previously discussed. This was a light, high-speed mill for small precision work requiring extreme sensitivity and top spindle speeds. Also included was the 9-J vertical mill, shown upper right, a large size machine with a 2-speed motor.

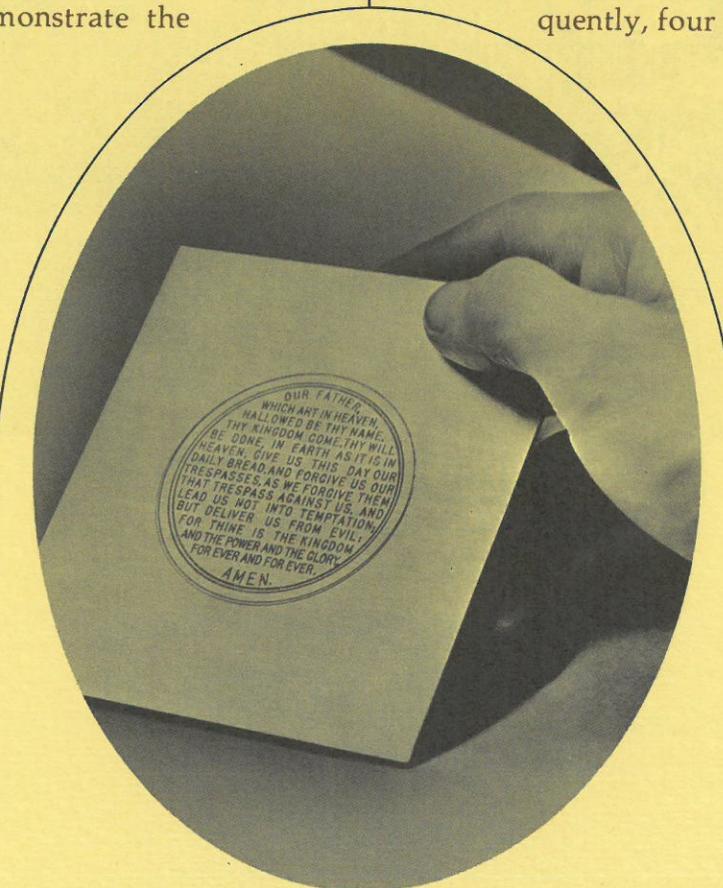
These machine tools were exhibited in the 1935 Cleveland show to present new entrees not only to the machine tool market, but to potential distributors. This resulted in complete sales coverage here in the United States and in the principal European countries as well.

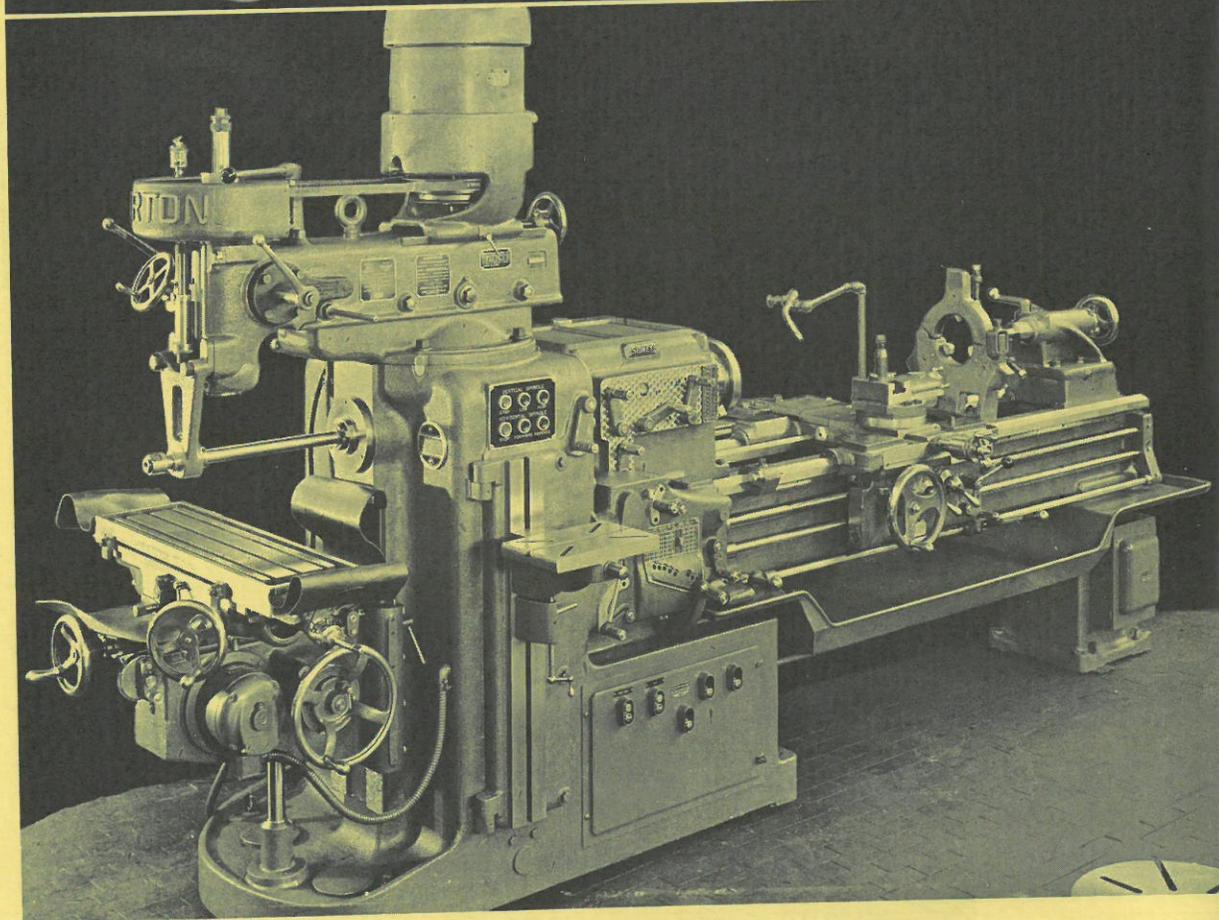
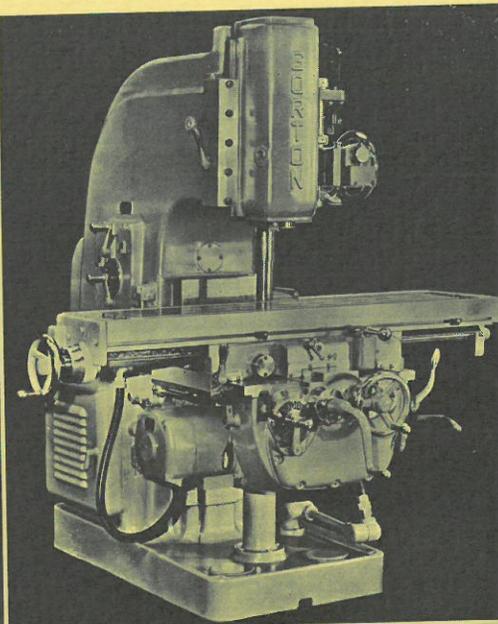
In the late 1930's, Mr. Gorton found a way to demonstrate the

tremendous accuracy attainable with the Pantomill. An engraving was made of the 300 characters comprising the Lord's Prayer within a circle of .005" diameter. This is about twice the thickness of a human hair, and has to be viewed through a 400-power microscope. Amazingly enough, it is clearly visible . . . and readable. This example of precision engraving is a permanent exhibit at the Gorton plant.

Gorton was still using the old facilities in 1939 . . . when in 1940 new plant building and offices shown at left below, were added . . . and a new Bedmill was developed. It was a 1 to 1 duplicator actuated by electric clutches. This was another first in the development of tracer-controlled milling machines.

Then came World War II and as it progressed, like all builders, Gorton was urged to continually increase production. We did! In 1940, the Gorton Machine Company's sales were 1-1/4 million dollars. In 1941 it was 3-1/2 million dollars. And in 1942 . . . 5-1/3 million. For this Gorton was the first of over 250 Racine companies to receive the coveted "E" Award, and subsequently, four additional stars.





During the second World War, in addition to our regular line, we built several hundred 16-B Swiss Type Automatic 3/8" Screw Machines, shown on opposite page, upper left. These were used to make aircraft instrument and fire control parts. While these machines were of Swiss design, none could be imported due to the German submarine embargo. Gorton was licensed by Switzerland to manufacture the 16-B's . . . drawings for which were brought over to the United States in diplomatic mail pouches so that they wouldn't be confiscated by the enemy.

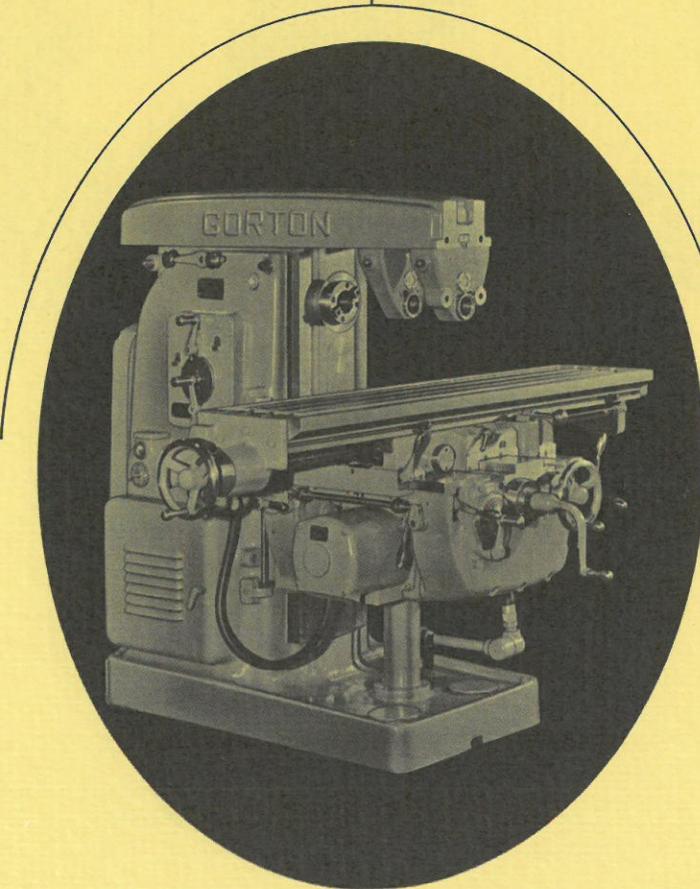
Our Navy also had need for combination lathe, milling and drilling machines, shown opposite, bottom, to be used as mobile machine shops aboard ship. Gorton built these, too. Both the automatic Swiss bar machines and the combination machines were discontinued after the need subsided.

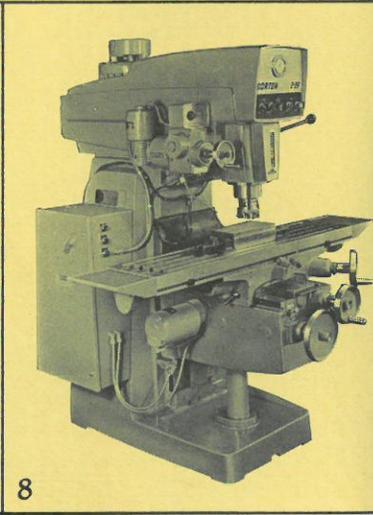
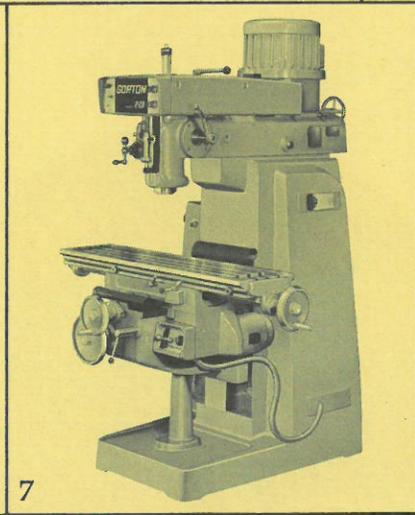
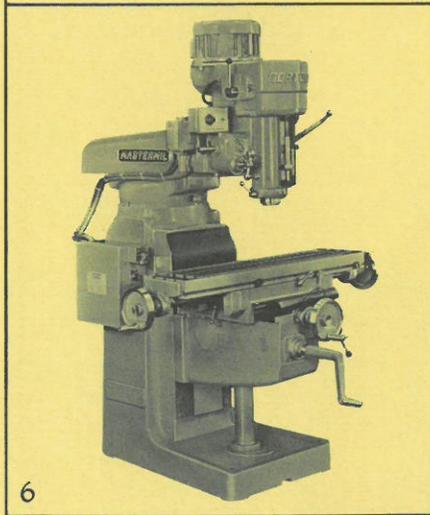
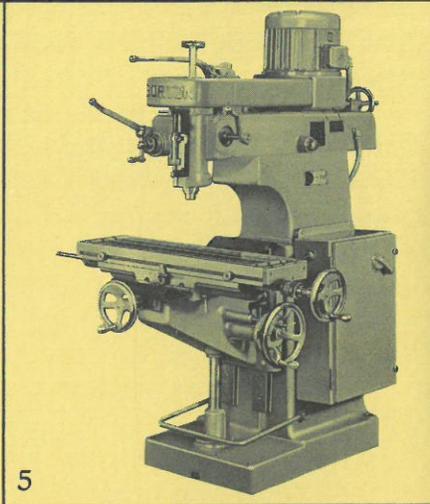
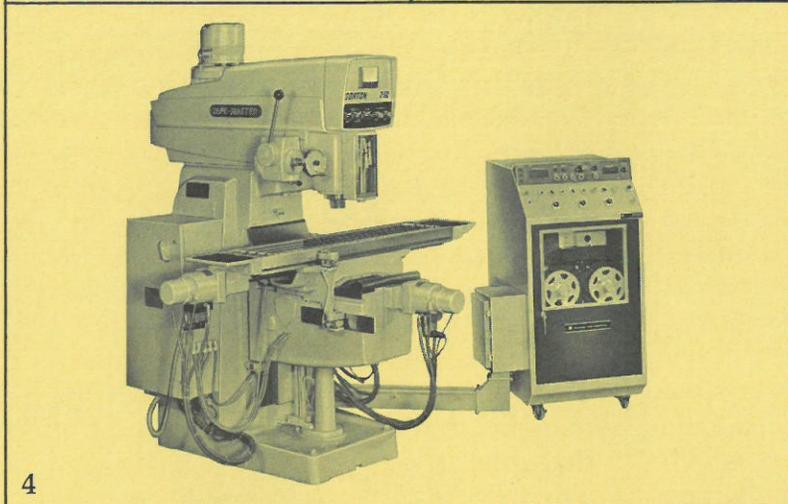
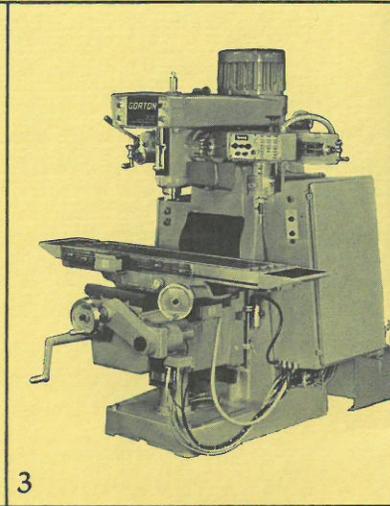
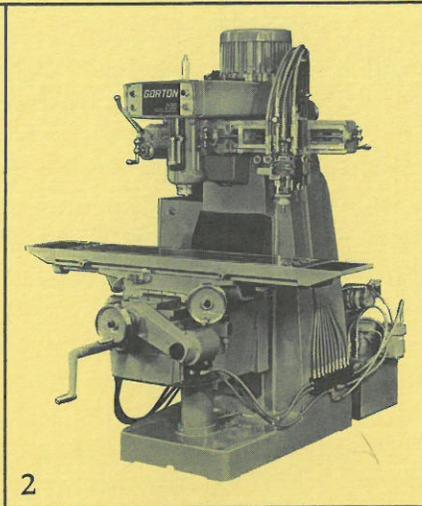
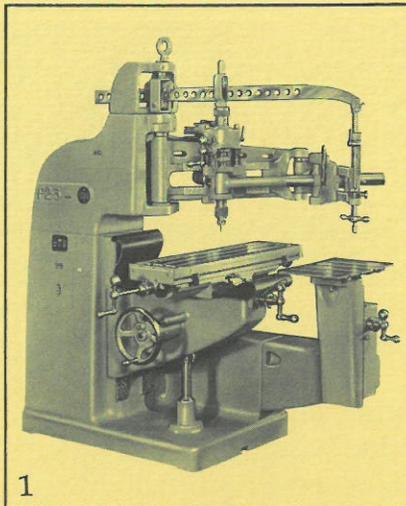
In 1947, Gorton entered the geared head, knee and column milling machine field with a new wide knee design which at that point was not offered by any competitors. To this Gorton added higher spindle speeds. These machines

were produced in plain and universal types, and with either horizontal (shown below) or vertical (shown on opposite page, upper right) spindles . . . sizes 2 and 3.

Because of the wide knee, these machines were extremely rigid and performed well with extended table travel. The company was at a disadvantage, however. Gorton did not have the finances to develop a complete line, nor the size plant in which to build it. Gorton's competitors did.

The turning point in the company's history really began in 1955, when Gorton Machine used its years of experience and knowledge, gained in the manufacture of pantomills, manually controlled duplicators and vertical mills, and concentrated all efforts to the fields of contour (profiling and/or duplicating) milling. The company began developing, in earnest, hydraulic tracer machines. This opened a large, new market . . . one that had far exceeded expectations of that time . . . one that was more profitable than that for the geared-type machines, which were then discontinued in 1960.





Since then all efforts have been concentrated on the development of the hydraulic and electro-hydraulic tracer line. With the advent of simplified, lower cost, continuous path, numerical control systems, Gorton Machine expanded rapidly into the N/C market. By 1966 the company offered to the metalworking industry the broadest line of contour milling equipment of any machine tool builder in the entire world.

The company had machines like the P2-3 Pantomill (#1 opposite) for 3-dimensional die and mold duplication, working at a ratio . . . the Trace-Master (#2 opposite) for operator-guided mold and die tracer milling . . . the Auto-Trace-Master (#3 opposite) for automatic production profiling and die-sinking . . . and the Tape-Master (#4 opposite) for numerically controlled contour milling of 2- and 3-dimensional shapes.

In addition, Gorton offers the widest range of vertical belt-driven milling machines in the industry. There is the 0-16 (#5 opposite), a vertical milling and routing machine for light precision work requiring extreme sensitivity and top spindle speeds, the 1-22 (#6 opposite), a rugged swivel head turret type mill built for sustained accuracy at high speeds. Hand and

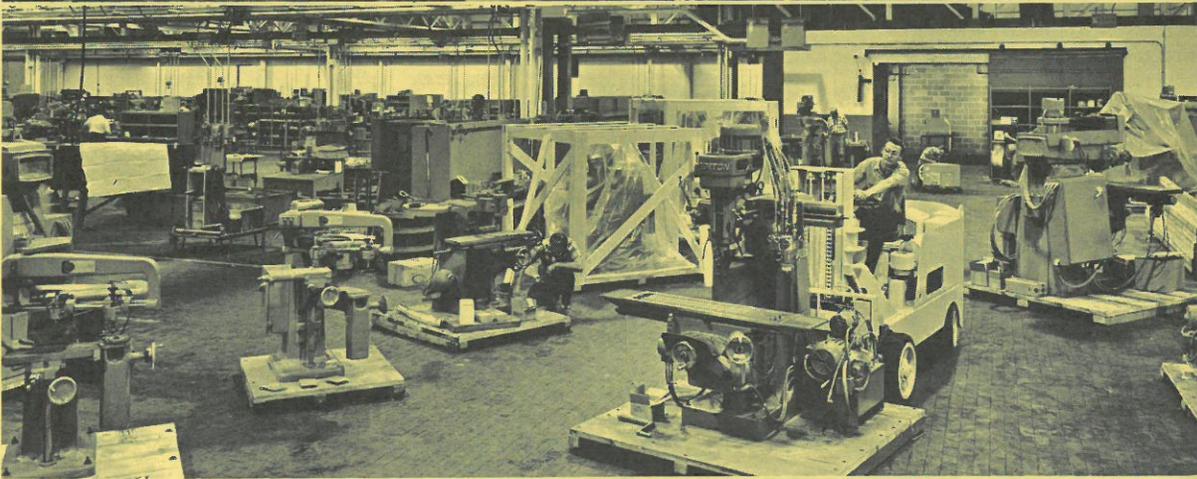
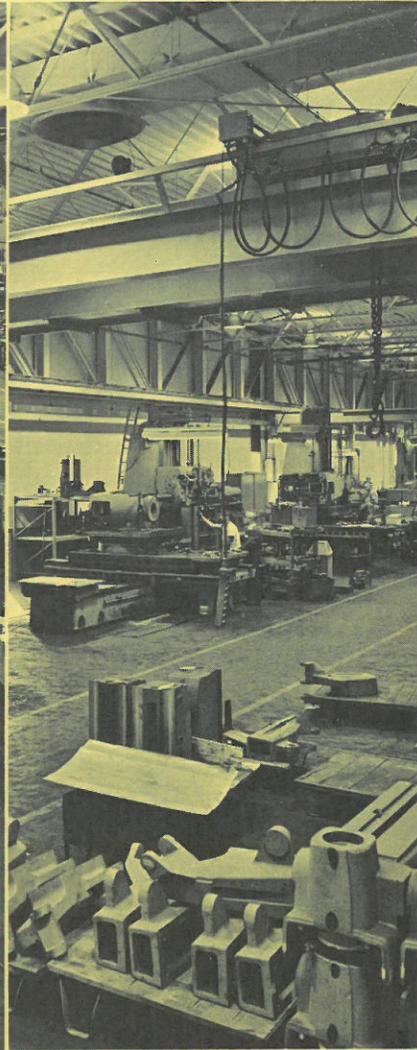
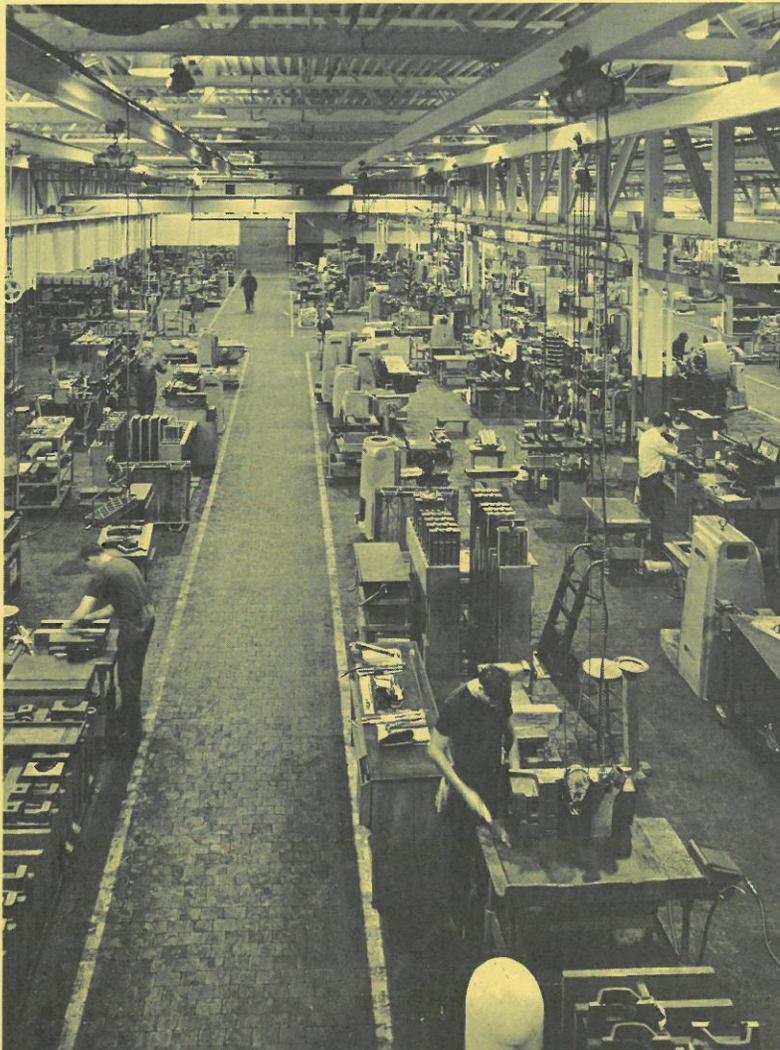
power feed models. Also in the line is the 2-28 (#7 opposite), a large size, solid ram vertical mill with a 1½" cutter capacity in steel. It's available in hand and power feed models and is adaptable to manual duplicating. And the 2-30 power feed vertical mill (#8 opposite), which has large machine capacity with centralized controls and infinitely variable power feeds.

Until April, 1967, the George Gorton Machine Co. was a family-owned company. The Board of Directors consisted of local industrial leaders. This was changed on April 28th of that year when Gorton became a wholly owned subsidiary of Kearney & Trecker Corporation, Milwaukee, Wisconsin, and the company's name was changed to Gorton Machine Corporation.

Management of Gorton remains the same with a change in the Board of Directors to include Kearney & Trecker Corporation personnel.

The joining of these two builders, both steeped in the development of modern machine tool manufacture . . . their talents and their facilities . . . offers to the metalworking world a still broader line of machine tools ranging from tool room types to sophisticated machining centers.





Since the days of the greenhouse, Gorton has increased plant size at a steady rate. The plant on Racine street has been expanded many times. Two additional plants were acquired over the years to keep up with product line expansion.

In 1968, a new plant, covering 160,000 square feet of manufacturing space on 62 acres was built and replaces the old facilities now occupied by Twin Disc, Inc.

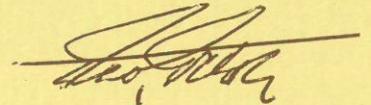
Shown here is the interior of our new plant. The entire layout was planned to gain the maximum in efficiency and productivity. This represents an investment of over \$4,000,000 in land, building, and new equipment. The company has spared no expense in building one of the most modern facilities in the industry.

Our projections over the next four years call for a 100% increase in Gorton sales.

This additional volume will not only come from Gorton's existing product line. New units to be introduced late in 1968, and others early in 1969, will assist in reaching these goals.

To Our Employees, Distributors, Customers and Friends: During 1968 we celebrate our 75th year in building good machine tools. We humbly thank all those who have helped us along the way. With a reputation for quality, a skilled work force, a productive new plant, and a fine new product line, we extend a most hearty invitation to join us for the next 75. Why not come along?

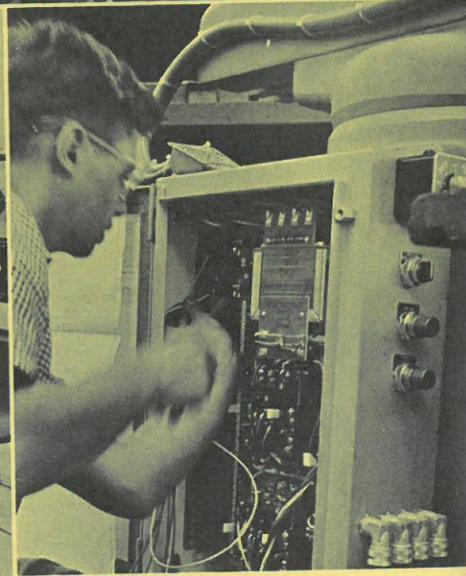
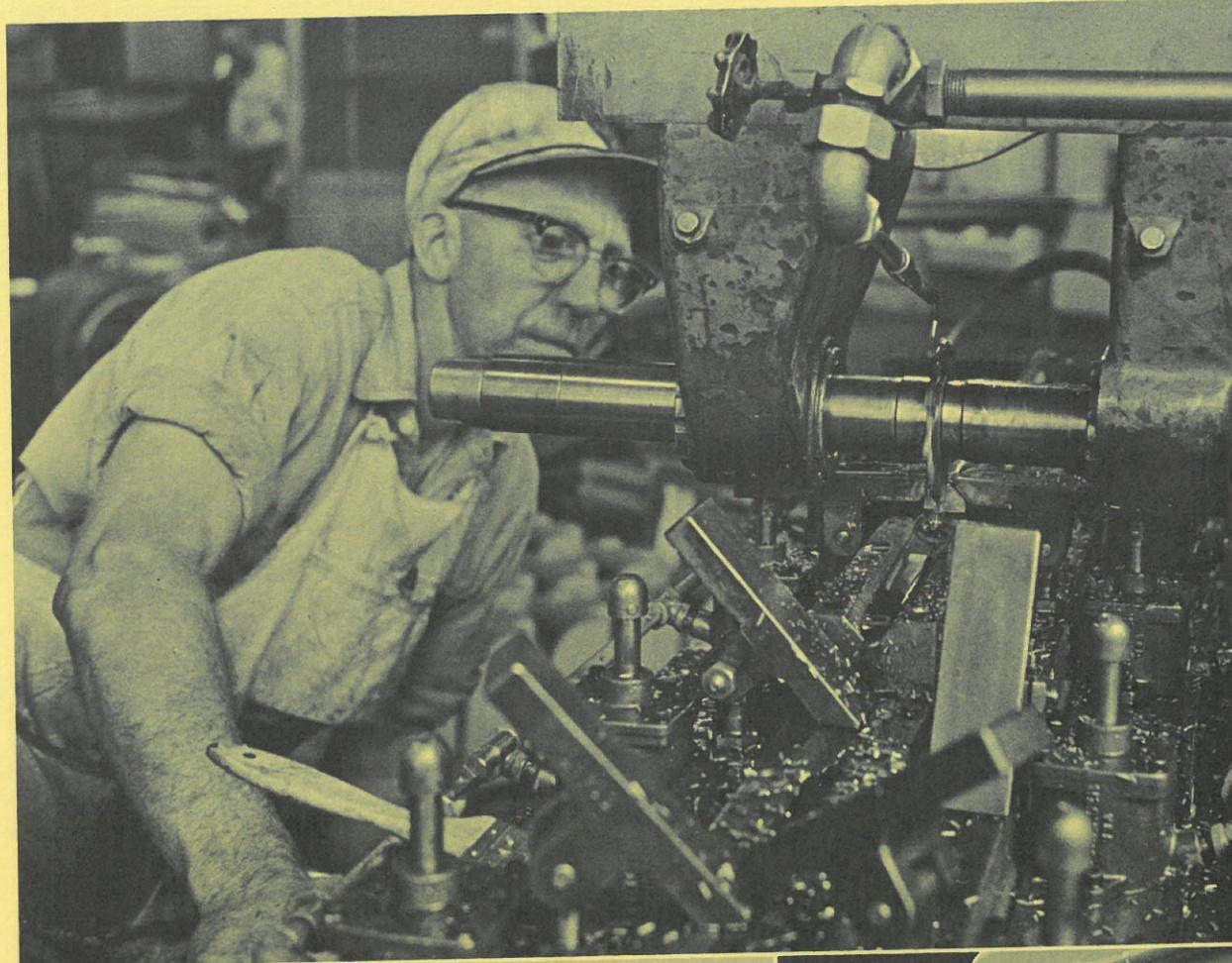
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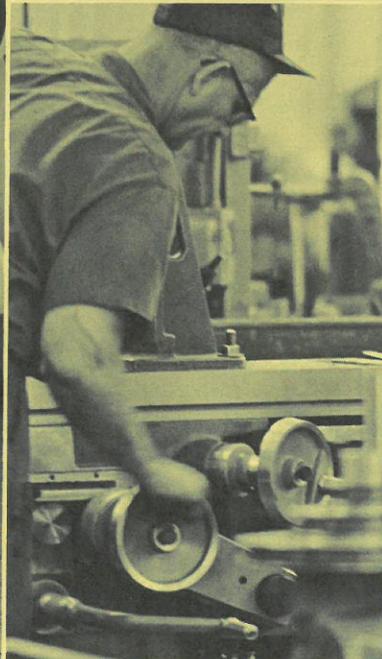
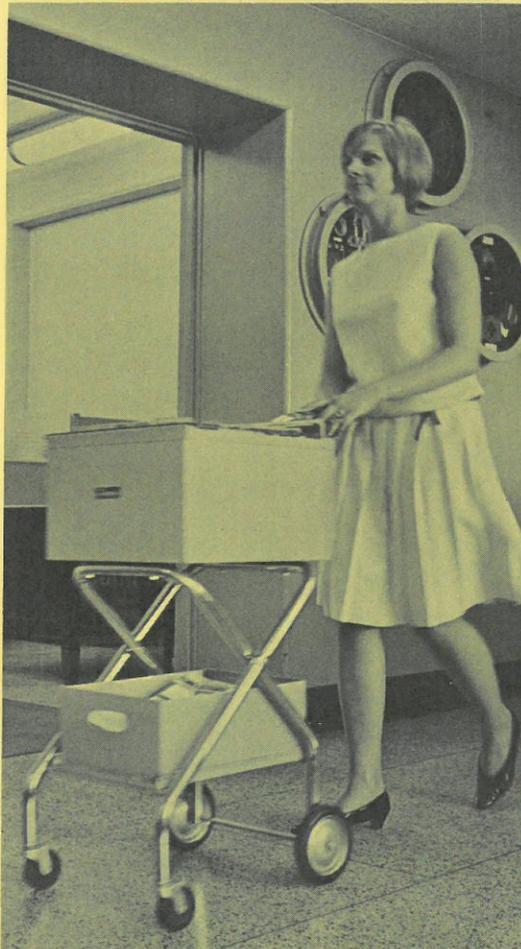


GEORGE GORTON III
President

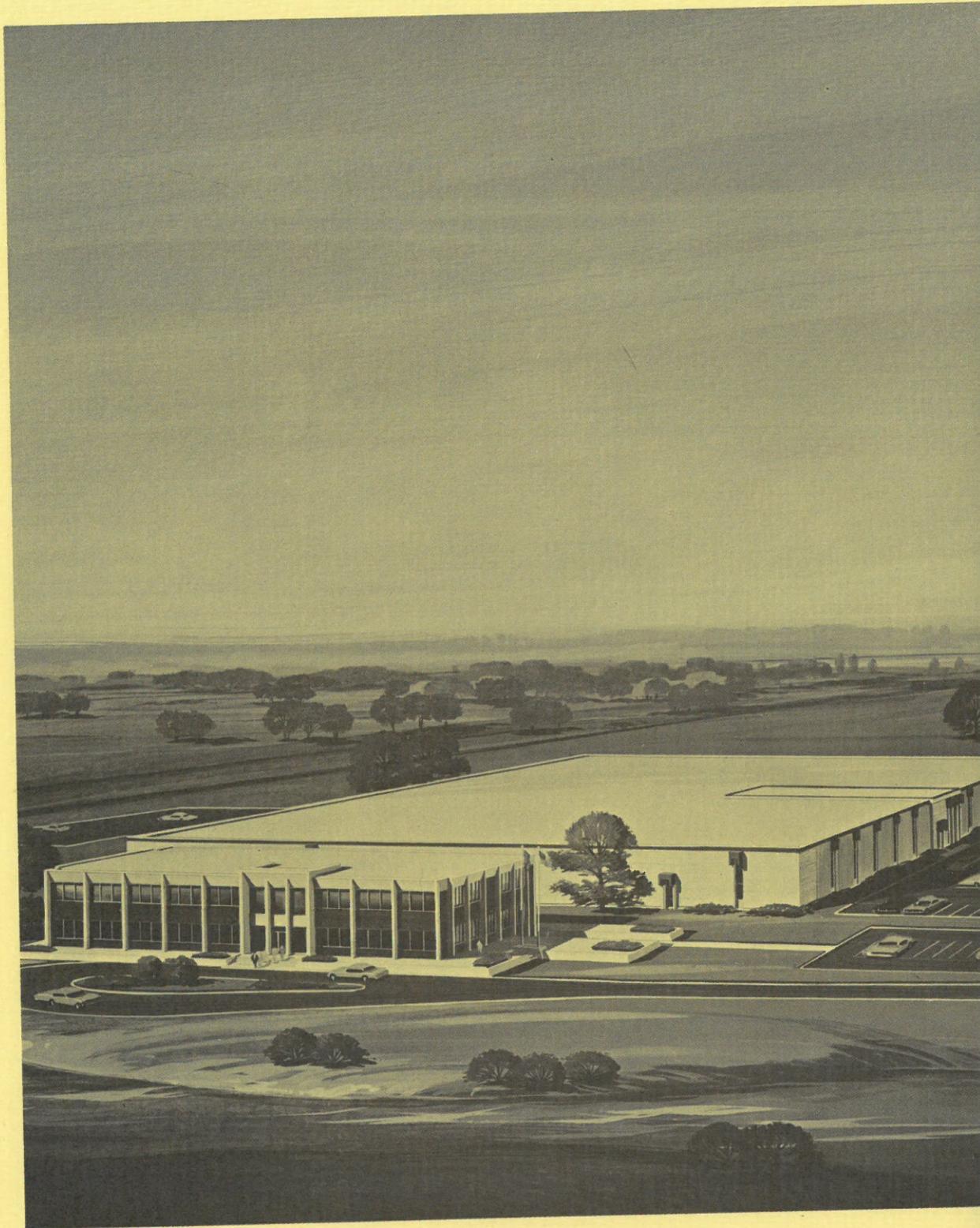
Gorton Machine Corporation
Subsidiary of Kearney &
Trecker Corporation
Racine, Wisconsin







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Vice President – Sales

DIRECTORS

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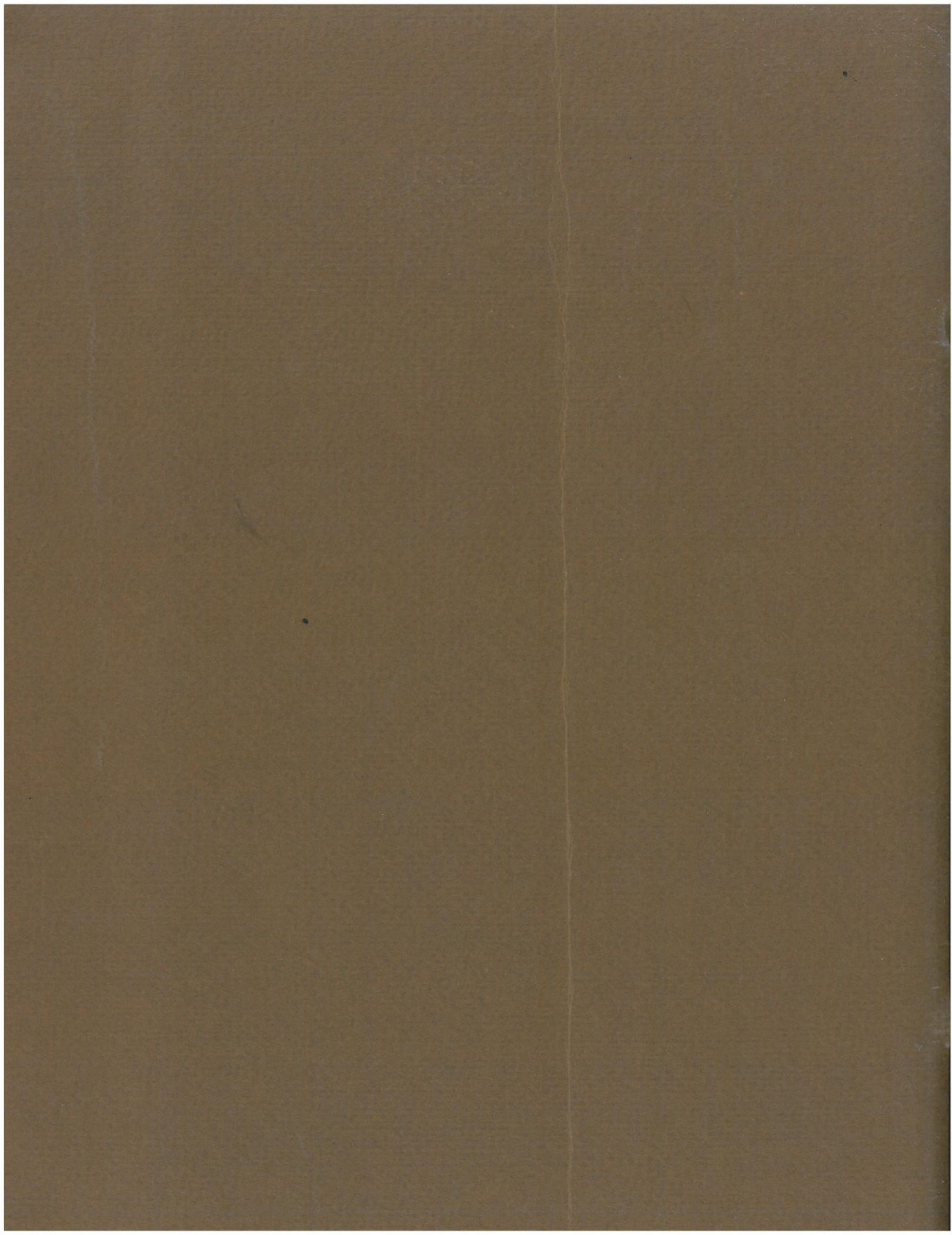
John S. Randall

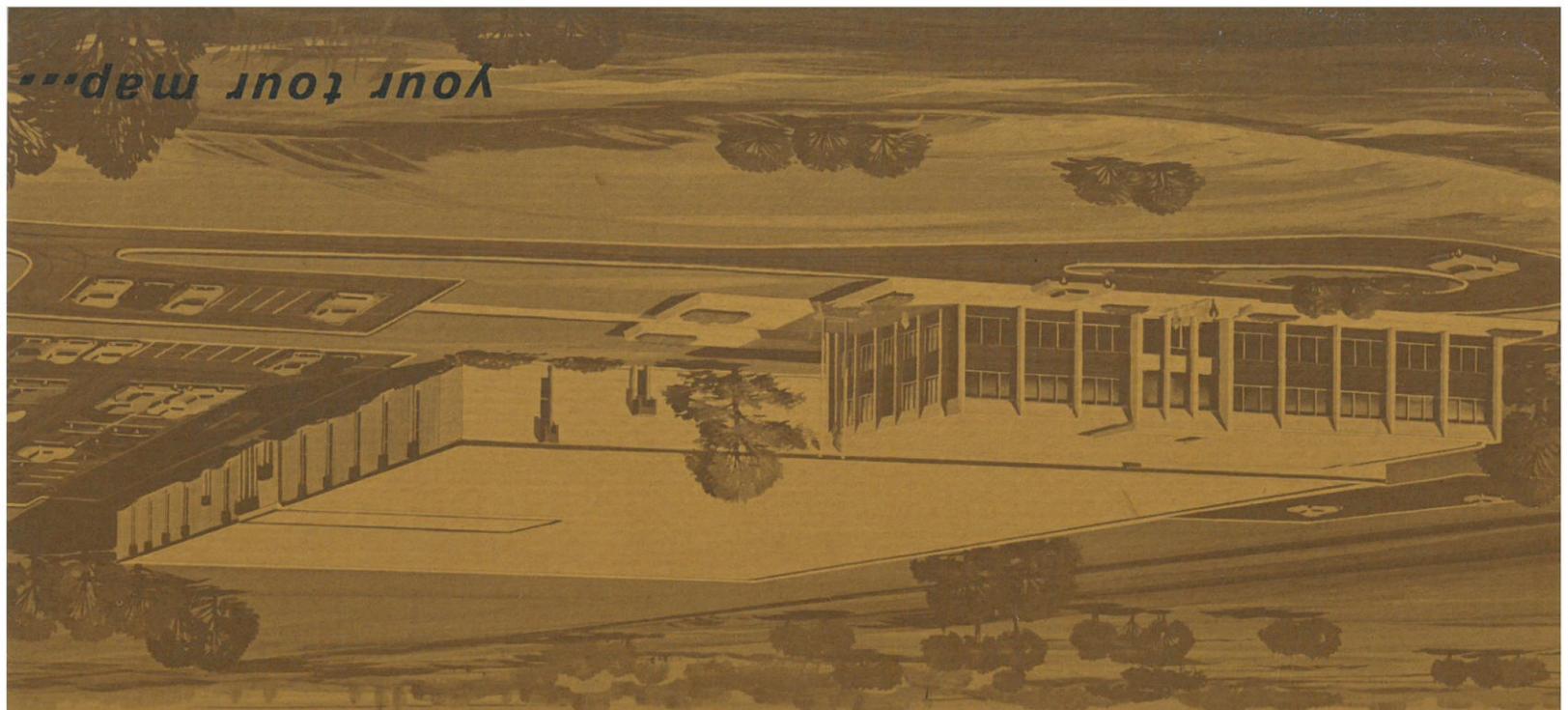
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75
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