

## The Kalamazoo Valley Paper Industry

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An old slogan frequently heard in the Kalamazoo Valley is "everything including some newsprint." That expresses in a few words the variety of products produced by the leading industry in the Kalamazoo River Valley. The truth of the slogan is revealed in the variety of papers manufactured: rag bonds, both ledger and writing; sulphite bond—coated and uncoated book, sulphite bristol, postage stamp paper, and greeting card paper; tissue and wrapping paper, box board, ice cream carton board, and butter carton board; playing card stock, and some specialties.

### Rank of Michigan in the Paper Industry of the United States

The manufacturing of paper and allied products in the United States is a huge industry. The value added by manufacturing in 1947 totaled \$2,874,958. Employment was provided for 449,833 employees.

Paper and allied products ranked tenth among the industries of the United States in 1947; it was outranked by such industries as food, textiles, machinery, and iron and steel.<sup>1</sup>

In 1947 Michigan ranked fourth in terms of value added by manufacturing and sixth in employment. In that year 26,022 persons were employed in paper and allied products mills in Michigan against 65,026 persons for New York, 28,144 persons for Wisconsin, and 31,674 persons for Ohio. In 1947 value added by manufacturing in the paper and allied products industry in Michigan amounted to 174 million dollars while that of New York was 232 million dollars and that of Wisconsin was 188 million dollars.

The paper-producing states can be divided into two major categories on the basis of the amount of paper and wood pulp produced and on the market or raw-material orientation of these products. The market oriented states are all within the North American Manufacturing Belt on a line from Massachusetts to Minnesota. The raw-material oriented states are separated into two groups; those primarily using northern coniferous forests (including the Pacific Northwest) and those using southern coniferous forests for raw materials.

The rank of Michigan in the North American Manufacturing Belt reflects certain advantages of the State: The central position within the American Manufacturing Belt, the presence of abundant labor, the presence of excellent labor relations, and the ease of obtaining raw materials and of shipping finished products.

### Rank of the Kalamazoo Valley among Paper Producing Areas in Michigan

Of the 160 paper and allied products mills in Michigan reported in the 1947 *Census of Manufacturers*, thirty-six, or nearly one-fourth, were located within the Kalamazoo and Allegan County area—the two counties

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<sup>1</sup> Calculated on the basis of value added by manufacturing.

containing the paper mills of the Kalamazoo Valley. Out of a total of 26,022 persons employed in the mills (within the state in that year), 7,945 were in Kalamazoo County, by far the leading county in the state. This is 31 per cent of the state total. More were employed in adjoining Allegan County for which census figures are lacking. Of a total of 174 million dollars added by manufacturing in the paper industry of Michigan, 49 million dollars was added by the mills of Kalamazoo County.

### The Paper Industry in the Kalamazoo Valley

The paper industry of the Kalamazoo Valley is the leading employer in the Valley. It is also the leading industry in value added by manufacturing. In 1947 Kalamazoo County produced manufactured goods valued at 150 million dollars. Of this amount 48 million, or 32 per cent, was in paper and allied products. Besides paper, other important industries include chemicals, metal fabrication, and primary metal production. These other three industries together account for less than paper alone.

During 1947 there were 20,867 employees in Kalamazoo County. Of this total 7,945, or 38 per cent, were in the paper industry. The next largest group in 1947, which consists of 13 per cent of the total industrial employment, was in metal fabrication; this industry accounted for 2,631 employees. The third largest industry, the chemical and allied products industry, accounted for 2,099 employees, or 10 per cent of the total number of employees in the county.

The paper mills of the Kalamazoo Valley are situated in or near four cities—Kalamazoo, Vicksburg, Otsego, and Plainwell (Fig. 1). Vicksburg

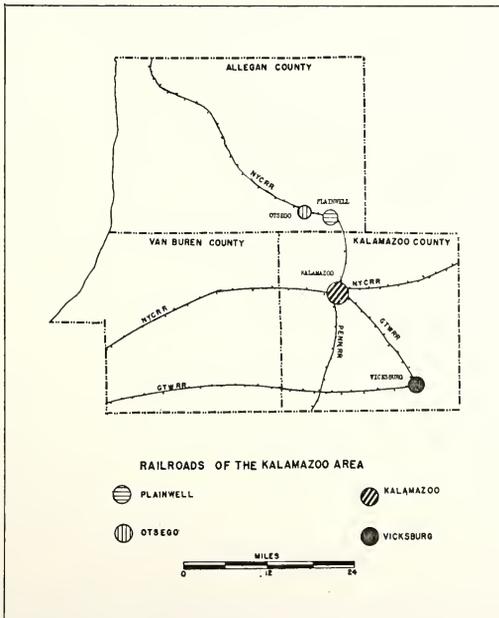


Figure 1

contains the Lee Paper Company; Kalamazoo contains the Allied Paper Company, Kalamazoo Paper Company, Sutherland Paper Company, St. Regis Paper Company, Kalamazoo Vegetable Parchment Company, Rex Paper Company, and other small companies; Otsego contains the Mac-SimBar Paper Company, the Otsego Falls Paper Company, and the Bardeen Division of the Allied Paper Company; Plainwell contains one mill—the Michigan Paper Company.

### History of Paper Production

The paper industry of the Kalamazoo Valley has gone through three stages of development: pioneer stage, expansion stage, and consolidation stage.

The pioneer stage, 1866-1872, is characterized by the founding of the first paper mill in Kalamazoo and by the change from water to steam power.

Paper making in the Kalamazoo Valley began in 1866 with the arrival in Kalamazoo of Benjamin F. Lyon. In order to provide water power for a paper mill, Lyon, a paper maker from Massachusetts, began construction on September 8, 1866, of a small dam across Portage Creek, south of Kalamazoo. A small frame building was constructed and the first run of paper was made in 1868.

After the destruction of the original mill in 1872 by fire, a new brick mill was constructed in which steam replaced water as the source of power. Steam had the advantage of being constant the year around; whereas with water power shutdowns were frequent during times of low water.

During the stage of expansion of the Kalamazoo Valley paper mills, 1872-1917, many of the original men of the Kalamazoo Paper Company (the original mill) left that company to form mills of their own. This was the result of the increased demand for paper and paper products. This period is also characterized by the advent of electricity for power. New mills were located not only in the City of Kalamazoo, but throughout the Kalamazoo Valley.

Benjamin F. Lyon left the Kalamazoo Paper Company and organized another paper company twelve miles north of Kalamazoo at Plainwell, Michigan (Fig. 1). This occurred in 1872. The mill was a small frame structure and used power from a mill race which was connected with the Kalamazoo River.

Plainwell's second paper mill was erected in 1887 on land immediately adjoining the Lyon Paper Company. This younger concern absorbed the Lyon mill and became known as the Michigan Paper Company.

George E. Bardeen resigned his position as secretary of the Kalamazoo Paper Company and decided to organize a company of his own. It was but a prank of nature that the site he selected was in Otsego, Michigan (Fig. 1). The spring of 1887 brought an unprecedented flood of water down the Kalamazoo Valley and the site offered by Otsego was the only one that was dry. Work began immediately and the mill was completed by the fall of that year. On December 26, 1887, the first run of paper was made in Otsego. The Bardeen mill was probably among the best equipped in the Middle West at that time. The building was of fireproof construction and was further protected by an automatic sprinkler system.

In 1895 three men associated with George E. Bardeen at Otsego—Noah Bryant, Frank H. Milham, and John F. King—left the Bardeen Company to form the Bryant Paper Company of Kalamazoo. This plant was later absorbed by the Allied Paper Company of Kalamazoo (Fig. 2, No. 3).

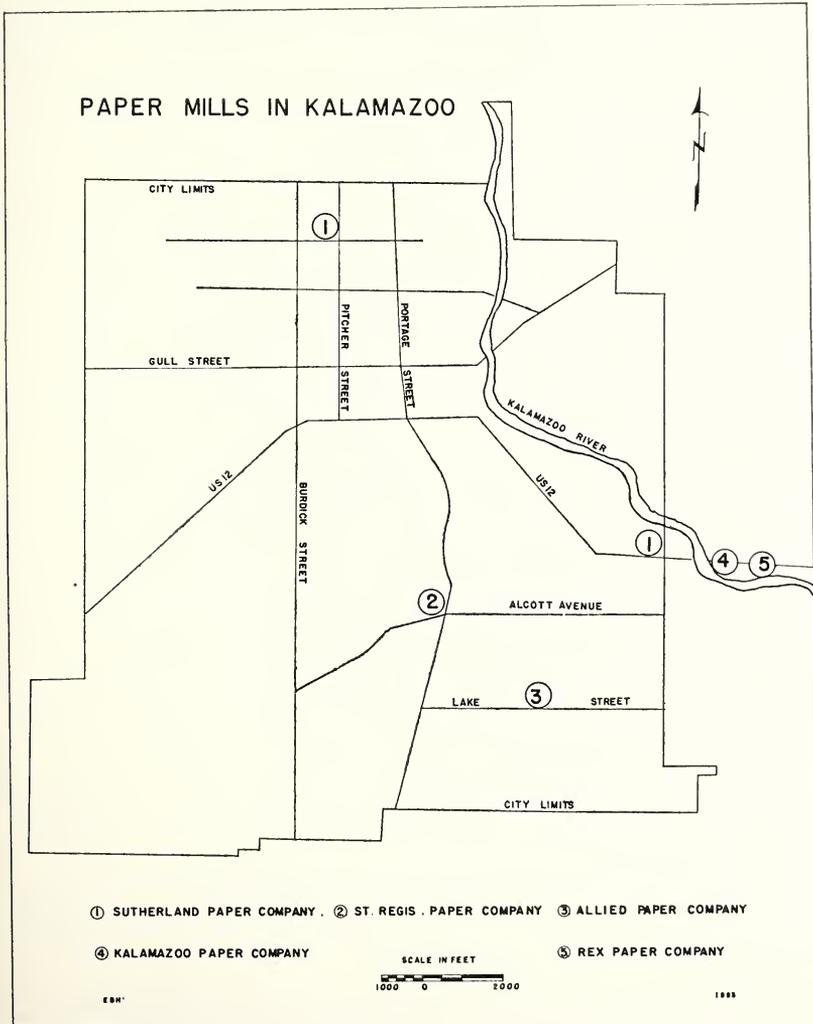


Figure 2

In the late 1890's the Kalamazoo paper industry was increased by the founding of the Wolverine Paper Company. Although this company turned out to be a financial tragedy, the failure made little difference to

the paper industry of the Valley because the Kalamazoo Paper Company bought the defunct Wolverine Company and continued its operation. The Kalamazoo Paper Company moved from its old locations, south of the city, and settled in the Wolverine mill which was on the east side of Kalamazoo (Fig. 2, No. 4).

From 1900 to 1917 there was a tremendous growth in the paper industry of the Kalamazoo Valley. The St. Regis Paper Company was formed in the early 1900's. This was a part of a large paper company having its main offices in New York. In 1901 John King severed his connections with the Bryant Paper Company and formed the King Paper Company. In 1915 John King, along with his son, Merrill King, left the King Paper Company and founded the Rex Paper Company (Fig. 2, No. 5).

In response to a demand for high-grade rag paper, the Lee Paper Company was organized at Vicksburg, Michigan, in 1903 (Fig. 1). The erection of the buildings was begun in the Spring of 1904 and paper production was in operation by January, 1905. The Lee Paper Company produces high-grade bond paper and photographic base paper.

The founding of the Kalamazoo Vegetable Parchment Company was of major importance to the paper industry of the Kalamazoo Valley. This company was organized by Jacob Kindelberger, a German immigrant. Upon coming to Kalamazoo from West Carrollton, Ohio, Kindelberger succeeded in interesting a group of local businessmen in establishing a company for the manufacturing of vegetable parchment. The old plant of the Kalamazoo Beet Sugar Company was purchased and shortly the making of parchment began. The mill was located in open country to the north of Kalamazoo, an area now incorporated in the city of Parchment, Michigan.

The story of the Kalamazoo Vegetable Parchment Company has been one of expansion. The rapid growth of the parchment business led to the erection of a paper mill in 1918. The paper produced was used as raw material for the parchment machines. The mill had two paper machines capable of producing seventy-five tons of paper per day. In 1933 a three-story building was erected for the storage of wood pulp. From an initial capitalization of \$50,000.00 the Kalamazoo Vegetable Parchment Company has developed into an industry having assets well over \$8,000,000.00.

The founding in 1917 of the Sutherland Paper Company marked the termination of the expansion period of the paper industry in the Kalamazoo Valley. The company was founded by L. W. Sutherland and F. W. Sutherland, both former employees of the Kalamazoo Paper Company. The Sutherland Company was launched in a machine shop on the present site of Plant No. 1 (Fig. 2, No. 1). The organization manufactured butter cartons and was first known as the Kalamazoo Sanitary Carton Company.

The Sutherland Paper Company has specialized in food cartons and asundry products. In 1935 the company began manufacturing food cans for the selling of fresh food and ice cream and at present are one of the three leading manufacturing concerns of paper cans in the United States.

Besides the production of food containers, Sutherland has expanded into the manufacturing of pie plates, paper forks, spoons, and vegetable boxes. The Sutherland Company has a capacity of more than one million paper plates per day.

The third stage of development in the paper industry in the Kalamazoo Valley was one of consolidation. Competition has become strong and successful operation depended upon large production, clever advertising, and new markets.

During this period many of the existing paper companies were consolidated forming fewer but larger concerns. Among these were the Kalamazoo Paper Company, Riverview Coated Paper Company, Monarch Paper Company, King Paper Company, Bryant Paper Company, and others.

The Kalamazoo Paper Company, the first company in the Valley, was particularly active in consolidation. The company assumed control of the Wolverine Paper Company and moved its plant and offices to the Wolverine plant. The original Kalamazoo Paper Company plant was purchased by the Monarch Paper Company. In 1918 the Kalamazoo Paper Company amalgamated with the Riverview Coated Paper Company and after this merger the Kalamazoo Paper Company became one of the largest suppliers of coated paper in the United States.

The Allied Paper Company of Kalamazoo was organized in 1922 by the merger of the King Paper Company, Monarch Company, Bryant Company and the Bardeen Paper Company of Otsego. This company, the Allied Paper Company, is now the largest producer of paper in the Kalamazoo Valley.

#### Locational Factors

Many factors have influenced the location of the paper industry in the Kalamazoo River Valley. The factors include the location of raw materials, location of markets, and transportation facilities, and the influence of labor.

The raw materials used in the paper industry of the Kalamazoo Valley are diverse in character and origin. The industry utilizes vegetable fibers, water, chemicals, and minerals.

Vegetable fibers form the basic material used in the manufacturing of paper. These fibers can be subdivided into four major categories—wood pulp, paper stock, rags, and cotton linter.

The differences in the internal structure of various papers are determined by the type of fiber used and the way in which the fibers are processed. In general, those fibers which produce long, strong, and straight cellulose strands are the preferable ones.

Wood pulp is the most important raw material; it constitutes between 50 and 70 per cent of all raw materials consumed. Approximately 119 thousand tons of wood pulp are used by Kalamazoo Valley paper mills during one year.

The wood pulp industry is characterized by four distinct processes which convert pulp wood into wood pulp. These processes are: (1) sulphite, an acid chemical process, (2) sulphate, an alkaline chemical process, (3) soda, an alkaline chemical process, and (4) ground wood, a non-chemical process. The sulphite process produces the most valuable pulp per ton. Sulphite pulp is the leading type of pulp used in the Kalamazoo Valley. Spruce, hemlock, yellow pine, aspen, and jack pine are the most important sources of pulp wood.

Lignin and non-cellulose products in the wood form approximately 50 per cent of the total weight of pulp wood. A yield of fibers of 42 per cent to 45 per cent of the weight of the wood is considered satisfactory.

Since pulp wood is comparatively heavy in comparison to wood pulp, the wood pulp industry is raw-material oriented whereas the paper industry is market oriented.

Wood pulp is obtained from mills located near the forests, principally in the Pacific Northwest, Southeastern and Northeastern United States, Northern Ontario, Eastern Quebec, and British Columbia (Fig. 3). The imports of wood pulp from Finland and Sweden have diminished considerably during the past decade. This is because of unsettled political situation of the world and because of new processes by which aspen and jack pine from Canada can be utilized from sulphite pulp.

The mills of the Kalamazoo Valley receive their wood pulp mainly by direct rail connections with the producing areas. The pulp which is obtained from Scandinavia is transported directly by ship to South Haven, Michigan, from where it is shipped by railroad to the Kalamazoo Valley paper mills. Wood pulp arrives at the mills in large, thin sheets resembling corrugated cardboard.

The Otsego Falls Paper Company, a small book paper concern in Otsego, Michigan, manufactures a portion of its own wood pulp at the site of the paper mill. This company is the only company manufacturing wood pulp in the Kalamazoo Valley. The pulp wood is obtained principally from Canadian sources.

In 1942, the Kalamazoo Vegetable Parchment Company purchased the pulp and paper mill of the Abitibi Company at Espanola, Ontario, and thus became an integrated company with both pulp and paper mills, though the pulp mill is outside our area of concern. Two hundred and fifty tons of sulphate pulp, produced in the Canadian mill daily, are shipped by rail to Kalamazoo.

Paper, like steel and wool, can be reprocessed. Paper stock, a second fiber raw material, is of utmost importance in the paper industry of the Kalamazoo Valley. Paper stock is used with wood pulp, giving added strength to the finished paper. Paper stock is used daily in paper board and book paper mills.

Paper stock comes to the Kalamazoo Valley mills from a radius of approximately two hundred miles (Fig. 3). Waste paper is collected by jobbers in Detroit, Chicago, Columbus, Cincinnati, and Kalamazoo. These men sell the waste paper to the paper companies of the Kalamazoo Valley. Paper stock is shipped to Kalamazoo exclusively by truck. The Allied Paper Company, the largest user of paper stock in the Valley, uses eight million pounds a month.

Upon arriving at the book paper mills, the waste paper is sorted. Paper containing too much clay filler is sent to the paper board mills in the Valley. The remaining paper stock is processed in rotary cookers, bleached, and blended with pure wood pulp before being placed on the paper machines.

A third fiber used in the paper mills of the Kalamazoo Valley is rag fiber. Cotton rags yield cellulose fibers that are about one inch in length.

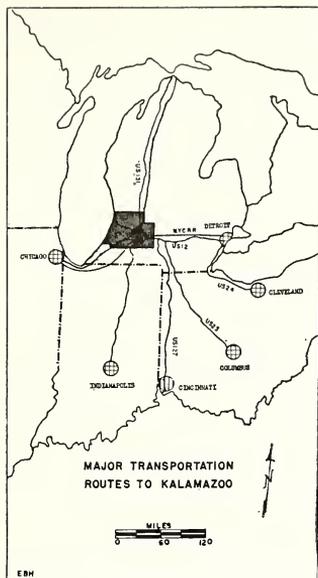


Figure 3

During the early days of paper making in the Kalamazoo Valley, the old rags were collected in Detroit, Chicago, and Kalamazoo by door to door peddlers. These rags were then sold to jobbers who in turn sold them to the paper mills. The use of old rags has declined recently throughout the United States. At the present time there are no old rags being used in the Kalamazoo Valley "rag mills."

The best rags used today come from new cotton scrap material. The shirt manufacturers around Troy and Rochester, New York, and the shoe manufacturers of St. Louis, Missouri, are the principal suppliers of rags (Fig. 3). The Lee Paper Company, the largest of the two "rag mills" in the Valley obtains its rags from these three sources. The rags are shipped directly to the mills by railroad.

After arriving at the paper mill, the rags are sorted and then are dusted in large rotary dusters. After the sorting and dusting, the rags are put through a cooking process to loosen dyes. When this process is completed, the rags are bleached with chlorine and are then placed in beaters which turn them into pulp.

A fourth fiber used in the Kalamazoo Valley mills is cotton linter. Cotton linter is the short cotton fibers left on the cotton seeds after ginning operations are completed. The complete supply of this fiber is obtained from Memphis, Tennessee (Fig. 3).

With the rapid rise of synthetic fibers during the last twenty years, the availability of cotton rags and cotton linter has been seriously curtailed. This has led to a reduction in the number of grades of rag content paper and a concentration in the production of a few high-grade papers.

Another reason for the marked decline in the use of rags in the paper industry is the increased use of sulphite pulp. Improvements in the processing of strong, bright wood pulps have made rags less essential for the fine grades of paper such as bonds and ledgers.

During the last twenty years only one new rag paper machine has been installed in the Kalamazoo Valley. The absence of more new rag paper machines points out the reduced use of rags as raw fiber for paper making.

### Water Supply

The abundant supply of pure water has been influential in the location of the paper industry within the Valley. Water is used in large quantities in the manufacturing of paper and allied products. Throughout the Valley are thick deposits of gravels which aid in the storage of ground water. These gravels also serve as natural filters. In addition to the abundant ground water there are surface waters of the Kalamazoo River and Portage Creek (Fig. 5). The majority of paper mills use a combination of ground water and surface water.

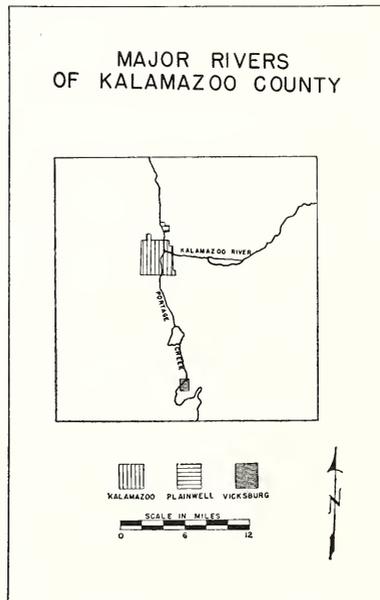


Figure 5

Surface water is used either for power house consumption or after filtering and purification for the paper machines. Surface water used on the paper machines is first pumped from the Kalamazoo River or Portage Creek into coagulating basins. Small amounts of alum are added to the water to expedite the settling of sediments. Following sedimentation, chlorination takes place. In addition to killing bacteria, chlorination controls algae growth, aids in the coagulation of impurities, helps oxidize

manganese, and reduces color by bleaching. After filtration, the water is usually given a treatment with slacked lime to bring the pH value to the desired strength.

The advantage of ground water is that it remains at a constant temperature throughout the year and that the supply remains nearly constant. A constant temperature of water is essential for certain chemical reactions which must take place during the processing of pulp into paper.

Water consumption in each of the Kalamazoo Valley paper mills varies from seven million gallons a day to forty million gallons a day depending upon the size of the paper mill.

#### Chemicals and Minerals

Although chemicals and minerals play an important role in the manufacturing of paper and paper products, they are less important than water in the location of the paper mills.

Chemicals and minerals used in the Kalamazoo Valley mills are obtained from a variety of sources (Fig. 4). The products are shipped to Kalamazoo by rail.

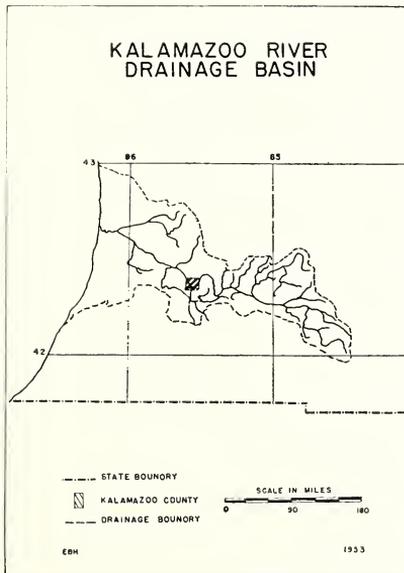


Figure 4

The most important chemical used in the paper industry is chlorine. It is used to bleach both rag and wood pulp as well as to sterilize water. Chlorine is obtained from the Wyandotte Chemical Corporation of Wyandotte, Michigan, and from chemical plants at Niagara Falls, New York.

Casein, used for making coating adhere to book paper, is obtained from Argentina and from the western United States. Before World War II a large amount of casein came from Australia, New Zealand, and

France, but since the war these sources of supply have dwindled, as has the experimental attempt to produce synthetic casein from soy beans in this country. Casein is a protein precipitated from milk and forms the basis for certain plastics and glues.

Starches used in the paper industry are made from a corn starch base. The majority of the starches used in the Kalamazoo Valley paper mills comes from Keokuk, Iowa, by way of Chicago.

Other chemicals and minerals which are used in the paper industry include clay from Georgia, rosin size from Georgia and Tennessee, titanium from New Jersey, lime from Missouri and Indiana, soda ash from Michigan, and coal from Indiana, West Virginia, and Kentucky (Fig. 4).

### Labor

Labor is an important locational factor. From a superficial glance at the paper industry of the Kalamazoo Valley, it would appear that the different types of labor used in the paper mills would not be large. However, a closer observation reveals that the types of labor employed are highly diversified—unskilled, semiskilled, skilled, and professional. The eighteen types of employment within the paper mills can be broken down into two major categories: general labor for which the paper industry must compete directly with other industries, and specialized labor which is peculiar to the paper industry. By far the largest number of workers in the paper mills are in the first category. Thus the paper industry has to compete with other industries for its labor supply. Inasmuch as general labor is relatively immobile, the paper industry needs to be so located as to obtain an adequate supply of labor. In order to obtain this supply, the paper industry of the Kalamazoo Valley concentrated in the labor market of Kalamazoo.

### Transportation Facilities and Markets

Kalamazoo and its neighboring paper manufacturing communities are located either on or near main highways and railroads which cross the Kalamazoo Valley (Fig. 1).

Kalamazoo is situated midway between Detroit, Michigan and Chicago, Illinois. Highway U. S. 12 and the New York Central Railroad pass through the city from the east to west and connect Kalamazoo with these two cities. Kalamazoo is connected with Grand Rapids, Michigan to the north and with the cities of Indiana to the south by the Grand Trunk Western Railroad, the Pere Marquette Railroad, and by Highway U. S. 131 (Fig. 1). These transportation routes provide easy access to raw materials and efficient means for shipping finished and semi-finished paper out of the Valley into the consuming areas.

The location of the Kalamazoo Valley paper industry with respect to these transportation routes has affected the market for paper. Although the large paper mills sell products to the Kalamazoo market, they are far from being dependent upon it. The excellent transportation facilities of the Valley expand the radii of the market of the paper mills to a national scale.

### Conclusion

The paper industry is the dominant industry in the Kalamazoo River Valley. Like most manufacturing concerns, the paper industry has been

influenced by various factors. It becomes apparent that some factors have contributed more influence than others to the location of paper making in southwestern Michigan.

It must not be inferred that the factors discussed herewith have been absolute in determining the location of paper manufacturing in western Michigan. Human choice was in the beginning the most important factor and throughout the history of the paper industry in the Kalamazoo region it has had a decided tempering effect on the non-human factors.