# COLUMBUS, OHIO:

# THE INDUSTRIAL EVOLUTION OF A COMMERCIAL CENTER

Dissertation

Presented in Partial Fulfillment of the Requirements

for the Degree Doctor of Philosophy in the

Graduate School of The Ohio State

University

By

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The Ohio State University

1953

Approved by:

Adviser

## Acknowledgements

It is difficult to recognize all of the individuals who have contributed something to this study. The more than 220 representatives of the various Columbus manufacturing plants which were visited during the Summer and Autumn of 1952 contributed time and ideas as they attempted to answer thoughtfully the questions of the writer. Their ideas, and the facts they presented, have been incorporated in this dissertation but if there are errors in interpretation, they are the writer's. The names of these men are listed in Appendix B, in partial recognition of their consideration and cooperation.

Mr. Grover Clements, of the Franklin County Regional Planning Commission, has been especially helpful to the writer. He has offered information, maps, and more important, interest. Mrs. Rosemary Martin, of the Industrial Bureau, the Columbus Chamber of Commerce, discussed phases of the dissertation in the light of the Chamber's interest in manufacturing in Columbus. To these, and to the other members of their organizations, the writer offers his appreciation.

It is a pleasure to acknowledge the critical advice and valuable suggestions made by Professor Alfred J. Wright of the Department of Geography, The Ohio State University, who acted as the advisor. Professor Eugene Van Cleef of the Department of Geography, The Ohio State University, had aided the writer, perhaps unknowingly, by his willingness to discuss any questions that pertained to urban or industrial planning in Columbus.

Professor David Harrison of the Department of Economics, The Ohio State University, read parts of the chapter dealing with the present industries in Columbus. His comments are appreciated.

And to Beth who has been wife, friend, and all good things to me -- through all of this and more -- without whom this work would not have been as pleasant and satisifying as it was.

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# INTRODUCTION

## Purpose of the Study

There is a growing interest in industrial geography in the United States as our economy grows and as industrialization spreads to non-industrial communities. At the March 1953 meetings of the Association of American Geographers, there were eight papers whose subjects dealt with some phase of this field. The geographer has not been alone in this interest. Industrial leaders have awakened to the fact that planned locations of manufacturing units may be more economical and satisfactory than chance locations. Because the bulk of American manufacturing still takes place within the loosely-defined "American Manufacturing Belt," cities and towns within that belt are more frequently considered as possible locations for manufacturing activities.

Civic leaders have become aware of the need for planning at the local level. Urban planning has been sponsored for many years but the concept of planning for industry has not received the attention required. Columbus, Ohio, has experienced increased industrialization within the past 15 years. As a city within the "American Manufacturing Belt," it has received the attention of national organizations as a center for the location of branch plants. Through an active Chamber of Commerce and established planning commissions at the city and county levels, Columbus has sought new industry.

As a growing industrial community cognizant of its position within the industrial heart of the nation, Columbus provides the opportunity for a thorough study of the location factors. Three objectives have been es-

tablished for this study: (1) to trace the industrial evolution of this commercial center, and by so doing, to learn what factors affected industrialization in previous periods, (2) to study the present industrial complex, and (3) to analyse and evaluate the principal forces responsible for the present location of manufacturing plants in the city, and thereby, draw conclusions about future industrialization in Columbus.

What follows is the life story of the industrial evolution of a city, briefly told. Its growth from a frontier state capital into a commercial center, and its recent trend toward industrialization, is the theme of the dissertation.

## The Approach

The basis for this consideration has been laid in extensive field work in the industrial communities of Columbus. More than 220 industrial establishments were visited and responsible representatives were interviewed personally. From these interviews, based upon an industrial questionnaire, came the information regarding the present industrial pattern of Columbus and the forces which have played a role in the location of industry in the city.

In addition to these industrial interviews, members of the Columbus Chamber of Commerce, the Columbus Planning Commission, and the Franklin County Regional Planning Commission, discussed this problem. Representatives of other groups in the community were also questioned and the disucssion which followed helped to produce a clearer view of the industrial growth of the city.

Whereas the industrial and civic leaders supplied some data which dealt with the historical development of the city, intensive library research provided the background for the first three chapters.

# I. THE RISE OF A COMMERCIAL CENTER

## A. Situation of Columbus

Columbus, Ohio, on the relatively flat Ohio till plain near the western edge of the Appalachian Plateau, was the first state capital in the Northwest Territory and the first planned state capital in the United States. The geographic position of Columbus, near the center of the state, was the principal reason for the selection of this site for the capital of Ohio.

## B. A Planned Political Center

In March 1803, the General Assembly met in Chillicothe for the ". . . purpose of organizing the state government." The Assembly divided the state into counties ". . . first among the new counties created by the new State Legislature was Franklin." Franklinton, then a thriving town on the lowlands west of the Scioto River, became the county seat.(1) It had been first settled in 1797 when Lucas Sullivant, engaged in a survey of the Virginia Military District, laid out the plans for the settlement on the low banks of the Scioto River near the point where it meets with the Olentangy (Whetstone) River.(2)

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1 See Henry C. Noble, Historical Address, Columbus, 1876, p. 41 and Lyder L. Unstad, A Survey of the Industrial and Economic Development in Central Ohio with Special Reference to Columbus, 1797-1872, Dissertation, The Ohio State University, Columbus, 1937, p. 11.

2 "If there is wonder that he located on the lowlands, instead of on the now more desirable lands east of the river, the answer is to be found in the fact that he had nothing to do with the latter lands. The limit of the tract he was surveying was the river." Osman C. Hooper, History of the City of Columbus, Ohio, Columbus, 1920, pp. 11-12.

State Capital. The General Assembly continued to meet in Chillicothe until 1810 when it met briefly in Zanesville. The desire for a permanent capital increased and the advantages of many sites in central Ohio were heard by the Assembly. Zanesville, Lancaster, Newark, Worthington, and Dublin were prominently mentioned until a group of men from Franklinton, including Lyne Starling (brother-in-law of Lucas Sullivant), Alexander Mc Laughlin, John Kerr, and James Johnston, offered the General Assembly ". . . a tract of about 1,200 acres on the east bank of the Scioto opposite Franklinton."(3) In addition, they offered to give the state 20 acres of land in this tract on which a capitol, a penitentiary, and other buildings would be constructed.

The permanence of the site was not settled but it was agreed that the capital would remain at Columbus until May 1, 1840. Only an act of the legislature could then change the site.(4) Joel Wright, of Warren County, was appointed the State Director in charge of the actual development of the capital. His city plan influenced the pattern of settlement and growth in Columbus.(5) (See Figure 1 on page 3.) The sale of the first city lots took place on June 18, 1812.

Columbus, and central Ohio, had few cultural attributes in 1812. Self-sufficient agriculture dominated but its advance was slow. Accord-

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3 Ibid., p. 26.

4 Roderick Peattie, Editor, Columbus, Ohio: An Analysis of a City's Development, Columbus, 1930, p. 1. In the early 1840's, there was some agitation to move the capital from Columbus to some other town more centrally located and less "metropolitan."

5 Laws of Ohio, X, p. 202.

ORIGINAL PLAT OF COLUMBUS

Figure 1

State Capital. The General Assembly continued to meet in Chillicothe until 1810 when it met briefly in Zanesville. The desire for a permanent capital increased and the advantages of many sites in central Ohio were heard by the Assembly. Zanesville, Lancaster, Newark, Worthington, and Dublin were prominently mentioned until a group of men from Franklinton, including Lyne Starling (brother-in-law of Lucas Sullivant), Alexander Mc Laughlin, John Kerr, and James Johnston, offered the General Assembly ". . . a tract of about 1,200 acres on the east bank of the Scioto opposite Franklinton."(3) In addition, they offered to give the state 20 acres of land in this tract on which a capitol, a penitentiary, and other buildings would be constructed.

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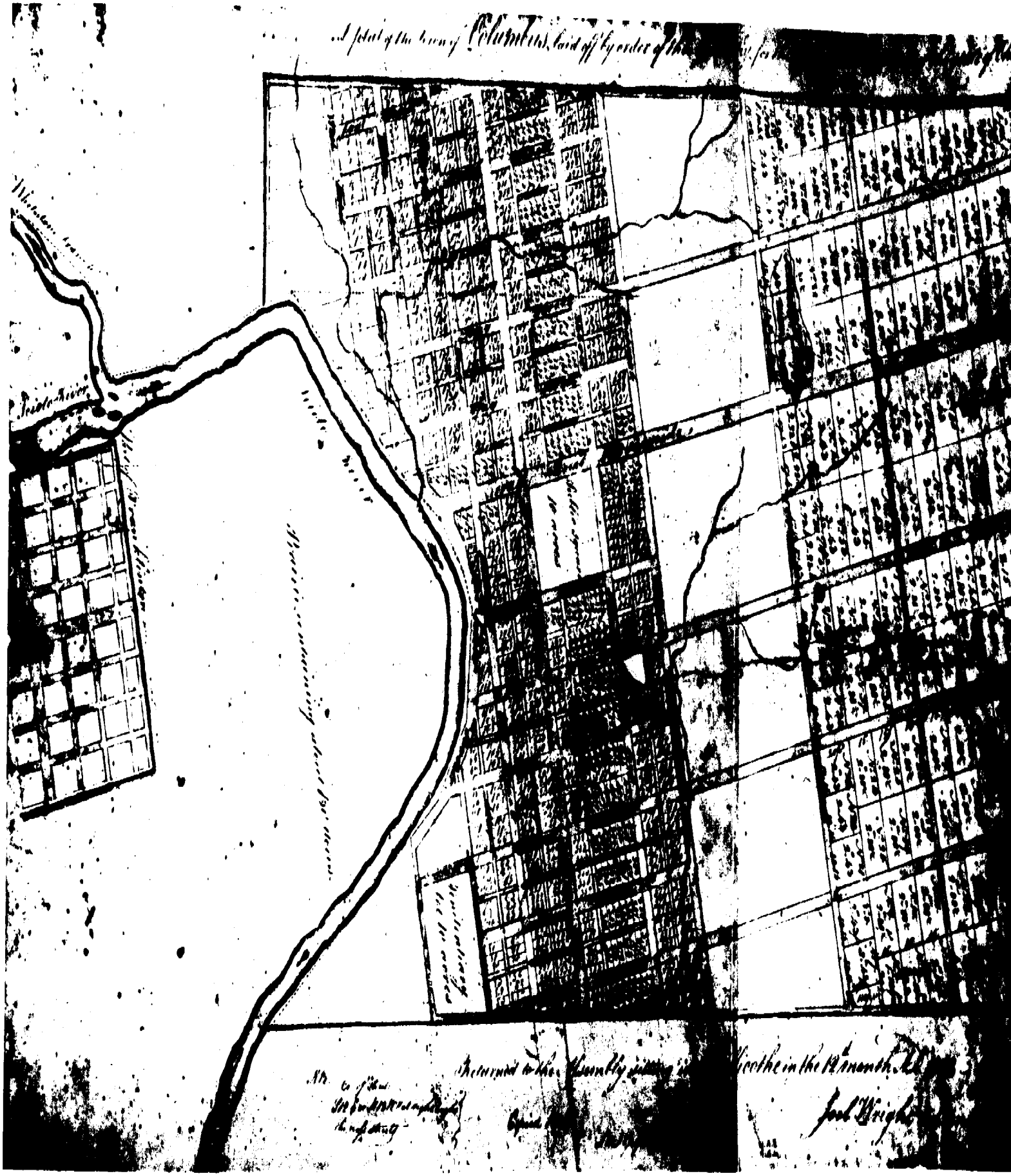

ORIGINAL PLAT OF COLUMBUS

Figure 1

ing to the maps of natural vegetation by Transeau, the area was densely covered by extensive hardwood forests broken occasionally by prairie openings.(6) The people of central Ohio were primarily engaged in clearing this land for agriculture.

County Seat. "The selection of the site for Ohio's capital must have been more for what it might become than for what it was at that time."(7) And yet, ". . . it was near enough to the center (of the state), more accessible than the other places proposed, and the donations were desirable in the then condition of the State finances."(8) As the political center of the state, Columbus increased its population through immigration, and commercial activities were expanded as the needs of the growing population permitted. In a matter of a few years, it out-distanced Worthington (which had been founded in 1804) and Franklinton. By 1824, the County Court was moved from Franklinton and Columbus assumed additional local importance as the county seat.

## C. Intra-regional Factors of Situation Which Led to Commercial Development

When Columbus was created the capital, there was nothing in the physical make-up of the community that presaged important developments. No outstanding raw materials were evident, no important trade routes were here, nor did the town serve more than local markets. But Columbus pos-

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6 Edgar N. Transeau and H. C. Sampson, Primary Vegetation Areas of Ohio, Manuscript map, 1934.

7 Hooper, op. cit., p. 27.

8 Noble, op. cit., p. 51.

sessed the geographical position to give it stability.

Land Grants. Original land grants and surveys have upon occasion served to unite and promote settlement in virgin areas. This was true in several parts of Ohio and much of the early settlement in the state can be attributed to it. The Congress of the United States provided for a survey of the western lands in May 1785; and on July 13, 1787, the Ordinance for the Government of the Northwest Territories was adopted. A number of chartered companies left eastern states to take up settlement in the new territory but their influence did not extend immediately into central Ohio.

Military grants -- Numbers of land grants were made in the central Ohio area: most of them attempted to reward men who had fought in various U. S. wars. One major division was the United States Military Lands set apart by Congress in 1796 ". . . to satisfy certain claims of the officers and soldiers of the Revolutionary War."(9) This tract lay east of the Scioto River, north of the present Fifth Avenue. (See Figure 2 on page 6.) To the south of these lands for four and one-half miles and extending eastward 48 miles was the Refugee Tract.(10) This tract was appropriated by Congress for the benefit of Canadian and Nova Scotian persons who had espoused the cause of the Colonies in the Revolution. The third division was the Virginia Military Lands that included ". . . all the land west of the Scioto River . . . that Virginia reserved for her

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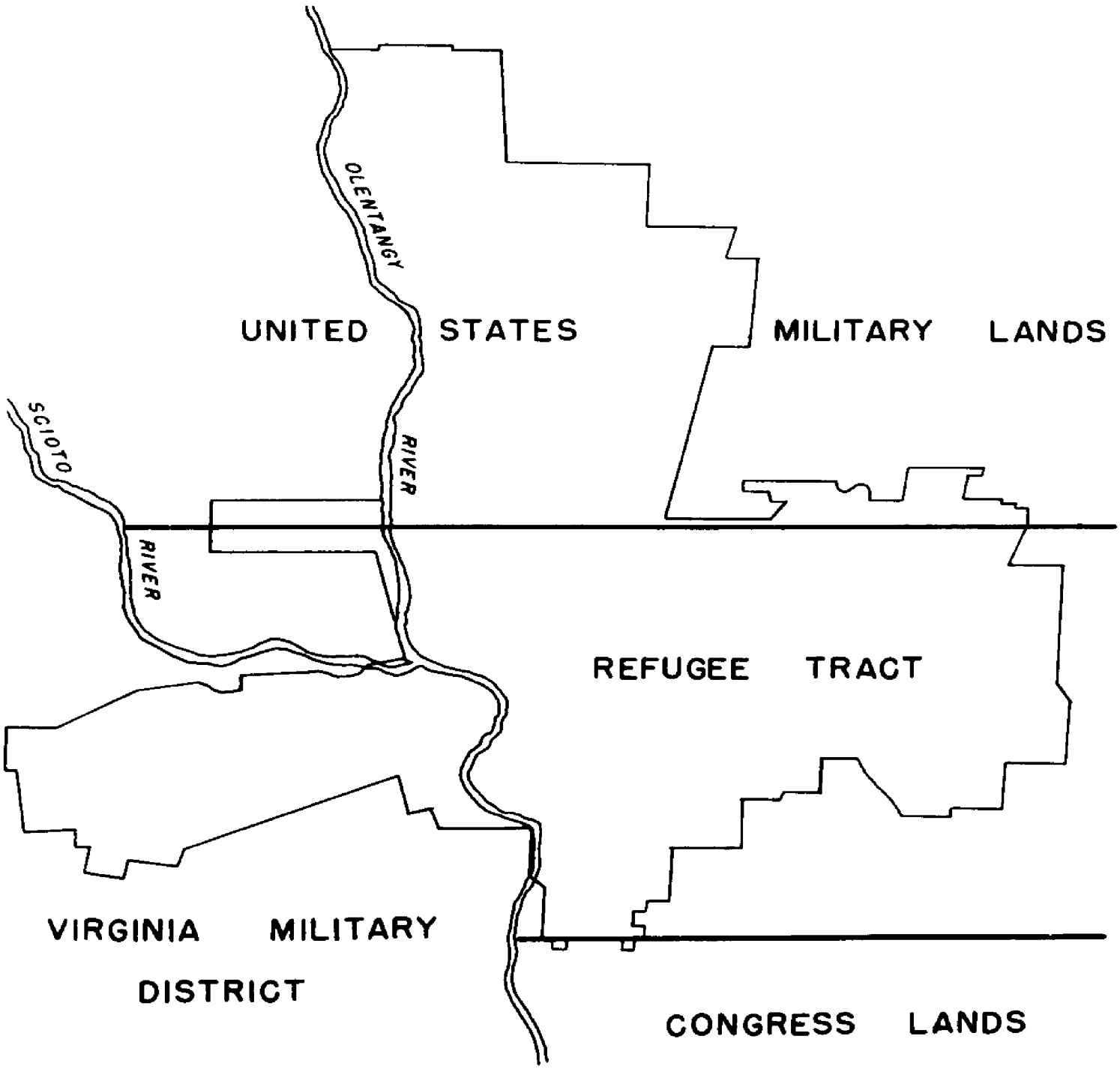
9 Hooper, op. cit., p. 8.

10 The present Refugee Road in South Columbus formed the southern edge of this tract.

# OHIO LAND GRANTS - IN THE COLUMBUS AREA




AFTER-O.C. HOOPER, "HISTORY OF THE CITY OF COLUMBUS, OHIO" 1920 P.9

Figure 2

soldiers . . ." in 1790.(11)

Congress Lands -- In addition to the military lands, the Congress Lands were set aside in 1796 to be sold directly to the settlers. They lay south of the Refugee Tract and east of the Scioto River. When the other tracts in the state are considered also, the significance of grants and surveys to Ohio settlement is better realized.

Settlement. One outstanding effect of these subdivisions was to open the land to surveying teams and settlers. Lucas Sullivant first visited central Ohio in 1795 as a surveyor and, recognizing the qualities of the area for farming, purchased land and returned in 1797. Others, learning of the fine Ohio soils, came to the area and took up holdings.

These were no bands of criminals or misfits which settled central Ohio, but some of the best blood and brains of New England, Pennsylvania, and Virginia. These people carried eastern and southern cultures with them and were quick to organize active communities. An early member of the local community wrote of the diverse geographic backgrounds of her neighbors: she received pumpkin from Vermont neighbors, corn hominy from Virginians, and sauerkraut from Pennsylvania Germans. One writer notes that ". . . with Puritan leadership from the north and Cavalier leadership from the south, Ohio could not fail to produce a versatile and energetic whole."(12)

Trails -- It was by the trails that crossed central Ohio, ". . . the keys to the central West . . ." that many settlers reached their

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11 Hooper, op. cit., p. 9.

12 Carrie B. Zimmerman, "Ohio, The Gateway to the West," The Ohio State Archaeological and Historical Society Quarterly, Vol. 40, 1931, p. 140.

destinations. The following Indian trails were of special significance:

Warrior's Path -- Through the Cumberland Gap streamed many southern farmers who followed this trail north through the Scioto Valley to Lake Erie. It was also a major route for armies.

Sandusky-Richmond Trail -- This passed through central Ohio (the home of the Shawnee), through the Hocking area, and to the Great Kanawha River valley. It was an important fur route and it brought settlers to central Ohio from the eastern and southeastern seaboard.

Monongahela Trail -- This trail connected central Ohio with southwestern Pennsylvania and the Monongahela River valley.

Moravian or Scioto-Beaver Trail -- From the Beaver River valley of Pennsylvania westward by way of Steubenville and Coshocton, came the settlers from Pennsylvania and New England.(13)

Thus, ". . . the Indian trails and not the rivers were the routes of the early settlers into the interiors . . ." and these trails, in turn, ". . . became the courses of the first roads."(14)

Waterways -- The Muskingum, Scioto, and Miami rivers also served to funnel new settlers into the heart of the state and in these river valleys some of the earliest settlements were established. Produce and supplies were carried by the rivers, too. The Scioto River was the chief means of carrying incoming merchandise and outgoing produce in central Ohio. As early as 1810, Lyne Starling and others built flatboats in the town and ventured with their cargoes of agricultural products down the Scioto, Ohio, and Mississippi, eventually to reach New Orleans.(15)

Roads -- The early roads of central Ohio connected the small towns

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13 Archer B. Hulbert, "The Indian Thoroughfares of Ohio," The Ohio State Archaeological and Historical Society Quarterly, Vol. 8, 1900, pp. 269-273.

14 Ibid., pp. 287 and 290.

15 Hooper, op. cit., p. 131 and Unstad, op. cit., p. 50.

with the county seat or a river town. A few such roads had been opened prior to the founding of Columbus — from Franklinton to Lancaster, Newark, Springfield, and Worthington. None was much more than a trail and it usually followed an Indian route. The War of 1812 prompted the construction of new military roads and in 1814-1815 the Assembly authorized money to construct a road between the capital and Granville. In addition, there were improvements to be made on the other roads.

"The great work, however, was left to individual enterprise. In 1816, the Franklin Turnpike Road Company, was incorporated to build a road from Columbus to Newark . . . It was the first of an almost innumberable throng."(16) Other toll roads were undertaken with a 106-mile road between Columbus and Sandusky the most ambitious effort. The roads were poor generally with transportation slow and expensive but the change from pack train to freight wagon and stage coach accelerated the commercial development of central Ohio.

Beginnings of a market — Improved river and road facilities permitted central Ohio to market its agricultural surpluses profitably. By 1825, Columbus had broadened its commercial scope and, as transportation facilities improved, trade increased with New Orleans and the south, with Baltimore and the Middle Atlantic cities, and with more localized markets.

## D. Inter-regional Factors of Situation Which Led to Commercial Development

Peattie has stated that "The fertile Scioto valley came to have its population concentrated at the junction of the river and the great east-

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16 Ibid., p. 132.

west artery, the National Road."(17) The significance of Columbus as a population center and as a junction of two basic routes of transportation was emphasized. The concentration of people at this point has increased and the importance of the city as a junction is reflected in the marked crossroads pattern of the present.

The National Road. The National Road was the culmination of earlier attempts to link central Ohio with eastern markets. For it was not until roads and canals were established that eastern trade "invaded" the state. Indian trails and waterways could carry the settler and pack animal, but an economical way of moving freight wagons was not available.(18)

The projection of the National Road into Ohio in 1825 offered the first opportunity for inter-regional trade by overland carriers. The Road originated in Cumberland, Maryland, crossed the Ohio River at Wheeling and continued westward through Zanesville to Columbus.(19) The time involved in the journey from Wheeling to Columbus, in 1837, was 49 1/2 hours. The system of highways that centered about the National Road provided ". . . the first great division of internal improvements, by which Ohio was opened to the outside world . . ." and the time involved in travel was a marked improvement over earlier efforts.(20) Built at

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17 Peattie, op. cit., p. 30.

18 Paul W. Stoddards, "The Economic Progress of Ohio: 1800-1840," The Ohio State Archaeological and Historical Society Quarterly, Vol. 41, 1932, p. 177.

19 Ralph H. Brown, Historical Geography of the United States, New York, 1948, p. 106.

20 Stoddards, op. cit., p. 186.

Federal expense, the Road reached Columbus in 1833 and later continued westward through Springfield into Indiana. The route into Columbus followed Friends Street (now Main) west to High Street, thence north to Broad, and west out of the city. (It is the present U. S. Route 40.)

Effects of the National Road -- Columbus reflected the opening of the Road with a growing population and increased commerce and industry. Prior to this "Columbus was a rough spot in the woods, off from any public road of consequence."(21) While earlier stage lines had connected the city with such distant points as Cincinnati, Portsmouth, and Lower Sandusky, it was the Ohio Stage Company which gave the city an important place in the transportation network of the state in 1829. Carrying passengers, mail, and light freight, this line connected with points throughout central and southern Ohio.

Turnpikes. In addition to the National Road, the turnpikes, which were established in the early 1800's, were extended considerably from 1845 to 1855. They were limited in mileage and came to Columbus from Harrisburg, Portsmouth, Pomeroy, Worthington, Mt. Vernon, and dozens of other communities. The Ohio Stage Company maintained its principal offices here as well as its wagon shops. As a consequence of this new overland accessibility, Columbus' shops turned out wagons in increased numbers for the westward-moving settlers and for the adjacent farm population.

Canals. Yet, there remained many towns in central Ohio which were inaccessible. As early as 1816, Governor Ethan Allen Brown, called the

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21 William T. Martin, History of Franklin County, Columbus, 1858, p. 292.

"Father of Ohio canals," had sought advice as to the possibility of canals in Ohio from Governor De Witt Clinton who had fostered the Erie Canal in New York. In 1818, it was urged in the General Assembly that canals were needed to ". . . increase industry and develop our resources, (and) internal communications must be improved to provide for the surplus produce of our state a cheaper way to market."(22) Another affirmative argument indicated the advantages of the canal by which gypsum, cloth, salt, and other merchandise could be brought in from the east. The Act of February 4, 1825, marks the beginning of the canal-building period in Ohio's history.

Five routes were considered: (a) Mahoning and Grand rivers, (b) Cuyahoga and Muskingum rivers, (c) Black and Muskingum rivers, (d) Scioto and Sandusky rivers, and (e) Maumee and Great Miami rivers. "A through route was not the first consideration. The primary object was to secure the greatest development of the state interests." A compromise to satisfy politics and economics established two routes -- The Ohio and Erie Canal, following the route from Cleveland to Portsmouth, and The Miami Canal, to follow the Great Miami River from Dayton to Cincinnati. The former route was chosen to aid central Ohio as ". . . the interior of the state was almost deprived of a market."(23) (See Figure 3 on page 13.)

The Ohio and Erie Canal was begun on July 4, 1825, when ground was broken at Licking Summit, but the 307-mile canal, which cost almost eight

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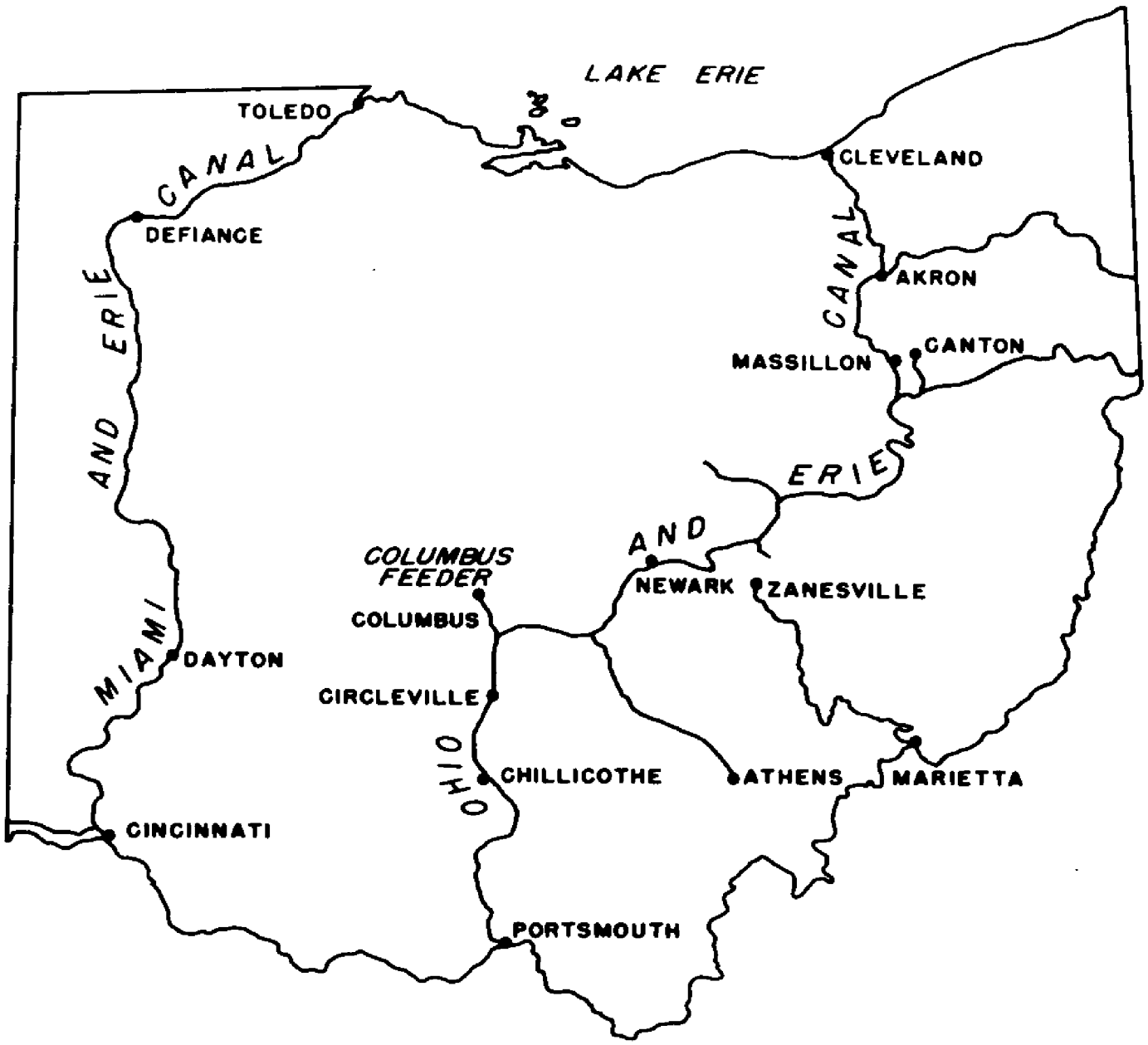
22 C. C. Huntington and C. P. Mc Clelland, History of the Ohio Canals: Their Construction, Cost, Use and Partial Abandonment, Columbus, 1905, p. 10.

23 Ibid., pp. 8, 15, 18-19.

# OHIO CANAL ROUTES




AFTER - HUNTINGTON AND MC CLELLAND
"HISTORY OF THE OHIO CANALS"

Figure 3

million dollars, was not completed until 1833.(24) Columbus was not on the main canal but on April 30, 1827, work was begun on a branch canal connecting Columbus with Lockbourne. The Columbus Feeder, 11 miles in length, was opened in 1831.

Effects of the canals -- The Ohio and Erie Canal was never an important through route due to insufficient water and its wandering course, but it ". . . stimulated industry, developed the great resources of the State, increased the value of the land and property along their courses, and invited new capital."(25) Along the northern part of the canal industries developed but the lower Scioto Valley carried considerable agricultural trade. Central Ohio gained least. However, new settlers were attracted to Columbus and the 1820 population of 1,400 increased to 25,000 by 1857. Thus, while the canal was a principal factor influencing the settlement of central Ohio, it also stimulated industry since the cheaper transportation gave the area greater accessibility to markets.

Through canal transportation, the beginning of a real interest in the coal, iron ore, and salt deposits of southeastern Ohio occurred. Exploitation of these raw materials was considerable but the area awaited the coming of the railroads for maximum utilization.

Railroads. James Kilbourne of Worthington, newspaper owner and manufacturer, was one of the men in central Ohio who recognized that railroads would be essential to the future. He proposed a railroad as early

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24 Ibid., pp. 31-32.

25 Stoddards, op. cit., p. 190.

as 1825. By 1830, a number of local road companies were incorporated but construction was not planned.

The first rail line into Columbus was the Columbus & Xenia Railroad. The Little Miami road had been completed from Cincinnati to Xenia and there was great effort to continue this road to central Ohio After many delays, construction was begun. "The rails (strap iron on hardwoods) for the road were bought in England and cost three cents a pound delivered here, the transportation charge being more than the original cost of the rails. A locomotive was shipped from Cincinnati by river and canal to assist in the track-laying."(26) By 1853, the two roads operated as a unit and continued so until 1869.

Effects of the railroads -- Canals and plank-roads were soon cast ". . . into the shade by the railroad enterprises which became the mania of the time."(27) The Cleveland, Columbus, and Cincinnati Railroad Company began operations on February 18, 1851, and was a success from the beginning. Following this, the central Ohio Railroad was completed to Zanesville in 1853, and a year and a half later reached Cambridge. Contact with the Ohio River to the east was achieved over the Baltimore & Ohio line. Almost at the same time, 1854, the Columbus, Piqua, and Indiana's first train traveled the route to Piqua and the entire line opened in 1859.

The desire for railroads was great, but frequently the companies were no more than paper arrangements; the financial structure was weak,

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26 Hooper, op. cit., p. 226.

27 Jacob H. Studer, Columbus, Ohio: Its History, Resources, and Progress, Columbus, 1873, p. 54.

and many failed before reaching the planning stage. With the construction of the four lines noted above, the first era of railroad building in central Ohio was at an end. Columbus had contact with Cincinnati, Cleveland, the Ohio River to the east, and Indiana.

These roads were not backed enthusiastically by Columbus business men partly because they were not able to realize their immediate value and partly because the powerful Ohio Stage Company, a monopoly, was centered here. By 1852, however, the Stage line had lost out to railroad competition; in 1854, the equipment was sold and shipped to Iowa where it was used on the new frontier.(28)

Appalachian Mountains. The Appalachian Mountains, although a barrier to the early settlement and development of interior Ohio, provided corridors which the early settlers followed and which are traveled by the railroads and highways of the modern day. Three principal routes provide the corridors of commerce. The lowland route, by way of the Potomac, Youghiogheny, and Ohio river valleys and the Wilderness Road through the Cumberland Gap in eastern Tennessee were the first traveled.(29) Later, the Mohawk Valley and the Erie Canal gave direct and easy access to Ohio by way of the lake plains. There were other corridors that carried commerce to Ohio but the fact remains that Ohio did not gain economic stability until this physical barrier was penetrated.(30)

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28 Unstad, op. cit., p. 292.

29 Brown, op. cit., pp. 184-186.

30 Alfred J. Wright, "Joel Wright, City Planner," The Ohio State Archaeological and Historical Society Quarterly, Vol. 56, 1947, p. 291.

This barrier limited trade between central Ohio and the east. The early settler in the area had his roots in the east; he wanted the manufactured wares that the east produced but he did not like paying the high costs of transportation. Many items did not reach central Ohio except by way of the costly long water haul up the Mississippi from New Orleans.

Ohio-Mississippi System. The Ohio-Mississippi river system was central Ohio's contact with the outside world. The Ohio, which carried new settlers westward, also carried agricultural products to the South. The New Orleans market was a great one for the Ohio farmers but it was a buyer's market and the Ohio farmer frequently suffered as a result.(31)

The economy of the agricultural south was based upon its two cash crops -- cotton and tobacco. A lively exchange took place between southern markets and northern farmers with food crops, and especially cereals, exchanged for the cash crops of the south. The flatboats, and later, the steamboats, carried wheat, corn, oats, flour, pork, bacon, and whisky, to the down-river market. The cash obtained from these sales bought the manufactured goods of New England and Pennsylvania which could not be had in the trans-Appalachian country.

Great Lakes. Whereas central Ohio prospered by its contacts with the Ohio River and the south, the Great Lakes had little influence upon the area. Columbus was oriented to the south by its transportation facilities. The canal resulted in very little commerce with the north and it was not until the coal-carrying railroads of the 1870's had penetrated

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31 Chester B. Finn, "The Ohio Canals: Public Enterprise on the Frontier," The Ohio State Archaeological and Historical Society Quarterly, Vol. 51, 1942, p. 5.

the north shore that adequate contact was established between the areas. The industrialization of Cleveland and other cities along the northern section of the canal was not due to any relationships with central Ohio but because of their position with respect to Pittsburgh and the western markets.

E. Nature and Extent of Commercial Development

The year 1833 was marked by two events which were destined to play an important role in shaping the commercial growth of Columbus during the following three decades. In this year, the National Road was extended from Zanesville to Columbus and the Ohio and Erie Canal was opened along its full route.

Importance of Commerce. The National Road carried settlers and eastern merchandise into Ohio and it was the route by which commercial freight and livestock reached the eastern markets. Moore gives an account of this activity:

> "From the east there were caravans of wagons, many of them drawn by four and six horses, conveying the products of the shops and mills to the frontier, and from the west they were transporting the products of the fields and farms . . ."(32)

The canal was of far greater commercial importance, however, since Columbus and central Ohio were able to export their agricultural surpluses at a great profit.

The influence of these trade routes upon commercial activities is obvious but they also exerted a strong influence upon population growth. From a town of 700 in 1815, Columbus grew to 2,437 by 1830. This period

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32 Opha Moore, History of Franklin County, Ohio, Topeka, 1930, p. 147.

was one of relatively slow growth characterized by a poorly developed transportation system. However, the city more than doubled in size by 1840 with a population of 6,048. The increase cannot be attributed to manufacturing or urbanization. It is largely a result of the political character of the city and the effects of the canal upon commercial growth.

With an increase in transportation facilities, the movement of new settlers advanced. By 1850, 17,882 persons were permanent residents. This rapid growth did not continue; only 672 persons settled here by 1860. The opening of the west by the railroads was responsible for the relative decline. A lower immigration into Columbus was over-balanced by a greater emigration westward. Such migrations reached their peak in 1857 and a more stable community evolved in the following years.

The Nature and Extent of Commerce on the National Road. The National Road was turned over to state control in 1831 by the Federal Government. Jordan says that ". . . a major part of Columbus' business centered directly and indirectly about emigrant trade." He gives the example of one traveler, with a wagon-load of household goods, who stayed in Columbus only two hours -- long enough to eat, drink, and have a shave. This traveler was no exception, for hundreds more thought of Columbus as a stopping-point only.(33) But while these travelers were here, felloes were tightened, harnesses mended and repaired, horses shod, and local merchandise purchased. The commercial gains were indeed worthwhile.

Tolls -- The tolls were based upon the ". . . injury done the road . . ." and were made for repair purposes. In the 1840's, each

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33 Philip D. Jordan, The National Road, New York, 1948, pp. 126-127.

passenger on a coach was charged ten cents at each toll gate. A score of sheep cost five cents, hogs ten cents, and cattle twenty cents. Individual animals were accounted for as well. A horse and rider paid three cents at each gate and a cart or wagon with two horses paid twenty cents. An additional horse meant an additional charge of ten cents on any haul. These are but a few of the rates for the period 1843-1844.(34) Whereas the Ohio and Erie Canal did a business of $452,122.03, in 1840, the National Road showed tolls of only $51,364.35, since a small percentage of its business was of a commercial nature.(35)

By 1859, the travel on the road was almost entirely local with practically all benefits confined to the local areas. The road fell into disuse and the costs of repair were prohibitive. As railroad activity increased and as the road continued to handle only local trade, the State of Ohio gave up its control and care to the counties through which it ran.

Manufacturing increased only slightly during this period since the National Road and the canal were too slow and inconvenient for the assembling of raw materials for fairly large manufacturing shops and they served no markets which Columbus could furnish with finished products.

The Nature and Extent of Commerce on the Ohio and Erie Canal. Columbus was one of the least important commercial towns on the Ohio canals. Its position, off the through route of the canal, (See Figure 3, Ohio Canal Routes, on page 13.) is a partial explanation of the limited trade in the city, but a further factor is that the city had no large permanent

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34 Eighth Annual Report of the Board of Public Works, Columbus, 1844, pp. 28-30.

35 Fourth Annual Report of the Board of Public Works, Columbus, 1841, pp. 4 and 17.

businesses to create or induce wealth. Newark and Portsmouth both had greater canal trade; Columbus outranked both of them in total tonnage only when the commerce of the National Road was added to that of the canal.

The exports of the canal included the agricultural products of the Scioto Valley. The imports -- merchandise of all sorts, pig iron, castings, wrought iron, and manufactured products -- were purchased in eastern centers. Columbus also obtained salt and coal from southeastern Ohio by way of the canals.

It was only natural that such a movement of goods should occur. Agriculture was the life-blood of Ohio as commerce was of Columbus. In 1842, the state led the nation in wheat production with 25,387,439 bushels. New York ranked second, producing only 11,132,472 bushels. In the same year, Ohio farms produced 39,424,221 bushels of corn and 19,381,035 bushels of oats.(36) These agricultural surpluses gave Ohio the basis of trade with the east. Any loss of agricultural production, and especially wheat, hurt the canal since wheat, the principal staple of the state, formed the basis of the canal trade.

Huntington states that ". . . many of Ohio's most flourishing towns and cities owe their early growth to the fact that they were favorably situated along the canals at places where breaks must occur in transportation, where products were to be shipped or re-shipped, where men must be employed in handling the commodities, where elevators must be

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36 Annual Report of the Commissioners of the Canal Fund, Columbus, 1843, p. 10.

built, and where markets are established."(37) The place of Columbus as a canal town can be ascertained by reference to the table which follows. (See Table I on page 23.) Selected five-year intervals from 1835 to 1878 are sufficient to present a picture of this trade.

Canal tolls — Tolls exceeded $100,000 for the first time, on the Ohio and Erie Canal, in 1833 when $136,555.70, were collected. Within 25 years, they fell below this figure and never were again as large.(38) It was in the decade from 1840 to 1850 that this canal prospered -- tolls in 1847 represented the greatest single year on the canal with $452,530.76.

Through trade on the Ohio and Erie Canal never was large. In 1844, for instance, 11,552,460 pounds of merchandise were shipped out of Cleveland but only 1,476,107 pounds reached Portsmouth.(39) The carrying trade declined until little remained by 1850. With increasing railroad competition, the canal's only service was in the movement of local commodities.

The canal gave central Ohio accessibility to the Ohio River and to Lake Erie. As a result, the prices paid for the produce of central Ohio increased and the prices paid for imported goods dropped, accordingly.

| | Wheat | Corn | Sugar | Coffee |
|---|---|---|---|---|
| 1829 | 50¢ bu. | 25¢ bu. | 9¢ lb. | 15+¢ lb. |
| 1858 | $1.08 bu. | 70¢ bu. | 7¢ lb. | 12¢ lb. |

Not only were the prices higher on domestic goods but the bushel of wheat,

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37 Huntington and Mc Clelland, op. cit., p. 121.

38 The canals operated at a loss from 1856 until the Civil War. After a brief prosperity period, losses again occurred. Ibid., p. 43.

39 Eighth Annual Report of the Board of Public Works, op. cit., p. 5.

TABLE I

"EXHIBIT OF THE AMOUNTS RECEIVED AT THE DIFFERENT OFFICES, BY THE COLLECTORS ON THE CANALS OF THIS STATE FOR TOLLS, FINES, AND WATER RENTS"

| YEAR | CLEVELAND | MASSILON | NEWARK | COLUMBUS | CIRCLEVILLE | CHILLICOTHE | PORTSMOUTH |
|---|---|---|---|---|---|---|---|
| 1835 | $ 68,757.36 | $ 13,518.11 | $ 20,551.87 | $ 4,291.16 | $ 9,870.34 | $ 11,857.92 | $ 22,583.69 |
| 1840 | 86,851.89 | 37,011.71 | 97,877.76 | 15,525.72 | 32,777.31 | 31,613.25 | 33,110.97 |
| 1845 | 62,284.97 | 14,272.02 | 22,153.13 | 7,864.37 | 14,775.31 | 18,564.39 | 25,235.33 |
| 1850 | 90,874.20 | 44,143.74 | 35,975.06 | 12,620.90 | 17,440.28 | 22,669.56 | 32,000.92 |
| 1855 | 43,210.10 | 9,853.90 | 6,474.44 | 4,354.43 | 8,609.83 | 19,157.29 | 12,592.44 |
| 1860 | 16,156.94 | 6,627.76 | 4,061.35 | 4,190.25 | 6,670.93 | 10,753.55 | 5,425.88 |
| 1878 | 12,335.27 | 4,627,64 | 1,200.35 | 1,368.11 | 772.32 | 1,342.12 | 100.12 |

SOURCE: The Annual Reports of the Board of Public Works, Columbus, Ohio. The following years are included in the preparation of this table: 1837, 1841, 1845, 1851, 1856, 1861, and 1879. The year 1878 was used as the final year, since data on the five year intervals between 1860-1380 were missing.

which had doubled in price, bought three times as much goods in 1858.(40)

Commercial Factors in the City Pattern. Columbus continued its slow growth through the canal period with minor increases in manufacturing activity. As the political center of the state, it attracted politicians and firms which catered to the government. As a stopping-point for the migrants heading west, it provided goods and services, and as a canal port, it shipped the agricultural products of the surrounding counties to distant markets. The city became a warehouse center for eastern manufactured products. From this movement of people and products, Columbus developed as a commercial center. Manufacturing, beyond the handicraft stage, was practically unknown.

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40 Huntington and Mc Clelland, op. cit., p. 129.

## II. ANTECEDENTS OF MANUFACTURING IN COLUMBUS

### A. An Analysis of the Forces in Operation up to 1870

Columbus remained ". . . a city of small and varied kinds of industrial establishments . . ." from 1812 until after 1870.(1) There were no large manufacturing plants in the city nor did any one particular type of industry dominate.

During its first 50 years, Columbus was busy with the political and commercial activities that are common to a capital city set in the heart of a productive agricultural country. The artisans and manufacturers who established themselves here did so at first to serve the limited local market, but they increased their production to meet the transient trade.

There were handicaps which retarded the industrialization of the city. While a few of these have continued to the present day, they were temporary, for the most part, and were offset by factors of an enduring nature which attracted industry and led ultimately to the industrialization of this commercial center.

Raw Materials. Despite the lack of mineral raw materials for manufacturing, the enterprising artisan or mechanic who sought to make his home in this frontier town found sufficient resources available to begin the operation of handicraft shops. From the neighboring farms came the wheat for the flour and grist mills and wool for the woolen factories that struggled for existence. Flax-dressing mills and small distilleries en-

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1 Lyder L. Unstad, A Survey of the Industrial and Economic Development in Central Ohio with Special Reference to Columbus, 1797-1872, Dissertation, The Ohio State University, Columbus, 1937, p. 11.

abled farmers to dispose of their flax and grain. Soap and candles were made from animal products, and leather-working shops were established to use the hides. From the hardwood forests that covered central Ohio came ash and hickory for wagons, implements, and tools, and walnut, cherry, maples, and poplar for furniture. The same forests supplied the shops and factories with wood and charcoal for fuel.

Coal and iron ore were known to exist in southeastern Ohio but central Ohio did not immediately benefit from them. It was not until 1829 that John L. Gill, a hardware merchant, brought bituminous coal into Columbus in four four-horse wagons from Nelsonville in Athens County.(2) Columbus' entrepreneurs did not seem to be alert to the advantages inherent in the coal reserves; the bulk passed through the city to the towns and cities of the north and west.

Although the iron ore of southeastern Ohio was the basis of an important charcoal iron industry in Lawrence, Jackson, and Vinton counties, between 1812 and 1870, the early foundries in Columbus depended upon pig iron brought in from Granville. No direct use was made of native ores by Columbus firms until 1870.

Power. Prior to the use of coal and the steam engine, industry had to rely on either water power or animate energy. Neither the Scioto nor the Olentangy rivers had sufficient fall or adequate sites for the development of mills. But even as early as 1813, a number of saw-mills, distilleries, and flour mills had located on the relatively short streams which emptied into the Scioto from the high banks of the river. Most of

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2 Alfred Lee, History of Columbus, Ohio, Columbus, 1892, Vol. 1, p. 373.

the mills depending upon water power, and all of those depending upon animate power, were short-lived. No large manufacturing plant developed before the advent of steampower.

The Ridgway Foundry, which has frequently been called the first successful manufacturing establishment in Columbus, converted to steampower in 1830. In 1831, the first steam saw-mill began operations in the city; from then on, steampower steadily replaced water power in the manufacturing plants of the city.(3)

Markets. Market profoundly influences the character as well as the scale of industry. Until 1870, Columbus manufacturers had a market limited both in extent and value by the farm trade of central Ohio. This kind of market neither attracted large-scale manufacturing nor provided the incentive for firms which sought to produce articles for the national market.

The characteristics of the Columbus market, localized in central Ohio, were an outgrowth, basically, of the original land subdivisions of Ohio. The central Ohio area, made up of 13 counties (4) was comprised of parts of three different surveys: the Virginia Military District, the Congress Lands, and the United States Military Lands. (See Figure 4 which follows and Figure 2 on page 6.) As Howe points out, "The settlers of new commu-

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3 The Columbus Business Directory for 1843-1844, Columbus, 1843, p. 41.

4 This division of counties is taken from Alfred J. Wright, Economic Geography of Ohio, Columbus, 1953, p. 16, Fig. 11. The counties include Highland, Fayette, Madison, and Union in the western tier; Ross, Pickaway, Franklin, Delaware, and Marion in the central tier; and Fairfield, Licking, Knox, and Morrow in the eastern tier.

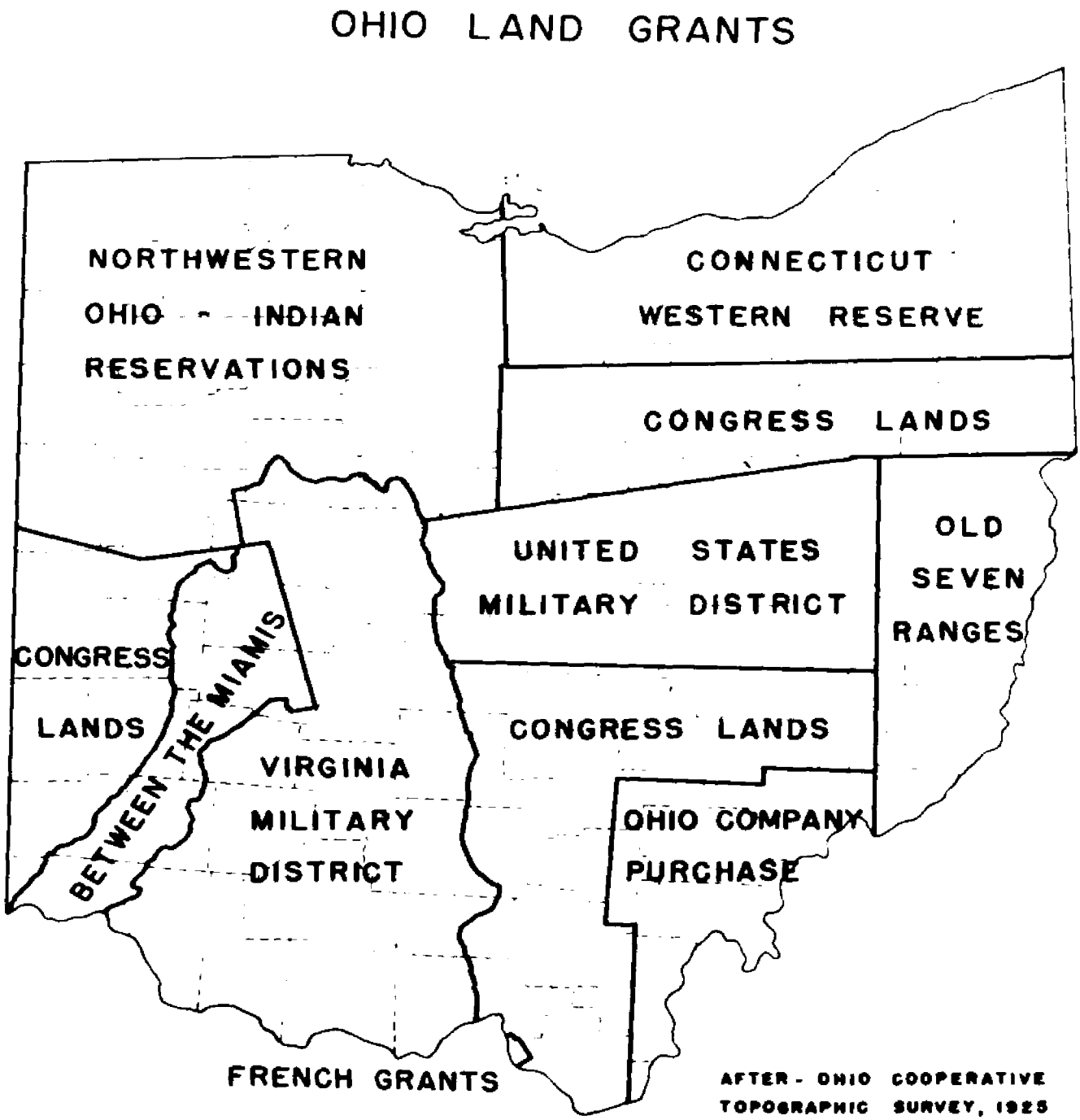
OHIO LAND GRANTS
NORTHWESTERN OHIO - INDIAN RESERVATIONS
CONNECTICUT WESTERN RESERVE
CONGRESS LANDS
UNITED STATES MILITARY DISTRICT
OLD SEVEN RANGES
CONGRESS LANDS
BETWEEN THE MIAMIS
VIRGINIA MILITARY DISTRICT
CONGRESS LANDS
OHIO COMPANY PURCHASE
FRENCH GRANTS
AFTER - OHIO COOPERATIVE TOPOGRAPHIC SURVEY, 1925

Figure 4

nities leave their impress upon the locality long after they are gone."(5) From their "impress" some factors can be derived which help to explain the limited industrial market available to Columbus in this period.

Western counties -- The western tier of counties, all within the Virginia Military District, was settled by Virginians and other southerners who served her armies. Of Highland County, the southernmost, Howe states: "The principal part of the early settlers were from Virginia and North Carolina."(6) The pioneers of Fayette County and Madison County came from Virginia and Kentucky.(7) ". . . Pennsylvania and Virginia had the honor of supplying the first of the pioneers for the southern part of Union County."(8) These were people who had grain and livestock farms such as those found in many parts of the eastern south. Madison County formerly had farms of thousands of acres but these were generally sublet to tenants, most of whom were Irish. In 1880, of those new citizens not Ohio-born, 28 percent in Highland, 35 percent in Fayette, 22 percent in Madison, and 18 percent in Union counties were Virginia-born. The influx of settlers from Pennsylvania was also large and Irish immigrants had increased noticeably.

Central counties -- The central tier of counties is divided by the Scioto River: to the west they are in the Virginia Military District while to the east they are either in Congress Lands or in the United

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5 Henry Howe, Historical Collections of Ohio, Cincinnati, 1898, Vol. 1, p. 125.

6 Ibid., Vol. 1, p. 912.

7 Ibid., Vol. 1, p. 603 and Vol. 2, p. 164.

8 Ibid., Vol. 2, p. 704.

States Military District. (See Figure 4.) These were transitional counties with the southernmost, Ross and Pickaway, characterized by Virginian settlements. The three northern counties were settled by people from the Middle Atlantic and New England states.

A traveler who passed through Pickaway County prior to 1840 noted the striking contrast in land use and tenure between the east and west sections. His comments suggest why Columbus' market was predominantly rural.

> "Within the county, on the west side of the river, is a territory of about 290 square miles, containing a population of 8,376, averaging a fraction less than 30 to the square mile; while the territory on the east side of the river, within the county, embracing only 209 square miles, sustains a population of 11,349, averaging almost 55 to the square mile . . .
> "To an observing traveler passing directly through the county from east to west, the contrast is very striking. While on the one side he finds the lands well improved, with fields of moderate size, well-fenced, with a good barn, and neat dwelling-houses to each adjacent field; on the other, he finds occasionally baronial mansions . . . with rarely a barn, and each field large enough for two or three good farms . . . The prices of the same quality of land on the east side are generally about double those on the west side. A part of this difference . . . results . . . from the different origin of the inhabitants. Those on the east side originated mostly from Pennsylvania; while those on the west side had their origin generally in the more northern slave states." (9)

The western tier of counties is one of the leading livestock areas in the state today. The large farms and sparse population inferred above have dominated. Absentee land-holdings and tenant farmers remain common. The sparse population and the rural market west of the Scioto River did not encourage manufacturing in Columbus.

The central counties reflect their agricultural past. According to

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9 Ibid., Vol. 2, p. 401.

Brown, the most enthusiastic reports of Ohio came from the settlers and migrants who had visited the Pickaway Plains. Settlement was so prompt that much of the area was in agricultural use even in 1806.(10) Columbus suffered by the absence of large urban markets and customers in the Virginia Military District.

Eastern counties -- The counties to the east experienced their greatest growth in the period between 1820 and 1840 when population increased by more than 135 percent. The inhabitants of Licking County came from Pennsylvania, Virginia, New Jersey, New England, Wales, and Germany, and those of Knox County were mainly from the Middle States, with some of New England origin.(11) Similarly, Fairfield and Morrow counties experienced heavy settlement from the east as well as scattered settlement from Virginia. The eastern groups were prominently noted in Licking County where the Welsh, from eastern Pennsylvania, established themselves in Welsh Hills, and settlers from Massachusetts founded Granville. Here, then, the urban dweller of the eastern cities merged with the agriculturist of the south. This sectionalism strangled trade since the people from the opposing areas did not trust the credit or the bank notes of their neighbors. Hence, there was no large outlet for manufactured production -- Columbus continued as a commercial city.

Accessibility to settlement -- This area was relatively inaccessible for settlers prior to the development of the National Road and the Ohio and Erie Canal. Brown states that ". . . the Congress Lands were in-

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10 Ralph H. Brown, Historical Geography of the United States, New York, 1948, p. 204.

11 Howe, op. cit., Vol. 2, p. 65 and Vol. 1, p. 981.

TABLE II

POPULATION INCREASES IN THE COUNTIES

OF CENTRAL OHIO, 1820-1880

| Counties | 1820 | 1840 | % Inc. | 1860 | % Inc. | 1880 | % Inc. |
|---|---|---|---|---|---|---|---|
| WESTERN TIER | | | | | | | |
| Highland | 12,308 | 22,269 | 89 % | 27,773 | 24 % | 30,281 | 9 % |
| Fayette | 6,336 | 10,879 | 71 % | 15,935 | 46 % | 20,364 | 28 % |
| Madison | 4,799 | 9,025 | 88 % | 13,015 | 44 % | 20,129 | 54 % |
| Union | | 8,443 | | 16,507 | 95 % | 22,357 | 35 % |
| | 23,443 | 50,616 | 79 % | 73,230 | 44 % | 93,131 | 27 % |
| CENTRAL TIER | | | | | | | |
| Ross | 20,610 | 27,460 | 33 % | 35,071 | 27 % | 40,307 | 14 % |
| Pickaway | 18,143 | 20,169 | 11 % | 23,469 | 16 % | 27,415 | 16 % |
| Franklin | 10,300 | 24,880 | 141 % | 50,361 | 102 % | 86,882 | 72 % |
| Delaware | 7,639 | 22,060 | 188 % | 23,902 | 8 % | 27,381 | 14 % |
| Marion | | 18,352 | | 15,490 | -15 % | 20,565 | 32 % |
| | 56,692 | 112,921 | 99 % | 148,293 | 31 % | 202,550 | 36 % |
| EASTERN TIER | | | | | | | |
| Fairfield | 16,508 | 31,858 | 92 % | 30,538 | - 4 % | 34,284 | 12 % |
| Licking | 11,861 | 35,096 | 195 % | 37,011 | 5 % | 40,050 | 8 % |
| Knox | 8,326 | 19,584 | 135 % | 27,735 | 41 % | 27,431 | - 1 % |
| Morrow | | | | 20,445 | | 19,072 | - 6 % |
| | 36,695 | 86,583 | 136 % | 115,729 | 33 % | 120,837 | 4 % |

SOURCE: Howe, op. cit. This table was drawn up using data that were accumulated from various sections of Howe's volumes.

ferior to others only in one major particular: their inland position reduced accessibility."(12) The Scioto Valley communities were settled more slowly and at a later date than was the Miami Valley of western Ohio because of this inaccessibility. (See Table II, page 32, for a summary of the population increases in the central Ohio counties.)

Newark was more accessible inter-regionally than Columbus for a time but this advantage disappeared with the improvements in transportation which came about with the expansion of the railway and highway systems. The Scioto Valley, however, did not possess the advantages that were inherent in certain other river valleys. The trading potential of the towns in the middle Miami Valley was enhanced by the earlier-settled Licking River valley of Kentucky, immediately across the Ohio River from Cincinnati. In contrast, the middle Scioto virtually is enclosed with only a narrow valley floor penetrating the hill country of Pike and Scioto counties. The trade territory opposite the mouth of the Scioto is practically sterile. Thus, the market that was to be had by Cincinnati and Dayton had no parallel in the lower Scioto Valley or in the hill country where the Ohio and Scioto rivers meet.

Within a few years after its settlement, Ohio was the leading producer of wheat and corn in the nation and central Ohio was a major grain surplus area. The attitude of the people here was to favor agricultural production and to ignore manufacturing. The advantages gained by the construction of roads and canals favored agriculture. The importance of these routes to manufacturing was not considered for many years.

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12 Brown, op. cit., p. 229.

In addition, Columbus had little real opportunity to compete for markets in industrial products in its first 50 years since the eastern cities needed food but not the mechanical inventions nor manufactures of Ohio.

Transportation. The principal purpose of the inter-regional transportation system which developed in central Ohio was to move agricultural surpluses to market. Inducements for manufacturers did not lay in this direction. The routes by which goods could be transported were too slow and inconvenient to assemble the raw materials needed for industrial operations of a sizeable nature. It was more economical to ship finished manufactured goods than to transport the necessary materials for industry into Ohio.

The canal, which was the principal means of transportation between 1830 and 1850, provided Columbus, off the main route, with a limited exchange of goods and with little contact with other urban areas.

The railroads which entered Columbus after 1850 did not relieve this. They brought the city commerce with farm communities but they did not link it to other industrial communities. Contemporary thought emphasized this: "The railroads bring the farmers so near to the eastern cities that they are not much dependent on their neighboring towns or cities for markets for their production. The capital of the towns and cities principally made the railroads — the farmer profits by them."(13)

The opening of the Hocking Valley -- It was not until 1869 that railroads penetrated the Hocking Valley coal reserves. The construction of the Hocking Valley Railroad was discussed first in 1857 but the road was

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13 William T. Martin, History of Franklin County, Columbus, 1858, p. 55.

not chartered until 1867. In August of that year, the first train passed through Columbus bound for Chicago with 15 cars of the coal which had spurred the development of the road. The line was soon extended to Toledo on Lake Erie. Later a southern branch reached the Ohio River.

The interests of the railroads and of Columbus in the Hocking Valley were reciprocal. The demand for coal from such points as Cleveland, Toledo, and Chicago, created in Columbus a growing through commerce and it was hoped that coal, cheaply shipped to Columbus, would make the city an important iron and steel center when used in conjunction with Ohio iron ores. These hopes did not materialize. The bulk of the coal trade remained as through trade and the iron ore was never much used. A fine railroad network grew out of Columbus, however, and created a jobbing trade of considerable importance.

Capital and Initiative. Among the prominent citizens of Columbus were men with money to invest, but few of them saw the advantages to be gained from investment in industry. Their interests were in land speculation and in transportation. The Columbus Gazette noted, in 1857, that ". . . every dollar that can be spared, aye, and borrowed too, goes into the purchase of lands, that are to lie idle long years . . ."(14) Much local capital was also tied up in the Ohio Stage Company and, after its collapse, in the railroads. Columbus businessmen apparently were not speculative. ". . . tempering the enterprise, energy, and magnitude of the business interests of Columbus is a sort of old-time conservatism." Consequently, capital was "cautious" and "steady" and the conservatism

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14 The Columbus Gazette, February 13, 1857, p. 2, col. 1.

that Howe recognized has continued to the present day.(15)

Small shops with limited capital dominated the city's manufacturing until after 1870. No large-scale operations could be undertaken without capital but men with initiative and inventive genius achieved success on their own merits. The newspaper editorialists believed that industrialization was possible if capitalists would invest.(16) In 1854, one of the first incorporated organizations in the city was founded, the Columbus Machine and Manufacturing Company. Prior to this, every industrial firm was owned and operated independently.

Of the city's newspapers, The Columbus Gazette was most concerned about the lack of manufacturing enterprise. An editorial in September 1858 considered the advantages of Columbus but pointed out that the lack of interest on the part of local capitalists had cost the city many new plants that subsequently went to Dayton, Springfield, Cincinnati, or other Ohio cities. Furthermore, skilled mechanics were lost for lack of work and the principal use made of the railroads ". . . is to gape at the immense traffic which daily passes through the depots, and wonder why people go abroad to buy . . ."(17)

Opposition to Manufacturing. Opposition to manufacturing has been a passive influence in the industrial growth of the city but it has persisted from the early 1800's to the present day, in some quarters. It has taken the form of opposition from the citizenry, disinterest by the capi-

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15 Howe, op. cit., p. 622.

16 The Columbus Gazette, June 11, 1858, p. 2, col. 2.

17 The Columbus Gazette, September 17, 1858, p. 2, col. 1.

talists in manufacturing ventures, and sectional opposition on the part of the State Legislature.

Columbus was, first of all, a political center. Manufacturing not tied directly to the immediate demands of the community usually met with some opposition. On the other hand, it was natural that commerce should develop with agriculture dominating the surrounding countryside; and with the crossroads pattern formed in 1833, the natural trading activities inherent in such a situation were accepted by the residents.

The leading capitalists hoped to reap a profit from trade and from land sales to new settlers who arrived in the city in increasing numbers in the middle 1800's. They were unwilling to risk the uncertainties and low initial returns of manufacturing.

Some of these men controlled the Ohio Stage Company which continued to operate until 1852. They, and the men who supplied them with equipment, actively opposed the railroads in the 1840's and 1850's. Most writers agree that the late arrival of railroads into Columbus can be attributed to their opposition. Only when outside capital invested in the railroads did the city secure the facilities it needed. Local business men were unwilling to back roads that might be through roads only: they wanted the business common to a terminus or junction point.

Those industries dependent upon the services of railroads were handicapped by this delay. Firms which would have been attracted to central Ohio because of the accessibility to coal and iron ore in the southeast either failed to materialize or they were established elsewhere.

The influence of the State government upon the growth of manufacturing in Columbus has been both beneficial and detrimental. The presence

of the capitol and other state institutions ". . . gave impetus to . . . business." But because of the strong sectionalism of the legislature, they ". . . retarded progress in an almost equal degree. They excited a jealousy and a prejudice against her (Columbus), as though she were a parasite living and growing at the expense of the rest of the State."(18)

A few firms expanded their operations because of government contracts but this was not common. Printing firms, binderies, and blank-book publishers found the city an excellent location, of course. The sectional interests in the legislature have demanded, from time to time, an equal distribution of expenditures among all parts of Ohio. Thus, Columbus' manufacturers receive no more consideration than others. What may appear to be an advantage in location has actually had very little influence on the development of industry.

Labor. An absence of a skilled labor force has handicapped manufacturing. On the other hand, an available and stable supply of semiskilled and unskilled labor has rarely been missing. Consequently, low-wage labor has been a major attraction to industry.

A few skilled mechanics and artisans settled here in the early 1800's and their numbers increased by the late 1820's. Artisans from eastern cities migrated westward as the result of economic depressions in these years. Many stayed here and organized handicraft shops. In such a way, Columbus began to accumulate the basic skills for manufacturing.

There was an influx of skilled workers in the 1840's when many Ger-

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18 Jacob H. Studer, Columbus, Ohio: Its History, Resources, and Progress, Columbus, 1873, pp. 565-566.

man immigrants made their way into central Ohio. The result was the establishment of new manufacturing activities and the enlargement of other operations. Prior to these two migrations, farm people from the south and east had settled here. (See pages 27 to 34, in part.)

The German workers occupied the southern part of the city, and their small, but neat, story-and-a-half brick homes and well-kept gardens still characterize parts of South Columbus. (See the photograph which follows.) The German laborer represented part of a labor force that was trained and reliable. These workers are known to have attracted plants to the southern section of the city.(19)

The absence of skilled workers naturally resulted in a lower average wage being paid in Columbus. In addition, the large number of salaried workers on the government payrolls were also low-wage earners. The effect of government institutions has been to create and maintain such a force. From time to time, this factor has attracted manufacturers to the city.

An abundance of female labor has proved to be an incentive to certain companies. The shoe, textile, and casket firms were able to employ a good working force at wages well below those in other areas. The surplus female labor could be used only in industries where light work, dexterity, or female skills were involved.

One other feature of the labor force was the availability of rural workers. In this case, the rural laborers formed an untrained but cheap and stable supply. Columbus was without competition for this labor.

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19 The influence of the German force has waned but many firms now in operation in South Columbus indicate that it was one of the principal factors influencing their choice of site in the city.

H.L.H.

TYPICAL GERMAN HOMES IN SOUTH COLUMBUS

The Ohio Penitentiary — A last factor, and an important one, which contributed to the low-wage rate which prevailed in Columbus is the Ohio Penitentiary. The Penitentiary has been one of the most controversial operations in the city's industrial history. It has been both an advantage and a handicap to manufacturing. It attracted some manufacturing to the city but it hindered the free labor of the city. It was this latter group which opposed the continued use of convict labor for manufacturing purposes.

The Ohio Penitentiary was built in 1815 by the same men who laid out the city and erected the capitol. Its workers produced copper wares, hoes, axes, chains, and nails, among other things, as early as 1817. The goods were sold in the city and the return from the sale was used to pay the warden's salary and to operate the institution. The majority of the citizens and the legislature favored this program which attempted to make the institution self-sufficient.

It was, however, a serious problem confronting the workers. The larger companies could employ prison labor under contract at wages of 37 1/2 to 50 cents a day.(20) With more than 300 workers employed at such wages, the position of the free laborer was jeopardized. While there was strong opposition to the continued use of contract labor by the free workers and, later, by other manufacturers, it continued for a century.

Without a doubt, many capable free men left the city because of this discrimination. Because of its immediate benefits to the individual manufacturer and to the tax-paying citizen, the system was upheld. Growing

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20 Unstad, op. cit., p. 479.

disfavor to the system adversely affected industrial growth in the city.

Competition in Central Ohio. Columbus stands alone in central Ohio. The city has no near competition for labor or markets. (See Figure 9, Trade Areas and Trade Routes of Columbus, Ohio, on page 237.) Within limits, this has promoted commerce and manufacturing.

The influence of the city has been greatest toward the south and the southeast. Whereas competition among the cities of the Miami Valley occurred in many lines of endeavor, Columbus has experienced no challenge by a city in all of the Scioto Valley or in the hill country to the east. To the west, competition is stronger as Springfield and Dayton limit the extent of Columbus' trade and, to the north, the Cleveland industrial market is extensive and limiting.

The sales territory of Columbus goes beyond the Ohio River into West Virginia. This wide area looks to Columbus for markets, for trade, and for employment today, as it did when the first railroad lines from central Ohio penetrated it.(21) Columbus turned naturally to the southeast when coal and iron were discovered there. Strong relations did not develop, however, until after 1870 when the railroads were built. Columbus made an initial impression that has not been dissipated. This penetration has given the city a marked advantage over its rivals in trade.

## B. Summary of Manufacturing, 1812-1870

1812-1835. As might be expected, ". . . manufacturing in a small way and of the most primitive kind dates back almost to the first settle-

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21 Labor from this area has been part of the labor pool that has attracted large branch plants to Columbus.

ment . . . there were mills for grinding the grain and for cutting logs."(22) These first shops were organized more out of necessity to serve the community than as profit-making ventures. By 1817, handicraft shops had increased in number and watches, compasses, and surveying instruments were made. In response to the activity of the state government, a book bindery was opened. The farm products found uses in the shops, breweries, wool-carding mills, and blending mills.

The requirements of the farmers for tools, agricultural implements, and household items were reflected in the growth of small metal-working concerns. The Columbus Foundry of Joseph Ridgway & Company began operations in 1822. "The principal article of manufacture was Jethro Wood's patent plow of which he (Ridgway) made and sold an immense number. It was considered the best plow in use."(23) The plow was not cast in one piece but had interchangeable parts which could be substituted in the field. It was one of the first examples of the application of the principle of standardization and interchangeability of parts in agricultural machinery.(24)

The first carriage and wagon shop began operations prior to 1819 and used native hardwoods. Three years later, another shop was in operation and, by 1828, J. S. White was prepared ". . . to make all kinds of coaches, wagons, hacks, and gigs. He made coaches for the Ohio Stage Com-

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22 Osman C. Hooper, History of the City of Columbus, Ohio, Columbus, 1920, p. 219.

23 Martin, op. cit., p. 429.

24 P. W. Bidwell and J. I. Falconer, History of Agriculture in the Northern United States, 1620-1860, Washington, 1925, pp. 209-210.

pany and may be considered the pioneer in the great carriage-making industry . . ." of Columbus.(25) Other firms made saddles, harnesses, chairs, and wheels for this growing industry which aptly reflected the commercial importance of the city at a natural intersection of trade routes.

Blacksmith shops were an integral part of the community and there were copper, tin, and iron smiths dependent upon Baltimore for raw materials. Rope, leather, furniture, and edge tools for agriculture and manufacturing were made. In 1827, Gill and Greer came here from Pittsburgh and opened a sheet metal shop and foundry. This became the Franklin Foundry, of later importance. In the same year, the Ohio Penitentiary, which had already gained a reputation as the largest manufacturing unit in the city, brought out a "new patent plough" in competition with Ridgway's plow but it did not last long.

The principal handicaps to increased industrialization at this time appeared to be the limitations of capital and the absence of manufacturing experience. Steam power was introduced to replace the inadequate power that had handicapped the operation of flour and textile mills. With an enlarged local market and reliance upon agricultural raw materials, the small shops succeeded.

1835-1845. The foundry of Gill and Greer expanded considerably in 1838 when it began the production of stoves, plows, and mill irons. "Corn shellers, trashing machines, and clover machines" were invented or improved upon by local firms and these products reached an expanding market. Papermaking, soap and candle production, and the manufacture of a variety of

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25 Hooper, op. cit., p. 219.

TABLE III

MANUFACTURING IN FRANKLIN COUNTY, 1820

| Articles | Value | Raw Materials | Quantity | Employees | Capital |
|---|---|---|---|---|---|
| Boards & scantling | $ 1,770 | Logs | | 2 | $ 1,700 |
| Boots & shoes | $ 5,376 | Leather, upper & sole | | 28 | |
| Broadcloths, cassimeres, sattinets, etc. | $12,000 | Wool and cotton | 7,500 lbs. W<br>250 lbs. C | 12 | $16,000 |
| Flour | $ - | Wheat, corn, rye | 26,640 bus. | 3 | $18,200 |
| Furniture, cabinet | $ 500 | Cherry, walnut bds. | | 1 | $ 75 |
| Hogsheads, barrels, tubs | $ 1,500 | Lumber | | 8 | $ 600 |
| Leather | $ 9,060 | Hides, skins, bark | | 5 | $12,500 |
| Nails cut, farming utensils | $19,000 | Iron nail rods | 40 tons | 26 | $ 2,200 |
| Saddles and bridles | $ 6,200 | Leather, hardware | | 3 | $ 2,800 |
| Whiskey | $13,825 | Corn, rye, barley | 13,330 bus. | 11 | |
| Wool, carded | $ - | Wool | 4,500 lbs. | 1 | $ 750 |

SOURCE: Digest of Accounts of Manufacturing Establishments in the United States and of Their Manufactures, Washington, 1823. (Facsimile reproduction of the original.)

household goods increased. The Hayden iron works were large -- employing more than 100 -- but the majority of this force was prison labor and Hayden's success was attributed to the low wages paid to these men.(26) The use of prison labor was a real problem to the free workers of the city and it continued so for many years.

1845-1860. Ridgway's Columbus Foundry began the manufacture of steam engines in 1848. A year later a "car factory" was built to produce railroad rolling stock. Without Ridgway's interest and enterprise these shops probably would have gone to Cincinnati. The company was successful in all of its ventures but with the death of Joseph Ridgway it was sold to Peter Hayden in 1854. Hayden had a business by then employing more than 200, most of whom were convicts, in the manufacture of saddletrees and coach hardware. The "Birmingham Works" of the company produced iron bars and rods. Operations expanded in 1857 to include the Columbus Iron Works in which wire, wire cloth (screen), pumps, springs, and axles were made. It was one of the largest concerns in the city. Coal from southern Ohio and local scrap were utilized in its operations.

The Franklin Foundry of Gill and Greer continued to expand. In 1855 a steel plow was introduced and by 1858 more than 4,000 of these were being sold in a year's time. Other foundries made goods for the home, farm, and industry.

Three tool companies organized between 1850 and 1851. "The Ohio Tool Company, incorporated in 1851, with a capital stock of $190,000 . . ." employed 200 in the manufacture of carpenter's planes. It was one of the

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26 Unstad, op. cit., pp. 262-264, for information on the above section.

first incorporated plants in the city.(27) The Ohlen, Drake Company, later Ohlen and Bishop, and now the Rockwell Tool Company, was then manufacturing quality saws.

The carriage industry continued to grow although railroad competition threatened its success. The boot and shoe industry grew and employed approximately 200 in 1849. The ordinary shops producing anything from copper and tin ware to furniture were numerous.

Civil War Period. The Civil War was the first national conflict to affect Columbus. As an army center with camps and prisons, manufacturing, trade, and business in general, increased in the city. Few important concerns actually began functioning during the war but the expansion of established firms was common. Metal and machine shops increased. The M. C. Lilley Company, bookbinders at the out-set of the war, emerged as manufacturers of regalia in 1865. The Columbus Bolt Works grew to a place of importance, too. The city began to think and act more like an industrial town as the impetus of the war caused it to consolidate its activities on a solid basis.

Summary. Columbus was not an industrial community in its first 50 years. Commercial activities, resulting from the agricultural productivity of the Scioto Valley, over-shadowed manufacturing. "A new industrial system" was said to have been established at the end of the war but Columbus awaited the inter-regional railroads for its first burst of true industrialization and the latter quarter of the nineteenth century witnessed this.

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27 Hooper, op. cit., p. 220.

## III. THE WIDENING INDUSTRIAL HORIZON: 1870-1952

For a period of 60 years Columbus was restricted to the immediate region, but the sphere of its economic development widened as accessibility was increased. "After 1870 Columbus began to grow in a way that threw all former progress into the shade."(1) The prime reason for this rejuvenation was the expanded railroad facilities which brought Columbus into contact with southeastern Ohio and with the coal, iron ore, and timber resources of the area. It was the first time local manufacturers were able to utilize native raw materials and the city's position with respect to these materials led outside interests to situate here. Through these contacts with the southeast, an important market was also maintained.

### A. Factors in the Industrial Evolution from 1870 to 1900

Population Growth. Between 1812 and 1900, the population of Columbus increased from a handful to 125,000. In the first 30 years, the percentage growth was great but the numerical increase was small. The movement of a number of farm settlers from the seaboard states was responsible for much of this.

The increase remained steady until the decade 1850-1860, when the city gained only 672 persons. Railroads had opened the lands of Iowa, Missouri, and Kansas to the eastern settler and the trans-Mississippi migration was on. Columbus lost many of its own residents and did not re-

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1 Columbus: The Hub of Ohio, The Ohio State Journal, Columbus, 1890, p. 12.

ceive many new settlers.

Following the Civil War and a short-lived boom, the city reached a population of 31,274 by 1870 and of 51,657 in 1880, when it ranked as the thirty-third largest city in the nation. Between 1880 and 1890, when Columbus showed an increase of 70.6 percent, the State of Ohio had an increase of under 15 percent.

TABLE IV

POPULATION GROWTH IN COLUMBUS, OHIO: 1820-1910

| Date | Population | % Increase |
|---|---|---|
| 1820 | 1,450 | |
| 1830 | 2,435 | 67.9% |
| 1840 | 6,048 | 148.3% |
| 1850 | 17,882 | 195.6% |
| 1860 | 18,554 | 3.7% |
| 1870 | 31,274 | 68.5% |
| 1880 | 51,647 | 65.1% |
| 1890 | 88,150 | 70.6% |
| 1900 | 125,560 | 42.4% |
| 1910 | 181,511 | 44.6% |

SOURCE: United States Census Reports, 1860-1910, Washington, 1864-1913.

Native-born population — The percentage of native-born persons in Columbus has always been high. This fact has been used for many years in promotional literature by the Board of Trade, the Chamber of Commerce, and the newspapers, in efforts to attract industry. In 1880, about 82 percent of the people were native-born and this proportion increased to

more than 90 percent by 1900.(2) Only Springfield had a higher percentage of native-born in the state. The problem of a "troublesome foreign element" was not present here as it was in Cincinnati and Cleveland.(3)

Negroes have lived here since the early 1800's but their numbers have been small. In 1900, they accounted for less than seven percent of the total population of the city.

An increasing number of persons engaged in some type of manufacturing in Columbus in the last 30 years of the nineteenth century. In 1870, about 5,150 persons were employed in manufacturing and, in 1900, about 17,060 were so employed. At no time, however, did the worker employment in Columbus compare with that of Cincinnati or Cleveland.

Railroad Expansion. The railroad is an industry as well as a form of transportation. Its expansion in central Ohio was one of the principal factors in the growth of Columbus after 1870. It provided the city with accessibility to the resources of southeastern Ohio and the markets of the nation, with opportunity for investment, and with employment.

The Hocking Valley Railroad -- In the decade prior to the Civil War, Columbus was a terminal for a north-south and an east-west railroad. The Ohio and Erie Canal remained important and the stage coach had not yet lost its fight to the railroads. But by July 1870, the Hocking Valley Railroad reached Athens, Ohio, and the resources of the southeastern section of the state. With railroads exclusively tributary to it and controlled by local capital, Columbus entered a new "era."

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2 United States Census Reports, 1880-1900, Washington, 1883-1901.

3 In 1900, approximately 82 percent of Cincinnati's population was native-born but in Cleveland, less than 68 percent were native-born.

The coal deposits of the Hocking Valley immediately interested the commercial groups in the city. Within a few years, Columbus merchants were doing more business, in supplies, with the Hocking Valley than with any other section of Ohio. The income for the railroad, in 1872, two years after it opened, was as follows:

| | |
|---|---|
| Coal freight | $594,000.00 |
| Other freight | $142,000.00 |
| Passengers | $110,000.00 |

Other roads -- Other roads were subscribed to locally to supplement the activities of the Hocking Valley road. The Columbus & Ferrara, backed by local capital, was to connect Columbus with the coal and iron fields of Perry County. A railroad from Columbus to Portsmouth and one north to Toledo were vigorously supported. The former, the Scioto Valley and New England, reached Chillicothe in 1876 and was extended to Portsmouth the following year. Its principal freight was lumber but tonnage in iron ore and pig iron was heavy. The Columbus & Toledo, completed in 1877, carried coal to Lake Erie. All of this railway activity added a new incentive to the manufacturing interests of Columbus.

In addition to the local roads, Studer credits the Baltimore & Ohio road with opening up central Ohio. It tied Columbus with Baltimore, New York, and Philadelphia. ". . . For some years, it held the key to this splendid western country, inducing emigration to, and settlement in Columbus, its terminal western point, thereby contributing largely to the prosperity and wealth of the city."(4)

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4 Jacob H. Studer, Columbus, Ohio: Its History, Resources, and Progress, Columbus, 1873, p. 489.

Columbus trade — By 1887, the railroad interests in Columbus had a business capital of about $150,000,000. The exploitation of the resources benefited the city not only directly but indirectly through the transportation of coal, especially, to other parts of the country. Columbus could not use the full production of the mines: a great amount of coal was shipped to Cleveland, Toledo, and Chicago, as well as to smaller communities.(5

The railroads gave impetus to increased trade and commerce and, in turn, created investment possibilities for local and foreign capital. The city became a jobbing center. In 1885, there were more than 67 firms engaged in wholesale trade; hardware, groceries, saddlery, furniture, dry goods, boots, shoes, and the like, were sold in mining communities. Columbus, with no rivals for this trade, experienced rapid commercial development between 1880 and 1890, and the amount of tonnage in freight in the city was greater than for any other city of similar size.

The Board of Trade enthusiastically stated that ". . . the business man and manufacturer find the success of their enterprises unexcelled . . ." with 15 rail lines entering the city by 1890. Railroad shops were here too. The Pennsylvania Railroad had its second largest shops here and all of the offices of the Hocking Valley Railroad were in Columbus.(6)

Coal. Coal was the cause of the rapid increase in railroad facilities after 1870. In turn, the mining communities gave Columbus its first large export market. Industries expanded and the trade that developed

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5 The Industries of Columbus: A Resume of the Mercantile and Manufacturing Progress of the Capital City of Ohio, Columbus, 1887, p. 20.

6 Annual Report of the Directors and Secretary of the Columbus Board of Trade for 1890, Columbus, 1891, p. 59.

has persisted to the present day. (Refer to Figure 9, page 237.)

Ever since John Gill brought coal to Columbus from Nelsonville in 1829, it has influenced the economic growth of the city. The coal, easily mined, seemingly inexhaustible, and of good quality, was delivered in the city by cheap rail transportation.

The coal fields were controlled, for the most part, by local capitalists. The Hocking Coal and Iron Company, a Columbus-owned organization, was the largest company. It employed approximately 3,000 of the total of 10,000 at work in the fields in 1887. There were more than 55 retail coal dealers in Columbus at this time.

Through trade — There was considerable difference between the tonnage which passed through the city and that which remained for local consumption. (See Table V, following.) Columbus was already a center for

TABLE V

THROUGH TRADE IN COAL

| Tonnage Carried by Railroads | Date | Tonnage Remaining in City |
|---|---|---|
| 3,899,331 tons | 1888 | 405,446 tons |
| 3,826,813 tons | 1889 | 396,535 tons |
| 4,455,122 tons | 1890 | 378,025 tons |

SOURCE: Annual Report of the Directors and Secretary of the Columbus Board of Trade for 1890, Columbus, 1891, p. 59.

the coal-hauling roads. The Hocking Valley, the Ohio Central, the Baltimore & Ohio, and the Panhandle were the principal coal-hauling lines.

Iron Ore. From the time of the first charcoal furnaces in southern Ohio, which utilized native ores, until the introduction of the higher quality Lake Superior ores, the development of an iron and steel industry was anticipated by enthusiastic Columbus citizens. It was not until after

1870 that a blast furnace was erected here but the coal and iron ore served the larger purpose of attracting rolling mills and foundries to Columbus.

Local capital controlled 15 extensive furnaces with an annual capacity of at least 200,000 tons in the Hanging Rock iron district of southern Ohio.(7) These charcoal furnaces had developed because the forest products, iron ores, and limestone were available. They remained competitive until the twentieth century; the last furnace closed in 1916.(8)

It was believed locally that ironmasters in the Columbus district could produce iron as cheaply as anywhere else in the country. Optimism was high in 1873:

> "A new impetus was given to the manufacturing industries of the city by the establishment of the blast furnace of the Columbus Iron Company in the year 1870 . . . The location of this furnace in our city soon induced our own and foreign capitalists to invest in various other manufacturing enterprises into which the consumption of iron entered . . . Rolling mills, foundries, furnaces, pipe works, etc., are springing up."(9)

Such enthusiastic hopes did not materialize but the city did experience increased industrial growth, partly dependent upon its location adjacent to the iron mines.

Natural Gas. Natural gas attracts industry to its source. The discovery and utilization of natural gas from the fields of Hocking and Knox counties influenced industrialization in Columbus in the last decade of the nineteenth century.

The Columbus Natural Gas Company was organized in 1886 to pipe the

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7 The Industries of Columbus, op. cit., p. 19.

8 Alfred J. Wright, Economic Geography of Ohio, Columbus, 1953, p. 154.

9 Henry M. Failing, First Report of the Business and Prospects of the City of Columbus, Columbus, 1873, p. 5.

gas from the eastern fields to Columbus. The Board of Trade, in 1891, noted that the ". . . striking of natural gas wells the past year within easy reach of the city, has added an impetus to manufacturing pursuits . . . natural gas is being used as fuel, both for domestic and manufacturing purposes . . ."(10) Perhaps most affected by the use of gas in manufacturing were the glass firms of the state. Many moved to Columbus but, of these older companies, only the Federal Glass Company remains.

With the industrial use of natural gas, Columbus anticipated enlarged manufacturing activity. The new fuel, together with coal and iron ore, gave the city a combination of resources for manufacturing such as it had never previously known.

Lumber. The lumber resources of southeastern Ohio influenced local manufacturing in the nineteenth century but they are of little significance today. Lumber was one of the principal exports of the southern counties and it played a major role in their economies.

More than 1,500 workers were engaged in the lumber industry of Columbus in 1887. It was estimated that no industry had so increased in importance in the preceding decade. The Ohio State Journal observed that ". . . Columbus (in the 1890's) is becoming one of the great hardwood lumber markets in the country."(11) It was one of the principal items shipped by the Scioto Valley and New England Railroad, which had one of its terminal points in Columbus.

New manufacturing plants came to the city to make use of these lum-

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10 Annual Report of the Directors and Secretary of the Columbus Board of Trade for 1890, op. cit., p. 62.

11 Columbus: The Hub of Ohio, op. cit., p. 22.

ber resources. The great carriage and wagon industry used the wooden products of wheelwrights and manufacturers of bent-wood items. With the location of these parts suppliers in the city, Columbus became a center for this industry. Showcase manufacturing plants became prominent towards the end of the century and furniture plants were always present. Each of the wood-consuming plants, tended to strengthen the bonds between Columbus and central Ohio.

## B. Industrialization, 1870-1900

The years 1870-1900 saw the first real growth of industries in Columbus. The manufacturing firms that were established during these years followed one of three lines of development: (a) they were a continuation of the types of manufacturing industries that had been established previously, (b) they were new firms based upon the increased importance of Columbus as a transportation center, or (c) they were firms which owed their existence to the development of the native natural resources.

The first group included those companies which used the raw materials of the limited local environment and satisfied a market in the central Ohio area. These organizations -- machine shops, foundries, tool shops, and the like -- had their origins in previous periods; their continuation must be regarded as a sign of their earlier success.

Those industries whose development was based upon the contemporary transportation systems were the first to give Columbus a national name as a manufacturing center. Carriage and wagon shops, coupled with the small supply shops that made seats, wheels, dashes, and bent-wood products, gave the city a reputation as a leading carriage center. For the rail-

roads, local firms produced iron rails, railroad cars, and equipment for passenger and freight service. Columbus had the shops and repair yards of a number of large railroads.

The third group of firms was established as a consequence of the development of the natural resources of southeastern Ohio. Coal was responsible for attracting companies which needed power. Because of the iron ores, heavy steel products were made and large engineering and foundry operations emerged. To meet the specific needs of the mining industry, inventive genius and capital responded.

1870-1880. In this decade, the shops of the local craftsmen dominated the industrial structure of the city although they were not large concerns. The Columbus Car and Wheel Works, which appeared to be the biggest establishment, employed about 400 and used more than 9,000 tons of pig metal and 1,800 tons of wrought-iron in its operations in 1872.(12) Its growth was due directly to the expanded railroad facilities in central Ohio.

The foundries and iron shops of earlier days remained active. The Columbus Bolt Works grew to a place of prominence with the coming of the carriage industry and the Ohlen Saw Company continued to prosper. The Franklin Iron Company, with a large blast furnace, yielded about 50 tons of pig iron daily. With the manufacture of iron and steel finally accomplished, the value of the coal and iron ore resources in the neighboring counties was realized.

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12 Lyder L. Unstad, A Survey of the Industrial and Economic Development in Central Ohio With Special Reference to Columbus, 1797-1872, Dissertation, The Ohio State University, Columbus, 1937, p. 406.

It now seems odd that the rise of the agricultural implement manufacturing industry had so little direct effect upon Columbus' manufacturing but the agricultural "revolution" that struck Ohio in the middle of the nineteenth century almost completely missed Columbus. There were but two implement manufacturers in the city in 1872: the industry was not as important as the location and resources of central Ohio might seem to justify. The successful operations of the Ridgway shop and of other implement shops of an earlier period were not duplicated. Consequently, the city lost the manufacturing experience that was Springfield's and Cincinnati's. A skilled working force that might have resulted from such an industry did not materialize to benefit later industries.

Columbus did profit by the transportation "revolution" that occurred in the 1870's and continued until the 1900's. Two results were the establishment of the carriage and wagon industry and the growth of the Columbus Rolling Mill Company which produced more than 100 tons of rail per day. The firms engaged in producing materials for the railroad industry, included with the supply firms, had the largest capital investment of any industry in the city with more than one million dollars by 1873.(13)

The peak in the carriage industry was not reached until the following decade but new plants came here as the industry continually moved towards the central states from the east. The reasons were many: ". . . land is cheaper . . . suitable lumber is abundant and prices favorable and . . . the developed railroad systems afford abundant means of transportation." By the later 1870's, local products were reaching the

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13 Failing, op. cit., pp. 6-8.

national market.(14)

By 1887, there were 18 companies employing about 3,000 workers in the city; Columbus led the nation in the production of high-class carriages. The Columbus Buggy Company, organied in 1875 but an outgrowth of an older firm, was the largest in the city. It was here that mass production of carriages took place with assembly-line techniques in vogue -- one buggy was made every eight mimutes. About 1,100 men were employed in this plant and more than $2,000,000 worth of goods was sold in 1890.(15)

1880-1890. The Columbus Board of Trade actively encouraged new companies to locate here. Competitive cities were attracting firms while Columbus failed because these other cities would sponsor industry. The Columbus Board believed that it ". . . should extend every courtesy and encouragement to parties seeking a location in our city . . . but measures contemplating financial aid . . . are impracticable."(16)

Local initiative and capital were responsible for the development of two firms whose histories are now synonomous with the city's growth. In 1877, the Lechner Manufacturing Company (now Jeffrey Manufacturing) began the production of coal-mining machinery and rotary drills for the coal industry market in Ohio. Four years later, the Kilbourne & Jacobs Company was organized.

The iron industry was a leading one but the Columbus Rolling Mill was

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14 B. Frank Miller, "The Carriage and Wagon Industry," Columbus Manufactures, Unpublished material, Columbus, 1906, pp. 4-7.

15 Osman C. Hooper, History of the City of Columbus, Ohio, Columbus, 1920, p. 221.

16 Annual Report of the Directors and Secretary of the Columbus Board of Trade for 1890, op. cit., p. 5.

forced to close its operations in 1884. When the change from iron to steel rails took place, the company could not obtain the necessary raw materials and the business "languished." Foundry products, structural steel, railroad cars and castings, anvils, bolts, and other items continued important, however.

The boot and shoe industry, basically a local one, expanded its operations and entered national competition for markets and raw materials. This "revitalized" action was due, in large part, to the emergence of the H. C. Godman Company as one of the major shoe companies in the nation. Columbus was soon recognized as a leading shoe center in the mid-west.

1890-1900. With the enlargement of the national scope of local companies, Columbus began the slow process of maturation as it became a part of the manufacturing economy of the nation. There were more than 900 factories in the city making everything from carriages and foundry products to jewelry and watches. While enlarging the national market, local industry remained stable and diversified.

Columbus supported a large foundry industry although not on a level with that industry in Cincinnati and Cleveland. An early survey showed that the major advantage for the foundries in Columbus was the excellent transportation system. A reasonable freight rate gave the manufacturer a wide market for his castings. Skilled foundry labor was available here and at low wages -- wages much lower than those paid at competitive points.

| | | | |
|---|---|---|---|
| Columbus | $535.00 (yearly wage) | Pittsburgh | $561.00 |
| Cincinnati | $537.00 | Chicago | $564.00 |
| Dayton | $539.50 | Cleveland | $566.00 (17) |

17 Alvin Ketcham, "The Foundry and Machine Shop Industry in Columbus," Columbus Manufactures, Unpublished material, Columbus, 1906, pp. 18-19.

What is now the Buckeye Steel Castings Company was organized in 1886 and the Columbus Steel Works and Furnaces of Carnegie Steel were built in 1894-1895. The Works had an annual capacity of 160,000 tons.(18) These firms responded to the combination of raw materials and market when they located in Columbus.

The A. K. Rarig Engineering Company, manufacturer of steam engines, compressors, pumps, and other products, was brought to the city largely through the efforts of the Board of Trade. Other iron and steel consumers came here at this time and products ranged from elevators to laminated tubing for bicycle frames.

The shoe industry continued its growth. There were four large firms in the city by 1900 and many smaller ones. Columbus followed St. Louis and Cincinnati as a leading shoe center in the mid-west. It had excellent transportation facilities for finished products and for raw materials. And while the local market was not well-developed, local firms reached the national market with ease. Labor was satisfactory, especially since partially trained male and female workers were abundant.

By the turn of the century, Columbus had reached a degree of industrial maturity unknown in the past. While still not a major manufacturing city, its national reputation had been enhanced by the carriage, foundry, and shoe industries.

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18 Excerpts from a letter from W. Everett Mc Laine, Director of Public Relations, United States Steel Corporation, 1953.

C. Forces in the Accelerated Industrial Growth, 1900-1952

The stimulus given to industry by the discovery and use of the resources of southeastern Ohio and by a transportation system that assumed its present inter-regional character in the late 1800's was missing after the turn of the century. There were no new natural resources to be developed in central Ohio and the effects of the realized resources were declining. The railroads remained the major permissive factor in the expansion of manufacturing, but they opened no new industrial fields as they had in the previous quarter century.

Between 1900 and 1914, the city and the nation experienced a minor depression and few new industries came to Columbus. An expansion of manufacturing facilities occurred in the post-war boom period and the continuing industrial growth of the city seemed assurred. This was followed, however, by the more serious depression of the 1930's. While Columbus fared better than many other Ohio cities because of the diversification and stability of its factories, there was no expansion of manufacturing. The second World War, and the accompanying post-war boom, resulted in the greatest increase in production in the city's history.

These events explain briefly the continuous but irregular development of industry during the years 1900 to 1952. The three principal forces which influenced the location of plants in these years include the changing market, labor, and the influence of the Federal Government.

The transportation revolution which took place between 1900 and 1952 gave the city a great advantage -- greater than it had had in the era of the railroads. The position of Columbus was modified by the opening of land and air routes, and by its situation with respect to the major auto-

mobile markets of the nation. The famous carriage industry declined rapidly but it was replaced by an expanding automobile industry. Columbus became an important parts supplier as a mid-way point between the steel centers and the auto assembly centers.

New plants were attracted to the city, partly at least, by the good labor force. The city's industries had few unions and strikes were rare. It was advertised as an "American City" and as one having a high percentage of native-born laborers. The shoe industry and branches of the automobile industry increased operations here because of this stable force.

A third factor affecting location was the Federal Government. Either by direct or indirect means, the Federal Government has played an important role in the location of industry. This is especially true during wartime emergencies although there was no evidence of direct government activity in Columbus during World War I, other than minor defense contracts. With the entrance of this nation into the Second World War, the city took a more active part in military preparations. The only large government-financed plant in central Ohio was built here in 1941 for the Curtis-Wright Corporation. Local firms received contracts and sub-contracts totaling millions of dollars. Dozens of small machine shops had their beginnings in this period and were able to continue into the post-war period.

## D. Industrialization, 1900-1952

1900-1914. The Chamber of Commerce tried to establish a $1,000,000 Guarantee Fund to aid new concerns, and promotional literature intended to interest outside firms in Columbus was published in this period. Even

sc ". . . great care (was) used in the selection of prospects and in making offers . . . the city does not want new plants which have not good prospects of success."(19) It was still not a simple matter to engage local investors in industry. For want of sufficient capital, many promising companies overlooked Columbus.

It was during this period that many plants established on Marion Road. Just outside of the city limits, they enjoyed all the privileges and benefits of the city but they payed only a township tax which was 100 percent less than the city tax.(20) A conscious attempt was made to attract outside concerns either to the city or the adjacent townships.

By 1914, there were over 800 plants in the city and Columbus ranked among the 40 leading industrial cities of the nation. About 35,000 persons were employed producing $85,000,000 worth of goods yearly. The average wage for all types of labor was about $600 a year. Skilled labor received as high as $3.00 a day.(21) The relatively low wages and the excellent labor relations were added incentives to plant location.

The principal factories included the foundry and machine shops and the blast furnaces of the Carnegie Steel Company, the U. S. Steel Corporation (two blast furnaces and a billet mill), and the Columbus Iron and Steel Company.

Columbus also had seven "varied" firms, each the largest of its kind in the world: Jeffrey Manufacturing Company, Kilbourne & Jacobs, Wolfe

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19 Annual Report of the Columbus Chamber of Commerce, Columbus, 1914, p. 28.

20 Columbus, Ohio: Industrially and Commercially, Columbus, 1914, p. 14.

21 Ibid., pp. 11 and 16.

Brothers Shoe Company, Capital City Dairy Products (butterine), M. C. Lilley and Company (regalia), Peruna Drug Company, and the Columbus Buggy Company. By 1914, the latter firm was no longer a leader; it was replaced by the rapidly growing automobile industry.

In this transitional period in the transportation industry, there remained six large buggy manufacturing plants and more than a dozen suppliers in operation in 1907. The Brown Manufacturing Company was known as ". . . the largest maker of carriage and electric automobile lamps in the world . . ." While the carriage industry was not yet abandoned, the company was active in the automobile industry. The Midgely Manufacturing Company had, in Columbus, ". . . one of the largest factories in the country for the manufacture of automobile wheels and rims."(22)

The shoe industry continued to expand. More than 5,000 workers were employed here in 1904 and seven large firms were in operation. The H. C. Godman Company and Wolfe Brothers Shoe Company were two of the largest in the nation. With an efficient, low-wage labor force, Columbus grew as a shoe center when other towns were losing this industry.

1914-1920. The beginning of World War I, following close upon a long period of depression, hindered industrial expansion. The threat of U. S. entry into the war limited new enterprises because investment was timid. It was characteristic of local capital to avoid investment: many of the efforts of the Chamber of Commerce to bring new firms to the city were consequently ineffective.

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22 W. B. Jackson, "Industrial Columbus," The Ohio Illustrated Magazine, Vol. 3, No. 6, December 1907, p. 463.

A diversification of manufacturing activity occurred during the war years, however, with the Belmont Casket Company, the Federal Chemical Company, and the Kilgore Manufacturing Company locating here in 1917. These firms came here to take advantage of distribution facilities. Other small plants were established but no major organizations developed.

In 1916, the Chamber of Commerce tried to bring a Federal armor plate plant to Columbus. A brochure was published emphasizing the advantages of this location. Columbus steel plants were producing up to 350,000 tons a year and could easily satisfy the armor plate plant's required 20,000 tons of pig iron. Good railroad service and an abundant supply of low-cost but unskilled rural labor were points emphasized. Furthermore, the city was a diverse and stable community free from industrial competition.(2

While this effort was unsuccessful, government contracts did benefit local manufacturers. By August 1917, ten firms were engaged in war-time production and late in the same year more than 50 firms were so engaged. A War Industries Board was set up here as a branch of the Cleveland Division in 1918 with the purpose of getting all industry, large and small, coordinated in war production and to speed up production, allocate labor, and regulate supplies more satisfactorily. But even this program did not bring the city important war contracts.(24)

A lasting influence of the Federal Government was the erection of a

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23 Determining the Location of the Government Armor Plate Plant, Columbus, 1916.

24 Monthly Bulletins of the Columbus Chamber of Commerce, Columbus, Vol. 4, August 1917, p. 1 and Vol. 4, October 1917, p. 12. See also the District Manufacturers Commission of Ohio, 1918, letters and data referring to the establishment of this commission.

$7,000,000 government depot here. This storage plant, one of three large ones in the country, was built in 1918. It has added to the government payrolls in Columbus and has become a stabilizing force in economic development.

The ten largest employers in the city in 1918 included:

| | |
|---|---|
| Jeffrey Manufacturing Company | Carnegie Steel Company |
| Buckeye Steel Castings Company | Ohio Malleable Iron Company |
| Federal Glass Company | M. C. Lilley and Company |
| H. C. Godman Company | J. P. Gordon Company |
| Ralston Steel Car Company | J. W. Brown Mfg. Company |

Foundry products, railroad and mining equipment, shoes, glass, and automobile parts were the leading products. A year prior to this, the American Rolling Mill Company (Armco) took over all of the facilities of the Columbus Iron and Steel Company.(25) The plant ranked seventeenth in size. The Ford Motor Company had a branch assembly plant here which ranked as one of the twenty-five leading firms in the city.

Columbus gained new factories in the immediate post-war years. The Timken Roller Bearing Company of Canton built a $1,500,000 plant on nine acres of land at Fifth and Cleveland avenues. Approximately 1,300 persons were employed at the time. The location was due primarily to the fine transportation network which tied Columbus to Pittsburgh and Detroit, in conjunction with a stable, low-wage labor force.

By 1920, the Allen Motor Company moved here from Fostoria, the Henderson Tire & Rubber Company from Bucyrus, and the Julian & Kokenge Company from Cincinnati. The American Zinc Oxide Company built a branch plant here. Smaller plants were also established. At this time, Columbus had

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25 Christy Borth, True Steel, Indianapolis, 1941, p. 237.

a population of 237,000 of which ten percent was engaged in work in the 960 manufacturing plants.

1920-1940. The pace of industrialization slackened during the post-war depression which lasted from 1920 to 1922. Conditions were not favorable to industrial expansion but the city continued to seek stable and diversified firms which were suited to the community. The brief depression was followed by increasing activity. The Industrial Bureau estimated that the city's business payroll increased by more than 365 percent between 1914 and 1926.(26)

The number of wage earners in industry is a criterion by which to gauge manufacturing activity in a city. From 26,751 workers in 1919, employment dropped in the early 1920's but picked up again to reach 26,576 in 1929. The effects of the depression are clear — in 1933 the number of wage earners had fallen to 17,516. Depression years are reflected very clearly in the total carloads entering and leaving Columbus in 12-month periods: in 1929, 175,122 carloads were recorded; in 1933, the lowest year, only 82,592 carloads were recorded. The value of manufactured goods dropped from an all-time high of $212,227,751 in 1929 to the relatively low figure of $89,687,883 in 1933.(27)

In the 1920's, the leading concerns were closely aligned to the field of transportation. Automobile parts had been made here since the first decade of this century. Commercial aviation was stimulated by the suc-

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26 Columbus: A City of Men, Materials, and Management, Columbus, 1928, p. 6.

27 The City Manual, Supplement to the City Bulletin, Columbus, 1932, p. 9, and 1934, p. 9.

cess of aircraft during the war. As early as 1918, Columbus was thought of as an aircraft center. There was the suggestion that the city, long a carriage center, could turn the buggy plants into aircraft supply plants where bodies, propellers, and other wood parts could be made. Five years later a 100-acre lot, five miles east of the city, was purchased for an airport. This was later abandoned and, in 1928, an $850,000 bond issue was approved to purchase a 543-acre site east of the city.(28)

The first transcontinental airway in the United States involved train service from the east coast to Columbus where a tri-motor plane carried passengers to the west. The railroads had brought industry to the city at an earlier date; the aircraft industry did not duplicate this. Two firms, Columbus Auto Brass and the Columbus Aircraft Corporation, tried to make aircraft but did not succeed financially. Both firms were backed by Columbus capital. Port Columbus eventually became an important Naval, Marine, and Army base. Commercial transportation grew considerably, as well, but it was not until World War II that a large-scale aircraft industry succeeded.

Meanwhile, other phases of manufacturing were undergoing changes. The Armco plant moved to Hamilton in 1928 to be near its main plant and the local facilities were taken over by the Columbus Coke and Iron Company which operated them as merchant furnaces.(29)

Two new hot-air furnace companies located here and increased Columbus' importance as a leading center for the warm air heating industry.

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28 The City Manual, op. cit., 1932, p. 11.

29 Borth, op. cit., p. 269, and Monthly Industrial Review, June 12, 1928, p. 4.

The Armstrong Furnace Company came from London, Ohio, in 1928, and the Midland Furnace Company built a large plant on Olentangy River Road. Five other large furnace companies had already been in operation.

The expansion by integration of local firms continued. The Jaeger Machine Company bought the Lakewood Engineering Company, its chief competitor, and Jeffrey Manufacturing bought the Galion Iron Works. This was done so that Jeffrey could absorb a basic metal company into its organization.

By the end of these 20 years, Columbus had undergone a change in its industrial structure. The leading products included mining machinery, concrete-mixing equipment, oil-well derricks, oilcloth, shoes (19 percent of the nation's total), and artificial teeth facings. The city was known as a center especially for the shoe, heating and cooling equipment, and mining machinery industries. Its national importance had increased.

1940-1952. The second World War had a great influence upon the further industrial development of Columbus. Its most obvious influence was the $14,000,000 Curtis-Wright aircraft plant which was erected in 1941 at government expense to manufacture naval aircraft.

A less obvious result was the fact that a great labor pool was created. Men and women, Negro and white, from cities, towns, and farms, were attracted to Columbus by the high wages of the aircraft industry. The force was essentially untrained but the Curtis-Wright organization provided on-the-job training as well as preliminary training in metal working at the State Fairgrounds. With fewer than 3,000 workers at its outset, the plant employed more than 25,000 during the war-time peak. Thus, an important labor pool was created not only for the war emergency but for

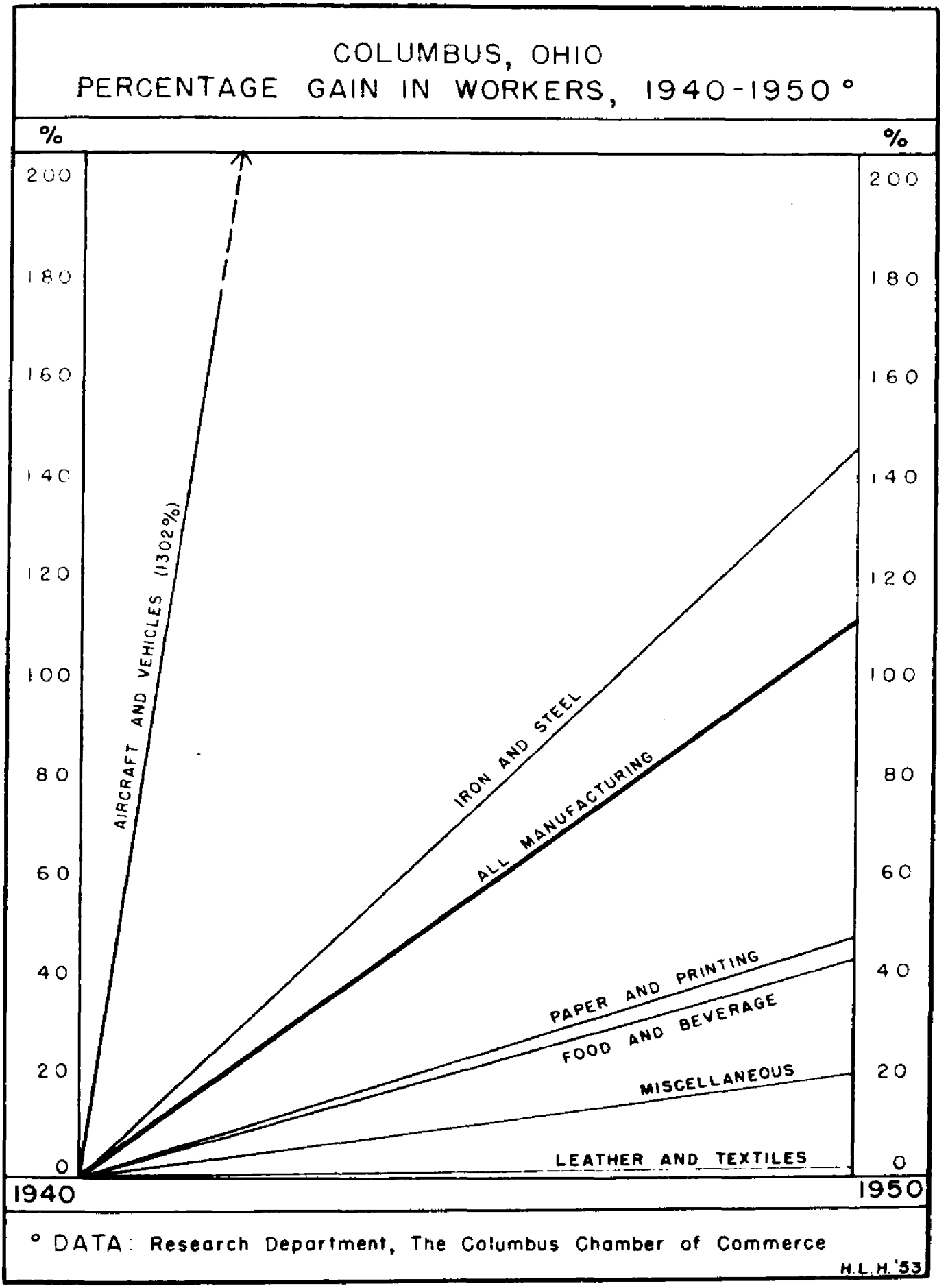
COLUMBUS, OHIO
PERCENTAGE GAIN IN WORKERS, 1940-1950 °
%
%
200
180
160
140
120
100
80
60
40
20
0
AIRCRAFT AND VEHICLES (1302%)
IRON AND STEEL
ALL MANUFACTURING
PAPER AND PRINTING
FOOD AND BEVERAGE
MISCELLANEOUS
LEATHER AND TEXTILES
1940
1950
° DATA: Research Department, The Columbus Chamber of Commerce
H.L.H. '53

**Chart I**

use in the post-war periods, as well. (See Chart I, page 71.)

As the aircraft industry sought labor on the local scene, it created hard feelings among the older firms in the city which lost workers. However, it asserted that it wanted to cooperate wherever possible and wanted to become a part of the industrial community. J. A. Williams, General Manager of the Columbus plant, stated that "Curtis-Wright is a definite part of Columbus. Already we are rooted deeply in the soil and are definitely here to stay . . . We hope to be one of the staid, old organizations of Columbus."(30) At the end of the war, however, Curtis-Wright abandoned Columbus.

Other than the establishment of new plants, war-time contracts permitted plant expansions and conversions. Franklin County, and Columbus, profited in all ways. More than a billion and a half dollars was invested in Ohio's industry during the war -- Franklin County had a total investment of $53,023,000 or about three percent of the state's total. Of this, $44,633,000 was spent on new plants (principally Curtis-Wright), $6,268,000 in the expansion of old plants, and $2,122,000 in the conversion of existing facilities.(31) Table VI, which follows on page 73, contains a comparison between Franklin County and the state in the investment of these funds.

With the end of the war, Columbus had the labor, space, and transportation facilities to attract new firms. It had been the movement of

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30 "Salute to Curtis-Wright," The Columbus Sunday Dispatch, November 30, 1941, p. 3.

31 The Geographic Distribution of Manufacturing Facilities Expansion, July 1940-May 1944, Washington, June 1, 1945, Exhibit M, p. 80.

TABLE VI

PUBLIC-FINANCED INDUSTRIAL FACILITIES IN OHIO

AND FRANKLIN COUNTY DURING WORLD WAR II

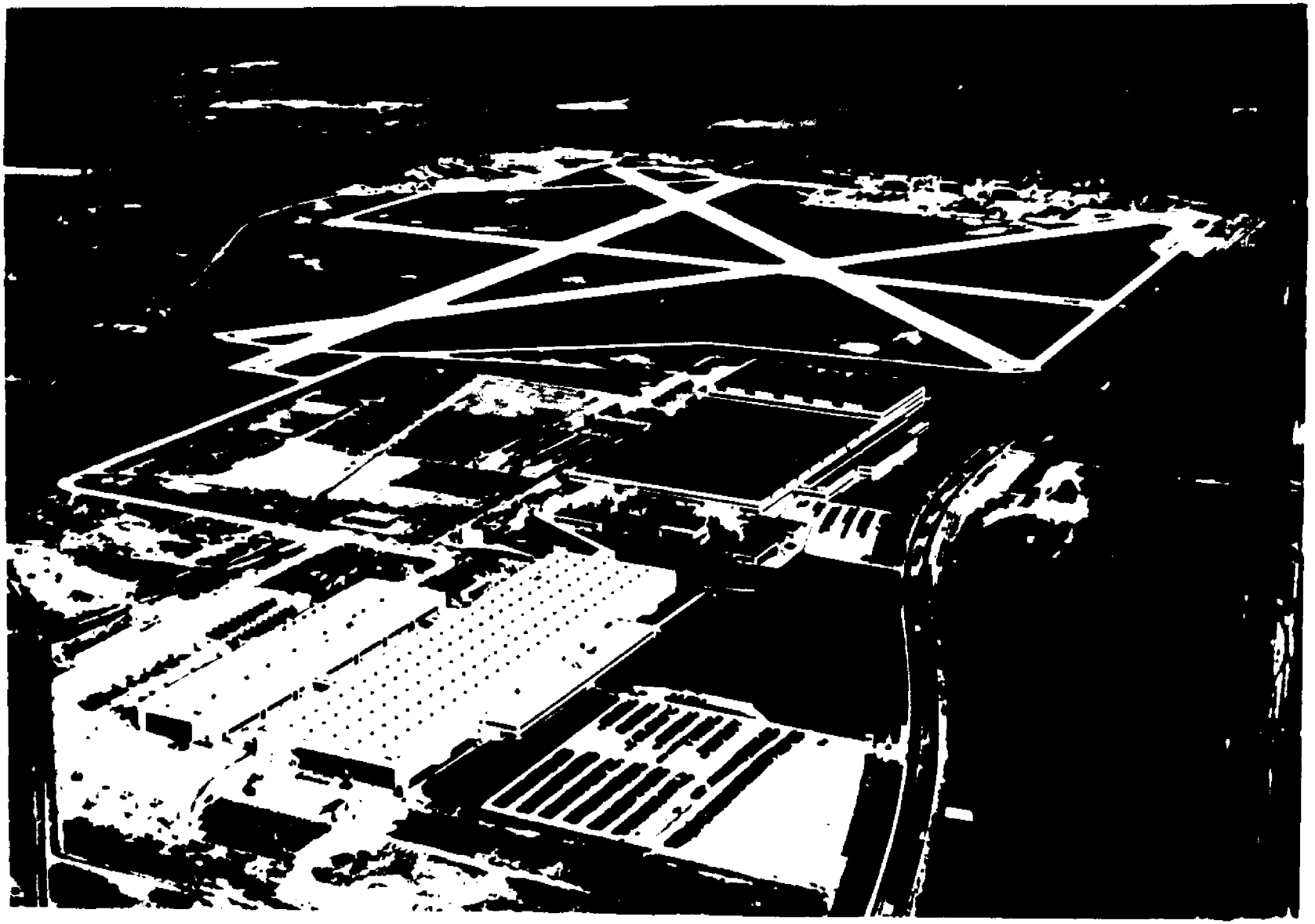
| Products | Ohio | Franklin County |
|---|---|---|
| Aircraft | $478,891,000 | $ 31,313,000 |
| Ships | $ 33,030,000 | $ 27,000 |
| Ordnance | $232,662,000 | $ 1,544,000 |
| Explosives | $146,970,000 | $ 31,000 |
| Iron & Steel | $247,575,000 | $ 5,940,000 |
| Non-Ferrous | $107,186,000 | $ 41,000 |
| Machinery | $202,636,000 | $ 11,721,000 |
| Chemicals-Petroleum | $136,373,000 | $ 1,079,000 |
| Food & Others | $ 92,076,000 | $ 1,327,000 |

SOURCE: The Geographic Distribution of Manufacturing Facilities Expansion, July 1940-May 1944, Washington, June 1, 1945, Exhibit L, p. 63.

large, national firms to the city that has been the major factor in changing the industrial structure of Columbus. Such a plant was the Ternstedt Division of General Motors (# 156), employing approximately 3,500 workers in the manufacture of hardware products for Fisher Body, that located in a non-industrial suburban area west of the city.(32) The supply of semi-skilled labor, good transportation facilities, and freedom from competition with similar firms made this location a wise one. Today, this plant is one of the stable firms that has added to the growing importance of Columbus as an automotive parts center and as an industrial community.

After Curtis-Wright closed its operations, part of the huge plant was occupied by the Lustron Corporation, which was a government-financed private concern. With the closing of the financially unsound Lustron Corpor-

32 The numbers in quotes after the individual plants indicated their key number of Figure 7, Location of Manufacturing Plants.



Courtesy North American Aviation Inc.

THE NORTH AMERICAN AVIATION PLANT AND PORT COLUMBUS
ON THE EAST SIDE OF THE CITY

ation, the North American Aviation Corporation (# 190) occupied the same building and began the production of jet aircraft for the military forces. (See the photograph on page 74. This shows clearly the extensive, one-story plants, the large areas devoted to parking space, and the available transportation facilities. In the background is Port Columbus.) Today, this company, which came here to make use of the partially trained labor force available in southeastern Ohio, West Virginia, and Kentucky, employs about 18,000 workers. It has expanded plant space considerably.

The huge, new Westinghouse plant has been built west of the city near the site of the General Motors plant. It is an impressive addition to the city and, as the major appliance manufacturing center for the entire Westinghouse organization, promises to be a stable, peace-time operation. (# 197)

## IV. MANUFACTURING IN COLUMBUS, 1952-1953

Thus far the industrial evolution of a dominantly commercial economy in Columbus has been the concern of this dissertation. While the city maintains its commercial importance, it is becoming increasingly an industrial community. It remains to analyze the character of manufacturing today and to ascertain the value of the various forces in industrial location.

### A. Field Study

Industries Visited. To obtain information for this chapter, 220 local manufacturing establishments, each employing more than ten workers, were visited, interviews were held, and the plant locations were mapped and studied. Responsible representatives at the plants discussed the various questions which were contained in an industrial questionnaire. (See Appendix A for a sample questionnaire.) In many cases, the manufacturing operations were witnessed and a better understanding of the functions of the plant resulted.(1)

Industrial Groups. After the interviews were completed, for convenience in analysis, each plant was assiged to an industrial group based

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1 Not all of the industrial groups represented in Columbus are included. No attempt was made to visit the individual companies in the food, beverage, printing, paper, lumber, or non-manufacturing industries, for instance. These are industries common to all cities of 100,000 and are not peculiar to Columbus nor do they characterize it in any way. The companies that were visited were engaged in some mechanical operations, in almost every case. Many used steel or steel products in the manufacturing process and many types of machine operations were employed. For a listing of Columbus' manufacturers by company name, employee size, and by product, see the Manufacturers' Directory, Columbus, Ohio. It is published yearly by the Industrial Department, The Columbus Chamber of Commerce. For a listing of the manufacturers included in this study, see Appendix B.

upon either the product it manufactured or the function it performed.(2) For a factory producing shoes and nothing else, it is a simple matter to include it in the Shoe Industry, an industry-group based upon product. The foundry, forging, and stamping plants, however, make a variety of items. No one characterizes the plant. Consequently, these plants were placed in industry-groups based upon the functions which they perform.(3)

| | |
|---|---|
| Casket | Machine Shop |
| Ceramic Products | Miscellaneous |
| Chemical Products | Paper and Paper Container |
| Dental Products | Plastic Products |
| Electrical Equipment | Rubber Products |
| Forging | Shoes and Textiles |
| Foundry | Stamping |
| Furniture and Fixtures | Steel and Ornamental Iron |
| Heating and Cooling Equipment | Tool and Implement |
| Industrial Machinery | Transportation Equipment |

A discussion of the individual industry-groups will follow a survey of the distribution of manufacturing activity in Columbus.

## B. Industrial Character of Columbus

Distribution of Plant Sites. The location of manufacturing activity in the Columbus area has undergone a pronounced change. Thirty years ago, three significant industrial communities were described by a sociologist at The Ohio State University(4) as follows: (a) a group of plants lying

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2 There are 14 plants out of the 220 which are not included in any industrial group. Either they did not fit into any of the groups which have been developed or their representatives did not participate in the personal interviews.

3 The industry-groups established here are arbitrary. They do not follow the classification set forth in the United States Census of Manufacturing but they embody some of the ideas advanced therein.

4 Roderick D. Mc Kenzie, "The Neighborhood: A Study of Local Life in the City of Columbus, Ohio," The American Journal of Sociology, Vol. 27, No. 2, September 1921, p. 151.

along either side of the New York Central Railroad tracks north of the downtown business district and centered about the Jeffrey Manufacturing Company's buildings on North Fourth Street, (b) a group south of First Avenue bordering the Olentangy River and extending into the downtown, and (c) the South Columbus community where the large steel plants and the foundry operations of the city were located. These three areas remain as the more important manufacturing sections of the city but there are new industrial communities as well. These older areas have declined in recent years and they show no signs of attracting new industry. They are stable areas but old ones.

New areas -- With new manufacturing plants coming to the city and with a new concept of industrial planning developed, three other sections have emerged. They represent a modern trend in plant design, in landscaping, and in planning with respect to accessibility to raw materials and markets. One such area lies in the northwest section of the city between the Olentangy and Scioto rivers. It is bordered by residential communities, for the most part, and is an attractive addition to the city because of intelligent planning. Port Columbus has been largely responsible for the growth of the second, or the East Columbus, manufacturing area. It has been dominated by the aviation industry since 1940 but there are also many small, new plants which have given stability to the area in recent years. To the west, the latest industrial development began with the erection of the large General Motors and Westinghouse plants. Although the number of manufacturing concerns in this area remains small, it is one of the major industrial communities because of the size of the plants.

Boundaries of industrial communities -- For convenience in referring to these industrial communities, six areal names will be used throughout the study: South Columbus, East Columbus, North Columbus, Northwest Columbus, West Columbus, and Downtown Columbus. The map which follows, Figure 5, indicates the boundaries which have been established for each.

No attempt has been made to establish industrial communities based upon the types of manufacturing in the area. This might be possible in a few instances but the local manufacturing activity is widely diversified and, therefore, difficult to categorize. Whereas the iron and steel factories were erected in South Columbus partly because of the accessibility to raw materials, no such advantage favors one section of the city over another for any specific industry, today.

Age of Industrial Sites. The average age of the 206 manufacturing plants which form the basis of this study is 22 years, but the age of the plants varies greatly in the different areas. Using the areal divisions established of Figure 5, the breakdown in Table VII results.

TABLE VII

THE AGE OF MANUFACTURING PLANTS BY AREA

| Area | No. of Plants | Age in Years (Ave.) |
|---|---|---|
| North Columbus | 55 | 28.0 |
| South Columbus | 30 | 27.5 |
| Downtown | 32 | 26.0 |
| East Columbus | 28 | 18.0 |
| West Columbus | 27 | 12.7 |
| Northwest Columbus | 34 | 12.3 |

INDUSTRIAL AREAS
NORTH
NORTH WEST
WEST
EAST
SOUTH
GREATER COLUMBUS
OHIO
1951

Figure 5

North Columbus has a number of plants that are 50 years or older but it has few firms less than five years in age.(5) The South Columbus area also has many old plants, but the average age is reduced considerably since one-third of its plants have been established within the past five years.

Table VIII, on the following page, indicates the number of plants which came to each of the six areal divisions in particular periods as well as the percentage increases for each period. An examination of this table will bring out two points: North and South Columbus are the oldest industrial areas and East and Northwest Columbus have had the highest percentage of their industrialization within the past 15 years.

North Columbus -- The principal industrial concentrations remain in the area adjacent to the New York Central tracks and/or along the east bank of the Olentangy River. Both of these communities are within a mile of the downtown business district. A few small firms have recently located in the northern part of this area.

South Columbus -- The largest and oldest plants in South Columbus lie beyond the city's limits in Marion Township. This industrial community is centered about Marion Road, east of Parsons Avenue. Of the eleven plants established since 1945, only one is outside of the city's limits. These new firms are small and their type of manufacturing differs from that of the older firms.

Downtown Columbus -- There are no principal concentrations of factories in this, the third oldest area. Many companies are on second or third

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5 The plants include new ones to the city as well as those which represent inter-city moves. By using both groups, the figures give a truer picture of the growth or decline of the individual manufacturing community.

TABLE VIII

NUMBER OF MANUFACTURING PLANTS ENTERING THE INDUSTRIAL AREAS, 1853-1963

| Years | South | | East | | North | | Northwest | | West | | Downtown | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % Inc. | No. | % Inc. | No. | % Inc. | No. | % Inc. | No. | % Inc. | No. | % Inc. |
| 1940-53 | 11 | 36.6 | 18 | 64.2 | 16 | 29.1 | 22 | 64.7 | 14 | 51.8 | 8 | 25.0 |
| 1930-39 | 3 | 10.0 | 2 | 7.1 | 10 | 18.1 | 6 | 17.6 | 8 | 29.3 | 11 | 34.3 |
| 1920-29 | 3 | 10.0 | | | 12 | 21.8 | 6 | 17.6 | 4 | 14.8 | 6 | 18.7 |
| 1910-19 | 3 | 10.0 | 5 | 17.8 | 5 | 9.0 | | | | | 4 | 12.5 |
| 1900-09 | 7 | 23.3 | 2 | 7.1 | 5 | 9.0 | | | 1 | 3.7 | 1 | 3.1 |
| 1853-99 | 3 | 10.0 | 1 | 3.5 | 7 | 12.7 | | | | | 2 | 6.2 |

These figures represent new manufacturing plants that have located in each of the industrial areas. The plants may have been new ones to Columbus or they may have been local firms that relocated within the city. The latter is especially true of the 22 plants that have located in Northwest Columbus since 1940. Most of these have completed inter-city moves to avoid the disadvantages of old industrial areas and to derive the benefits of a location in a new attractive industrial area.

floors of commercial buildings while others occupy structures that were erected many years ago for entirely different purposes. More than one company is operating in an abandoned brewery that has been redesigned for its use. There are a few companies that occupy new buildings constructed for their specific needs; this is especially true of the Shoe Industry.

All three areas are handicapped by the lack of desirable building sites, inadequate parking facilities, and high costs of land. Industrially-zoned properties are scarce within each area and that which is available is frequently not desirable for modern industry.

The new areas -- In contrast, the great increases in industrialization in the Northwest, West, and East Columbus areas are a reflection of the advantages for new plants in these areas. The older parts of these areas lie close to the heart of the city and suffer from the same disadvantages as the other old communities. It is on the fringes, however, that many of the new factories have located. In the Northwest, on the other hand, manufacturing plants have encroached upon an area that is largely residential.

In these areas, attractive building sites are available and space is adequate for expansion and parking facilities. The cost of land may be high but large tracts are present thus reducing the over-all costs of the purchase.(6) There is a psychological advantage as well. These are new industrial districts that are clean and attractively landscaped. A mod-

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6 The Ternstedt Division of General Motors and the Westinghouse plant, on Georgesville and Phillippi roads in West Columbus, located here partly because large tracts of land were available. In South Columbus and adjacent Marion Township, no large tracts are available and manufacturing interests must make costly, individual deals with dozens of landowners.

ern factory may blend nicely into the surrounding community. Smoke, odors, and noises are at a minimum. Many established Columbus firms have moved to the outskirts to secure these advantages and the new bigger firms have also been attracted to them.

Size of Industries. The 206 manufacturing plants which are the basis of this study employ approximately 65,000 workers. This figure represents about 85 percent of the entire manufacturing force of Columbus, according to comparisons made with the recent estimates formulated by The Econometric Institute of New York City.(7)

The largest industrial group is the Transportation Industry which employs a total of 27,850. (Refer to Table IX for a classification of all industries by employee size.) Of this number, about 18,000 are employed in the aircraft division by the North American Aviation Corporation. The automobile parts and railroad car (Ralston Steel Car) divisions add another 9,850 to this. Second in size with 10,500 workers, is the Electrical Equipment Industry. These are the only two industries in Columbus that are called large-scale industries.(8) (See the breakdown of industries by size of plants on Table X.)

Those industries which use steel or steel products follow in importance, with industrial machines, foundry products, heating and cooling equipment, forgings, and stampings among the ten largest industries by

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7 Reports of the findings of The Econometric Institute, which undertook a study of Columbus' economy for the Chamber of Commerce, appeared in The Ohio State Journal, May 15, 1953, p. 1.

8 The breakdown of plants used here is based upon that used by Alderfer and Michl. See E. B. Alderfer and H. E. Michl, Economics of American Industry, New York, 1942, pp. 8-10.

TABLE IX NUMBER OF MANUFACTURING INDUSTRIES AND WORKERS

| Industries | Number | Workers |
|---|---|---|
| Transportation | 16 | 27,850 |
| Aircraft | 1 | 18,000 |
| Automobile parts | 14 | 9,720 |
| Railroad cars | 1 | 130 |
| Electrical equipment | 9 | 10,510 |
| Industrial machines | 16 | 4,425 |
| Foundries | 15 | 3,585 |
| Heating and cooling equipment | 14 | 3,090 |
| Textiles | 14 | 2,200 |
| Shoes | 9 | 2,120 |
| Machine shops | 26 | 1,370 |
| Miscellaneous | 8 | 1,370 |
| Stamping industries | 7 | 1,355 |
| Forging industries | 5 | 1,335 |
| Chemicals | 16 | 1,250 |
| Plastics | 7 | 1,220 |
| Paper containers | 7 | 915 |
| Steel and ornamental iron | 9 | 755 |
| Furniture and showcases | 8 | 590 |
| Tools and implements | 4 | 500 |
| Caskets | 5 | 410 |
| Dental products | 4 | 195 |
| Ceramic products | 4 | 160 |
| Rubber products | 3 | 60 |
| TOTAL | 206 | 65,265 |

size. The Shoe Industry, seventh in total number of workers and sixth in average number of workers per establishment, is also important.

The eight small-scale industries are essentially local firms engaged in the manufacture of specialty products. The Dental Products Industry is an example. Three of the four firms make teeth according to prescriptions furnished them by the local dentists. These firms are oriented, for the most part, to a Columbus market.

The ten largest firms in the city employ more than 42,000. The first four companies are controlled by outside industry but the other six are locally controlled. More than 60 percent of the manufacturing force is employed by the following concerns:(9)

| | |
|---|---|
| North American Aviation, Incorporated | 18,000 |
| Westinghouse Electric Corporation | 8,000 |
| Timken Roller Bearing Company | 4,320 |
| Fernstedt Division, General Motors | 3,500 |
| Jeffrey Manufacturing Company | 2,555 |
| Buckeye Steel Castings Company | 2,000 |
| Federal Glass Company | 1,100 |
| Columbus Bolt & Forging Company | 1,050 |
| Columbus Coated Fabrics Corporation | 1,000 |
| Ranco, Incorporated | 900 |

While outside industry controls less than 20 percent of the 206 plants, it controls nearly one-half of the working force in these plants. The influence of the national industry is increasing in Columbus as it finds this a good location for the erection of branch plants.

Worker concentration — About three-fourths of the working force is employed in the North, East, and West Columbus industrial areas. (Refer

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9 The figures include the Westinghouse plant which expects to open late this year. It is considered as an operating part of the industrial city in this dissertation.

TABLE X AVERAGE NUMBER OF WORKERS PER ESTABLISHMENT

| | |
|---|---|
| All manufacturing | 317 |
| **Small-scale Plants** | |
| Rubber products | 20 |
| Ceramic products | 40 |
| Dental products | 49 |
| Machine shops | 53 |
| Furniture and showcases | 74 |
| Chemicals | 78 |
| Caskets | 82 |
| Steel and ornamental iron | 84 |
| **Medium-scale Plants** | |
| Tools and implements | 125 |
| Paper containers | 130 |
| Textiles | 157 |
| Miscellaneous | 171 |
| Plastics | 174 |
| Stamping industries | 193 |
| Heating and cooling equipment | 220 |
| Shoes | 235 |
| Foundries | 239 |
| Forgings | 267 |
| Industrial machines | 276 |
| **Large-scale Plants** | |
| Electrical equipment | 1,168 |
| Transportation equipment | 1,741 |

to Table XI below and see Figure 6, Relative Size of Manufacturing Plants in Columbus, Ohio, on page 89.) The first area has one-fourth of the plants in the city and these employ about 15,700 workers in the two older manufacturing communities. The East and West areas, each with only 13 percent of the plants, employ 20,450 and 13,930 workers, respectively. In these cases, it is the new manufacturing plant -- North American Aviation in the East and General Motors and Westinghouse in the West -- which swell the totals.

TABLE XI

EMPLOYMENT BREAK-DOWN BY AREAS

| Area | Total Employment | % of Total |
|---|---|---|
| East Columbus | 20,450 | 31.4 |
| North Columbus | 15,700 | 24.1 |
| West Columbus | 13,930 | 21.3 |
| South Columbus | 6,280 | 9.6 |
| Downtown | 4,800 | 7.3 |
| Northwest Columbus | 4,065 | 6.2 |

Northwest Columbus, with 65 percent of its plants new ones since 1940, employs only 4,000 (6.2 percent of the total). This is a reflection of the age and types of manufacturing -- labor requirements are low as these are new companies, starting slowly. Light manufacturing has been attracted to the area, for the most part.(10)

Downtown and South Columbus together employ 11,000 workers. In the Downtown, small companies prevail. There is no large employer. South

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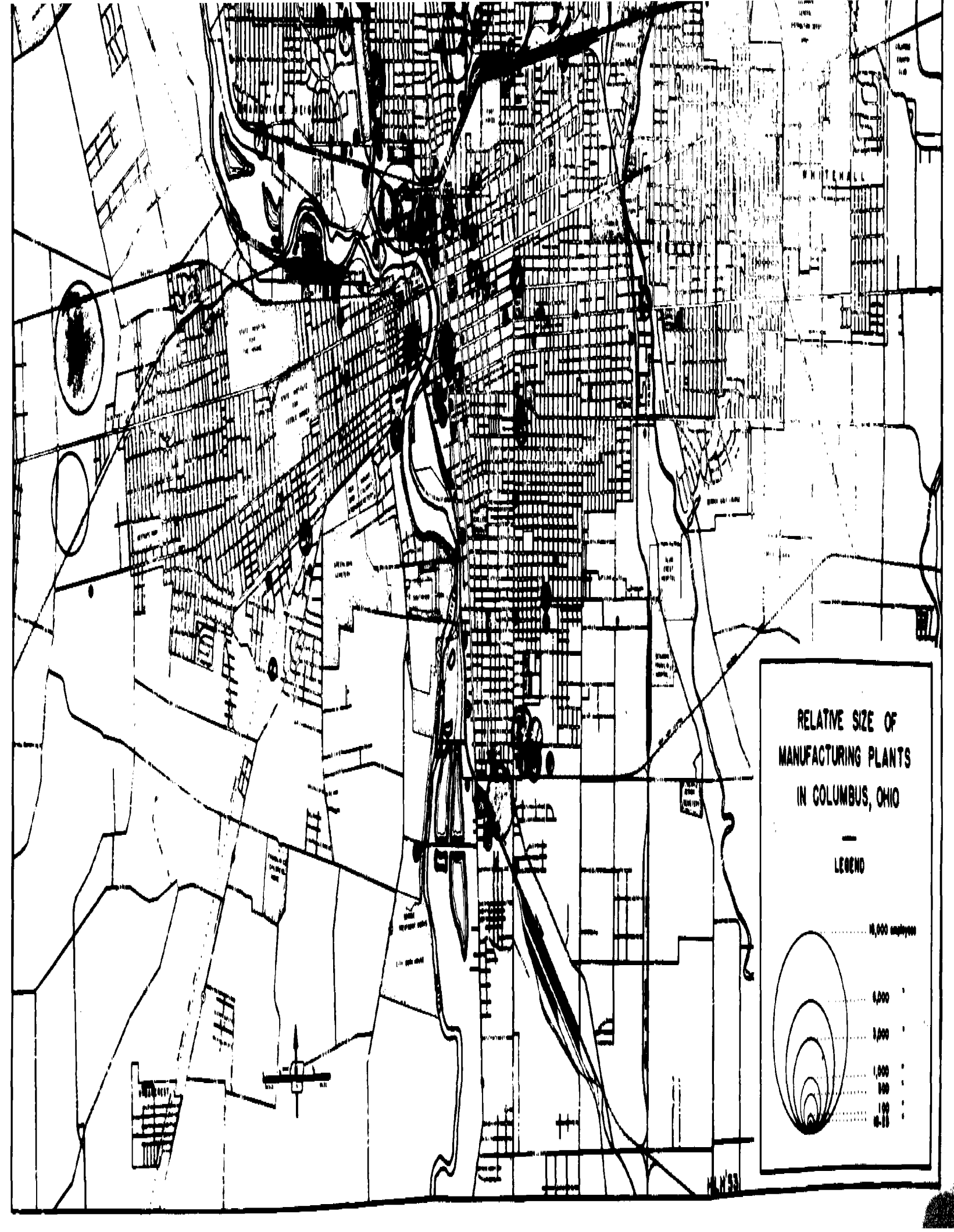
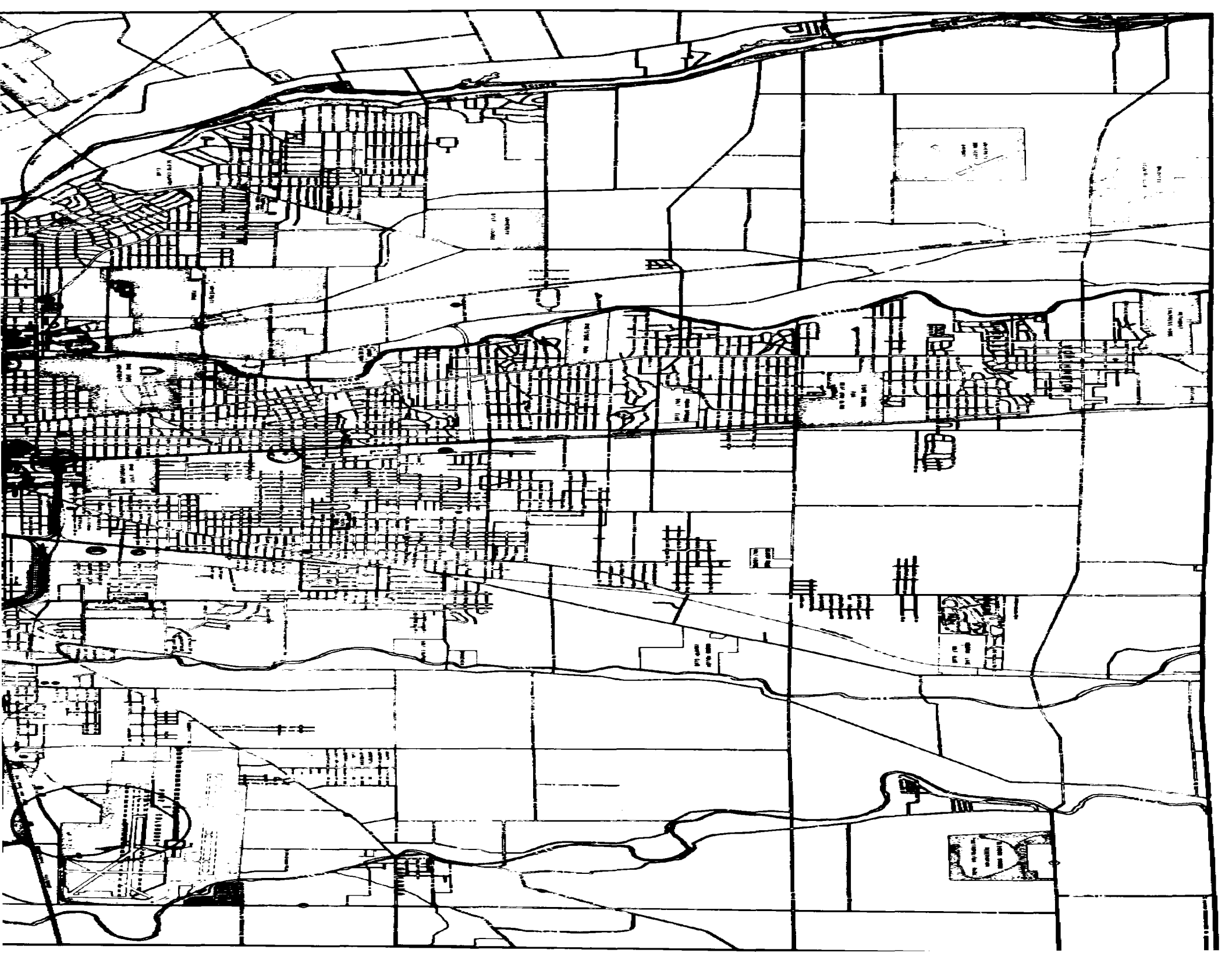
10 The Econometric Institute recommended that light industry should continue to locate here. The Ohio State Journal, May 15, 1953, p. 2.


RELATIVE SIZE OF
MANUFACTURING PLANTS
IN COLUMBUS, OHIO
LEGEND



Columbus has one or two large plants, such as the Buckeye Steel Castings Company, and many small concerns. These areas, both in total number of plants and in the number of employees, represent the city's average.

Original Sites and Plant Dispersal. About 60 percent of the manufacturing plants in Columbus are now located at sites other than their original ones. This is typical of native firms. However, the majority of the concerns new to the city, which are controlled by outside capital, remain at the original site. This is generally true because the location was planned. In many cases, buildings were constructed to meet specific needs. Such facts would seem to indicate the value of planned sites.

In contrast, the small shop which began in Columbus usually located by chance. An available building, cheap land, or some such factor decided the site. The new firm with a minimum of capital uses a site which can be made to fit its needs. An established firm with comfortable capital chooses a site which can supply certain advantages, some of which are necessities -- parking facilities -- and some of which may be luxuries -- room for landscaping.

Plant dispersal -- Of the plants that originated in a given area, how many left the area and where did they go? Table XII shows this. It is apparent that Downtown Columbus is a "cradle" of industry. While many plants have started in this area, many -- 56 percent of the total -- have left it. As the oldest part of the city, the Downtown section has many low-cost sites in old buildings or on second and third floors of commercial buildings available to young firms. If the firm increases in size, however, the Downtown area cannot continue to meet its needs and a move to an out-lying area commonly results. (See Table XII, following.)

TABLE XII

ORIGINATION AND DESTINATION OF PLANTS BY AREAS

| Area | Originally in Area | Left Area | % Left | Present Site | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | N | D | W | S | E | NW |
| North Columbus | 52 | 14 | 26 | - | 1 | 3 | 4 | 0 | 6 |
| Downtown | 50 | 28 | 56 | 8 | - | 6 | 5 | 2 | 7 |
| West Columbus | 27 | 13 | 48 | 2 | 2 | - | 3 | 3 | 3 |
| South Columbus | 24 | 5 | 20 | 1 | 1 | 1 | - | 1 | 1 |
| East Columbus | 18 | 4 | 22 | 1 | 1 | 1 | 1 | - | 0 |
| Northwest Columbus | 13 | 1 | 7 | 0 | 0 | 0 | 1 | 0 | - |
| Unknown Origin | 22 | | | | | | | | |

At the other extreme is Northwest Columbus. Only 13 firms have had their original sites in this area and only one of these has left. More new plants have moved to this attractive industrial community than to any other section in the city.

Origination areas -- Further evidence of the differences in these areas may be shown by a consideration of the origin of the plants now in an industrial area. In Downtown Columbus, approximately 70 percent of the 32 plants now present began operations within the area. Very few plants, which originated elsewhere, move into the Downtown. This is a further indication that the Downtown remains as an important area in which firms originate but it is not an area to which established firms move.

Again, Northwest Columbus offers the greatest contrast. Of the 34 plants now located there, only one-third originated there. The majority moved into this area for expansion. Seven came from the Downtown, six

from the North, and the remainder from the other areas.

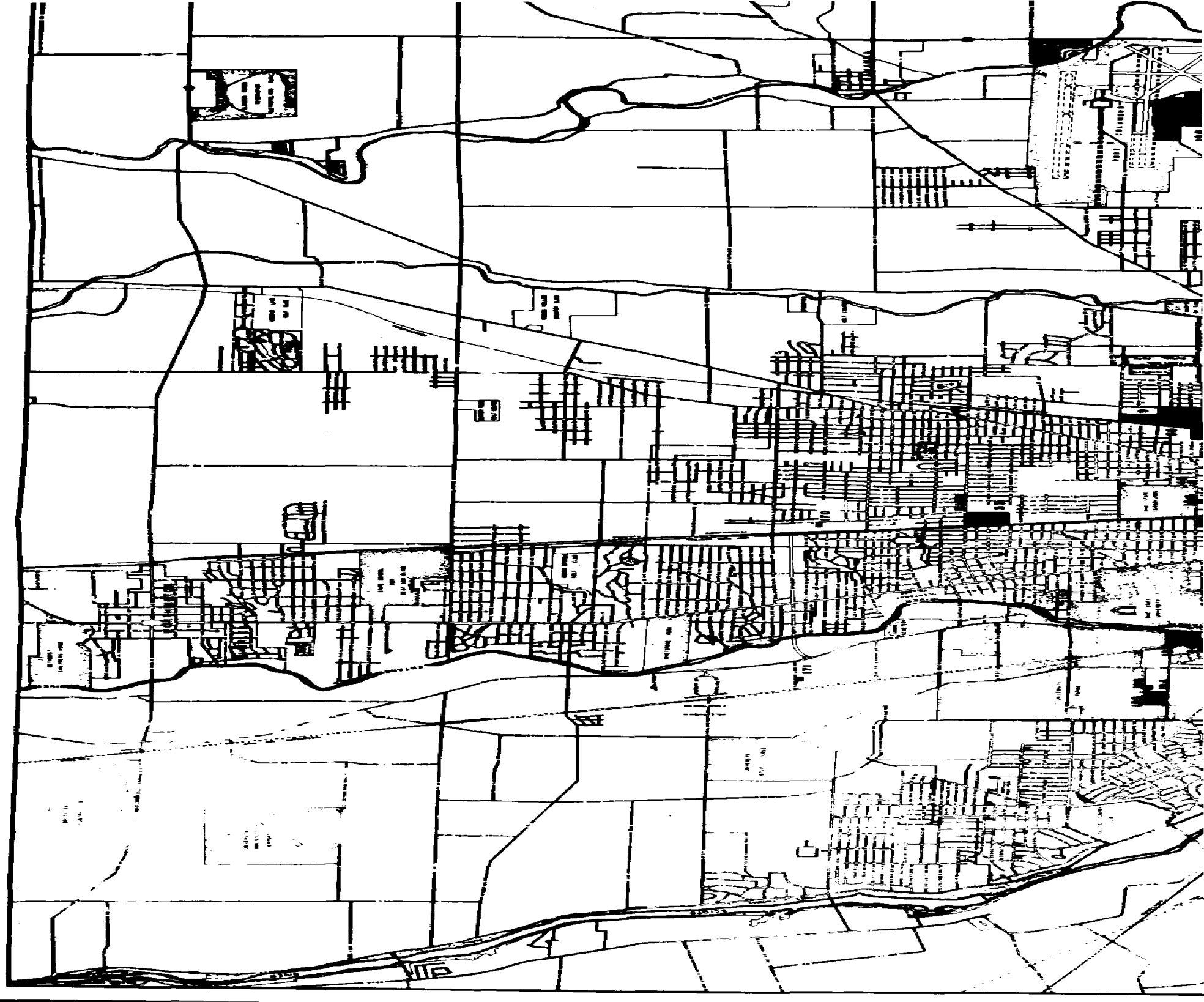
In the other four industrial areas, at least 50 percent of the present plants had their origin within the area. In the North, 67 percent; in the South, 56 percent; in the East, 53 percent; and in the West, 50 percent originated in the area. In each area but the East, the largest number of plants came from the Downtown and North industrial areas, two of the older areas.

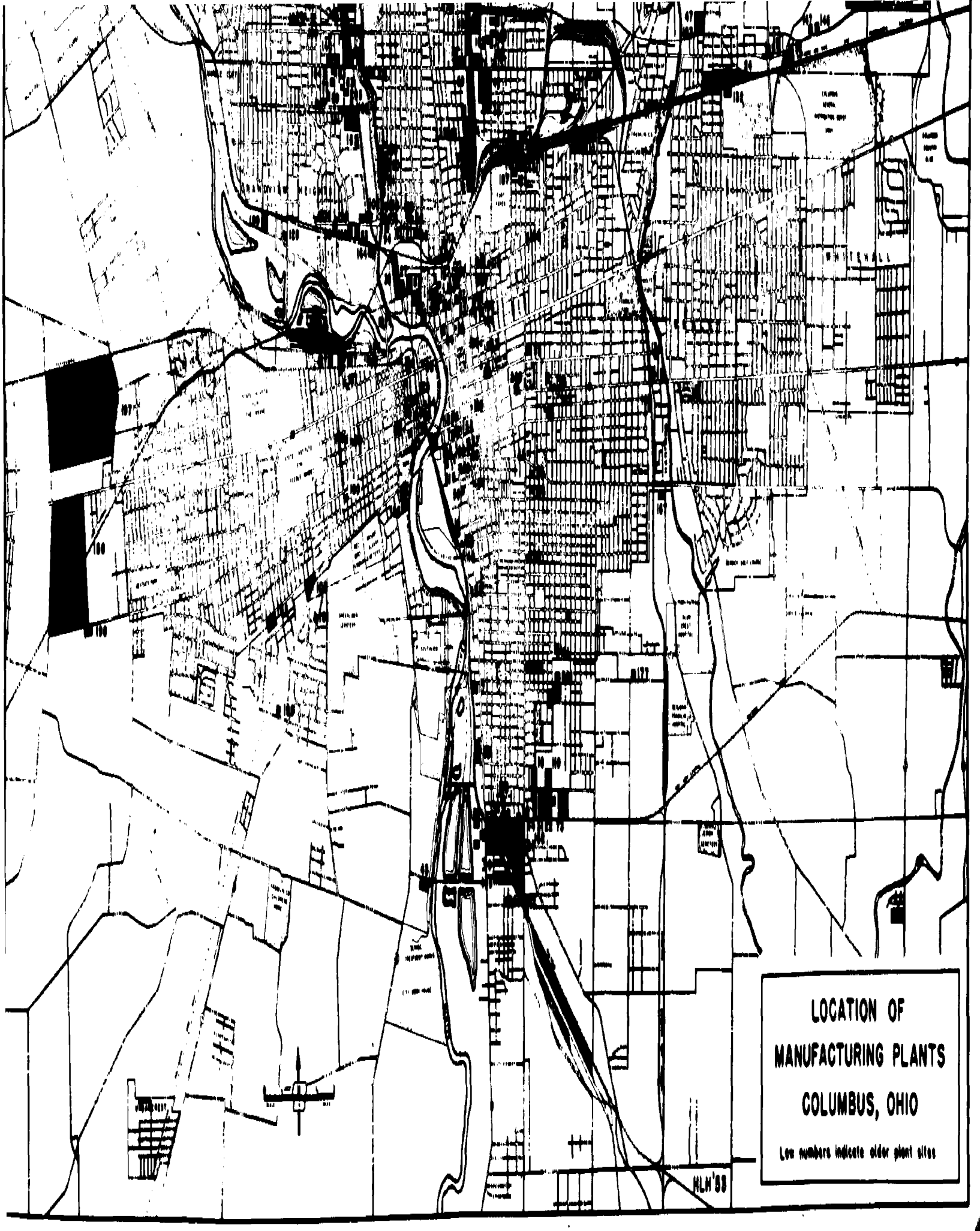
Of the 82 plants in Columbus which remain at original sites (40 percent of the total), 20 are branch plants of national concerns; the remainder are local firms. Here again, the superiority of the planned locations of the branch plants is evident. The local firms, which chose sites with little consideration for expansion or urban growth, were less content with their locations within the city.

Summary — The expanding and successful industrial organization seeks a new and growing industrial community in which to locate. This is good psychology. This over-simplified factor is basic to an understanding of the rapid development of the Northwest and of the suburban industrial communities in West and East Columbus. It explains the outward movement of factories from the Downtown, South, and North industrial areas.

### C. The Major Industry-Groups of Columbus, Ohio, 1953

The 206 manufacturing establishments which form the basis of this study were earlier classified into 20 major industries. To achieve coherence and unity in a discussion of these industries, they have been further classified into six major industry-groups. In each of these major groups, the individual industries will be discussed at length and the force




LOCATION OF
MANUFACTURING PLANTS
COLUMBUS, OHIO
Low numbers indicate older plant sites
HLH '58

involved in the location of each of the 206 manufacturing establishments, which employ about 85 percent of the city's manufacturing workers, will be emphasized. These sections are a word picture of industrial Columbus in 1953.

## The Metal Industry: A Processing Group

Included in this group are five industries which produce semi-finished or finished metal parts for assembly or fabricating industries. The first three, the Forging, Foundry, and Stamping industries, are among the five oldest in Columbus. (See Chart II, Average Date of Establishment of the Major Industry Groups, page 96.) Since they are the basic metal producing industries and are among the oldest industries in the city, they take preference over other groups in this discussion.

THE FORGING INDUSTRY. There are no industries that are older and few more stable than the Forging Industry in Columbus. The average age of the five companies which form this comparatively small group is approximately 67 years. In June 1952, the Columbus Bolt & Forging Company (# 1) celebrated its 100th years of successful operations in Columbus. The other forge plants are also old: The Berry Brothers Iron Works (# 4) was established in 1881, the Brightman Manufacturing Company (# 11) in 1895, the Columbus Forge and Iron Company (# 13) in 1898, and the Columbus Anvil and Forging Company (# 16) in 1900.(11)

Plant sites — The present building sites are those occupied by the companies at the outset of operations. Four of the plants are on the

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11 The numbers following each firm's name refer to the numbered locations of each firm on the Location of Manufacturing Plants map, Figure 7, page 93.

fringe of the Downtown or are within that area itself. The Brightman Manufacturing Company is part of the industrial concentration found beyond the southern limits of the city. Thus, these plants are in the older industrial sections. Their physical appearance confirms their age if not their productive capacity. All but the Columbus Bolt & Forging Company occupy one-floor structures which are usually of red brick and with numerous additions. They are built to the street's edge and the landscaping common to the newer sections of the city is missing. These remarks are intended not as a reflection upon any of the firms but emphasize the age of each plant and, in the larger sense, the age of the communities in which they have developed.

The only firm which could expand its operations on its present site is the Brightman Manufacturing Company. The Berry Brothers plant is virtually hemmed-in by the Jeffrey Company; the Columbus Bolt & Forging plant has used all of its available ground. This has led to multiple-story structures resulting in higher operating costs. Storage and parking space are requirements which cannot be easily met.

Plant expansion could take place only beyond the present limits of the city, according to representatives of two of these plants. The land that is present for industry within the city is high-priced and generally unsatisfactory.

Factors in location -- The oldest company, Columbus Bolt & Forging, attributes its start here to the initiative and foresight of New England bolt-makers who came to Columbus at a time when the agricultural implement and railroad market was growing. A fine supply of labor and the availability of capital in Columbus were factors which permitted the de-

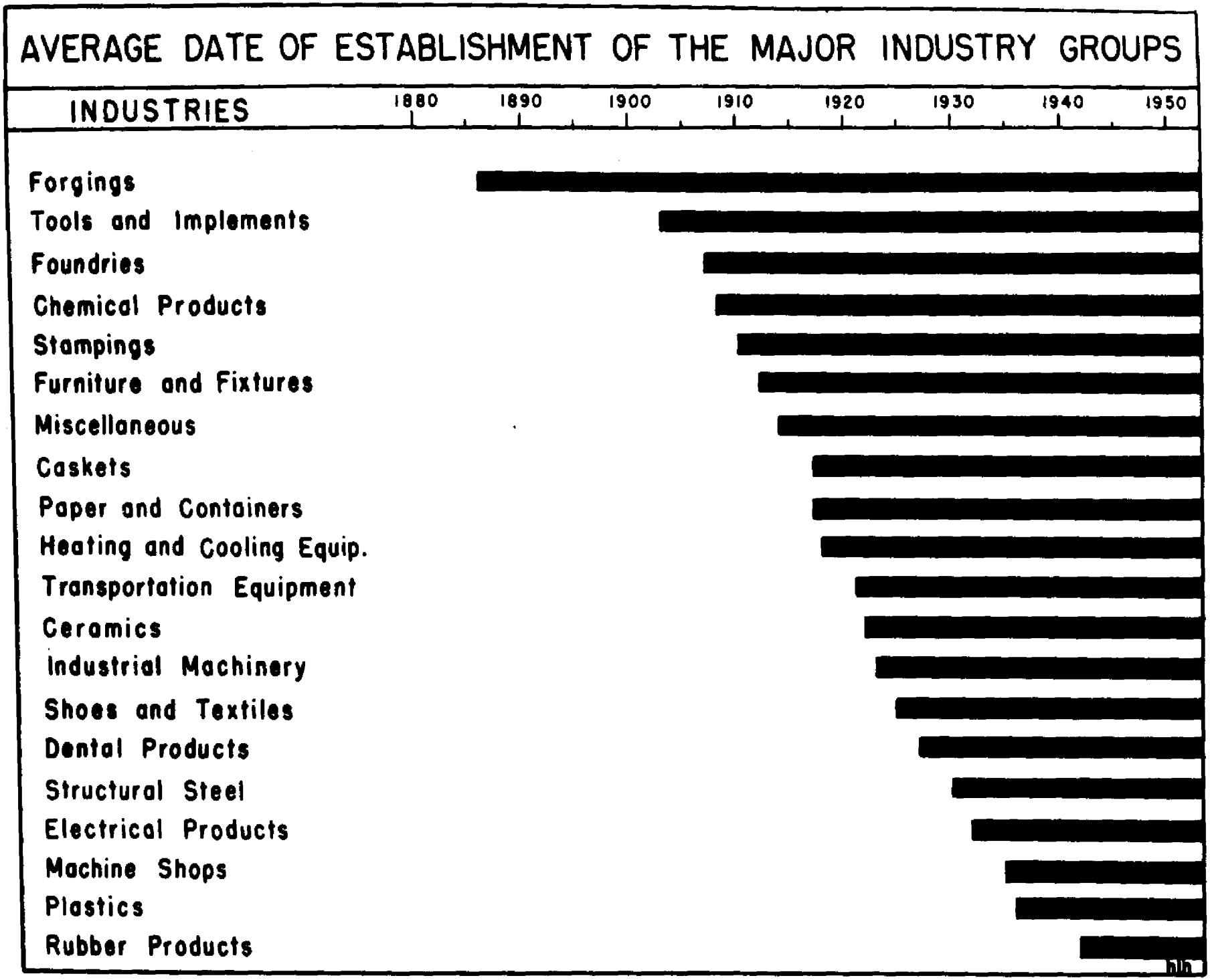
AVERAGE DATE OF ESTABLISHMENT OF THE MAJOR INDUSTRY GROUPS
INDUSTRIES
1880
1890
1900
1910
1920
1930
1940
1950
Forgings
Tools and Implements
Foundries
Chemical Products
Stampings
Furniture and Fixtures
Miscellaneous
Caskets
Paper and Containers
Heating and Cooling Equip.
Transportation Equipment
Ceramics
Industrial Machinery
Shoes and Textiles
Dental Products
Structural Steel
Electrical Products
Machine Shops
Plastics
Rubber Products

Chart II

velopment of the company. No doubt important in the success was the dominating position of Springfield, Ohio -- at this time the leading forge center in the nation.

The other four companies were established here because of the close ties their founders had with this area. In every instance, the capital backing and the initiative of the early industrialists were prime factors in their growth. Largely because of the excellent market, the firms continued to grow and prosper. Production shifted from forgings for agricultural implement manufacturers and the railroads, to the manufacture of bolts, nuts, and screws for the buggy trade. Since 1900, the greater share of the market has been with the automobile industry.

Bonds -- The forging companies are, in no way, parts of larger national organizations. Indeed, there is little relationship between the firms and any others in the city. Only the Berry Brothers Iron Works seems to have developed any real bonds with other local firms. It must be assumed that its location on East First Avenue was due, in part, to the growth of the Jeffrey Manufacturing Company. Berry Brothers began operations four years after the Jeffrey Company and has always sold a large proportion of its finished goods to that firm.

Products -- Presently the bulk of the forged products is for the automobile industry. Brake rods, throttle rods, bumper bolts, machine bolts, lag bolts, nuts, screws, and various truck forgings are representative. In addition, forgings are made for the mining machinery and conveyor industry, for road machinery, for the electrical industry, and for the machine tool industry. Columbus Bolt & Forging produces wrenches, pliers, tin snips, and other hand tools. The Columbus Forge and Iron Company re-

mains as the only producer of forge anvils in the United States. The Brightman Manufacturing Company specializes in nuts and bolts for railroad equipment and farm implements. The finished products are usually sold directly to the consumer who may further machine the forged items. These companies do not compete since each engages in the manufacture of its own specialities. Outside the city, competition stiffens, especially in connection with the auto trade.

Markets -- The Forging Industry serves two principal markets. One is local -- three plants sell forgings for mining machinery to the Jeffrey Manufacturing Company. This makes up approximately 50 percent of the Berry Brothers' market. In addition, sales are with the Columbus Auto Parts, Seagrave, and General Motors plants.

Most of the market lies beyond the immediate region. This has been cited as one of the principal handicaps to the industry's continued location here. The market is limited locally by the diversification of industries. Add to this the freight disadvantage which these companies assert is encountered in the shipment of goods to the major markets in Detroit and other Michigan cities, and it is evident that Columbus has deteriorated as a center.

A similar situation exists with raw materials. Because of these handicaps, three of the forge plants would locate elsewhere if such a possibility presented itself and if business conditions permitted. Detroit, Cleveland, Chicago, or Pittsburgh would be better locations market-wise or from the standpoint of raw material supply.

While Detroit is the biggest single market, sales also take place in Cincinnati, Cleveland, Springfield, and other Ohio cities, in St. Louis,

Philadelphia, and as far south as Atlanta, Georgia. The Columbus Forge and Iron Company carries on overseas trade as well but it is limited to what has become a minor product -- forge anvils. Widely used in many "backward" nations, they are exported through a New York representative. Requests for drop-forgings from northwestern European and South American nations are frequent but little has been exported because of legal and technical difficulties encountered.

Raw Materials -- The basic raw material is common steel which is purchased in Pittsburgh, Cleveland, Chicago, and Youngstown.(12) Alloys are purchased in Canton and Massilon. Practically no steel is gotten locally since neither quantity nor variety is available.

Transportation -- Each plant is well-served by the railroads. Nearly all imported goods are transported by rail. In fact, one company has no adequate facilities for handling incoming goods by any other means. In contrast, the Brightman Company employs truck service for all shipments. The importance of trucking is a direct outgrowth of shipping costs. Those companies using rail facilities do so because of the large quantities of steel shipped in carload lots. In this case, the railroads provide lower freight rates than the trucking firms.

Many of the out-going products are shipped by truck for speed and convenience. On shipments to Detroit, truck transit takes about 12 hours and rail shipment between two to three days.(13)

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12 Columbus is a stop-in-transit point for steel: Pittsburgh to Columbus to Detroit (raw materials to processing to finished goods.).

13 Many truck shipments are at the insistence of the auto and truck industry which is anxious to sell this type of transit to other industries.

Labor -- The effect of new firms in Columbus upon the older concerns has been negligible except as they affect labor. The labor force -- 95 percent of which is native-born -- attracts industry today as it has for the past 50 years. The older industries have followed a pattern of training their workers for jobs and can ill-afford to lose them. Since few men are actually skilled, this industry competes with others in the city for common labor.(14) New firms have absorbed some of this surplus.

There are approximately 1,350 workers in the industry with about 1,050 of them on the payroll of the Columbus Bolt & Forging Company. About 210 women and 15 Negroes are employed. At an earlier date, the contract prison labor of the Ohio Penitentiary provided companies in this industry with a very low-wage force. The Columbus Bolts Works used this force and it is possible that its site, bordering the prison on the east, may have been related to its labor supply within the Penitentiary.

Work in the industry is heavy and hard but it is compensated for by a fairly high wage. The average shop wage is about $1.90 an hour but the skilled workers, such as die setters, may earn up to $3.50 an hour. Generally, if the worker remains on his job from three to six months he will stay with the company. The Brightman Company has an old labor force that has been with the firm many years. It is comprised of many good workers from the older German communities in South Columbus.

New firms -- The labor problem is not the only one created by new concerns. In exchange for increased business and an enlarged local market, disadvantages have occurred in parking and housing. Many represen-

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14 According to one representative, there were only 800 die setters in the country ten years ago.

tatives of this industry believe that Columbus has experienced a rapid growth in industry without corresponding social growth. Inadequate housing and parking facilities, unsatisfactory highways, and delayed development in the extension of public utilities, have been the results of this expansion.

Utilities are generally satisfactory but two plants, the Columbus Anvil and Forging and the Columbus Bolt Works, supplement the city water supply with their own wells. The Brightman Company experienced water shortages in South Columbus until an 18-inch main, installed within the past five years, relieved the situation.

Prestige -- As with the Foundry Industry which follows, there is little prestige for an industry of this type in Columbus. Steel-making cities, such as Pittsburgh and Cleveland, are the present-day forge centers. Only through the services rendered by the local firms has Columbus come to be known as a center for the forge industry.

THE FOUNDRY INDUSTRY. The Foundry Industry is not as old as the Forging Industry (See Chart II, page 96) but it too is a market-oriented locally-initiated industry. Of the eight iron and steel foundries and seven non-ferrous foundries in Columbus, all but one were started by natives of the area who anticipated a growing market. While this is a leading industry in Columbus,(15) the city does not have a wide reputation nationally as a foundry center. More than 40 years ago, however, when the Columbus foundries served a number of stove and furnace plants in central Ohio, the city did have prestige. It was considered the eastern apex

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15 The Foundry Industry is the fourth largest in size in the city.

of a "foundry triangle" which had Indianapolis and Cincinnati at its other points. For clarity of discussion, the iron and steel foundries and the non-ferrous foundries will be reviewed separately.

Iron and Steel Foundry Industry. The eight foundries vary in size from the Poulton Foundry (# 55), which employs 20 workmen, to the Buckeye Steel Castings Company (# 21), which has about 2,000 employees. The industry has operated locally for over one hundred years, but the oldest of the present firms is the Hertenstein Company (# 7) which was established in 1880. (See Chart III, Date of Establishment of the Oldest Active Company in Each Industry Group, pages 118-119.) All of the foundries began operations prior to World War II -- they average 45 years in age.

Factors in Location -- Seven of them were started through the initiative of local individuals. The growing stove, wagon, and machinery markets afforded potential trade. Local ties, established at an early age, were responsible for the success of some plants. The Ohio Malleable Iron Company (# 20) sold foundry products to the Jeffrey Manufacturing and Kilbourne & Jacobs companies from 1900 on. Jeffrey purchased the foundry in 1905 to assure its supply of malleable iron chains and castings. About 30 percent of current production goes to Jeffrey.

The Columbus Malleable Iron Company (# 101) was organized here by Cleveland interests. This plant, on Curtis Avenue, is an independent part of the Lake City Malleable company which has other plants in Cleveland and Ashtabula. The Columbus plant was purchased in 1936 when an old foundry site was available at a low price. With this purchase, the Lake City organization reduced competition in its field and strengthened its own structure.

Bonds -- There are no industrial bonds other than those noted above but there are many close relationships between firms. For years, the Poulton Foundry has done practically all of the cast iron work for the Weinman Pump Company and there have been similar ties in the past. The Hertenstein Foundry has produced cast grills and grates for the stove companies. These bonds are not readily seen and they may not be considered in the structural framework of an individual company but they are vitally important to the industry's growth.

Products -- A variety of cast products is typical of the industry. Four of the firms produce grey-iron castings -- the Hertenstein, Poulton, Chase (# 12), and Columbus Co-op (# 114) plants -- whereas the Columbus Malleable and Ohio Malleable firms produce malleable iron castings and the Buckeye Steel Castings and Bonney-Floyd (# 22) companies make a variety of steel castings.

Castings for the railroad, automobile, mining machinery, and agricultural equipment industries dominate the production, but pumps, valves, chains, gears, die and tool parts, truck parts, tank car parts, and parts for the heating and cooling equipment industry, are also made. The bulk of these goods is shipped directly either to a consumer who uses the casting as it is (the railroad industry, for instance), or to a processor who machines it for use in a finished product (the automobile industry).

Markets -- The large foundries reach national and international markets. The latter results in "token" shipments for the most part, but the Buckeye Steel Castings Company supplies car couplings to railroads in Europe, South America, and South Africa. The Columbus Malleable Iron Company has sold pipe-line joint castings to Middle Eastern nations for use

in the oil fields and, today, ships railroad castings to Venezuela for use on the U. S. Steel's railroads there.

Nationally, the Buckeye Steel Castings Company sells in a competitive market to any railroad building or repair shop. The Hertenstein Foundry supplies a number of stove manufacturers in Ohio and West Virginia with grey-iron castings. The Chase Foundry and Ohio Malleable Iron concentrate their sales in the truck and automotive fields. The former sells special castings to the manufacturers of special duty heavy trucks while 70 percent of the latter firm's output goes to the auto industry. The Bonney-Floyd Company ships goods to agricultural equipment makers and to power shovel companies in a few large mid-western centers.

Competition -- Competition exists among the small foundries but it is limited. each shop makes its own specialty items. When work is short, competition increases but it is "friendly."(16) Each of the small shops has regular customers within an area not more than 50 miles from the foundry. These market-oriented firms are limited by unfavorable freight rates.

Competition among the larger firms is on a national level. The American Steel Foundry at Alliance, the Ohio Steel Foundry at Springfield, and Commercial Steel Castings and Alloy Steel Castings in Marion, are Ohio firms that offer direct competition in the larger domestic markets.

Raw Materials -- Pig iron is supplied by Cleveland, Toledo, Pittsburgh, and Buffalo furnaces with secondary sources in Portsmouth, Middletown, Erie, Birmingham, and Daingerfield, Texas. The Hertenstein Company brought pig into the city from Germany, Scotland, Chile and France, and

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16 "Friendly" is used in contrast to cut-throat competition. There is no intended reference to collusion or price-fixing.

the Columbus Malleable firm brought it primarily from Germany during periods of shortages.

Some scrap steel is used in the open hearths of the Buckeye Steel plant and in the electric furnaces at Bonney-Floyd. This is usually obtained locally: about 600 pounds of scrap are used for every 400 pounds of pig iron.

Coal and coke are brought in from western Pennsylvania and West Virginia. Sand, for use in forming molds, may be fine- or coarse-grained. Fine sands come from Galion, Sandusky, and Conneaut, Ohio, while the latter are obtained either locally or in New York. Some manganese comes here from Mansfield and one plant gets limestone from Missouri.

Transportation -- The small firms transport their materials by truck. The larger companies use the railroads due to the greater quantity of bulk goods handled. The Buckeye Steel Castings Company ships practically everything by rail and it specifies rail shipments on incoming goods since the railroads are Buckeye's biggest customer.

Labor -- This industry employs about 3,345 workers -- an average of 415 in each plant. Women are not used but Negroes find ready employment, especially in the malleable and steel foundries, where work is heavy and dirty. Almost 50 percent of the workers in these foundries are Negroes.

Skilled foundrymen are scarce. Common laborers, ". . . such as they are . . ." are available but they lack training. "Floaters," who are unreliable and who create instability, are present. These men shift from job to job, from plant to plant. The small plants do not lose their best men, however, since loyalties to company and trade are strong, generally. New firms have <u>not</u> taken the skilled foundryman but they have

absorbed much of the untrained force.

Increased wage rates in the city have been the major effect of the new firms. This is true not because of a scarcity of workers but because such plants as the North American Aviation Company were permitted to raise their wages above the city's average during the period of wage controls. The older, smaller companies found it difficult to hold their workers under these conditions. While the city has never been a strong union center, increased industrialization has resulted in growing union strength. A final consequence of recent industrialization has been a continuing decline in the number of white foundry workers and the reduction of the pool of partially trained workers.

Plant Sites -- There is no definite locational pattern in the distribution of the foundries. (See Figure 7, page 93.) Four plants are in the heavy industrial South Columbus. Bonney-Floyd moved to Marion Road in 1904 when farm land was available there in large tracts at low cost. These advantages are now gone and crowded working conditions are common but the site is still satisfactory. The Hertenstein Foundry is on family-owned land in South Columbus lying between South High Street and the Scioto River. Even though topography has dictated two levels of plant operation, the site has been satisfactory.

The Ohio Malleable Company moved to Fields Avenue in North Columbus to expand its operations in a non-residential area. Good railroad connections were available at this site within a few blocks of Jeffrey.

The small shops usually occupy older one-story buildings. By the nature of the plant -- dirty, dusty, and smoky -- the sites are not particularly attractive. This is the heaviest industry in Columbus and the

H.L.H.

THE BUCKEYE STEEL CASTINGS COMPANY IN SOUTH COLUMBUS

A LARGE, HEAVY INDUSTRY IN AN OLD INDUSTRIAL AREA

No. 3

open hearths at the Buckeye Steel plant and at the malleable iron plants add to this industrial complex.

Handicaps -- Some apparent physical handicaps plague this industry. The large Buckeye Steel plant is crowded and suffers from a lack of sufficient water in South Columbus. Many other plants lack space for expansion or are housed in inadequate buildings. More significant, however, is the declining market in Columbus. The new companies entering the city offer some new markets but they are not able to absorb the lost production. The absence of manufacturers who utilize foundry products has handicapped growth.

Firms coming here within the last 15 years have influenced the expansion of supply and warehouse facilities in the city, however. Increased supplies are a benefit to the entire industrial community.

Utilities -- Public utilities are normally satisfactory although a water shortage has existed in South Columbus. An 18-inch main, laid within a four year period, has relieved this. Electricity is satisfactory although two companies supplement purchased power with their own. The Bonney-Floyd plant, said to be the biggest electric consumer in the city, received very good service. A gas shortage during the winter months is a minor handicap that is being overcome.

Non-Ferrous Foundry Industry. The non-ferrous foundries, while dominantly a locally-oriented group, differ considerably from the iron and steel foundries. They are smaller in size on the average (the largest employs only 78 men), produce a more limited variety of products, and sell to a more concentrated market.

Products -- Brass foundries dominate the group: six of the seven

firms produce brass castings. Four firms also produce aluminum castings and one makes bronze and iron casts as well. The aircraft industry and the plumbing and building trades industry afford the major markets, and castings for the automobile and electronic equipment manufacturers are of lesser importance. There is an industrial sequence of products, in some cases, with the rough castings going to machine shops before they reach the consumer. For the plumbing and contracting industry, wholesalers and distributors receive the castings directly.

Age -- The Non-Ferrous Foundry Industry is old and well-established. The Triumph Brass Company started operations here in 1850 (See Chart III, pages 114-115.) but the Industrial Aluminum Company located as recently as World War II. The average age for the industry as a whole is 42 years. Even with an industry that has operated continuously for more than a century, there is no particular prestige. Foundry-men find Columbus a good town, well-located for raw materials and markets, but it is a minor producer with small quantity production and with no basic research here.

Plant Sites -- There is no strong pattern of plant location developed since Columbus did not restrict industrial growth in a physical sense. An industrial core never developed, but in contrast, plants were established on the fringes of the city in widely separated areas. The absence of a restrictive industrial core at the time of early industrialization largely explains the present hodge-podge.

The Atlas Brass (# 28) and Buckeye Pump (# 35) plants are in residential sections of South Columbus. Their facilities include residential dwellings which have been converted into plant and office space. Triumph Brass (# 45) is in the southern section also but it is relatively close

to the Downtown. The Franklin Brass (# 72) and Industrial Aluminum (# 135) companies are in the industrial strip of land bordering the Pennsylvania Railroad yards east of Cleveland Avenue. The site is not attractive but the advantage of adequate buildings and cheap land compensate for the smoke, dirt, and noise. The only foundry immediately north of the Downtown is the Simplex plant location in a one-story building on a small lot.

To emphasize the limited amount of space available, four foundries occupy buildings formerly housing non-industrial facilities. The Industrial Aluminum Foundry is in a building originally used as a restaurant. The Columbus Brass Manufacturing Company (# 205) occupies the former showrooms of the Lehman Lumber Company in Northwest Columbus. This company, the only plant to relocate recently, has a modern building and a large lot which are in sharp contrast to the usual small, dirty brick buildings and crowded lots now occupied by the other firms. The Franklin Brass Foundry has a 30 foot square garage and the Simplex Foundry (# 71) uses a crowded garage. These companies indicate the need of many small Columbus firms for adequate industrial buildings and grounds.

All but two of the plants, the Industrial Aluminum and Atlas Brass companies, have had previous locations. Triumph Brass first began operations in old Franklinton. The convict labor of the penitentiary, used to produce cast kitchen utensils, was a factor in its relocation near the penitentiary. A number of other sites followed until a permanent one on Wager Street was chosen in 1919.

While these companies are handicapped by inefficient plants and by crowding, the advantages of the location with respect to market, raw material supply, and for transportation service, more than compensates. The

Simplex Foundry emphasizes the importance of its position in Columbus as the only plant in central Ohio for heat-treating aluminum materials.

Local Ties -- All of the non-ferrous foundries were promoted by the initiative and inventiveness of natives of Columbus. None has ties beyond the city. Five are entirely independent, but the Industrial Aluminum Company was purchased recently by the Columbus Dental Manufacturing Company and the Triumph Brass Foundry was taken over by the Ebco Manufacturing Company a few years ago. Whereas Triumph makes practically nothing that is used by Ebco, the Industrial Aluminum Foundry makes a few products for the dental firm. No other ties exist currently although the Simplex Foundry had its beginning in the 1920's when it was a part of the Raney Company. Until 1922, it made aluminum heads for the Raney carpet sweeper.

These firms would relocate here under present conditions. The strongest tie is the market. Curtis-Wright was a major market during the war and Ranco, Incorporated and Exact Weight Scales remain important. North American Aviation offers the most important single market to the industry today. It exerts considerable influences on the location of small supply firms, such as foundries.

Competition is insignificant. Most shops have their own customers -- machine shops which engage in sub-contract work for the aircraft and automobile parts concerns.

Markets -- The majority of the plants reach a market throughout the central lake states although sales are concentrated within the Columbus area. Freight rates are a limiting factor in the extension of the sales territory -- so much so that only one plant ships west of the Mississippi or south of the Ohio. Plumbing goods are marketed in New York, Chicago,

Louisville, and locally. Detroit, Pittsburgh, Toledo, Cleveland, Mt. Vernon, Muskingum, and other cities within a 200-mile radius form the core of the market. Columbus is centrally located to reach the principal urban markets of central United States.

Raw Materials -- Few raw materials are acquired in central Ohio. Brass ingot, rod, and sheet, are purchased in Chicago and Cleveland, and from outlets in Cincinnati, Detroit, Pittsburgh, Buffalo, and Waterbury. Aluminum ingot is purchased from all of the major aluminum producers in Chicago, Newark, Cleveland, and Cincinnati. Lead and zinc are brought here from Chicago and St. Louis whereas copper alloys are purchased in neighboring communities. Core and mold sands may be obtained locally or in Galion, Zanesville, or Albany, New York. Pig iron and steel come from Pittsburgh.

Transportation -- Generally, 90 percent of the outgoing shipments are by truck but railroads are important on incoming shipments. Truck service is quicker and more efficient for the small company, and for local deliveries. Four companies have railroad spurs but they are rarely used -- only to handle sand or other bulk goods.

Labor -- About 240 workers are employed. Fifteen women work at the Atlas Brass and Triumph Brass plants where they do light work. Fifteen Negroes are also employed -- they are usually unskilled but capable.

Work is hard and requires much physical labor. Many young workers who seek soft jobs with high pay are unwilling to undergo the rigors of this type of work. Other firms have taken some of the unskilled men with higher wages as the incentive but the trained molder has no place with the new firms coming to Columbus. Whereas the absence of competitive companies

is an advantage at the moment, the fact remains that the local industry is not able to train and keep the skilled workers it needs. A few shops have had no turnover in a year's time and this is significant in the foundry trade. No foundry has a union.

Public Utilities -- All plants use city water but a few supplement this with their own wells which supply needed pressure for testing operations. The electric supply is generally adequate but two firms have had costly shutdowns due to power failures.

The fluctuating gas supply during winter months is another major complaint. Companies requiring gas for industrial operations or for heating are affected.

Public transit facilities and parking facilities are adequate for the small firms. A major handicap is the lack of properly zoned building space. Land is high-priced and good sites are scarce. None of the crowded firms can expand economically at its present site. The inadequacy of industrial lands and buildings within the urban center is a major problem facing industrial society today.

The Non-Ferrous Foundry Industry is an old industry that has not profited by growth until recent years. The static nature of the industry in the past reflects the absence of heavy industries. The small shops, scattered throughout the city and with little heed to the factors of geographic location, are representative.

THE STAMPINGS INDUSTRY. The Stampings Industry is old and established but, unlike the Forging Industry and the Foundry Industry, it has never been one of the leading groups in the city.

It is characterized by a high degree of individualism and by changing products which respond to changing markets. Its genesis is local and, consequently, the location factors are not of prime importance. It has never been a major industry but it has been important as a functional part of the manufacturing community.

Factors in Location -- The small plants, scattered over the city, with no characteristic building type, currently have few important functioning ties within the community. The Buckeye Stamping Company (# 31), a local firm, responded to a Columbus market in 1910 when it relocated in expanded quarters in South Columbus to be nearer the Federal Glass Company. The Columbus Manufacturing and Stamping Company (# 157), originally a Chicago firm, located to be near its principal market, the Columbus Bolt & Forging Company.

The Lilley-Ames Company (# 183), once the largest manufacturer of fraternal regalia in the world, is now owned by the U. S. Chromite Company and produces metal stamping for the military forces. Its location here more than 85 years ago was a result of family ties. Cheap labor in plentiful supply and an ideal situation with respect to raw materials and markets continue as advantages of this location.

The firm declined in importance as a manufacturer during the depression and abandoned its large, multiple-story buildings on East Long Street. It now occupies a second floor on East Broad Street in the Downtown. The changes in the plant sites of other firms have occurred for expansion and

modernization purposes. The D. L. Auld Company (# 50) moved to its present site in 1920 when it doubled its productive capacity in a change from the manufacture of jewelry to automobile and appliance name plates.

The Banner Die, Tool & Stamping Company (# 89) moved from the Downtown in 1933 to Northwest Columbus to gain more space in a less congested area. In contrast, the Columbus Manufacturing and Supply Company (# 106) occupied an uneconomical three-story building in the heart of the crowded older industrial Downtown. The available building, attractively priced, was the prime reason for this move.

While relocations within the city are frequent, only one concern would consider leaving the area. Pittsburgh would be a better location since it purchases its raw materials there and has much of its market there. The D. L. Auld plant, on the other hand, would not leave Columbus but would seek a location at the city's edge if a move were contemplated.

Handicaps -- Whatever handicaps exist are local. Most of these are outweighed by advantages of a national order. The Buckeye Stamping Company, in South Columbus, and the Banner firm, in the newly developed Northwest, both have inadequate transit service since they are beyond the political city. With narrow streets and the absence of through-routes, automobile and truck accessibility is hindered in both areas. All other public utilities are satisfactory, however.

Advantages -- The distinct advantage of Columbus is its access to national markets. Four firms sell to the automobile industry and Columbus is in an excellent position to reach this market. Markets in appliances and other electrical equipment fields are within a few hundred miles. The relatively close sources of steel, steel products, and other raw ma-

terials, are added advantages. A fairly cheap, non-union, and stable labor supply is still present here, in comparison with many other Ohio communities. Labor is an increasingly important factor in the location of industry.

Market -- Competition is not great locally but a number of competitors are within 100 miles of Columbus. The variety of products includes automobile stampings, name plates, tin cans, pipe fittings, rollers, and miscellaneous products for the automotive and electrical equipment industries. The markets vary -- the Columbus Manufacturing and Stamping Company has nearly 60 percent of its market here, but Lilley-Ames, Buckeye Stamping, and Columbus Manufacturing and Supply companies concentrate their sales in the national market. The D. L. Auld Company has a wide range of sales from the auto centers in Detroit, Toledo, and South Bend, to the appliance manufacturers in the Miami Valley. Recently, the firm began the manufacture of aircraft parts for national distribution. The Banner Die, Tool and Stamping Company sells to the automotive market in the above named areas as well as in Cleveland, Pittsburgh, and Fort Wayne. Appliance sales are with producers in Dayton. Local sales now average 40 percent of this firm's total compared to 75 percent in 1942.

About 90 percent of the shipments of goods is by quick and efficient truck service for the less-than-carload shipments which occur in this industry. Trucking is cheaper than railroad service; the latter is rarely used. It is unreliable, time consuming, and generally unsatisfactory.

Raw Materials -- Raw materials are transported by truck in almost every case. Steel products from Cleveland, Youngstown, Middletown, Sharon, Pittsburgh, Weirton, and Wheeling, and brass obtained in Detroit and

New Jersey are the basic raw materials. Plastics, obtained from chemical companies in the mid-west and east, are now being widely used to replace costly and scarce metals.

Labor -- The industry employs about 1,400 workers with over one-third women. Women can perform the simple stamping operations and thus replace males who have turned to other, higher-paying industries. About 75 Negroes are untrained, generally, but afford a satisfactory working force. Labor unions do not dominate this industry although bitter disputes have occurred in the past. The large unions have been kept from gaining control of the plants. It would seem, however, that a more intensive unionization will occur in the future since these firms are tied closely to the heavily unionized automotive and electrical equipment industries.

Many semi-skilled or trained workers have been lost to these latter industries in the city through the lure of higher wages and attractive incentive programs. Increased operating costs and tighter competition for services have resulted. The new firms offer limited markets for the established companies but it is hoped that the diversified new plants may mean a more adequately trained labor force in the future.

The Stamping Industry is not a major one in Columbus and its future appears no more impressive than its past. It is obvious that there is little prestige in this industry. It has attracted neither labor, new markets, nor new industries to the city.

# DATE OF ESTABLISHMENT OF THE OLDEST ACTIVE COMPANY IN EACH INDUSTRY GROUP

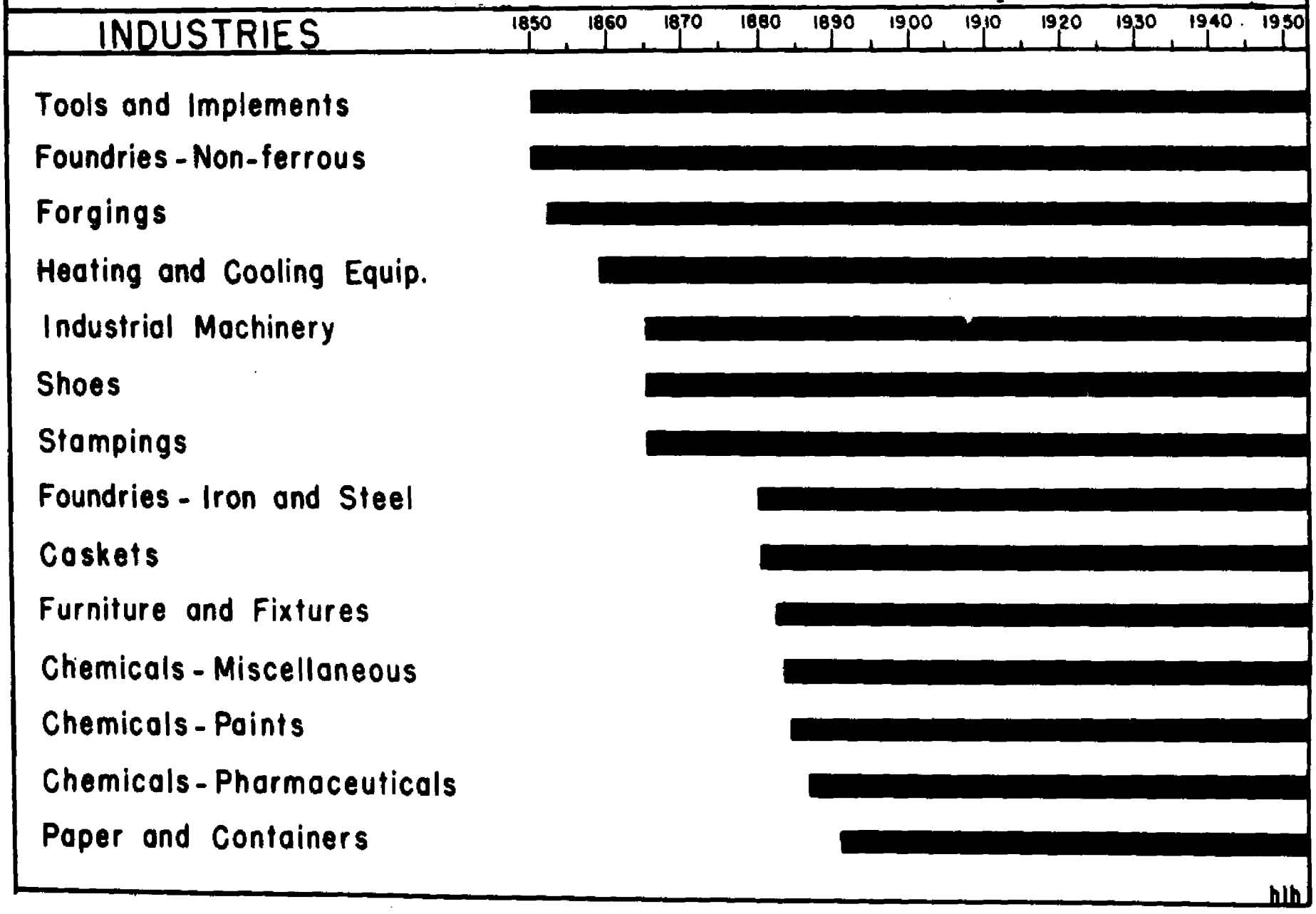


Chart III

# DATE OF ESTABLISHMENT OF THE OLDEST ACTIVE COMPANY IN EACH INDUSTRY GROUP

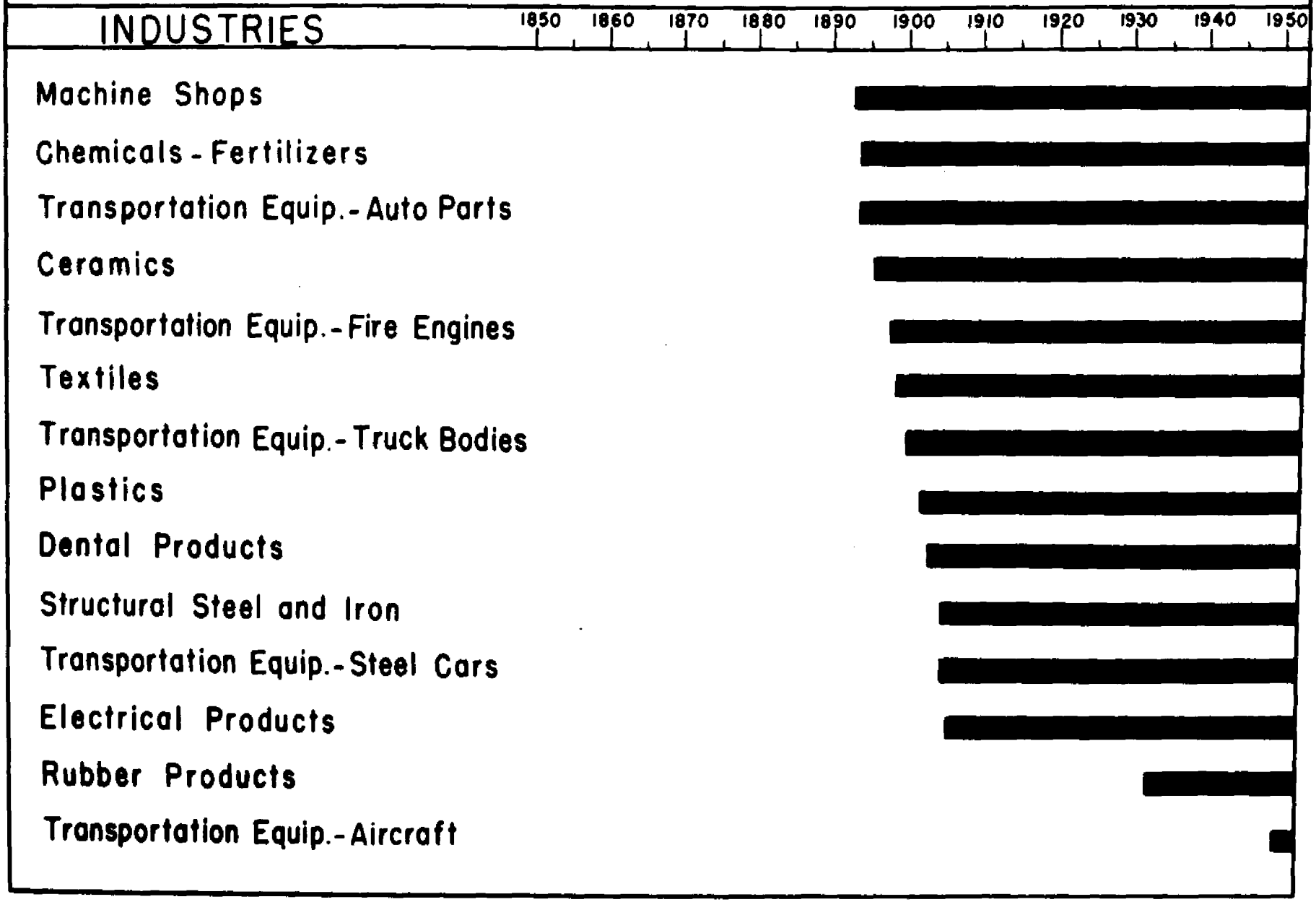


Chart III

THE STRUCTURAL STEEL AND ORNAMENTAL IRON INDUSTRY. In the sense that the above three industry-groups are a functional part of a manufacturing community, this one is not. Its ties with other manufacturing in the city are virtually non-existent. From raw materials purchased outside of Columbus, this industry fabricates structural steel for the construction industry or it shapes ornamental pieces for the same industry. There is no actual manufacturing involved.

Columbus has not had a primary iron and steel industry since 1927 when the American Rolling Mill Company (Armco) withdrew its facilities from the city. While the state of Ohio ranks second in the production of steel products in the nation, Columbus has never been one of the major centers within the state.(17) The Structural Steel and Ornamental Iron Industry is a loosely-knit group. It produces no iron or steel but purchases these products from steel centers and fabricates them for a local market. Six of the nine firms produce the structural steel parts and three firms are ornamental iron shops.

The Structural Steel Companies -- The industry is characterized by small, unattractive shops which serve a market concentrated in the central Ohio region. Two of the firms have been here since 1905, but the average plant is about 20 years old. (See Chart II, page 96 and Chart III, on the preceding pages.) There is no pattern of distribution; the factories or shops are usually in the older industrial communities.

The Dresser-Stacey Company (# 159), formerly Ideco, is the largest firm in this group. It also reaches the widest market and produces the

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17 Even in 1927, Columbus offered no market for the blast furnace products. The furnaces moved to Hamilton for integration with the Middletown mills.

greatest variety of products. Originally producing oil derrick equipment, the company has concentrated heavily upon satisfying the growing needs of the television, radio, and aircraft industries for aerials, towers, beacons, and hangars. Whereas the majority of the smaller firms are limited to an Ohio market, Dresser-Stacey sells its products throughout the world.

Two other plants reach a national market; they serve those parts of the nation in which their parent company operates. The Porcelain Steel Buildings Company (# 94), a subsidiary of the White Castle System, and the Federal Steel Fabricators plant (# 132), a subsidiary of the Universal Concrete Pipe Company, are not of local origin. The White Castle System has small restaurants in eastern and mid-western cities. In 1927, it undertook to build a porcelain steel building. With the success of this experiment, the Porcelain Steel Buildings Company came into existence. At this time, the organization moved to Columbus since it was centrally located for the entire system. The availability of raw materials and a reasonably low-wage labor force were added incentives.

The Federal Steel plant in East Columbus makes reinforced concrete frames. The plant was located here as part of the company's expansion of a local machine shop. Operations are tied to the functions of the parent firm.

The C. E. Morris Company (# 122), the J. T. Edwards Company (# 127), and Columbus Steel Industries (# 48), are local concerns that fabricate and cut steel for bridges, buildings, and other construction. Competition is heavy since markets are limited to an area within 100 miles.

Raw Materials -- Pittsburgh is the principal source of structural, bar, and sheet steel. A few of the smaller concerns purchase steel from

local warehouses with Chicago, Cleveland, and Dayton, secondary sources. During a critical shortage, steel was brought here from Japan.

Most companies transport by truck but Dresser-Stacey relies upon rail shipment. Generally, truck service is cheaper, quicker, and more convenient for the small organizationswhich are not able to handle carload lots.

Labor -- Seven hundred and fifteen workers are employed by the structural steel firms (about 500 of them by Dresser-Stacey, which is also the only firm with a union). There are only 45 workers in the three ornamental iron shops. Only a handful of Negroes is employed on dirty jobs and on ones requiring little skill. Few skills are required of any worker, for that matter, since physical labor is the prime requisite. Workers are easily trained to cut steel beams and to weld or rivet parts and sections.

Labor is readily available but many plant supervisors said that the average worker is a "floater" -- consequently, labor turnover and absenteeism are high. This situation is due, in large part, to the low wages.

Effects of New Plants -- Such new firms as North American Aviation and General Motors have had a beneficial effect upon this industry. The demand for supplies of raw materials has caused increased warehousing and stockpiling in the city. This has benefited the smaller firms which were unable to demand such service in the past.

Utilities -- Utilities are fairly satisfactory. The Morris Steel Company, on Curtis Avenue, has suffered numerous power failures, however. These have been particularly serious in this part of the city: other Curtis Avenue firms report similar trouble with electric power. Inadequate public transit service and poor parking facilities create difficulties at the Dresser-Stacey and Morris plants. Both are in old industrial areas.

The Ornamental Iron Companies -- These small, locally-owned shops have a market that is distinctively local. The shops are scattered, with two in West Columbus and one in the North. Each produces finished ornamental iron work either of standard stock or for the custom trade. Competition is strong but Columbus is a good location because of the growing market which has accompanied new home construction.

With the exception of inadequate gas service to the Artcraft Ornamental Iron Company (# 142) in North Columbus, utilities are good. The two West Columbus firms, Buckeye Wire & Iron (# 97) and the Columbus Metalcraft Company (# 174), are in old residential areas where they are cramped for space. The Artcraft firm has a modern building, attractively landscaped and decorated with ornamental iron.

Summary -- The Structural Steel and Ornamental Iron Industry has no strong ties in Columbus. Only the Dresser-Stacey, Federal Steel, and Porcelain Steel Buildings companies have outside interests. Their positions here have resulted from policies dictated by their parent firms. The location of Columbus in respect to markets and raw materials is the factor which explains their success.

THE MACHINE SHOP INDUSTRY. The Machine Shop Industry is the ultimate in the functional metal industry-group. Its principal purpose is to further refine or machine a metal part that may have been produced by the forging, foundry, or stamping firms. It produces no original products nor does it cater to a particular industry-group.

Development -- It is doubtful whether there is an industry whose development is more closely tied to the recent industrial boom and whose future is less stable in Columbus than the Machine Shop Industry. Its

growth is closely aligned to the growth of war-time industrial plants and the location of large branch plants in the city in the past ten years. There are 26 shops in this group; 16 of them have located here since 1940, and ten of these since the end of the war.

Buildings -- In a sense, the style and type of building suggests that the shops are temporary and here only because of the boom.(18) The shops are in one-story cement block buildings that have been erected on small lots scattered in various parts of the city. Many of the owners have other businesses which represent their permanent investments; the machine shops are "sidelines," or temporary but profitable business ventures to last only as long as the market.

Plant Sites -- A further indication of this temporariness is the fact that only seven of the firms occupy the site that they did when first organized. The need for larger quarters usually prompted their moves although the instability of the industry had some influence. Three companies moved out of the Downtown to avoid the inconveniences of crowding and traffic. The distribution of the shops throughout the city is fairly even although more are located in North Columbus than anywhere else. These shops, on East Fifth Avenue, are relatively near the North American plant.

Origin of the Shops -- Most of the shops were started by Columbus natives who had worked previously in related industries. Quite a few of the owners had been employed at either the Jeffrey Manufacturing Company or at the Timken Roller Bearing Company in Columbus.(19) They had saved

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18 The idea that this industry, at its present size, is a temporary one was voiced by many of the respresentatives interviewed.

19 Every one of the ten shops organized prior to 1940 was Columbus-owned.

money during the war years and this, coupled with their own initiative and ingenuity, started them on their way. Only one firm was organized in another community. It moved here from Dayton because an important new market was recognized here and labor relations were more favorable.

Products and Markets -- The important products of these shops are parts for the aircraft industry. Drilling, grinding, shaping, or cutting operations are performed on parts supplied to the shops by the aviation company. The machine shop is commonly a part of a sequence of operations as it machines foundry or forge products. Often the part is not finished when it leaves the machine shop. Some finishing and final assembly work may take place at the North American plant. Automobile parts -- including roller pins, bearings, nuts, screws, and special tools and machines -- are of secondary importance. Some sub-contracting work takes place for General Motors, usually involving tank parts for the Cadillac tank plant. A firm such as the Thurman Machine Company, an old Columbus machine shop, may also manufacture its own line of products, in this case industrial scales and precision instruments. Six of the firms are tool and die specialists but emphasis is currently on products for the aircraft and automobile industries.(20)

Raw Materials and Transportation -- Machine shops operate on direct contracts from manufacturers. The companies handling sub-contracts under government orders have no choice in the materials they work with nor do

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20 Included are: Modern, Tool, Die, and Machinery Company (1915), Capital Die, Tool and Machine Company (1900), Columbus Die, Tool, and Machine Company (1906), Superior Die, Tool and Machine Company (1928), Advance Tool, Stamping and Die Corporation (1940), and Thompson Metal Fabricating Company (1951).

they transport these goods. In dealing with North American, a company truck delivers the raw materials to the shop and picks up the finished, machined parts when the order is ready. Absolutely no substitution of materials is permitted and samples for inspection must be prepared with each batch. While such supervision is difficult, it relieves the small shop of many responsibilities; it need not purchase nor transport goods.

Advantages and Disadvantages -- The only advantages not enjoyed by these firms are on the local level. They operate in crowded buildings, have limited access to railroad facilities, and are victims of traffic. This latter fact applies especially to the firms on East Fifth Avenue. Access to market is an advantage and the availability of raw materials within 200 miles of the city by excellent rail and highway transportation are important considerations. The labor picture is not so favorable, however.

Labor -- About 1,200 men and 150 women work in the machine shops. The Negro force is small. The average number of workers per plant is 51 with the smallest shops employing ten and the largest up to 130.(21) The skilled machinist is hard to find. Such a worker may be required to setup and operate a screw machine which may perform five to seven different timed operations upon one part. Work at lathes and milling machines may be carried on by semi-skilled workmen but a high degree of accuracy is required on aircraft and automobile parts so that partially trained workers are a disadvantage. In addition to the screw machines and lathes, drill presses, milling machines, planes, and borers are used.

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21 The Thurman Machine Company employs 130 and the Wright & Company, manufacturers of aircraft parts, has 10 employees.

The skills are required in setting-up the job, adjusting the tools, and checking the over-all operation.

Females are used at light tasks and those requiring patience. Most companies prefer not to use women but the shortage of qualified males precludes this. Wages are somewhat lower for the female worker but the tasks she can perform are limited too. The average weekly pay check for all workers in one shop was approximately $100.

New firms, with accumulated advantages, have caused many skilled men to leave these small companies. They brought some benefits to the small firm, however, by making supplies of a varied nature more readily available.

Specific markets -- The importance of North American Aviation as a market has been emphasized but General Motors, Surface Combustion, Ranco, Denison Engineering, Armstrong Furnace, and American Blower, all use the machine shops for sub-contract work. While there is little contact with the national market, some work may be done for companies in the immediate area.

Raw Materials -- Local warehouses are sources for steel, brass, and aluminum since the needs of this industry are for sizes and shapes commonly stocked. Steel requirements are further met in Cleveland, Dayton, Pittsburgh, Youngstown, and Chicago. Iron, brass, and aluminum castings are made locally. Practically all shipments, incoming and outgoing, are by truck. Less than five percent of the commodities move by rail. This indicates the nature of the products -- high-value, low-bulk items that are shipped short distances and meet deadlines -- and the convenience of easier handling and lower costs.

Bonds -- No bonds exist beyond Columbus and there are few ties within the city. The Machine Shop Industry is, in a sense, a service industry and its expanding operations, perhaps temporary in part, have developed to meet the growing industrial demands of Columbus.

## The Metal Industry: A Fabricating Group

Nearly three-fourths of the manufacturing workers of Columbus are employed by this industry-group. The largest number, 27,850, are employed in the Transportation Industry. The Electrical Equipment Industry is the second largest in the city with 10,510 employees and the Industrial Machinery Industry ranks third with 4,425 workers. (See Table IX, page 85.)

A larger percentage of the individual firms within this industry-group are controlled by outside capital than in any other group and the role of the branch plant is strikingly clear. Each firm produces a finished product which may be marketed for the consumer market or for an industrial market. Perhaps this industry-group, more than any other, has given the city a place of prominence in the national industrial picture. It certainly has been responsible for the growing industrialization of Columbus.

THE TOOL AND IMPLEMENT INDUSTRY. Because this is an old and locally established industry that has recently come under the influence of a national organization, it will be discussed first. It is one of the few prestige industries in the city and, as such, was one of the first to give the city a national reputation.

There is, in a sense, an old world quality to the growth of the Tool

Industry.(22) The factors which usually explain the expansion of an industry do not apply to this one in Columbus. The Tool Industry requires a relatively long apprenticeship before the worker becomes a skilled craftsman. A parent company, such as the Ohlen-Bishop Company in Columbus, frequently exerts a great influence upon its employees. Thus, where there is an increased demand for tools, a "splintering" of the parent company may occur from time to time and a few craftsmen, with initiative and capital at their command, may organize their own companies. In turn, when a renewed demand for the tool product occurs, the new company may experience the same "splintering" effect as some of its trained workers break away to establish their own businesses with a limited line of products.

The Tool Industry, a small one but with its roots established here for many years has experienced just such a growth. The Ohlen-Bishop Company, which began operations in 1852, has undergone many such "splinterings." The three firms which now manufacture saws trace their location in Columbus to the presence of the older firm. The fourth company in this industry, the Union Fork & Hoe Company, has not been so related in its production of hand garden and farm tools.

The Ohlen Company began as a small family organization and a number of partnerships were formed before the Ohlen-Bishop name became familiar. The company's progress fluctuated. At times, it was one of the leading saw manufacturers in the nation but there were other periods of near failure. The firm built a modern plant, scientifically designed by Battelle

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22 The Tool Industry, as defined here, is restricted to those firms which manufacture saws and farm implements. The Machine Tool Industry is separately discussed in the section of the Machine Shop Industry.

# THE SAW INDUSTRY:
# AN EXAMPLE OF SPLINTERING IN INDUSTRY

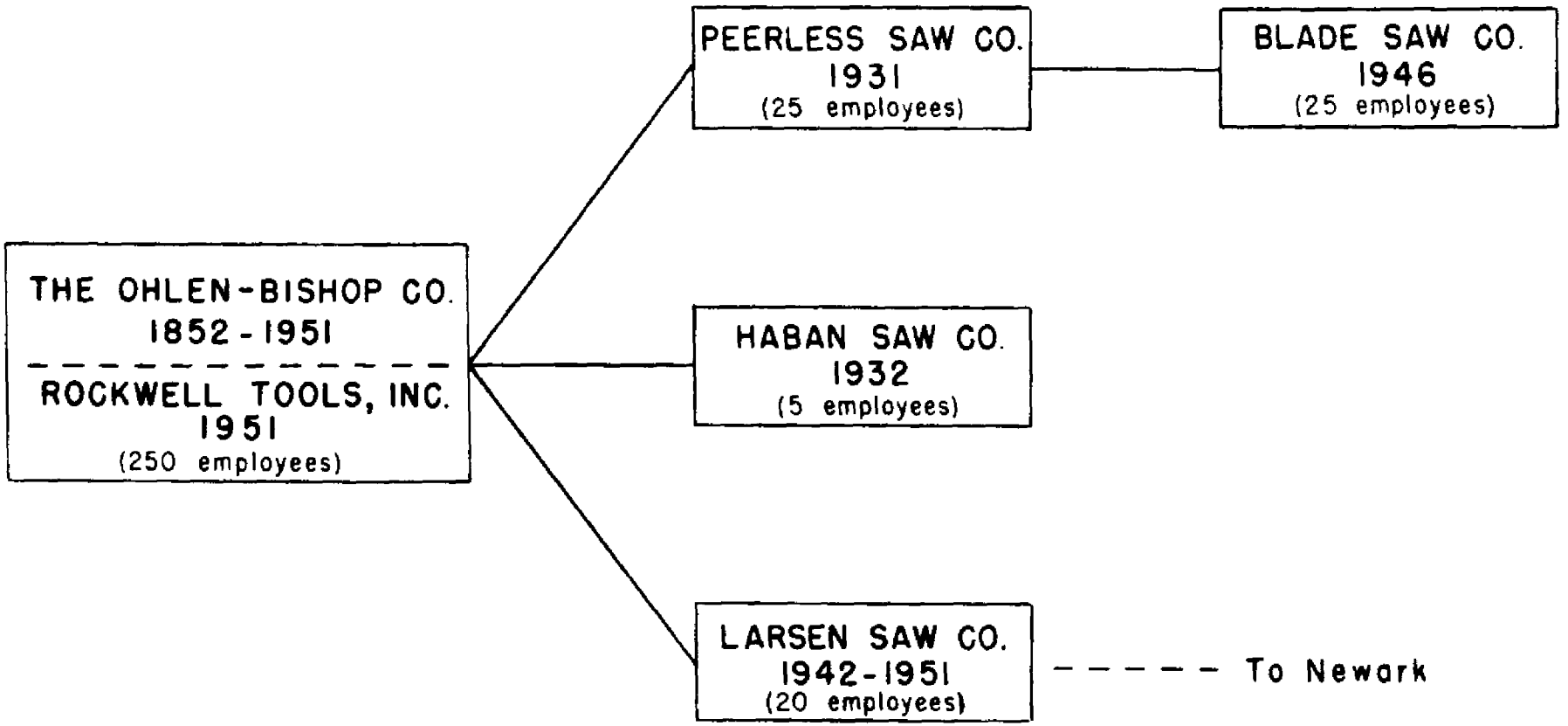


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Chart IV

Memorial Institute, on Kinnear Road in Northwest Columbus in the post-war period, but it was not in sound financial condition. This, coupled with a costly labor dispute, resulted in its sale, in 1951, to the Rockwell Tools, Incorporated (# 195), a branch of the Rockwell Manufacturing Company of Pittsburgh. The new subsidiary fits nicely into Rockwell's expansion program; it supplies saws to the Delta Manufacturing Division, another Rockwell subsidiary. With aggressive leadership, the Rockwell organization hopes to regain much of the saw trade that was formerly Ohlen-Bishop's.

Other Companies -- The other two saw companies located in Columbus have stemmed from the Ohlen-Bishop firm. The Peerless Saw Company (# 84), established in 1931, was started by five former employees of the Ohlen-Bishop Company. They located here because it was their home town and their meagre finances limited a further move. The company now specializes in high-quality saws for wood, non-ferrous metals, and plastics. Whereas the original market was local, sales are now national.

A "splintering" of Peerless Saw Company by some of its original owners gave rise to the Blade Saw Company (# 161) in 1946. The firm located in Northwest Columbus in an available building on West Third Avenue. The local market is now of little consequence for this firm.

The Union Fork & Hoe Company -- This firm has no connection with the Ohlen-Bishop organization but its early history is confused with the industrial operations of the Ohio Penitentiary. The company is one of many local firms that used cheap contract prison labor prior to 1900. Since 1907, the firm has been incorporated and has occupied a site on Dublin Avenue in the heart of an old industrial community in North Columbus.(# 27).

It suffers from many of the handicaps that other firms face in the older areas -- parking space and expansion space are at a minimum. The 1907 incorporation resulted from the consolidation of the local plant with a New York firm. Columbus was chosen for the center because its location for marketing finished products and buying ash timber and steel was ideal.

Advantages of the Location -- Accessibility to raw materials and markets is an advantage enjoyed by all of these firms but this is permissive as a force: the impelling force in their locations was the influence of the established firms in the city. Since local sales are minor, a national market is reached through jobbers or wholesale hardware outlets. The Blade Saw Company produces saws for tool kits which are assembled by national distributors under various trade names. Rockwell Tools sends a large share of its production to the Delta Manufacturing Division for inclusion in similar kits. Competition among the firms exists locally and on a national level.

The Union Fork & Hoe Company has a market concentrated in central United States. Competition with the True-Temper organization of Conneaut, Ashtabula, and Geneva, Ohio, is keen. A sistern plant, in New York state, markets tools and implements in the New England and Middle Atlantic states and a third plant, in Jackson, Mississippi, serves the south and southwest.

Raw Materials -- Various steels used by Rockwell Tools and the Blade Saw Company are obtained from Pittsburgh and Ohio mills. Peerless Saw buys most of its steel from the Jessop Steel Company in Washington, Pennsylvania. For high-quality band saws, however, Swedish steel is purchased.(23) The

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23 Mr. Hodapp, of Peerless Saw, stated that this is undoubtedly the finest saw-steel available.

lumber for saw handles comes from Indiana, generally.

The Union Fork & Hoe Company buys steel in Pittsburgh and Ohio. The availability of ash wood was a principal factor in the firm's location and it still is a major raw material.

Labor -- Sufficient skilled labor is not present. This situation is recent and has been aggravated by the arrival of new concerns. The saw companies cannot attract apprentices since their future is uncertain and the four to six years training does not seem worthwhile. At one time, labor was a principal advantage since Ohlen-Bishop trained large numbers in this trade. There are about 450-475 workers with about one-half employed by the Union Fork & Hoe Company. This firm's demand for labor is seasonal, with the low period in the summer. Peerless Saw and Blade Saw companies each employ 25 steady workers. A few women are employed by the Rockwell Tool Company and the Union Fork & Hoe Company. Some Negroes work in the forge department of the latter firm.

Disadvantages -- Local disadvantages are apparent. While the Rockwell organization has all of the advantages of a pleasant suburban location, it has the disadvantages as well. Parking facilities are abundant and expansion is possible, but there is no public transit with a mile of the plant. The Union Fork & Hoe plant faces the opposite conditions -- it is crowded, faces traffic congestion, has inadequate parking facilities, and has little room for expansion. In other respects, there is little criticism.

The Tool Industry, with 100 years of successful operations, is a highly specialized but very stable industry. Local bonds are weak today yet the present stature of the saw companies can be traced to the influ-

ence of the Ohlen-Bishop organization upon plant location. In an industry-group where the influence of outside capital has been a dominant characteristic, the Tool Industry has been individually a Columbus-oriented industry.

THE INDUSTRIAL MACHINERY INDUSTRY. Whereas the Tool Industry can trace its development to its close orientation to Columbus, probably no other industry owes so much to the early inventive genius of its pioneers as the Industrial Machinery Industry. Of the 16 firms, 13 have evolved from local inventions and entrepreneurship.

It is doubtful whether these inventions would have been made or that the industry would have succeeded were it not for the position of Columbus in the heart of a state where minerals, agriculture, and manufacturing were so amply developed. The coal mines of Ohio inspired the ideas that resulted in coal-mining machines and conveying equipment, such as that made by the Jeffrey Manufacturing Company. The need for roadways and construction equipment resulted in the inventions of earth-moving equipment and cement mixers, such as produced by the Jaeger Company. Manufacturers, always seeking a more economical way to produce, moved men to invent. A sterile state does not inspire creative minds but Ohio challenged thinking; Columbus and other cities profited. In addition to the fertile mind and creative hand, geographic and economic factors in Columbus were favorable.

Products -- A variety of machines is assembled here. Portable industrial machinery -- wheelbarrows, conveyors, concrete mixing equipment, harvesters, and elevators -- are manufactured by six firms. Stationary machinery and equipment -- scales, air purification systems, bakery ma-

chinery, hydraulic oil presses, nut and screw machines, various testing devices, and even ice cream cone machines -- are made by ten firms.

Portable Machinery Producers -- The Kilbourne & Jacobs Company (# 2), founded in 1865 to manufacture wheelbarrows for the farm trade, is the oldest firm. (See Chart III, pages 118-119.) Later, a complete line of industrial hand trucks was produced and the firm emerged as one of the largest manufacturers of these items in the world. Competition was strong: 17 firms now manufacture hand trucks and 12 others produce wheelbarrows. New York City was the major market for hand trucks (40 percent of the sales) and Ohio was an important local market.

This firm was closed in 1953 and its plants and facilities were integrated into the Jeffrey Manufacturing Company (# 5). This gave the latter firm increased plant space south of its main plant and the right to patents and designs that had been exclusively Kilbourne & Jacobs'.

The Jeffrey Company was organized in 1877, an outgrowth of the inventive genius of F. J. Lechner, who invented a coal-mining machine, and the organizing ability of Joseph Jeffrey, who supplied the capital for the successful development of the machine. It is the largest manufacturer of coal-mining machinery in the world. The unplanned location in Columbus has proved remarkably successful since the mining markets of the east and west are economically reached.

In addition to mining machinery, chains, conveyors, industrial machines, hand trucks, and other mining equipment are produced. The Jeffrey Company is the best example of integration in Columbus. (See Chart V on the following page.) To assure its supply of malleable castings and chain, the Ohio Malleable Iron Company, north of the Jeffrey plant, was purchased

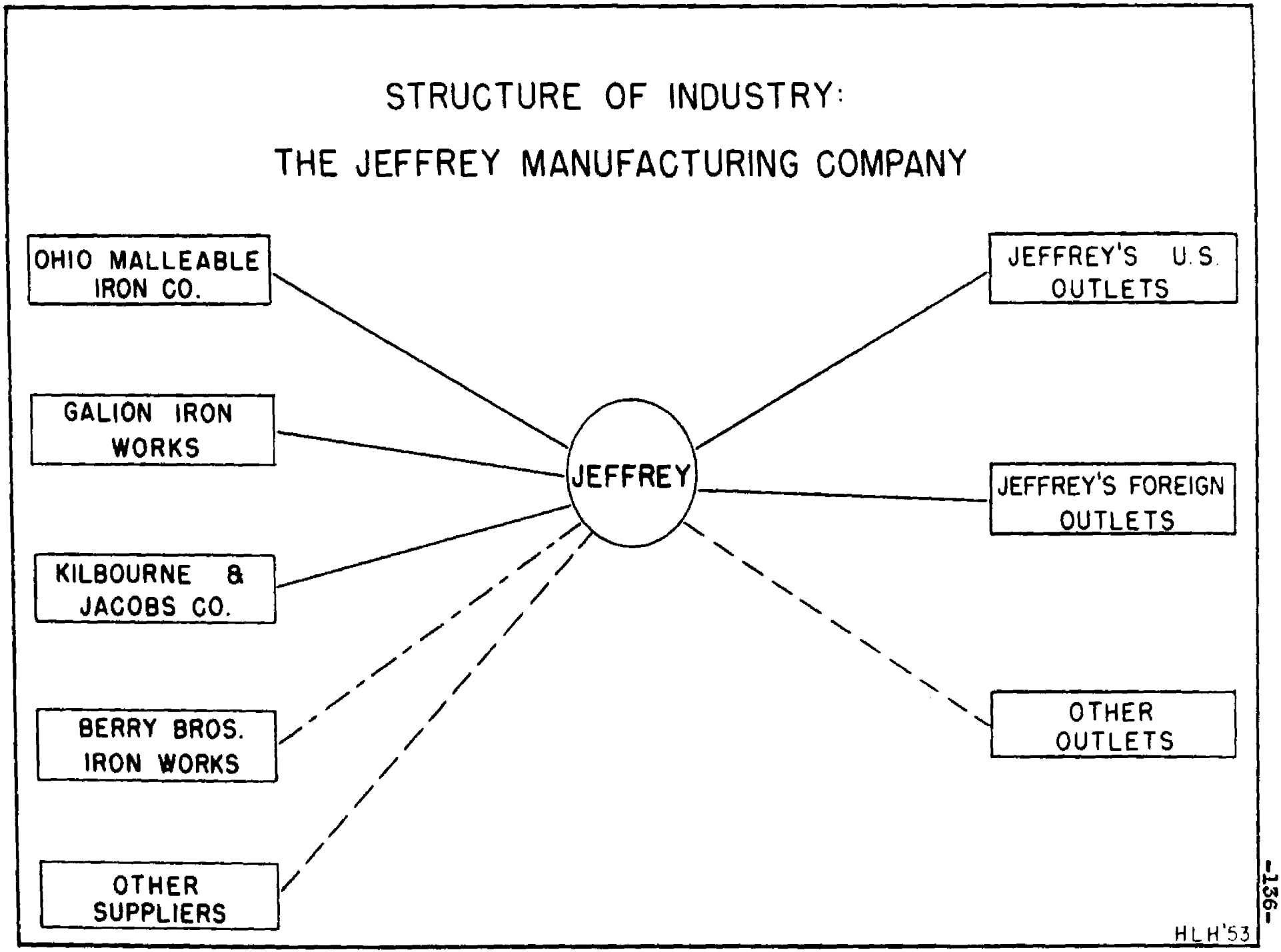
STRUCTURE OF INDUSTRY:
THE JEFFREY MANUFACTURING COMPANY
OHIO MALLEABLE IRON CO.
GALION IRON WORKS
KILBOURNE & JACOBS CO.
BERRY BROS. IRON WORKS
OTHER SUPPLIERS
JEFFREY
JEFFREY'S U.S. OUTLETS
JEFFREY'S FOREIGN OUTLETS
OTHER OUTLETS
HLH'53



Chart V

about 50 years ago. The Galion Iron Works, in Galion, Ohio, was absorbed by Jeffrey to gain a manufacturing outlet for road-building machinery and to eliminate competition in the manufacture of conveying equipment. Direct linkage appears between Jeffrey and the Berry Brothers Iron Works. The latter firm, while independent, is surrounded by the Jeffrey plant and sends 50 percent of its production to the larger firm. Integration at the market has taken place with the expansion of Jeffrey's facilities in Great Britain and South Africa. This extensive integration program has given Jeffrey stability in production and marketing.

Two other firms, which were started by natives who foresaw a growing market, manufacture conveyor equipment. The Columbus Conveyor Company (# 53) organized in 1919 to build custom-designed conveying equipment to move bulk materials. Many of its products mirror the inventive genius of the founder. The Bonded Scale and Machinery Company (# 99), organized in 1932, has a diversified line including industrial scales, conveyors, vibrators, and crushers. Limited competition exists between these companies and Jeffrey. Nationally, the Joy Company of Franklin, Pennsylvania, competes with all of them in mining machinery. (Joy is a former employee of the Jeffrey Company.) The Columbus Conveyor Company restricts its sales to eastern United States but the Bonded Scale Company sells to a national and international market.

The Jaeger Machine Company (# 30) began in 1903 to manufacture a cement-mixing machine -- a tilting drum type of portable mixer -- which was invented by the owner. With the support of local capital, the firm grew and prospered. Cement mixers, pneumatic drills, concrete spreaders, and other road-building equipment are produced for a world-wide market. While

competition exists in Ohio with such firms as the Davey Compressor Company in Kent, and the Barrance Company and the Gorman-Rupp firm in Mansfield, the major competitors are in New Jersey, Wisconsin, and Iowa. The Jaeger firm purchased control of a Cleveland competitor a few years ago and has moved that company's operations to Columbus.

The Capital Elevator Company (# 62) and the Scott-Viner Company (# 193) also manufacture portable machinery. The first was founded in 1918 by a man who had earlier worked for a local company that made elevators. He put his skills and money together and founded this business. As it was dependent upon Columbus capital, the firm remained in the city and developed a market within an area of 300 miles. As a branch of the construction industry, it manufactures and installs industrial and passenger elevators and dumb waiters.

The Scott-Viner Company, a manufacturer of agricultural implements, was started in Cadiz, Ohio, and later moved to Columbus, Wisconsin. The local plant was built first in 1926 and the present modern building was erected in the Northwest section in 1951. This was one of the first firms to make a pea viner and a sugar beet harvester; these are still important lines. Competition is stiff nationally with the International Harvester Company and the King-Wise firm the major competitors. The company also manufactures canning machinery for the processing of foods, sales of which are limited to the urban centers in the east and mid-west.

Stationary Machinery Manufacturers — Of the companies producing stationary machinery, the Exact Weight Scales Company (# 82), founded in 1916, is the oldest. It was organized by a native of central Ohio who invented the over-and-under scale for use in repetitive weighing in food processing

and meat packing plants and in the chemical industries. A national market is reached with limited competition coming from Toledo Scales in Toledo.

The American Solvent Recovery Corporation (# 47), manufactures air purification equipment for the food processing industry. It was founded by natives who were backed by local capital. Located in East Columbus, the factory serves an area including Ohio, Michigan, and Pennsylvania.

Three small concerns, which have located here since 1935, can also trace their origin to the inventiveness of their owners. The Krouse Testing Machine Company (# 124) produces machines to test the strengths of metals. They are used in testing laboratories in universities and in the automobile, aircraft, and steel industries. While the company did not start here, it moved to Columbus in 1937 when capital and space were here.

The Eldred Manufacturing Company (# 143) is a small plant that makes a large machine which bevels or glazes the edges of glassware. Mr. Eldred developed this idea while employed at the Federal Glass plant in South Columbus. His own company was formed in 1946. The machines, which take months to build, are sold throughout the world -- they are in Brazil, Colombia, Mexico, Germany, Greece, and other nations. Carefully built, checked, and assembled before shipping, the finished machine is usually accompanied by Mr. Eldred to aid in installation and training of operators.

One of the newest companies, and one which has created much interest locally and nationally, is the Industrial Nucleonics Corporation (# 182). It was organized in 1951 by two Ohio State University graduate engineers who found a way to use Beta rays (given off by an atomic pile) for testing the quality of continuously-produced steel, rubber, or paper. The

company has grown rapidly with an expanding market. Its location in Columbus was based upon three factors: (a) the men were natives of the city and graduates of the university, (b) the plant is well-situated to serve the rubber markets of Akron, the steel markets of Ohio and Pennsylvania, and the paper markets of the Miami and Scioto valleys, and (c) the research facilities of the Battelle Memorial Institute and The Ohio State University are at hand.

Another example of local inventiveness, initiative, and capital combining to succeed is the Denison Engineering Company (# 129). Organized in Delaware, Ohio, in 1935 where its pioneer work with hydraulic oil presses attracted wide attention, the company moved to Columbus when fire swept the original factory. The Budd-Raney plant in Columbus, which had done work for Denison, was purchased at this time. Today, the firm occupies a modern and extensive factory on Dublin Road in Northwest Columbus. It experiences no local competition but similar presses are manufactured nationally. It has expanded sales and operations in this country and in northwestern Europe.

The three remaining firms, while utilizing local initiative and capital, have not developed from inventions in this area. The Pfening Bakery Machinery Company (# 104) is an outgrowth of a salesman's knowledge of the machinery he sold. The company started here in 1930 as the owner knew the community and was able to raise money here. It is one of two such concerns in the nation; the one in Albion, Michigan, is the largest. The market is scattered and it varies in size, but 3,000 bakeries across the nation are potential customers. About 20 percent of the total sales are with Canadian firms since no similar machines are made there.

The Miller Glass Engineering Company (# 96), once a principal fabricator of glass-making machinery, now produces an automatic nut machine. The machine was developed by the Budd-Raney Company and its basic ideas are employed in current models. Specialized nut machines are made to order. For example, the Ford Motor Company wanted a machine to make the nut which is used to hold Ford's spare tire in place. The Miller Company made it -- the only one of its kind. The company's sales are national although centered in the manufacturing belt stretching from New York to Chicago.

A unique firm in the city is the Cream Cone Machinery Company (# 169) which came here in 1948. A Cleveland firm founded in 1908, it manufactures machines for making ice cream cones. Its market is very restrictive. Columbus was chosen for the plant site because a building was available in an area where labor was cheap and raw materials handy.

Age and Sites -- These firms have operated in Columbus an average of 30 years. All of the older plants have moved within the city to improve their sites. A number remain relatively close to the crowded industrial Downtown but a few have pioneered the move to suburban districts of light manufacturing. The Exact Weight Scales Company, with a one-story, brick structure set back from the street, and a well-kept lawn and shrubbery, was the first plant to make this move. The factory was built in 1930 and led the way to further buildings of this type. (See the photograph which follows.)

The spacious, one-story Denison Engineering plant, erected in 1942 on Dublin Road to be free of the inconveniences of the Downtown, is another example. The Industrial Nucleonics and Scott-Viner companies built their new plants in the growing Northwest in 1950 and 1951, respectively.

H.L.H.

THE EXACT WEIGHT SCALES COMPANY

A PIONEER MANUFACTURING PLANT IN NORTHWEST COLUMBUS

No. 4

Handicaps -- There are no common handicaps of location in this industry. Singularly, public transit service is not adequate for a plant beyond the city limits (Scott-Viner, Denison Engineering), or space for expansion is not present (Jeffrey Manufacturing Company), but these do not apply to the entire group.

Advantages -- The situation of Columbus in the nation affords many advantages. These companies enjoy a favorable freight rate in shipping their high-value, high-bulk products from this point. The proximity to major markets and accessibility to raw materials are two more reasons why the area has attracted new plants.

The research facilities of Battelle Memorial Institute and The Ohio State University are distinct advantages for plants which do not have the capital to support their own laboratories. These research organizations have become increasingly important factors in the location of industry. Whereas they are rarely impelling forces, they do influence development. As research needs increase with the future, the full value of such organizations will be realized by many other small Columbus firms.

A last advantage, and one that will become intensified as industry expands and diversifies, is the growing market in the immediate central Ohio region. It is a market still not economically served by other manufacturing areas.

Raw Materials -- Raw materials are varied but less than ten percent are purchased in the city. Steel is most important. Columbus warehouses supply eight companies but Pittsburgh, Cleveland, Middletown, Chicago-Gary, and Youngstown are the important supply centers for the others. Iron castings are purchased in the city; some come from Marion. The Jeffrey Company

has its own brass foundry and its subsidiary, Ohio Malleable Iron, produces iron castings. Less important are aluminum and brass castings which are supplied locally.

Most of the machines are power-operated and motors come from Westinghouse, General Electric, and Master Motors distributors. Electric controls made by General Electric, Westinghouse, and Minneapolis-Honeywell are used widely. The Jaeger Machine Company buys power plants and diesel units from Chrysler, Continental, Hercules, and General Motors. Some local firms produce their own motors because other manufacturers cannot meet their specific and changing needs. Rubber products, such as belting and tubing, come from Akron or from local warehouses. Lumber has decreased in importance with changes in the industry but it is still supplied from sources in the Appalachians or on the west coast.

Transportation -- Approximately 75 percent of the shipping is by truck but the three largest companies prefer rail service. Commonly, where carload shipments are required, rail service is more economical. Railroads maintain a strong position in this industry with nation-wide markets.

For the smaller firms, trucks are more satisfactory. They are more convenient, require less dock space, can be easily loaded, and, when speed is required, are ideal. A few firms whose finished product requires special handling have their own trucks.

Labor -- Only three concerns regard the labor supply as adequate. Even though a major part of the work is assembling, there must be skilled machinists available to make the specialized and intricate products which will become integral parts of a working machine. The small shops require a great amount of individual initiative which is not found in the average

worker nor in the labor pool which is currently available. The large shop, while not requiring as much initiative, seeks the skilled worker because he is a more economical worker in the long run.

The industry as a whole employs about 4,425 workers with half of them at the Jeffrey plant. Other large companies include the Jaeger Machine Company (700), Denison Engineering (438), Kilbourne & Jacobs (145), Exact Weight Scales (125), and Industrial Nucleonics (115). The average number of workers per plant is 270. Few are Negroes, but those who are are employed as foundrymen or janitors. The very nature of the work limits the number of female employees. The Jeffrey Company employs fewer than 100 women in manufacturing and these are engaged in light, repetitive work.

Unions -- Unions are not prevalent although they are active in three of the four largest plants. The opinion was expressed that new firms have had a detrimental effect upon labor and have increased union activity.

Functional Bonds -- Nine companies operate as the only unit in their organization but seven have immediate bonds or are branch plants. No company has the extensive ties of the Jeffrey Company, but the Jaeger Machine Company, until recently, operated branches in European countries. Most of these have been consolidated or lost. Exact Weight Scales has a small branch in Toronto, Canada. The American Solvent Recovery plant is closely associated with the Barneby-Cheney Company of this city.

Perhaps this industry gives Columbus more prestige than any other. The Jeffrey and Jaeger companies are known throughout the world and many of the other firms have gained national reputations. The variety of products -- no two plants make the same type of machine -- fails to give the city the character that Akron has as a rubber center or that Pittsburgh

has as a steel center but Columbus possesses the stable quality of diversification.

THE HEATING AND COOLING EQUIPMENT INDUSTRY. Like the Industrial Machinery Industry, this one owes much to the initiative and inventiveness of natives of Columbus. Unlike the Industrial Machinery Industry, however, the number of large branch plants which are members of this industry is high. The Heating and Cooling Equipment Industry is a mixture of local and national firms combining to give the city an established reputation.

The state of Ohio is the leading manufacturer of heating and cooling equipment in the nation. Columbus is a leading center of production since five of the 25 larger firms in the state are located here. Smaller concerns are also present and they help to give character to the industry.

Products -- There are 14 companies in the city; domestic coal, gas, and oil heating equipment is produced. Various space and aircraft heaters, conversion burners, gas ranges, automatic and barometric draft controls, boilers, pipe fittings, and complete ventilating systems are also made. Refrigeration and air conditioning equipment is manufactured by the American Blower Company, which also makes dust collectors and drives for refrigerator units.

Markets -- The finished products are sold to a consumer market by dealers and jobbers. No company enters the retail trade, but sales are made to other manufacturers, to mail-order houses (such as Montgomery-Ward), and to contractors.(24) The sales territory, which is limited by the high-bulk, relatively low-value product, recently shifted.

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24 Through such sales, some Columbus-made products commonly lose their identity in the nation-wide markets.

The change from the coal furnaces to the gas and oil unit has influenced local production. The Armstrong Furnace Company, the largest producer of coal furnaces in the United States, has noted a considerable drop in the demand for them. Much of the blame for this is placed upon the costly coal strikes of recent years. The costs of coal have steadily risen whereas gas and oil costs have remained stable. The Armstrong Company has supplemented the loss by increased concentration in the gas and oil lines.

Shifting Markets -- A geographical shift in the market has occurred. The Norman Products Company has enjoyed a large business in gas conversion units especially in the south and southwest. Similarly, the Quad Stove Company's market has shifted from the mid-west to the growing southern market. Some companies are limited in their sales by their parent organization. This is true, for example, of the Lennox Furnace Company which confines all of its sales to the area west of the Ohio-Pennsylvania border since the eastern market is handled by its Syracuse, New York plant. In general, Columbus, at the junction of coal, gas, and oil facilities, and near the population center of the nation, is an excellent location for marketing these commodities.

Canadian sales are handled by three firms but overseas shipments are rare due to the bulk of the furnaces. For these reasons and because of competition with Canadian manufacturers, sales are limited.

Competition -- The local firms compete but the major competition is from the Holland Furnace and the Bryant Furnace companies in Michigan, the Champion Furnace Company in Indiana and Illinois, the Olson Furnace Company in Sandusky, and other large firms. Stove manufacturers in Delaware,

Newark, Mansfield, Hamilton, and Cleveland, offer competition. The Columbus Heating & Ventilating Company (# 107), which manufactures entire heating systems for schools, meets strong competition in southeastern Ohio.

Age and Factors in Location -- The present firms range in age from 93 years (the Borger Brothers Boiler Works) (# 145)), to seven years for two near firms. The average plant has been here about 34 years.

There have been two reasons for the location of these factories in Columbus: the smaller, native-owned plants were located to reach a local market, and the larger branch plants came here where greater production and procurement, through consolidation, permitted them to produce at lower costs for a national market.

With the Armstrong Furnace, Lennox Furnace, Buckeye Furnace Pipe, American Blower, and Surface Combustion companies, all branch plants, a consideration of their place in the structure of the parent company was foremost. The first three are members of the Norris Industries of Iowa. The Armstrong plant, originally in London, Ohio, was moved in 1928 to take advantage of Columbus' labor. Excellent transportation facilities, favorable freight rates(25), and an accessible supply of sheet steel at the Pittsburgh base price, were other factors involved.

In 1940, the Lennox Furnace Company occupied its large one-story factory on the Olentangy River Road to consolidate the company's operations. Favorable transportation to the highly competitive mid-western markets was a major permissive factor in this choice. Armstrong and Len-

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25 Freight rates are currently a major factor in the successful location of a plant. Railroad rates have increased by 76 percent in the last seven years.

nox then occupied adjoining buildings but in 1947 the Armstrong Company moved to its new plant on West Third Avenue. By 1945, the Buckeye Furnace Pipe Company was organized for the express purpose of manufacturing pipe fittings and as another step in the consolidation of the Norris Industries in this area.(26) Buckeye Furnace has expanded its production considerably. The Armstrong and Lennox plants are competitors even though members of the same holding company. The only material gain resulting from the concentration of the three factories Columbus has been in quantity purchasing of raw materials. Other bonds are weak.

The Surface Combustion Company, with its home plant in Toledo and other branches in New York, sought a location favorable to the sale and transportation of gas products in an area where freight rates were satisfactory. Columbus met these needs in 1930 and a building was available.

The American Blower Company is one of the few large concerns in Columbus which came primarily because of an available building. Whereas the city was regarded as a good rail center and a central shipping point, it was the building that was a major factor in location. This firm is a subsidiary of the American Radiator Corporation in Detroit and was established here in 1938.

Concentration of Plants -- One concentration occurs in Northwest Columbus where the Lennox Furnace (# 121), the Armstrong Furnace (# 162), and Norman Products (# 141) companies are situated. This is in a new industrial development between the university and the Arlington residential district. The three plants are modern and spacious one-floor plans, set

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26 Lennox had manufactured pipe fittings but the price was set at an O. P.A. ceiling that was not profitable. The new company was organized to manufacture these fittings at a new ceiling and at a profit.

H.L.H.

THE ARMSTRONG FURNACE COMPANY

A MODERN, SPACIOUS PLANT IN NORTHWEST COLUMBUS

No. 5

back from the street. They have formed the nucleus of an important industrial community. Through attractive landscaping, which enhances the appearance of their brick buildings, a pleasant industrial community has developed without the unfavorable aspects of older industrial areas. (See the photograph on page 150.)

A minor concentration is found in South Columbus where the Lattimer-Stevens (# 73), American Blower (# 110), and Oran (# 109) companies are situated within a few blocks of one another. The latter plants have been in the area since 1935 but Lattimer-Stevens located on Marion Road in 1927. The buildings are fairly modern and large but their attractiveness is diminished in this old, crowded, and dirty industrial area.

The other firms have remained at their original scattered sites. Five of the plants in the older industrial areas -- Surface Combustion (# 83), Buckeye Furnace Pipe (# 139), Quad Stove (# 23), Columbus Stove (# 117), and the Schoedinger companies (# 6) -- space is not available for future expansion. The older buildings are commonly more than one-story in height and uneconomical to operate. The absence of parking space presents a serious problem too.

Other Handicaps -- New industrial lands and adequate buildings are scarce and both are high-priced in the industrially zoned areas. Public transit service is far from satisfactory in many instances, and especially where female help is employed.

New areas must be properly zoned for industry and many older areas need to be re-zoned. Adequate housing facilities and improved highways are also a necessity if the community is to continue its vigorous growth. None of the companies wants to move and yet, if adequate facilities are

not provided, it might be forced to. The city must meet the demands of its people and industries.

Raw Materials -- There are no handicaps of national scope, however. Accessibility to raw materials is an outstanding advantage. While the city produces no light-weight sheet steel and stocks very little, this basic material is readily being obtained in Pittsburgh, Weirton, Wheeling, Youngstown, Middletown, Cleveland, and Gary. Grey-iron castings are purchased locally and from foundries in Cleveland, Detroit, and Bloomington, Indiana. The Armstrong Company receives castings from a Norris subsidiary in Jackson, Ohio. A variety of blowers and thermostats are used but Minneapolis-Honeywell equipment is best known; for these Minneapolis, Detroit, and Cleveland are supply centers. Brass valves and brass products required by Quad Stove and Columbus Stove, are obtained in Cleveland, Detroit, Pittsburgh, and Chicago. The Johns-Manville organization in New Jersey supplies the asbestos required.

Transportation -- In the past ten years trucks have taken over much of the railroad's business. Eleven firms have good rail facilities with spurs on the Chesapeake & Ohio, Pennsylvania, or New York Central lines, but they ship 75 percent of their goods by truck since smaller than carload lots make up the majority of their shipments. Truck service is rapid and convenient. Recently, too, more customers specified truck shipment to ease their unloading problems and to assure quick service to distant points. Representatives of this industry asserted that more considerate public relations by the Columbus railroads would insure a greater volume of business in the future.

Employees -- The number of workers varies between 25 and 700, with

an average of 220 workers in the 14 plants. Female labor is not used widely since so much of the work is heavy or involves bulky objects. Few Negroes are employed.(27)

Columbus, as a commercial center, had the reputation of a good labor town where little union activity was experienced. Continued peace is not anticipated since new industries have brought stronger unions and higher wages.

Utilities -- Public utilities are satisfactory. New water mains in South Columbus and in the newly-settled Northwest have satisfied long-standing needs. The Columbus and Southern Ohio Electric Company provides adequate electric power. It has been most cooperative in an effort to meet their needs. Poor service is supplied by the gas company, however, and costly bottled gas has had to supplement the natural gas supply during critical winter months.

Summary -- Columbus is an important center for the Heating and Cooling Equipment Industry. With five national firms and nine local concerns, the city has gained a reputation as one of the leaders in this industry.

THE TRANSPORTATION EQUIPMENT INDUSTRY. A transportation industry has been active in the city since the period in which the great carriage industry operated here. (See Chart II, page 96 and Chart III, pages 118-119.) It was successful but it was replaced by the automobile and automobile parts industries and, more recently, by the aircraft industry. Both local and national firms are represented in this industry. It is another that has given Columbus a new national importance in manufacturing.

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27 Women were employed during the war on military and peace-time projects. They have been replaced, for the most part.

The Transportation Equipment Industry is the fourth most important industry in the state.(28) In Columbus, where 27,850 persons are employed, it is the largest industry. Included in this group is the manufacture of aircraft (exclusive of engines), automobile parts, truck bodies, fire engines, and railroad freight cars. (See Table IX, page 85.)

There is no single unifying feature that characterizes this industry. No concentration of plants is found, although six of the 16 plants are in North Columbus and four in West Columbus. The average firm has been here between 30 and 35 years but there are four whose origin goes back to the turn of the century and there are four post-war additions. Plants vary in size from the truck body shops with 20 employees to the giant North American Aviation plant, largest employer in the city, with about 18,000 workers. And finally, the lack of unity is reflected in the permanence of the automobile parts manufacturers and the lack of permanence which typifies the aircraft and railroad car groups. It is not known whether the nation's largest manufacturer of military aircraft is permanently located. The decline of the railroad car manufacturing industry is evident.

For an analysis of the forces which have modified the Transportation Equipment Industry, it is subdivided into three sections: Aircraft, Railroad cars (one plant with 130 workers), and Automobile Parts (14 companies and a total employment of 9,215).

Aircraft. The North American Aviation Corporation (# 190) of Los Angeles took over the government-built Curtis-Wright plant in December 1950. It is leased from the Navy under the Naval Industrial Reserve Aircraft Plants (NIRAP) program and is one of 13 such plants in operation.

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28 Ohio: An Empire Within an Empire, Columbus, 1950, p. 29.

North American, as it is generally called, manufactures and assembles military aircraft on government contract. It is the only firm in central Ohio devoted to the production of aircraft, but functionally associated with it are more than a dozen machine shops which do sub-contract work.(29)

Factors in location -- The following reasons explain why North American saw fit to take over the Curtis-Wright plant which was built in 1941:

(a) Columbus, an inland city, fit into the plant dispersal program that was initiated in the war years and carried into the present.

(b) Adequate rail and highway transportation facilities are present. Tracks of the Pennsylvania and Baltimore & Ohio railroads lie to the south of the plant. Excellent highways are nearby.

(c) The plant is built adjacent to Port Columbus on city-owned land. A high percentage of good flying weather is typical of the Port.

(d) Columbus is within 70 miles of the Wright-Patterson Air Base at Dayton which carries on research and testing of aircraft.

(e) Most important, probably, Columbus was the only large city in Ohio which actually had a surplus of labor in 1940. An on-the-job training program provided the thousands of unskilled laborers with basic training. In 1950, North American could rely on many of these laborers returning to the plant from rural and urban areas in central Ohio, southeast Ohio, West Virginia, and Kentucky. It was a semi-skilled labor force ready for use.

The North American organization considered other locations in Texas, Kansas, and Nebraska, but the exceptionally well-planned, modern, physical plant which existed here was the deciding factor. It is doubtful whether the company would have built its own facilities here, considering the other sites which were more suitable in some respects for peace-time production.

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29 The machine shops engaged in the production of aircraft parts are included in a section on the Machine Shop Industry. They are not an integral part of the Aircraft Industry.

Local Advantages and Handicaps -- Public utilities, expansion space, and the physical lay-out of the plant, are satisfactory features. Most of the handicaps appear to be temporary. The absence of good access roads has been modified but the principal routes to the plant are jammed with traffic when shifts change. (See the following photograph.) This has bothered other manufacturing concerns in the area and it has plagued residential commuters.(30) Public transit was not adequate for a number of months but this has been improved with bus service now available throughout the day. Relatively few workers use this service, however. Parking facilities remain inadequate even though large areas have been restricted for this purpose.

Markets and Raw Materials -- Neither markets nor raw materials is a prime force in location. The market is the military service. Fliers pick up the assembled craft and fly them to bases across the nation.

Aluminum and light metals are the basic raw materials. Sub-contract work is extensive and it has left its mark on the city with the establishment of many small shops whose existence depends upon it. Raw materials, which are purchased by the Government, tested by it, and then allocated to the individual sub-contractor, may not be substituted for. The transportation of all local products is by truck. Rail service is important when distance, volume, and size justify it.

Employment -- Peak employment at Curtis-Wright during World War II reached 25,000. North American has gradually increased its force to more than 18,000 -- twice as many being males as females. Women do wiring,

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30 While more than $450,000 has been spent in improving the access roads and the parking facilities, it was announced on April 21, 1953, that new efforts will be made to alleviate the continuing traffic problem.

Courtesy North American Aviation Inc

TRAFFIC FLOW AT THE NORTH AMERICAN AVIATION PLANT--
THE SUBURBAN LOCATION HAS NOT ELIMINATED CONGESTION

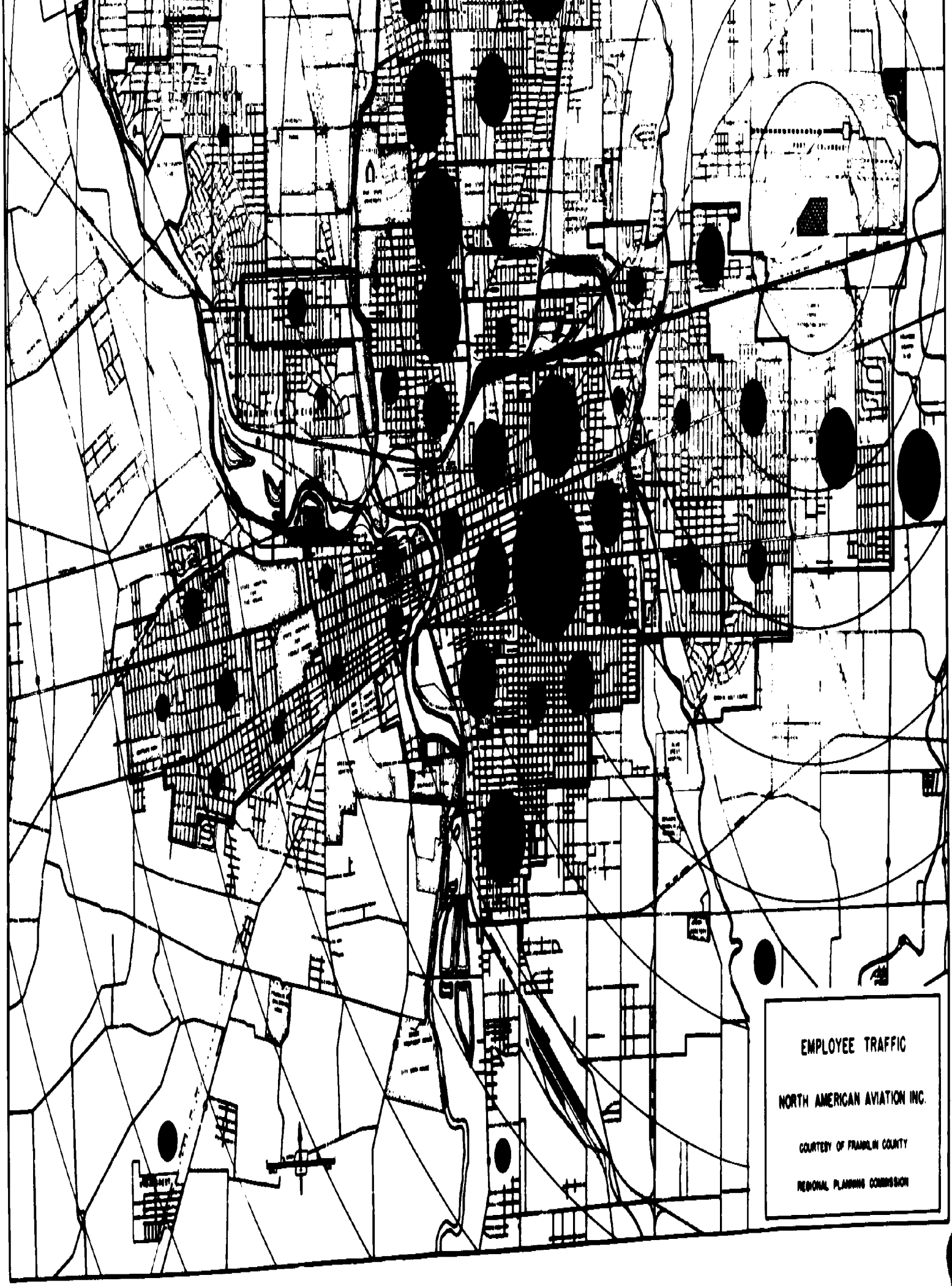
No. 6

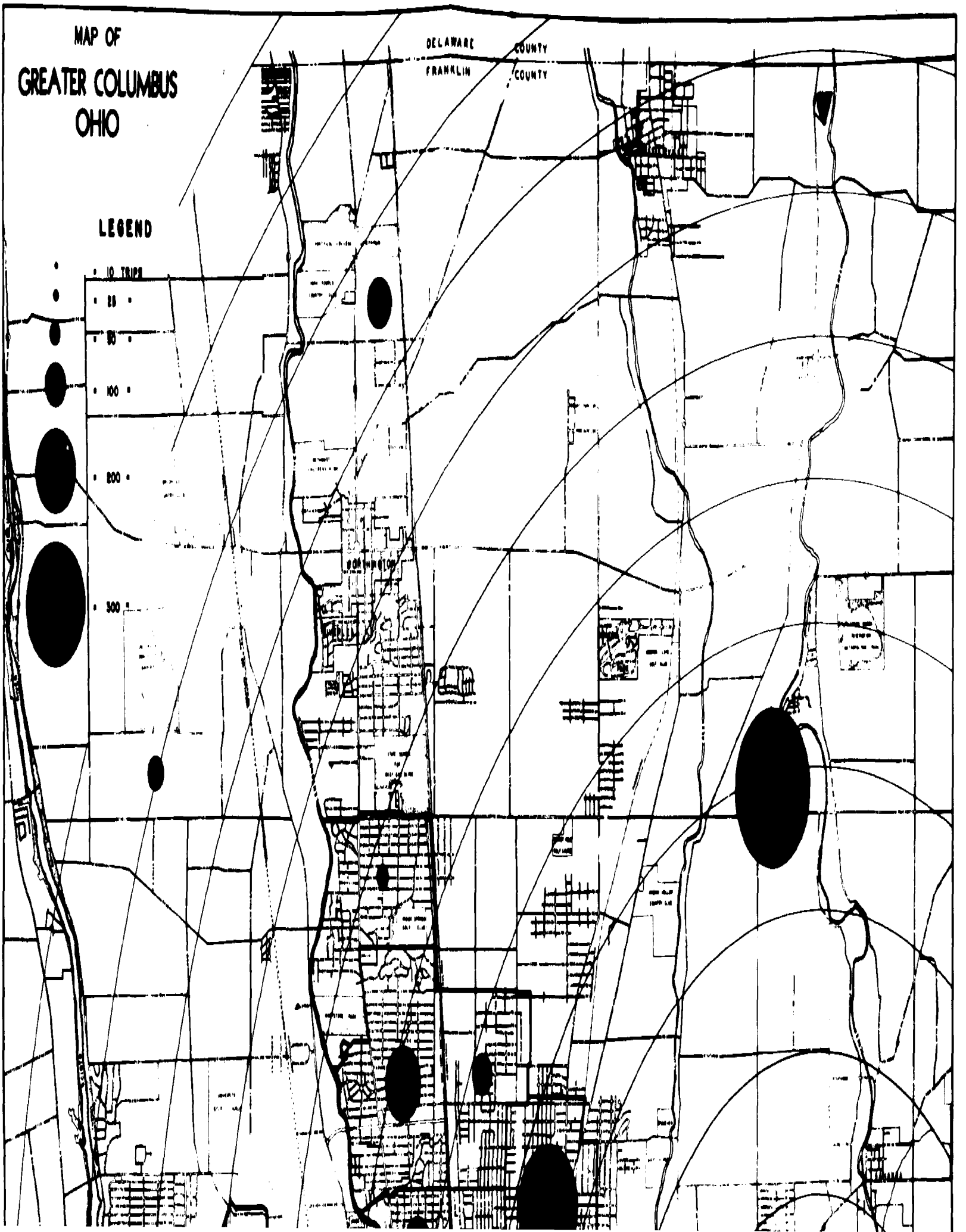
riveting, and assemble small parts; heavier machine work is done by men. The skilled mechanics, tool and die makers, draftsmen, and engineers are not readily available although Ohio leads the nation as a machine tool state. Labor is short because of the high production rate in these lines that has been maintained since the early 1940's.

Workers have been attracted to North American not only from Columbus but from many urban and rural areas of Ohio and adjacent states. The relatively high wage offered by the aircraft industry is the principal reason for this. (Figure 8, on the following page, illustrates the movement of workers from various points in the city and in the surrounding townships to the North American plant. It suggests why traffic congestion is a major problem at the plant.) These semi- or untrained workers have been given on-the-job training to fit them to their present jobs. While labor has been readily obtained by the North American Company, it is expected that new plants such as the Westinghouse plant and the Atomic Energy Plant in Pike County will create local labor shortages.

Labor Competition -- Practically every other manufacturing company in Columbus has complained about North American taking labor and bringing high wages to this tradionally low-wage town. Other firms, which often were anxious to grant wage increases or provide some other benefits, did not receive the prompt attention from governmental agencies that North American did. Instead, they lost their workers to the aircraft industry.

Structure of Industry — It is difficult to see where the structure of the national industry played any role in the location of this plant. The company's headquarters and three other plants are in southern California. The Columbus plant is the only one not closely tied to the parent.


EMPLOYEE TRAFFIC
NORTH AMERICAN AVIATION INC.
COURTESY OF FRANKLIN COUNTY
REGIONAL PLANNING COMMISSION


MAP OF
GREATER COLUMBUS
OHIO
DELAWARE COUNTY
FRANKLIN COUNTY
LEGEND
10 TRIPS
50
100
800
300

Effects upon Columbus -- In the past ten years, the Aircraft Industry has helped change the industrial character of Columbus. It brought a "foreign" type industry to the city. The dozens of small machine shops which dot the city owe much of their growth to the market created by this industry. The close ties between the General Electric jet engine plant in suburban Cincinnati and the local plant has affected the maturing of the manufacturing community. In addition, large national manufacturers were attracted to Columbus as an industrial center in part because of the success of the aircraft industry. The surplus of semi-skilled labor created by Curtis-Wright went a long way in bringing General Motors, North American Aviation, and Westinghouse to the city. Perhaps no other single industry has done so much to attract national attention to Columbus as an industrial city.

Railroad Cars. It is almost incongrous to turn next to this section on railroad cars. While North American Aviation is a dynamic, growing organization, the Ralston Steel Car Company (# 24) is an example of a dying industry in Columbus. This firm, after almost 50 years, announced on January 2, 1953, that it was closing in the near future.(31)

Location -- The Ralston plant is located in East Columbus a few blocks from the North American plant. It is an old factory that has not been kept up. It originally housed the Rarig Engineering Company which made disappearing gun carriages for coastal defense and the first large pumps for public water works.

Ralston located here because the large building was available at a

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31 The company was sold in 1953 but there are no plans for its future use.

reasonable price and because an excellent railroad market was here. Five large railroads enter the city and four of these have local repair yards. The construction of railroad freight cars of all types was on a direct contract basis but, in recent years, the company did sub-contracting work for other shops.(32)

Labor -- The type of labor needed in this industry was not ordinarily found in Columbus. It congregated in steel centers but moved to Columbus whenever Ralston received car orders. The labor force has always been transiot and mobile. Generally it was unskilled; most of the work involved cutting and assembling steel sections for the cars. Much of it was heavy and dirty work, thus many men were discouraged from seeking employment in the industry. At its peak, 700 men were employed by Ralston but the figure has dwindled to about 130 in recent years.

Ralston has employed part-time farm labor in its shops since a steady working force could not be maintained. Negro laborers have been used occasionally but they have proved to be unsatisfactory.

Raw Materials -- The company was well-situated for its raw materials. Steel was furnished by Pittsburgh mills and lumber came from the south. Some local foundry products were used but these were never important parts of the whole. The expected tie between Ralston and the Buckeye Steel Castings Company never materialized.(33)

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32 At one time, an average of 25 cars were made in a day. As many as 40 were made in a day's time but this production rate was uneconomic.

33 The absence of any bonds between the two firms is due to the specifications set forth in the contracts that Ralston handled. If the contracts did not specify Buckeye equipment, it could not be used.

Summary -- Railroad cars have been built in Columbus since the middle of the nineteenth century. The closing of the Ralston Steel Car Company's factory, after 47 years of operation, ends an important period in the city's industrial history. Ralston's inability to get much-needed allocated steel at the war's end and its inability to keep pace with the fast-changing railroad industry brought about its closing. It illustrates what seems to be increasingly true -- the specialized plant of local origination, which has typified the city's industry for many years, is slowly giving way to the branch plants of national organizations.

Automobile and Truck Parts. There are eight companies engaged directly in the manufacture of auto parts, one company in the manufacture of fire engines and accessories, and five companies in the construction of truck bodies and accessories. In addition, many small machine shops do subcontract work for these firms.

A. Automobile Parts Manufacturers -- No one dominating factor has influenced the location of these plants. The initiative of local men gave rise to the establishment of six of them, however. In some instances, a local invention affected the development of a company but this has been the exception rather than the rule. The Columbus Auto Parts Company (# 33) originally made equipment of the carriage industry but it now manufactures connecting rods and parts of universal joint assemblies for the auto industry. The American Auto Parts Company (# 116) once produced hydraulic washing machines but the inventiveness of the owner led the company into the manufacture of valve guides for the automotive industry. It is the third largest independent producer of these guides in the nation.

The Clark Grave Vault Company (# 59) stamped metal burial vaults for

many years, but government contracts in World War II boosted its output in other lines and it made extensive changes in the nature of its product. In the late 1940's, this firm was an important manufacturer of auto parts.

The Columbus Metal Products Company (# 172), now located in a modern plant in Northwest Columbus, is an old firm that has experienced many changes in product. From carriage parts to auto lamps and even to airplanes, the company has shown initiative and progress. It continues today as a manufacturer of auto and truck lighting equipment.

The two companies controlled by outside capital are branches of national organizations. Their location can be related to the internal structure of the individual firm. Each is the result of planning but the final choice of Columbus for the plant site was with respect to the national structure of the parent organization. One other firm, Henri La Prise Company (# 203) is a local firm that was purchased in 1953 by the Summer Company, a national firm, as part of its expansion program.

The Timken Roller Bearing Company (# 46) chose Columbus for the site of a new plant in 1919. The Timken family began operations in St. Louis but moved to Canton, Ohio, in 1899. Canton was well-located with respect to coal, iron ore, and steel, and the new automobile market; its transportation facilities were inadequate, however. When the company considered expansion, it chose Columbus which, with five major railroads, had accessibility to all markets and to the raw material centers of the country.(34) Columbus also had a very good labor supply at the time. It had been rela-

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34 Both Canton and Columbus were mid-way between the raw material centers in the Pittsburgh district and the market in Detroit.

tively undisturbed by other industries or by unions. The new plant was located favorably with respect to the company's other operations in Ohio.

The move of the Ternstedt Division plant of General Motors (# 156) to Columbus is in contrast. The economic considerations of the parent firm were more important than local geography. The General Motors organization considers the Great Lakes area the best in the nation for markets, raw materials, and the sale of scrap. This plant's operations are geared to materials sources and markets well beyond central Ohio. Its raw materials are obtained from many different areas in the surrounding states and its finished products are shipped to 22 General Motors plants across the nation.

Columbus was the third choice for the location of this plant. A site in Chicago where a government-built plant was available near the Buick assembly plant was the first choice, but it was refused because the price was too high. Cincinnati was the second choice. Property was purchased and plans laid for the new building when petitions by the citizenry discouraged continuation. In this way, Columbus, the third choice, came to acquire a large, modern factory and a stable industrial concern.

The geographical position of Columbus has been called its greatest resource. Certainly no other factor explains so well why the automobile industry has succeeded here. The city's position earlier influenced its development as a carriage center and as a minor manufacturing point for agricultural implements, but its advantages as an automobile parts supplier are even greater. Mid-way between the steel centers of Pittsburgh, Wheeling, Youngstown, and the Ohio cities, and the automobile market in northwestern Ohio, southern Michigan, and northern Indiana, the city is

a manufacturing-in-transit point for the steel products.

Transportation -- Transportation is almost entirely a permissive factor in location and yet the flexible transportation system in central Ohio is a principal reason for the establishment of large branch plants here. Rail and truck are both widely used although the latter dominates when convenience or speed are desired. The General Motors factory has facilities for 16 railroad cars a day to assist in its great storage and shipping problem and to supplement truck service. Firms that operate on close schedules with Detroit automobile factories realize the time saved by the use of rapid trucks.

Labor -- For most local firms, labor is taken for granted but a national concern must evaluate the labor supply in terms of its long-range needs. The semi-skilled labor force that the Curtis-Wright Company had trained provided a potential force in central Ohio in 1946. With little competition in the area or in southeastern Ohio from other industries, the new firms could draw upon this pool as they needed.

There are more than 9,200 workers in this section of the industry. About one-fourth are females who are employed to carry out light tasks in the factories. The male workers operate lathes, drill presses, screw machines, stamping presses, or forges. Only a few jobs require true skills; most men are specialists in one or two tasks. They are trained to do these in a matter of a few days.

Products -- These eight firms whose diversified products range from valve guides, lights, lighting equipment, connecting rods, universal joints roller bearings, and spark plugs, to auto body hardware, are not clustered in one community. Most of them are in North Columbus. This is generally

an accidental location but it may be to take advantage of the accessible outgoing rail and highway facilities to the north.(35)

Community Ties -- Occasionally, a special advantage may be encountered in the location of this industry. The Stitt Ignition Company (# 65), which manufactures spark plugs for the automobile and petroleum industry, found Columbus a good location because of the influence of The Ohio State University. Training in ceramic engineering at the university has resulted in the orientation of the spark plug industry to this potential supply of ceramicists. This tie, while not a common one nor a strong one, nevertheless explains, in part, the continued operations of this firm in Columbus.

There are few other local ties. Practically no purchases or sales are made in central Ohio. The only active suppliers are the foundries -- Hertenstein and Chase foundries supply these firms with a large proportion of their grey-iron castings. National bonds are not much stronger except with the Timken and General Motors organizations.

B. Fire Engines and Accessories -- The Seagrave Corporation (# 17) is the largest manufacturer of fire-fighting equipment in the country. Employing about 300 males, it builds a complete fire engine, including the motor.

The firm has a national market with any community a prospective customer. Its raw materials are readily available -- steel from Pittsburgh, Youngstown, or Cleveland, and truck parts from Cleveland or Detroit. Cast products are either made in the plant or they are purchased locally. The company now casts its own engine block; these were formerly purchased.

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35 Columbus Auto Parts, in North Columbus, has a location that gives it the advantage of an hour's shipping time over a location in South Columbus when shipping to the Detroit market.

Seagrave's began operation in 1881 in Detroit where it made ladders for apple-picking. Gradually the ladders began to sell to fire companies and more items were added to the stock. In 1898, a move was made to Columbus because the city was a better location for marketing the finished product and it was the home of the firm's owner. A few years after the return to Columbus, the plant moved from West Lane Avenue at the C & O tracks to South High Street, just beyond the limits of the city. This move was undertaken to avoid the city's tax and zoning structure. Land was plentiful there in 1900 and a building and necessary capital were also obtainable.

The Seagrave Corporation is typical of the independent, specialized plant that was common to the older Columbus industrial community. It represents local inventiveness, initiative, and capital successfully at work.

C. Truck Bodies and Accessories -- Five companies of local origin are engaged in the assembly of truck bodies. This is not actually a manufacturing industry. These firms buy their raw materials from local warehouses and then assemble truck bodies for a local market. Because their orientation is completely local, they add little to the national structure of the automobile parts industry.

THE ELECTRIC PRODUCTS INDUSTRY. This industry is similar to the Transportation Equipment Industry in that it too is represented by both local and national firms which have given Columbus a greater prominence in the nation. It is, however, one of the newest industries in the city. (See Chart II, page 96 and Chart III, pages 118-119.)

With more than 10,500 workers, the Electric Products Industry is the second largest industry-group in the city. (This figure includes Westing-

house Manufacturing's anticipated payroll of 8,000.) It is a relatively new industry, since only three of the nine companies were in existence prior to 1925, and four have come here since 1940. One, the Westinghouse Manufacturing Company, is not due to open until the fall of 1953.

Local Companies -- The Ebco Manufacturing Company (# 26) was organized in 1906 as a foundry by a Columbus native. After many changes in products, and difficult financial conditions, the present management took over in 1935 and has successfully developed a nationally-known line of water fountains, coolers, air driers, juice dispensers, and refrigerator parts and accessories. The three-story plant on the original West Columbus site has been crowded recently because of increased industrialization. The Ebco Company has purchased acreage near Port Columbus for expansion in the future.

Ranco Incorporated (# 102), dating from 1913, is also a local firm although control of the company is now with the Nash-Kelvinator organization of Detroit. The founder of Ranco invented an automatic circuit breaker for use in coal mines while working at the Jeffrey plant. With other ideas in mind, he formed his own company with local capital. The present modern, one-story plant at West Fifth Avenue and the Olentangy River is on a site that was formerly a city dump and which was available at a reasonable price in 1936.

Ranco manufactures refrigerator, auto heater, and automatic temperature controls for national distribution. In addition to the home plant, two smaller units operate in Columbus and, in line with the company's program of plant dispersal for economy's sake, separate plants operate in Delaware and Plain City. There is also a small plant in Scotland which

handles overseas sales.

Established in 1921, the Buckeye Telephone & Supply Company (# 194) is the third oldest firm in this industry. The modern and attractively landscaped plant, situated in the Northwest, was in a crowded Parsons Avenue building prior to 1951. A local entrepreneur organized this company which rebuilds and remanufactures telephone equipment for small telephone companies and for industrial firms. Competition is limited even though the firm sells to a national market as well as to several South American nations.

The Bell Sound Systems (# 152), the result of local invention and initiative, was started in a garage at Mr. Bell's home in 1932. By 1946 it moved to larger quarters on Marion Road in South Columbus where it occupied part of the building of the Buckeye Stamping Company. A variety of sound equipment is produced including public address systems, tape recorders, inter-office communication systems, and custom electric products. Sales are national; competition is keen.

Similar factors explain the humble beginnings of the Nippert Electric Products Company (# 155) in 1942. In four years time, the firm moved to a new plant in West Columbus. The move, from a Downtown site to one just outside the city limits(36), was undertaken to avoid high rental costs and inadequate space. There is plenty of space for expansion and a large parking lot is present. Commutators and slip or collector rings used in the electrical and aircraft industries are the principal products. They may appear in electric mixers, generators, starters, or power tools.

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36 The plant is just one foot beyond the city. This was done to avoid restrictive zoning regulations in this area.

National sales, concentrated in the mid-west, are direct to a manufacturer who will use the product in a finished good. Plants in Dayton, Cleveland, Toledo, and Chicago offer the principal competition. Ohio is the leading producer of commutators in the nation.

The Antenna Research Laboratories (# 171) is another native industry. This research organization, founded by The Ohio State University research scientists in electronics, does limited custom manufacturing. The plant, in a rural area in North Columbus, is free from obstructions and interference from other factories. It is now owned by Thompson Products of Cleveland and its research is geared to the program of the parent company although allied work is carried on with the Wright-Patterson Air Base.

Outside Interests -- Of the three outside firms, the National Electric Coil Company (# 95), established in 1934, is the oldest. Its location was planned to take advantage of the accessibility of markets and raw materials. Other National Electric Coil plants are in Bluefield, West Virginia, and Harlan, Kentucky. This suggests two things: this company had located its plants in areas where wages are low -- therefore, it is labor-oriented -- or its plants have been located near the important coal mines of eastern United States -- therefore, it is a market-oriented organization. Electric windings and insulation for motors and generators used in the transportation, electric utility, and steel fabricating industries are the products of this firm, but re-winding is carried out in each plant, as well.

The Acro Manufacturing Company (# 191) is the former Crise Company which began operations here in 1940. The Crise organization had operated in Mt. Vernon, Ohio, but an attractive financial offer brought it to

Columbus. Acro, an eastern concern, bought control of the company in 1950 and now operates three branches under one roof: Crise Manufacturing, Acro Switch Company, and the Mu-Switch Corporation. They occupy part of the old multiple-story Holtzman piano factory on East Main Street.

A representative of the company indicated that its holdings were moved here to take advantage of the favorable tax rate which prevails for industries and individuals. A stable, non-union labor force and a good location with respect to raw materials and markets were added incentives. Competition for labor and unionization is feared especially when the opening of the Westinghouse plant is considered. Most of Acro's workers do precision work on electric snap-action switches (over 8,000 items), temperature controls, and shaded-pole motors, which are sold to original manufacturers. The Minneapolis-Honeywell Company is the principal competitor.

West Columbus has undergone a great physical change with the coming of the General Motors Ternstedt plant in 1946 and the construction of the tremendous new Westinghouse Manufacturing Company's (# 197) modern structure in 1952-1953. The choice of Columbus for the site of this appliance center was the result of months of careful planning and research by Westinghouse. Four reasons were given: (a) ideal transportation facilities were available and a favorable freight rate was in effect, (b) Columbus is centrally located for raw material supply, (c) sound labor and wage structures prevail, and (d) the city is situated to serve the major markets and is a good distribution point. Established manufacturers viewed the arrival of this plant with alarm. Westinghouse personnel learned, through approximately 30 interviews, that two things worried the local concerns: what will Westinghouse do to the current favorable wage rate

and will Westinghouse take labor from the established firms? These questions have not yet been fully answered.

The plant was scheduled to manufacture jet aircraft for the Navy but in January 1953, it was announced that refrigerator equipment would be made here in the largest such unit in the Westinghouse organization. The plant site in suburban West Columbus was chosen because of (a) flat terrain ideal for construction, (b) 318 acres of land were available in a large tract, (c) excellent rail facilities with four spurs each from the New York Central and Pennsylvania railroads, (d) a suburban location away from congestion, and (e) the satisfactory utilities and housing units which were present. Plans for schools, shopping centers, and housing units are in the making but currently inadequate water supplies have created some difficulties between the company and the city since adequate utilities, water, and sewers, had been promised.

The Electric Products Industry is of growing importance to Columbus. It is the fourth youngest industry-group in the city and the areal distribution of the plants emphasizes this. The five new plants are located beyond the old industrial agglomerations; many are on the urban fringes. (See the photograph on the following page for an example. This is the National Electric Coil plant in Northwest Columbus.) The firms, such as Ebco in West Columbus, Bell Sound in South Columbus, and the Acro Manufacturing Company in East Columbus, in these older areas suffer some of the inconveniences of traffic, inadequate parking, and crowded buildings. There is no concentration of plants, however, as there are no mutual bonds that attract them or hold them to one part of the city.

Each plant is independent of any other in the city. Local ties are


H.L.H.

THE NATIONAL ELECTRIC COIL COMPANY: A MODERN BRANCH PLANT

(NOTE PARKING FACILITIES IN FRONT OF THE MAIN BUILDINGS.)

No. 7

insignificant yet five firms are members of national firms. Some, such as Ranco Incorporated are functionally tied to their parent firms but others, such as Westinghouse, are branch manufacturing plants. Practically every firm sells to a national market; none is restricted to central Ohio. Within 500 miles are the major industrial markets and consumer markets of the nation and they are easily reached by highway, rail, and air. A favorable freight rate prevails for the shipment of electric products.

Raw Materials -- These come from a variety of places and the central position of Columbus is a distinct advantage. Steel comes from Cleveland, Middletown, Sharon, and Pittsburgh. Copper and brass are usually obtained in Connecticut; mica, used by a number of companies for insulation, is imported through Boston and New York from India; and finished parts, such as motors and compressors, are purchased in Detroit, Dayton, Sydney, and Marion. The Westinghouse plant expects to get rock wool for insulation from Newark where the Owens-Corning plant is situated. Wool will come from the Rocky Mountains and plastics will be obtained from other Westinghouse outlets. Some plastic products are being introduced for use in this industry by local companies.

Labor -- Labor has been an advantage. About one-third of the 10,500 workers are females who are able to perform the repititious and dexterous tasks better than men. Fifty percent or more of the employees of Bell Sound, Acro Manufacturing, Ranco, National Electric Coil, and Nippert Electric Products companies are females. Westinghouse estimates that one-fourth of its 8,000 workers will be women. This is a complementary use of female labor (not symbiosis) and it is possible in this community where

many female workers are available. Few jobs require skill but each requires training until a routine is established.

In most of the plants, the male workers perform repetitive tasks at machines that require training but not skills. Men are needed to cut, trim, and polish finished products, to assemble parts, to move and crate equipment. In some plants, and this will be true of the Westinghouse plant, operations are based upon an assembly line technique where each man may possess no skill but can doubtless do a routine job.

New Firms -- New firms have not yet had much effect upon this industry. Labor turnover and shortages have appeared. Absenteeism is high. The influence of the large, national plants upon the local labor supply is feared. A representative of a small company stated that ". . . the large national firms will bring national problems and kill the area for small firms."

Summary -- This industry has a bright future in Columbus. The principal advantage of the city is its position. Of a more local nature, a good supply of readily trained labor is present. There are no serious handicaps to detract from the area. It would appear that other organizations within the industry might find Columbus a good location. Research facilities are present, industrial planning is gaining wider attention, and the community readily welcomes this type of diversified manufacturing. A sound and healthy future should be recorded for the Electric Products Industry in Columbus.

## The Chemical Industry

There are five separate industries classified under the one group heading, The Chemical Industry. Combined they form the fourth largest industry-group in the city. Included are The Chemical Products Industry (heavy chemicals, drugs, and paints), The Ceramic Products Industry, The Dental Products Industry, The Plastic Products Industry, and The Rubber Products Industry. There are no bonds between these separate industries and there is no real basis for classifying them together except for convenience in discussion.

THE CHEMICAL PRODUCTS INDUSTRY. The Chemical Products Industry of Columbus is not large when compared with its national counterpart yet it is an important local industry not only because it serves a local market but because it offers employment to more than 1,200 workers.

A specific definition of the Chemical Products Industry is needed. Alderfer and Michl subdivide the national industry into three parts: (a) the strict chemical industries, (b) the allied chemical industries, and (c) the chemical process industries.(37) In order to analyze the Columbus industry in detail it has been further subdivided into four parts based upon products -- fertilizers, drugs, paints, and miscellaneous products. Based on the classification of the national industry, fertilizers, drugs, and the miscellaneous products are members of the strict chemical group and paints belong in the allied field.

For the most part, the chemical companies in Columbus are oriented to an Ohio market and have few local or national bonds.

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37 E. B. Alderfer and H. E. Michl, op. cit., pp. 216-217.

Fertilizers. Fertilizer manufacturers have been in Columbus since 1894 and four concerns are now making these products. Three firms, Smith Agricultural Chemical Company, Farmers' Fertilizer Company, and The Davison Chemical Company, produce commercial farm fertilizers. The fourth, Agricultural Laboratories Incorporated, produces seed innoculants or a type of plant fertilizer. The commercial farm fertilizers are usually sold by dealers or farm cooperatives in the Ohio, Michigan, and Indiana area. Seed innoculants reach a wider market in the Corn and Cotton belts.

Factors in Location -- The Smith brothers (# 10) recognized a growing market for fertilizer products in central Ohio in the late 1880's when they imported them by the barrel. By 1894, these men began the manufacture of fertilizer in their own plant on Champion Avenue in East Columbus. This plant, within a block of the stockyards, served two purposes: it utilized the animal manures and waste products in the manufacture of organic fertilizers, and the farmers who brought livestock to the stockyards were a potential market for the fertilizers.

The factors responsible for the development of the Farmers' Fertilizer Company (# 9) are not clearly known but it is believed to have been established in 1894 as a local cooperative. It originally handled many products for the farm trade but gradually gave them up and restricted its sale to fertilizers for which there was a large market in central Ohio.

The present Davison Chemical Company (# 32) was originally the Welch Chemical Company which established itself here in 1911. This was also oriented to the local market which it continues to serve as a subsidiary of the Baltimore firm.

The Agricultural Laboratories Incorporated (# 130) is a fairly re-

cent company organized in 1932. The original owner was a Columbus man who expanded this business through consolidations with similar businesses on the east coast and in Baltic, Ohio. The firm sells to farm cooperatives, grain stores, and farm supply stores.

Sites -- All but the latter firm are in or near East Columbus. Each company was attracted to its site by cheap but abundant land adjacent to railroad lines. A factor that was not considered when these large plants were built was zoning. Fortunately, two of the plants are beyond the residential areas. Dust, odors, and fumes are associated with the plants by their residential and industrial neighbors. The companies have taken steps to curb these nuisances but the continued expansion of residential areas has made this difficult.

The Agricultural Laboratories firm is located in Northwest Columbus where its two-story cement block building is shared with Detergents, Incorporated. There are no fumes or odors associated with this firm.

Transportation of Materials -- The bulky, low-value fertilizers are limited in the extent of their markets by freight rates. With an important sale of fertilizers at the local plant, truck transportation dominates in central Ohio. Raw materials are carried by rail, however. The combination of good markets and good railroads has made Columbus an ideal site.

Labor -- To some extent labor has become scarce and wages have increased with the influx of new firms but an acute labor shortage is not threatened. The Negro labor force, which includes 210 of the total of 375 workers, is important since the dirty, dusty, and heavy work does not attract white workers. The largest employer is the Smith Agricultural

Chemical Company which employs over 200 workers, half of them Negroes. The Agricultural Laboratories uses only 20 workers, mostly females, who label, prepare, and pack the products, in a plant where the labor requirements are light.

Raw Materials -- The most important raw materials are potash, obtained in New Mexico and California, and rock phosphate, obtained in Florida. Sulphuric acid is produced by a number of plants but Farmers' Fertilizer buys its sulphuric acid from its neighbor, the American Zinc Oxide Company. Nitrogenous materials may be purchased from local farmers or from other chemical plants. The Agricultural Laboratories buys powdered humus from the Smith Agricultural Company and gets powdered charcoal in Tennessee.

Thus, while the basic raw materials must be transported more than 1,000 miles, this industry remains tied to its Ohio market. Well-established in an agricultural valley with economical transportation present, the industry's future seems assured. Future expansion of the city and/or stricter zoning regulations might lead to a relocation, however.

Pharmaceuticals and Serums. The four companies that form this division are completely unrelated. The Columbus Pharmacal Company (# 37) and Warren-Teed Products Company (# 105) are pharmaceutical concerns, the General Products Laboratories (# 93) manufactures proprietary medicines, and the Columbus Serum Company (# 60) produces hog cholera serum. These firms are primarily a result of local capital and initiative although the Columbus Serum Company was originally a state-owned organization.

Sites -- The plants are scattered over the city since their locations were not selective but were due, in most cases, to the presence of an

available building. The General Products Laboratories occupies a large, old four-story building in the Downtown but the other firms are in far more modern structures in other sections. The above firm was the only one which noted a handicap to its site and this was because of its crowded building and the inadequate parking facilities in the Downtown.

Market -- A major market is in central Ohio but each firm, except the Columbus Serum Company, also reaches a national market. The Warren-Teed organization has warehouses in Texas, California, Oregon, and Tennessee but the other companies only have sales representatives in the national market.

Raw Materials -- Chemical raw materials are gotten in the east coast port cities and in St. Louis and Chicago. The Columbus Serum Company buys hogs from the surrounding farm county. Where chemicals and drugs are shipped, parcel post is used widely. Truck service is important but it is replaced by rail freight when bulkier or heavier items are shipped.

Labor Force -- Approximately 200 of the 350 workers are women. The work is light but requires patience, agility, and speed. No Negroes are employed. Plants range in size from the Columbus Pharmacal Company, with 135 workers, to the General Products Laboratories, with 18 workers. In labor, as in practically every other respect, the Pharmaceutical Industry has not been affected by the other industries in the city.

Paints. The state of Ohio ranks fourth in the nation in the value of its paint products and Columbus is a leading center. The Columbus paint industry was developed to serve a market highly concentrated in this area. It is an old industry with the Hanna Paint Company (# 34)

started in 1884, the Dean & Barry Company (# 15) in 1885, and the Shepard Paint Company (# 98) in 1890. The newest firm is the Frey-Yenking Company (# 74), organized in 1923. (See Chart II, page 96 and Chart III, pages 118-119.)

Concentration of Factories -- The firms are concentrated in or near the Downtown. The latter two companies have no plants outside of Columbus; their main plants are west of the Downtown sections. Hanna and Dean & Barry are both in the heart of the Downtown; both firms have branches outside of Columbus. Hanna Paint Company has a large industrial paint plant in Pittsburgh and smaller plants in Birmingham, Alabama, and Dallas, Texas. The Dean & Barry Company operates a small plant in Dennison, Ohio.

Products -- Each firm produces secondary products in addition to its major line of house paints. The Pittsburgh branch of the Hanna Company produces industrial paints (60 percent for the steel industry), while Dean & Barry are now engaged in wallpaper design and production, and Frey-Yenkin sells varnishes, resins, and enamels. Sales are through retail outlets, hardware stores, or jobbers. The Dean & Barry Company maintains its own retail stores throughout Ohio and West Virginia. Local competition is on friendly terms but there is increased national competition.

Factors in Location -- The Hanna Company was started by two brothers, originally from Columbus, who worked for the Sherwin-Williams Company in Cleveland and returned to Columbus to start their own business. The present site of the Hanna building, in the heart of the Downtown, resulted from forward planning by the company's management. The building is many-storied and appears to be poorly designed for paint manufacture. Actual-

ly it was designed so that it could be converted into an office building. In the fall of 1952, the company announced its plans to expand facilities at a new location on Windsor Avenue in North Columbus. This move would consolidate all holdings in Columbus and would mean the abandonment of the Downtown building. It was purchased by the neighboring electric company which will use it for offices.

The other companies have located in the Downtown for a number of reasons. Dean & Barry did so at a time when the area was partially residential and they have remained in their original location. Frey-Yenkin feels that its location at the junction of the rivers gives it access to the Downtown without the handicaps of the Downtown location.

Expansion of Industry -- The expansion of industry in Columbus has had a negligible effect upon the Paint Industry. Labor has tightened and wages have increased but the unskilled worker is present in Columbus. Business has increased considerably because new firms have meant new jobs and new homes.

Markets -- The prime market is within 150 miles of the city, yet almost all of the raw materials used are brought in from beyond Ohio's borders. Linseed oil, probably the single most important raw material. is imported from the northwest, Texas, and the cities of Minneapolis and Buffalo. Tung oil comes out of the south, turpentine from the naval stores industry in the southeast, fish oils from coastal areas, and other oils from a variety of sources. Pigments, spirits, lead, and zinc are usually purchased from chemical companies with headquarters in the east.

These bulk items are shipped by railroad tank car to the plant's door. Prevailing freight rates determine the method of transport. About 90 per-

cent of the outgoing products is shipped by truck on the short hauls.

Labor -- About 310 persons are employed with 290 of these men. The Hanna Company has a working force of 165 persons (20 women) that is reliable and stable. Dean & Barry has 75 male employees, many of them commuters from rural communities. This firm's labor is stable, turnover is low, the workers are reliable, and cooperation between workers and management is fine. The company distributes a bonus every year to its workers -- no labor union has ever been organized. The Shepard Paint Company, with 12 employees, is the smallest firm in this group.

The paint companies are local firms oriented to central Ohio in many ways. Ties with the national paint industry are non-existent.

Miscellaneous Chemicals. Widely diversified and unrelated are The Ironsides Company (# 78), founded in 1883, which makes special preservatives and lubricants; The American Zinc Oxide Company (# 58), a subsidiary of the American Zinc, Lead, and Smelting Company, was founded in 1920 and produces zinc oxide; The G. F. Smith Chemical Company (# 77) produces analytical chemicals; and the Barneby-Cheney Company (# 123), founded in 1921, makes activated carbon products.

The American Zinc Oxide Company is a branch firm of a national organization and its location in Columbus is tied to the national industry. Four factors affected its location on Windsor Avenue and perhaps the first is most important: (a) a balance was maintained between the raw materials (zinc ore or concentrate from the company's holdings in Tennessee) and the market (rubber, paint, ceramic, and chemical industries), (b) good railroad facilities were here, (c) a good supply of bituminous and anthracite coal is available, and (d) a good supply of labor is present here.

Balanced between the raw materials of Tennessee and the coal of Pennsylvania, the plant can also easily reach by rail the major markets in the industrial lake states. It sells by-product sulphuric acid to the Farmers' Fertilizer Company. The plant is just beyond the city's limits in Clinton Township where it can avoid restrictive zoning measures.

Other Firms -- Natives of central Ohio started the other firms. The Ironsides Company makes lubricants for the steel or wire-drawing industries from refined vegetable and animal oils. While located in a cluttered industrial hodge-podge in the Downtown, its facilities are adequate.

The G. F. Smith Company has no bulk sales but its analytical chemicals reach world-wide markets. The company, started by a research chemist, ships its low-bulk, high-value products by parcel post.

The Barneby-Cheney Company, here since its founding, was organized by Columbus men. The activated carbon product requires domestic and foreign nut shells for raw materials. Black walnuts from Tennessee, pecans from Texas, peach pits from California, and coconuts from Java are some of the shells used. Because of the long haul to its major markets in the Texas and California oil fields, railroad transportation is used.

The company has been closely tied to the American Solvent Recovery Corporation since Mr. Barneby is an officer in both firms. On January 12, 1953, an announcement was made that the two firms had consolidated as the Barneby-Cheney Company; a Solvents Recovery Division will still manufacture air purification systems.

Employment -- In all, only 215 workers are in this division with 150 employed by the American Zinc Oxide Company. Since much of the work is dirty and involves heavy labor, a large number of Negroes are employed.

There are no females in this industry and unions are non-existent except at the above plant.

Summary -- The Chemical Industry is oriented to central Ohio in every way except raw materials. The relationships between this Ohio industry and the national industry are very weak. While the strong influence of local initiative and capital are evident, the dependency of the industry upon distant areas for raw materials and some markets characterizes it.

THE CERAMIC PRODUCTS INDUSTRY. The raw materials of central Ohio have played no role in the development of this industry, either. The principal factor which has influenced its growth in Columbus is not a conventional one; it may be termed institutional. More specifically, it is the influence of The Ohio State University and its department of ceramic engineering. Through its early program in this field, the university trained men who are presently successfully engaged in the Ceramic Products Industry. The continuing research carried on at the university supplements industrial experiments and offers new techniques and ideas to the private industries just as the training program supplies technicians.

The Institutional Force -- While this force is the obvious answer to the present ceramic industry's existence in Columbus, the interests of The Ohio State University in this field are related to the natural resources of the state. Clay, coal, and gas were the initial raw materials which stimulated the ceramic industry in the state. Westward-moving markets, which were developed during its initial period of growth, added further incentive. The nation's largest clay manufacturing centers were established in the Plateau counties of eastern Ohio yet there was no center of research.

The Ohio State University answered the challenge and, unwittingly perhaps, assumed a dominant role in influencing the location of ceramic products manufacturers. The local industry is an equipment-making industry, not a clay products industry.

There are growing bonds between the industry and the university. Ceramic art classes (fine arts), teacher training groups, and pottery training for the layman have increased these bonds. The Battelle Memorial Institute is available to tackle problems of private industry in this field as well as in others. That the entire program has been useful is proved by the continuing research at the university and at Battelle, by the success of local firms, and by the increasing interest on the part of the public in ceramic art.

The Orton Foundation -- There are only four companies in this industry-group but each of them relates its origin to the university. The oldest firm is the Orton Ceramic Foundation (# 75) which was established by Edward Orton, Jr. Mr. Orton had organized the Ceramic Engineering Department at the university and, while a member of the faculty, began the production of pyrometric cones for use in determining temperatures in furnaces and kilns. Earliest products were made prior to 1900 but the Standard Pyrometric Cone Company was not founded until a few years later. The business was a sideline to university work but gradually it dominated Orton's activities and he left university teaching.

The successful operation of the company, the sole producer of the cones in the United States, led Orton to establish a research foundation to continue after his death. Its purposes were two-fold: to continue to make and supply cones to the ceramic industry and to use all profits to

continue research and to supply financial grants for research in this country.

The Foundation was organized in 1932. Its location in residential North Columbus was permitted on special condition that it conform to the zoning laws. It is an attractive addition to the neighborhood.

While the other three firms do not have such long histories, each can relate its development to the university's influence. It was the prime factor in their location: other factors of market, raw materials, and/or labor, have been permissive in this industry. None is impelling, certainly.

The Harrop Company -- The Harrop Ceramic Service Company (# 189) was started in 1920 by local men as an engineering service. Manufacturing was secondary but it became important and, in 1950, a new building was occupied in East Columbus with adequate space for manufacturing facilities.

Industrial Ceramic Products Corporation -- Three graduates of the university, with degrees in ceramic engineering, combined their skills and capital to form this company (# 103) in 1936. Originally, designers of kilns and plants, it now produces supports for dinnerware in the glost (or glaze) fire as well as a few specialty items. Its modern, one-story plant on West Fifth Avenue in the Northwest, was one of the first manufacturing plants to occupy the area.

Pereny Equipment Company -- This firm (# 163) was organized by a native of Detroit who received his degree in ceramics at the university. While he originally operated a pottery shop, the demand for equipment stimulated the organization of the present company. Electric furnaces and kilns of varying sizes and a variety of other equipment, are produced for schools and industry. Expansion was rapid and the company moved to a

site in Northwest Columbus which was zoned for light industry and had railroad facilities adjacent.

Competition is not great. The Orton Company has two competitors; one is in nearby Pataskala and the other in East Liverpool. The other firms have no strong competition.

Markets -- Market was not a principal factor in location but it is doubtful whether a better location could have resulted with careful planning. Whereas the local firms sell to international markets, Ohio and its neighboring states absorb the bulk of production. California has been increasingly important as a market because of the strong interest in pottery-making in that state. International sales are not sought by most companies because handling costs are high and breakage is common. The Orton sells to firms in Europe, Asia, and South America.

Raw Materials -- All raw materials are brought in from out of state. Orton and Industrial Ceramics use earth materials. Kaolin is obtained in the southern Piedmont and Florida, ball clays in Kentucky and Tennessee, quartz from Illinois, feldspar from Canada, and specific minerals from the source areas possessing the desired qualities.

The other two firms, which manufacture furnaces and kilns, have entirely different needs. Steel and electrical supplies are purchased locally and refractory brick comes from Pennsylvania.

Practically all transportation is by truck although the available storage space at a plant will determine how much can be stockpiled. Outgoing products are trucked since they are generally fragile and require careful handling.

Labor -- This has been no problem. It is a passive force. About

155 workers are on the combined payrolls. Pereny Equipment Company has a small force of ten but Industrial Ceramics Products employs nearly 100. About one-fourth of the employees are females who are engaged in light, repetitive tasks. Most of the women are married and come from the neighborhoods adjacent to the plants. They are a reliable and economical working force.(38)

Prestige -- With the reputation established by The Ohio State University and by the four manufacturing firms, Columbus has gained a considerable reputation as a ceramic center. A further tribute to its importance will be recognized when the new national headquarters of the American Ceramic Society are completed on North High Street.

THE DENTAL PRODUCTS INDUSTRY. This industry utilizes ceramic products among others but there is no connection between it and the local ceramic industry.

Whenever a list of the diversified products of local manufacturers is compiled, the heavy industrial commodities are stressed but the list ends with the phrase ". . . and even artificial teeth." A Columbus firm is one of the world's largest manufacturers of inter-changeable artificial teeth and backings for bridgework. The Dental Products Industry would be insignificant indeed if it were not for the Columbus Dental Manufacturing Company which is the only firm of four that sells to a market beyond central Ohio. The other companies are dental laboratories which serve the dental trade at a professional level.

The Columbus Dental Manufacturing Company (# 39) started operations

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38 The average wage for women at Orton Foundation was $54 for a 40-hour week with an additional bonus at the year's end.

here in 1903 and, by 1915, had expanded to new quarters on Wager Street in South Columbus. The founder of the firm, Thomas Steele, was originally a watchmaker in New England. Through experience gained with a friend who made an unsuccessful artificial tooth, Mr. Steele produced a highly satisfactory one which was a modification and improvement of the earlier design. The name Steele is synonymous with the term inter-changeable teeth. Mr. Steele, who left New England when he could find no backing there, was financed in Columbus and for this reason established his shop here.

Dental Laboratories -- The other dental laboratories produce restorations for the dental profession. They are market-oriented in the strictest sense. The Alban-Theodo Laboratory (# 80) was established in 1930 near the Medical Center on East State Street. The National Dental Company (# 86) began its operations shortly afterwards and, in 1932, moved to its present quarters on the sixth floor of a High Street building. The third laboratory, Cranfill Dental Laboratory (# 165), is also downtown in a second floor building. This company started here in 1945 and expanded to its present quarters in 1947.

Markets -- The professional market and the desire by the owners to establish their own firms determined their locations. Each firm sells its finished product to the dentist who ordered the item. Competition is keen and a high degree of efficiency is required to meet standards.

The Columbus Dental Manufacturing Company, on the other hand, meets a world-wide market. Local sales are negligible; the majority of its sales are confined to the United States but others reach all continents. The company does not do work in the denture field -- its only products is the inter-changeable type tooth.

Raw Materials -- The dental laboratories buy plastics, precious metals, and other supplies from local supply houses. The larger firm buys on a national market. The teeth used by this firm are molded and fired in eastern Pennsylvania (Philadelphia is the center of the industry) and the local firm prepares them and their backings. Gold, silver, paladium, and platimum are widely used. They are purchased in New York and Chicago.

Transportation -- Most finished products are shipped by parcel post but the laboratories will use messenger service for local deliveries. Incoming goods are shipped by parcel post or express -- the nature of the product and the urgency of the need determines the method.

Labor -- Each small shop must train its own working force which is a technical force that is relatively well-paid. Because of the skills involved, this labor is non-competitive. On the other hand, the Columbus Dental Company does not need highly trained workers. Its wages are lower, on the average, and labor is much more competitive.

The latter firm employs about 150 workers of which 50 percent are females. The three laboratories have a total of 55 workers -- eight females. No Negroes are employed reportedly because there are few who are trained for this technical work.

Utilities -- All utilities are satisfactory. Public transit service is adequate but parking facilities are poor at these Downtown sites. The Columbus Dental Company has its own lot: it is the only company which owns its own building and has room for expansion when needed.

Bonds -- The companies are independent organizations and there appear to be no functional ties in Columbus although two of the firms have ties beyond the city. The National Dental Company is associated with a

larger organization having six laboratories in Ohio and West Virginia, and The Columbus Dental Manufacturing Company has recently expanded its interests to include outlets in California and the Industrial Aluminum Foundry in Columbus. A machine shop within the main building, opened during the war, can supply small precision machined parts that are needed. A complete polishing and plating department is also maintained. Chrome, nickel, and copper plating is done for company use and for local contracts. In this way, the company keeps its minor functions in operation profitably throughout the year.

A representative of the Columbus Dental Manufacturing Company, a well-known name in the field, asserted that no real prestige exists for the industry in Columbus. It is a specialized industry that has added to the city's importance as a diversified manufacturing center, but the real "prestige" centers are in Philadelphia and Chicago.

THE PLASTIC PRODUCTS INDUSTRY. The Plastic Products Industry is one of the newest in Columbus but its growth has been rapid. (See Chart II, page 96.) Its ties with the city are weak -- no institutional force governed its localization nor did a local market or native raw materials. Each of the seven firms were developed by natives of the area who had ideas and capital to back them. Geographic factors have been entirely permissive in the location of this industry.

Six plants have come here since 1938 but the oldest company, the Yardley Industries (# 92), has operated here since 1902. It was known for years as a manufacturer of insulating materials, weather-stripping, and screening. With new management in 1941, it began the fabrication of plastic wall tiles, pipe, and tubing.

Two other companies manufacture metal products along with plastic products but the latter form their major production today. The B & T Metals Company (# 119) and the National Aluminum Company (# 167) produce aluminum molding and stripping in addition to injection molded plastic extrusions. There is some competition in the sale of these goods but it is not cut-throat. The growth of the B & T Metals Company has been rapid. It started in the basement of the B & T Floor Company on South High Street. The metal stripping was a sideline to the flooring and was made to be used to hold linoleum in place. Gradually, this phase of the business increased and the firm expanded to a larger plant in West Columbus.

The Columbus Plastics Products Company (#108), the largest in the industry, was established by Columbus natives to produce household items of injection molded thermoplastics. The Plastex Corporation (# 118) makes plastic parts which are sold to other manufacturers who utilize them in a finished product. Sales to the refrigerator industry, to lamp manufacturers, and to sign and billboard firms indicate the diversity of products. The S & W Molding Company (# 150), originally a sales organization, is now an independent unit of the Yardley Industries. It finishes aluminum and plastic molded parts. Welch Plastics (# 160), a producer of custom molds to the specification of other concerns, in the newest firm.

Plant Sites -- The plants are scattered over the city but four of them are in the older industrial-commercial sections. The others are on the urban fringes. The Columbus Plastics Products Company was formerly on Dublin Avenue in the heart of an old industrial area but it now has a modern and spacious plant on West Mound Street. The National Aluminum

Company operates a single-story but spacious cement block building on Alum Creek Drive just a few feet beyond the city's border. Welch Plastics has a small plant in Grandview, west of the Olentangy River. The Yardley Industries now occupy a series of residential buildings in East Columbus but it plans to build a new factory on seven and one-half acres of land in South Columbus.

Markets -- These companies have the largest percentage of their sales within mid-western United States but four firms sell to foreign areas as well. New and diversified plants in the city have created a larger home market, however. The Welch organization rarely has customers east of New York or west of Indiana. It has the most limited market. About 98 percent of the Plastex market is out of the state. The B & T Metals Company and the S & W Molding Company both reach the building and construction industry throughout the nation. Products include wall tiles and aluminum moldings for kitchens, bathrooms, furnishings and floor coverings.

Raw Materials -- Chemical plastics from Dow, Du Pont, Celanese, Monsanto, Bakelite, Goodrich, and Koppers companies are imported from out of state. Aluminum ingot is gotten from the Kaiser plant in Newark, primarily. Usually raw materials are shipped by truck but the railroads carry their share of bulky goods. Truck facilities offer faster, more convenient, and cheaper service.

Labor -- Of the 1,225 workers, nearly 300 are females who are preferred to men since they demand a lower wage and are usually more readily available. Yardley, Columbus Plastics, Welch Plastics, and S & W Molding, uses them for light repetitive jobs. The first two employ over

two-thirds of the total.

Three of the plants employ Negroes. Actually 90 percent of the working force of the B & T Metals Company is Negro. The reason for this is that the owner of the firm was a Negro who has hired as many qualified Negro workers as he could use. The firm has never had a labor shortage.

Skilled workers are not particularly needed. Simple feeding, cutting, handling, and packing operations are typical of the extrusion companies. Some stamping operations are performed in the plastic plants but most goods are molded. Even though the jobs do not require skill, the workers must be adept at their specific tasks.

Utilities -- Public utilities are satisfactory in general. For the plants within the city, parking is a problem. Most plants use the neighboring streets; this is an inadequate but necessary step. The firms on the fringes have parking space but they lack good transit service. The same applies to expansion: those plants within the city are in older buildings which have been utilized to capacity. New plants have wisely planned and have anticipated future needs by locating in areas where expansion is possible.

Summary -- Columbus is not a plastics center and yet none of the companies would leave here. Each is Columbus owned and operated and is identified with the city. A better location might be found from a marketing or supplying standpoint but Columbus remains a stable community in an excellent location with respect to markets and raw materials. This is an expanding industry nationally; its continued growth in Columbus seems assured.

THE RUBBER PRODUCTS INDUSTRY. This industry consists of three small firms whose locations are oriented to the local market. Their products, few in number, are assembled or fabricated rubber goods. The oldest company, the Fournier Rubber & Supply Company (# 113) was organized in 1933 when the owner, a salesman for the Goodyear Rubber Company, recognized the need for a rubber supply house in the area. In 1945, the company began to manufacture cut rubber gaskets and this now forms one-third of the business.

The Allen Manufacturing Company (# 153), formed by natives of central Ohio in 1943, is also market-oriented. It employs about 20 women who stuff shredded foam rubber into cotton ticking. The rubber is bought in Akron and the ticking from southern mills. Columbus supplies the low-wage labor to assemble the finished product. The principal urban markets are easily reached.

The third firm, Clarite of the Great Lakes (# 186), is actually a battery assembly plant. It is the only firm with ties beyond the area. Established here in 1945, it is a branch of a Salt Lake City organization which has other plants in California, Kansas, and Oklahoma. The bonds are financial since all plants are independent operating units which have no ties with one another. The company chose to locate this assembly plant in Columbus since the city is a good distribution point. Its principal sales territory is in Michigan, Ohio, Indiana, and Illinois. The Ohio market is the prime one for all three firms but the Allen Company also ships to international markets.

Raw Materials -- These are few in number. Paper, cork, and asbestos are purchased by the Fournier Company from suppliers in Detroit, Pitts-

burgh, and Lancaster, Pennsylvania. The company hopes to manufacture metal gaskets before long; its material requirements will increase. The Clarite firm buys all of its materials. Hard rubber battery boxes are purchased in Indianapolis from the Richardson Rubber Company and battery tops are obtained in Chicago. Lead, for the battery plates and posts, comes from the National Lead Company.

Eighty percent of the shipping is done by truck since over-night deliveries can be made at much lower rates and in shorter periods than prevail for rail hauls.

Sites -- No plant has facilities for shipping by rail. They occupy small buildings that are particularly adapted for manufacturing. The Allen Company has its own small, cement block building in South Columbus but the other firms rent their buildings. All utilities are satisfactory.

There is nothing in Columbus to attract or retain these firms. The fact that the city is a good distribution point with an extensive transportation network and is a good labor town seems to make it an ideal location for these firms.

## The Wood and Paper Industry

This industry-group is the second smallest in the city. Less than 2,000 workers are employed by the three industries which form this loosely-knit group. While the firms producing wood products -- caskets, showcases, and furniture -- are old-line Columbus firms which have given character to the manufacturing of the city, the paper companies are a minor part of the manufacturing community.

THE CASKET INDUSTRY. Columbus is a center for the market- and labor-oriented Casket Industry. There are only five companies in the city but two of them are among the largest in the nation. In each instance, the position of Columbus, near the center of population and the national market, has been the principal factor in location.

Low-wage Labor -- Of almost equal importance is the presence of a relatively low-wage labor force. Columbus has the lowest wage rate of any of the five leading industrial centers in Ohio, according to the Monthly Business Review of the Federal Reserve Bank of Cleveland.(39) Although the combined payroll for this industry is only 410, the casket manufacturing firms are low even for Columbus.

The abundance of labor and the skills of the labor force are not the principal considerations of these firms. The low-wages are; they brought and kept the industry in Columbus.

Female workers are always available but their particular places for work in this industry are limited to the sewing rooms. A few women are used as press operators in the larger plants but the work they may perform is limited by law. A skilled worker is not generally required although a few craftsmen -- carpenters, painters, and designers -- are necessary. Many of the jobs appear to require skills such as lining the interiors of caskets, but a person can be trained to do this job in a relatively short time.

Work is steady and one finds stability in this industry. The low wages are supplemented, in part, by this stability and by permanency.

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39 The Monthly Business Review, Federal Reserve Bank of Cleveland, Vol. 34, No. 5, Supplement, May 1952. See the entire bulletin.

Many older employees who seek such security are willing to stay on but younger workers are not. New industry and higher-paying industry has attracted many of them but even so, the Buckeye Casket Company believes that the new firms might prove beneficial, in the long run, by supplying a larger number of diversified workers for the labor market.

Products -- All types of caskets are made from cheap wooden caskets to ones of expensive bronze. The Belmost Casket Company, which specializes in high-quality metal caskets and considers itself the pioneer in this field, makes lead-coated steel, copper, and bronze caskets in addition to wooden caskets. The Boyertown Burial Casket Company makes only wooden caskets in its Columbus plant but the parent factory in eastern Pennsylvania supplies metal cases and hardware. Both the Columbus Coffin Company and the Buckeye Casket Company produce metal and wooden caskets. The smallest and newest firm, Advern Casket Company, buys the wooden shells and finishes them.

Competition is keen but it is usually restricted to specific price ranges and individual styles. The high-priced caskets reach a national market and have relatively little competition. In contrast, the cheaper caskets are rarely shipped more than 150 miles but competition is great.

Markets -- Market, the motivating force in the location of this industry, varies greatly with each firm as well as with the product. The Belmont Company sells throughout the United States but Ohio is its major sales territory. The Buckeye Casket Company reaches markets in 36 states in the east, south, and mid-west. Local sales are not important. On the other hand, Columbus Coffin, Boyertown Casket, and Advern Casket companies concentrate their sales in Ohio and neighboring states.

Age and Sites of the Plants -- The average casket company has been in Columbus about 35 years. (See Chart II, page 96.) The oldest, the Columbus Coffin Company (# 3), came here from Zanesville in 1880. The founders were originally from Columbus and, recognizing the growing market in central Ohio, relocated their plant here. The company currently occupies the old, multiple-story building that it erected in 1880 and subsequently enlarged in the crowded industrial area on Buttles Avenue.

The Belmont Casket Company (# 41) is a branch plant of a Bellaire, Ohio, firm which moved most of its operations from Bellaire because that city was poorly located with respect to markets and transportation. Columbus was chosen for its urban market, excellent rail facilities, and ready supply of low-cost labor. The labor force was considered "ideal" at the time. The Columbus Chamber of Commerce was instrumental in obtaining the old Peters' Buggy plant for this firm. The site in North Columbus is still used. All of the metal stamping is done in the Bellaire plant -- the local factory assembles metal caskets and make wooden ones.

The Boyertown Burial Caskets Company (# 68) is the only other firm with ties beyond central Ohio. The opportunity to contact the mid-western market was the principal factor in the location of this branch plant. Expansion by this firm coincided with the closing of the Ohio Casket Company in 1924. Because of the inadequate building, the new firm moved to the Immel Body and Coates Steam Car companies' building on South High Street where it is located today.

The Buckeye Casket Company (# 91) and the Advern Casket Company (# 133) have been formed by local entrepreneurs who had Columbus capital

backing them. The Buckeye Company was started in 1921 by a man who had formerly worked for other casket firms in the city. He chose to situate here because of personal contacts in this accessible market territory. The Advern Casket Company was begun in 1943 when the present owner, recognizing the possibilities of this business, purchased the Swetland Casket Company which was then closing. The company's low-priced caskets reach a market limited to the rural communities of Ohio, West Virginia, and Kentucky.

Raw Materials -- The Casket Industry has been at no disadvantage in obtaining raw materials. Practically all of the textiles are purchased in New York City where eight textile firms cater exclusively to the casket companies. Casket woods are purchased in the nearby forested areas with oak coming from the Appalachians of Kentucky, West Virginia, and Tennessee, cherry from Pennsylvania, birch from the Adirondacks, and tulip and walnut from Ohio. Cheaper grades of wood, such as cypress which is used in the construction of covered caskets, are purchased on the west coast or in the south.

Metal products come from many sources: copper from the Revere Copper Company in the Connecticut River valley, and zinc, aluminum, and lead from Chicago. Steel is purchased in Ohio from Armco Steel in Middletown or from the Youngstown Sheet and Tube Company. Belmont Casket buys its lead-coated steel from the Wheeling Steel Company and uses it in its stamping operations at Bellaire. Hardware supplies for the other firms are purchased out of the city with Richmond, Connersville, and Elmwood, Indiana, the centers.

Transportation -- Transportation facilities are adequate for the

needs of these companies. Rail service dominates this industry because it gives the companies a better freight rate than the trucking industry. A few firms have their own trucks which insure the safe, convenient, and economical transportation of their raw materials and finished products.(40)

Bonds with Columbus -- These firms are in those parts of the city where parking facilities and space for expansion are available. (See Figure 7, page 93.) Public utilities are generally good. There are no handicaps to the continued success of the casket companies. Bonds between this industry and others within the city are weak. A burial slipper firm and a number of clothing manufacturers operate here, but they have no ties with the Casket Industry. This is a small but stable industry; its future growth seems assured unless labor becomes a more critical problem.

THE SHOWCASE AND FURNITURE INDUSTRY. While not as much oriented to its market as the Casket Industry, market has been the principal factor in the location of this industry. Three of the eight plants in Columbus came here specifically to be near the growing market. The others were started here but market was a permissive factor in their development.

A secondary factor governing location is the raw material supply. Columbus is centrally located to receive the various woods used by these shops and to purchase glass, hardware, and steel. Good truck and rail facilities permit satisfactory operations although this is not a major factor in the location of any plant.

Age and Bonds -- No firm has bonds with national organizations nor

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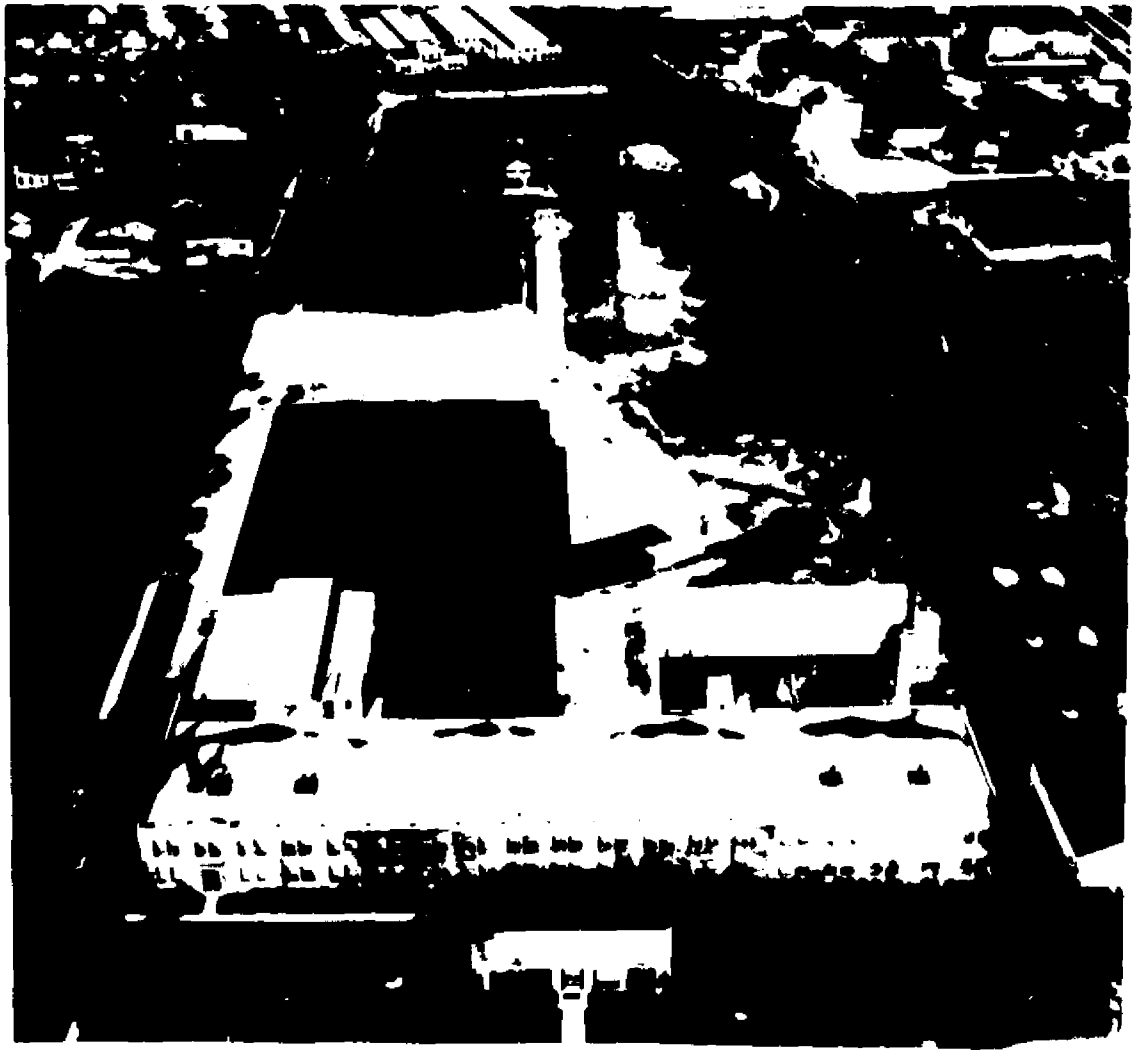
40 Boyertown Burial Caskets Company has its own specially-built trailers which were designed to carry casket shells between the plants and to carry finished caskets to markets.

with other concerns in the city. All are Columbus firms and their histories in this area are fairly long. This is the sixth oldest industry in the city. (See Charts II and III, pages 96 and 118-119, respectively.) Five of the eight firms were organized here prior to 1901. Two companies, both of them furniture manufacturers, located here since 1945.

Columbus Showcase Company -- The best known local firm and the second largest firm of its type in the nation is the Columbus Showcase Company (# 64) which began operations here in 1895. The present plant, in Northwest Columbus, was carefully planned to benefit from all of the advantages of this new industrial area. The physical plant was built to meet the specific needs of the company; no other plant in the industry was so constructed. The entire history of this company reflects locational planning and a consideration of the future. (See the photograph which follows for an aerial view of the plant and adjacent industries.)

The principal manufacturers of showcases, outside of the eastern seaboard cities, were in Chicago, Quincy, Rockwell, and St. Louis during the late 1890's. The founder of the Columbus Showcase Company then operated a plant at Quincy but he decided to move eastward to meet the market in the lower lake states. His first choice was Buffalo, but Columbus was finally chosen after the railroad facilities and the accessibility to raw materials were considered. In 1895, Columbus had almost 15 rail lines entering the city; they could bring in prize oak from the forests of southern Ohio and Indiana, and they could quickly assemble the glass and hardware materials from the Pittsburgh area. With an adequate force of skilled, low-wage labor here, the combination was hard to beat.

Other companies -- The other concerns, local firms that were estab-



Courtesy Columbus Showcase Co.

MODERN PLANTS IN THE INDUSTRIAL NORTHWEST
SECTION OF THE CITY. COLUMBUS SHOWCASE CO. (foreground)
AND NATIONAL ELECTRIC COIL CO. (background)

lished because of the local market, have expanded their production considerably and now reach more distant markets. The J. S. MacLean Company (# 69) was organized in 1885 but it did not then occupy its present site. This firm, which sells custom showcases, moved into an old brewery in 1925 and has operated successfully from there.

The Schwartz-Showell Corporation (# 52) and Boss Displays (# 88) are both smaller firms. The former is located in Northwest Columbus where it has occupied the same site since 1920 when it moved there to gain railroad facilities and space for expansion. Boss Display is almost entirely oriented to a Columbus market; it rarely sells beyond Ohio. Fixtures for restaurants, bars, and drug stores are its principal products.

The Franklin Lumber & Fixture Company (# 90) makes hotel and restaurant equipment. There is no competition in central Ohio but it increases at the national level. The firm started here in 1901 and presently occupies cramped quarters in a crowded section of North Columbus.

Furniture Companies -- The Josephinium Church Furniture Company (# 25), whose history goes back to 1882, was originally part of a Catholic home for boys. When the manufacturing phase of its operations was ordered separated from the church, a group of Columbus business men saw the possibilities for investment. The company has operated in a crowded, old shop in an alley (Merritt Street) in South Columbus. Its workers are skilled carpenters who must undergo apprenticeships in the plant. Many foreign-born persons, skilled in woodcraft, work here. Competition within the industry is keen although limited to a few concerns.

The General Furniture Corporation (# 173), a manufacturer of dinette furniture, and Lerch Industries (# 196), a manufacturer of custom living-

room furniture, are both new companies. The latter was started by a man who had successfully operated the Crise Manufacturing Company (electric products) in Columbus. He started this company after retiring from the Crise organization. General Furniture centered its activities here so as to reach the markets within Ohio. The buildings occupied by these firms were available when needed -- they do not suit the occupant's need.

Markets -- Markets range from central Ohio to the entire nation. In most cases, stock items are produced by each shop but custom production is a considerable part of the business. Some companies, the Columbus Showcase Company for instance, have regular customers for whom they make showcases. One such customer is the Parker Pen Company which uses the display cases by the Columbus Showcase Company exclusively. The showcase market is expanding -- 80 percent of the above firm's market was in Ohio 20 years ago, but only 20 percent is now centered here.

Church furniture is sold nationally but the other furniture firms are more limited. Only the Franklin Lumber & Fixture Company sells overseas. Minor sales are made in South America and Asia.

Raw Materials -- Wood is the principal raw material and the quality of wood needed depends upon its application in the finished product. The Josephinium Company uses the finest quality oak from the Appalachians and elm from Michigan and Wisconsin. Cherry and walnut, once favorites, have gone out of style and are no longer readily available. The showcase firms once used Ohio oak almost exclusively for the finished wooden cases, but Appalachian and west coast areas supply the requirements today. Glass is still purchased in Pittsburgh and in Mt. Vernon, Ohio.

Hardware comes from Chicago and Grand Rapids; the latter is an important supply center because of the furniture industry there.

Steel is purchased by the Franklin Lumber Company for its refrigerated cases in Pittsburgh, Middletown, and Cleveland. The Lerch firm buys finished wooden frames from shops in Grand Rapids, springs and felt from a variety of sources, and textiles in New York City.

Transportation -- While practically 90 percent of the finished goods are shipped by truck because of speed and conveniences, it was railroad transportation that was a factor in location 50 years ago. Railroads are rarely used today; usually only for the importation of wood. Most of the large plants have sidings and plenty of dock and storage space. In a number of instances, careful planning at the site has meant the most economical use of the grounds.

Labor -- The average number of workers in these plants is 73 -- this is a small-scale industry. (See Table X, page 87.) The largest employer is the Columbus Showcase Company with 300 workers. Six firms employ between 25 and 50. There are a few women employed who do cutting and sewing work in the Lerch plant and assemble and cover furniture for the General Furniture Company.

With a large percentage of the work requiring skilled carpenters and wood-working craftsmen, there is a shortage of good labor. The Josephinium Company, which requires a four-year apprenticeship for its workers, finds it difficult to interest young men in this work. Frequently, the showcase plants "rob" this company of its workers after they have served part of their apprenticeship. The Lerch Company imported its essential laborers from Grand Rapids before it began operations here.

Utilities -- These are satisfactory for the light needs of this industry. Public transit service is not always good but this situation has been remedied, in part. Those plants in congested areas, Franklin Lumber and Boss Displays, do not have adequate parking space nor room for expansion.

Summary -- Columbus is not nationally known for its furniture industry but it is nationally known as a manufacturing center for the showcase industry. Since the finished products do not reach the retail market or attract the attention of the average person, it is doubtful that many persons out of the trade recognize the importance of this Columbus industry. This is another locally-oriented industry that reaches a national market.

THE PAPER AND PAPER CONTAINER INDUSTRY. A market-oriented industry, dependent upon distant sources for its raw materials, is the Paper and Paper Container Industry. The Columbus shoe industry created an important local market at an early date and was a principal factor in the location of the four container companies. A generally favorable market influenced the location of the three remaining firms.

Factors in Location -- The oldest firm, The Columbus Paper Box Company (# 54), has been here since 1890. It is distinctively market-oriented toward the shoe industry. The set-up and folding paper boxes it makes are light and bulky and, therefore, costly to ship. A plant here was well-situated for the markets in neighboring Chillicothe, Washington Court House, Lancaster, Nelsonville, Xenia, Logan, and Portsmouth shoe centers.

Frankenberg Brothers, Incorporated (# 61), founded in 1895, manufac-

tures folding boxes for the retail trade that is found within 500 miles of the city. The founders were natives of the area who recognized a growing market in central Ohio. The business has expanded so that less than 20 percent of its sales are now in Columbus; the majority is in Ohio and adjacent states.

The Corrugated Container Company (# 144) is one of two firms which was located in the city by outside interests. Eastern investors chose to build here in 1916 when they sought a good location in the heart of the growing mid-west. About 65 percent of the company's sales remain in central Ohio with the majority of the corrugated products going to the consumer goods industries.

The Heroules Box Company (# 44), on Marion Road in South Columbus since 1919, is a fully-owned subsidiary of the Federal Glass Company. All of its production originally went to the parent firm but today very little does. The growth of the company resulted from the parent firm's desire to consolidate its facilities in South Columbus where space was available and good transportation present.

The largest paper plant in the city, and the only one with bonds beyond the city, is the Pollock Paper Company (# 151) on Frebis Avenue in South Columbus. This plant, which came here in 1946, makes wax paper for bakeries. It is one of five plants owned by a Texas group which has a wide market throughout much of southern and eastern United States. Originally, the plant was in Cincinnati but when that factory was forced to close, Pollock decided to buy a "going" concern rather than to build a new plant and be forced to shut-down operations entirely. The Ohio Wax Paper Company, in Columbus, was for sale at this time. It was bought

by Pollock interests and its building was occupied. Most of the Cincinnati operations were moved here but, later, some were moved to Middletown. In addition to the two Ohio factories, two branches serve the southeastern market out of Atlanta and Birmingham, and two serve the southwest from Dallas and Houston.

The remaining two firms are natives in all respects. The Dobson-Evans Company (# 115), a manufacturer of cut paper products for an Ohio market, first set up operations in 1902 in the Downtown. It now occupies a modern building in Northwest Columbus. The newest and smallest firm, Puritan Products, Incorporated (# 200) was founded in South Columbus in 1951 to make cellophane and polyethylene bags. About 70 percent of its market is in central Ohio with the remainder in states west to the Mississippi.

Transportation Problems -- Handling of goods is a problem in this industry. Many box firms ship to their principal customers as frequently as once a day because purchasers usually do not have storage space and can make only limited purchases. The necessary frequent shipments can be most conveniently carried-out by truck. The Pollock Paper Company has its own handling problem. Wax paper requires careful handling. It must be shipped by refrigerator truck or car so that it is satisfactory for immediate use. The company uses its own trucks and it trains crews for the delivery and handling work. The firm imports its raw materials by rail, however.

Raw Materials -- While markets are dominantly in central Ohio, none of the raw materials is obtained locally. Paper is purchased from scattered mills in the United States and Canada; cardboard comes from plants

in Middletown, Toronto, Urbana, and Franklin; paper board and kraft paper, used in corrugated boxes, is bought in the South Atlantic and Gulf states. Chip board, used by one firm, comes from Middletown, Lancaster, and sources in Pennsylvania and New York. The petroleum industry in Texas and Indiana supplies Pollock with wax, and printing ink is bought in central Ohio. Cellophane and polyethylene, used by Puritan Products, is obtained from chemical companies such as Du Pont.

Labor -- There is a better supply of semi-skilled workers in Columbus than in most cities. Even so, labor is tight. About 930 workers are employed and 225 of these are females. The Pollock Paper Company is the largest employer with 250. Puritan Products has only 15 workers. Heavy female employment is found at the Columbus Paper Box, Hercules Box, and Frankenberg Box companies. Females are well-suited for work in this industry.

Unions are present in four plants but activity is at a minimum. The wage average is about $1.25 to $1.75 an hour with incentive systems in force. The South Columbus firms find that the dependable labor of the past is no longer abundant. Good plant and secretarial help is scarce.

Local Handicaps -- Similar handicaps as those that have appeared in other groups are common here. Gas service is not adequate. Plants in the South Columbus area were unanimous in agreeing that poor transit service was a major handicap to the development of that area. All of the plants have adequate parking space, even in the crowded industrial areas, but such space is obtained at high costs.

Prestige -- This is not a prestige industry but it is another example of a distinctively market-oriented industry that has prospered. Continued success can be anticipated for these firms in Columbus.

## The Shoe and Textile Industry

There are few similarities between this industry and the others in the city. There are many similar characteristics between the shoe and textile companies, however. Both have been firmly entrenched in the city for more than 50 years; both are labor-oriented industries; both employ large numbers of female workers who are available and adept at the work; and both reach national and international markets. The Shoe and Textile Industry is older than the founding dates of the present firms would indicate. The Shoe Industry has had a colorful history in Columbus and the city remains a minor shoe center today. The Textile Industry, as represented in Columbus, might well be found in any city of 350,000 persons. There are a few specialty houses, however, that give it a particular character.

THE SHOE INDUSTRY. The Shoe Industry, originally heavily settled in New England, and specifically in Massachusetts, has spread over much of the mid-west and south. The concentration of the industry in New England had occurred because of the abundance of cheap labor trained in this work.(41) With unionization and the leasing of machinery(42) which introduced mechanization and increased the subdivision of labor, the industry moved closer to the center of population. Cheap, non-union labor and access to the important mid-western markets have made Columbus an excellent location.

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41 The term trained is used in preference to skilled. Workers in this industry are trained to a job -- they are not skilled craftsmen.

42 Machinery in the shoe industry is leased. This permits a small shoe manufacturer to start in the business with a minimum of capital. It also allows for much mobility within the industry.

History -- Shoes have been made here since the early 1800's but never on a large scale until the 1880's. The H. C. Godman Company (# 57), which had started as a leather-finishing business at the close of the Civil War and began to make shoes when the Mc Kay Automatic Stitcher was invented, became one of the nation's biggest shoe manufacturers. In 1890 the firm left one factory in Columbus and moved to Lancaster. Labor difficulties brought it back to Columbus and a very large five-story plant was erected in West Columbus. There were also two other factories here and one each in Xenia and Logan; the firm was one of the four largest in the country. As a result of the depression and prior over-expansion, the firm held only the two local plants and its Logan factory in 1940. The West Columbus building was sold to the Federal Government and all manufacturing facilities in the city have been abandoned.(43) In 1949, a large plant in Marion, Indiana, was purchased and it is now the company's headquarters. A retail system of about 100 stores still operates consuming nearly 50 percent of the company's output.

The Godman Company's experiences are typical of the shoe industry. Because it is a low-wage industry, any disturbance of labor may affect its location. Commonly, the movement of a large shoe firm from an urban center to a rural community is a reflection of this sensitivity. In addition, the leasing of machinery permits much easier and cheaper movement than would otherwise occur.

The Jones Heel Manufacturing Company (# 40), the second oldest in

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43 A labor-oriented industry, the Godman Company may have left Columbus because of feared competition for labor with the high-paying electrical equipment and transportation equipment industries.

the city, has also experienced such moves. It was first organized in Pennsylvania at the turn of the century, but the firm moved here in 1916 to consolidate factories located in Williamsburg, Batavia, and Dayton. In addition, its principal market -- H. C. Godman Company -- was here, and a secondary market in Cincinnati was accessible. Trained labor was relatively plentiful and wages were low. Today, a market remains in Ohio (locally and in Portsmouth) but the growing market is in the south.

Labor has influenced the moves of the Julian & Kokenge Company (# 85), too. This Cincinnati firm was represented in Columbus by its subsidiary, the Lape and Adler Company, from 1921 until 1932 when the parent firm came here. Labor problems in Cincinnati in the form of unionization and the demand for higher wages forced this move.

Walker T. Dickerson, a man trained in the Julian & Kokenge organization, started his own company in 1930 when he purchased the Reilly Shoe Company. He recognized the fine physical facilities here, the presence of a trained, low-wage labor force, and the national market for women's shoes. Today, the Dickerson Shoe Company (# 79), and Julian & Kokenge compete in the sale of quality women's dress and health shoes.

Two new firms manufacture dance and ballet shoes. Prima Footwear, Incorporated (# 166) and Hollywood Products, Incorporated (# 137) established here in 1940 and 1946, respectively. The former company has occupied its South Columbus factory since 1948. Hollywood Products was organized by a couple who had previous experience in other shoe factories. Their plant, on North High Street, is in a crowded, inadequate building.

Joyce Shoes, Incorporated (# 126), a California manufacturer of women's shoes and the originator of the platform shoe, moved most of its

facilities here in 1941 to be nearer its raw materials and to reduce shipping costs to the major markets. With experienced low-wage labor present, the company felt the move a wise one. It began operations in Pasadena, California, and still retains offices and sales rooms there. Its principal manufacturing plants are in Columbus but there is also a small factory in Xenia and shoes are made under contract by a New Hampshire firm.

Linkage -- Industrial linkage was a factor in the location in Columbus of two separately organized firms owned by the same New England firm. The Leighton Heel Company (# 111), a branch of Leighton Industries of Lynn, Massachusetts, Auburn, Maine, and Lynchburg, Virginia, was organized here in 1931 to produce fiber heels. It came to Columbus because a large percentage of its business was with the Godman Company. In 1938, the firm bought a Godman-owned building in West Columbus and, with it, purchased the fiber production facilities of the Godman Company. By this functional tie-in, the Leighton Fiber Products Company (# 112) produces fiber board used by the Leighton Heel Company and other manufacturers of shoe heels.

Sites -- A characteristic of the shoe companies is the multiple-story type building they occupy. The buildings, which generally have been given good care, are clustered in or near the heart of the Downtown where expansion is limited and parking difficulties intensified. (See Figure 7, page 93.)

Utilities -- Public utilities are satisfactory. Two of the larger companies have their own wells, in addition to city water. Electric service to this large power consuming industry is very good as is public

transit since every plant is within the Downtown area. The limited parking facilities are supplemented by on-street parking.

Labor -- The principal force attracting this industry has been labor. Currently it is tight and wage demands are higher than usual. Approximately 2,120 workers are employed -- more than 1,200 are females. Women workers are commonly associated with the shoe industry because they form a mass of cheap labor in communities where men are employed in other industries. The shoe industry is a symbiotic industry in many areas but in Columbus it makes complementary use of labor.(44) No Negroes work in this industry: it is said that tradition, more than anything else, keeps the Negro out. Unions exist in only two of the nine plants -- the H. C. Godman Company and Julian & Kokenge, two of the larger firms. Less than 50 percent of the labor in the national industry is unionized due largely to the many moves the companies have made.

Much of the labor requires no more than repetitive skills. It is largely handwork done at cutting, sewing, stitching, or shaping machines. Some operations are carried out while seated at a machine although such jobs as cutting or shaping counters are done at upright machines. Frequently the work is on an incentive basis with a base wage established and increments added for extra production. Most of the machines in any shoe plant are leased from the United States Machinery Company. Leasing of machinery is an important factor in the location of plants (45) as it

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44 In northeastern Pennsylvania, where the male workers were employed in the anthracite mines, the shoe industry located to use the cheap female working force that was available.

45 E. B. Alderfer and H. E. Michl, op. cit., p. 494.

permits a company with little capital to enter the business. Thus, the availability of cheap labor and the leasing system are basic factors in the location of the shoe industry.

Market -- There is another consideration in a review of the factors which influence the location of this industry. It is the role of market. The H. C. Godman Company attracted at least three other firms to the city. (See above.) The Godman Company purchased as much as 100 percent of their production at times.

Central Ohio is a good distributing point for the major national markets. The Jones Heel, Leighton Heel, and Leighton Fiber Products companies sell their specialized supplies to manufacturers locally and nationally. All other firms manufacture shoes for the retail trade. Of these, only the Godman and Julian & Kokenge organizations have their own retail outlets. Competition is very keen in this industry.

Markets vary. The Godman, Julian & Kokenge, and Prima Footwear companies sell beyond the United States to South American and Pacific nations. The supply houses are more restricted. The Jones plant concentrates sales in central and southern Ohio but also reaches Kentucky, Tennessee, and West Virginia. Fifty percent of Leighton Heel's sales are in Ohio with neighboring states, Missouri (largely St. Louis), and the Pacific coast absorbing the remainder. Fiber products are even more restricted. About 30 percent goes to the heel plant and the remainder to the Williams Shoe Company and the Selby Shoe Company in Portsmouth.

Raw Materials -- For a century or more, raw material supply centers have been in the New England and Eastern Seaboard states. Leather, cloth, and findings are still obtained there. Pennsylvania, Ohio, and Wisconsin

have recently become important centers. St. Louis, probably the nation's leading shoe center, is another big supplier of findings. The scrap product used by the heel and fiber companies, is difficult to obtain. It is found occasionally in this area but ordinarily it must be imported from the east.

A large percentage of imported goods are carried by rail since the long haul of supplies and scrap is more economical this way. Finished shoes are shipped by truck. Smaller lots and shorter distances dictate the type of carrier used.

Summary -- Labor has been the impelling force in the location of the Shoe Industry in Columbus. There have been many permissive forces. Some of them have assumed impelling characteristics at various periods in the industry's development. The growing western market and the presence of the H. C. Godman Company in the city attracted factories. The leasing system, within the industry itself, permits the easy establishment of a shoe factory in any community with a satisfactory labor force. And lastly, because shoe plants have been here for almost 90 years, the city has gained some prestige in this industry. This, too, may be a permissive force in the location of a new plant.

THE TEXTILE INDUSTRY. A great variety of textile products are manufactured in Columbus although the most widely advertised product is oil cloth. Sheepskin and coated gloves, automobile seat covers, burlap and cotton bags, trousers, suits, uniforms, and dresses, fabric notions, knapsacks, and burial slippers are made. Limited local competition and increasing national competition characterizes the industry. Goods are sold directly to retail houses or are handled through wholesale firms or job-

bers. In most cases, sales are nation-wide but the United Woolen Company, Joseph & Feiss, and the minor bag firms have more limited markets. The Columbus Coated Fabrics Company is one of the few to sell to a world-wide market.

Factors in Location -- A variety of factors have influenced the location of these firms in Columbus. The three older companies, National Glove (# 19), Columbus Coated Fabrics (# 14), and the J. P. Gordon Company (# 87), were all started here more than 50 years ago. The latter two were, in effect, out-growths of the important buggy industry. The first made buggy tops and aprons and the latter made horse covers, storm fronts, and other items. The J. P. Gordon Company is known today for its automobile seat covers.

Between 1915 and 1920, the Practical Burial Footwear (# 49), Simon & Haas (# 149), and the Capital Bag & Burlap (# 100) companies were organized to take advantage of the westward-moving market. The first two have now expanded to meet a larger market.

In the next ten years three outside firms moved here for independent reasons. The Hercules Trouser Company (# 56), an industry that makes complementary use of cheap labor, came here in 1921 from Zanesville.(46) In 1935, a decentralization program was initiated to better orient plants in non-industrial communities where cheap female labor could be employed. Wellston, Manchester, Hillsboro, and Jackson, Ohio, are manufacturing outlets; the Columbus plant is largely a warehouse and an office.

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46 Labor difficulties, principally unionization efforts, continue to plague this company locally and in the neighboring communities where its branches operate. The situation is similar to that in the Shoe Industry.

The United Woolen Company (# 67) came to Columbus in 1924 when the company's plant in Parkersburg, West Virginia burned. The location here was based principally on the accessibility to market. The Rudolph Stern Dress Company (# 154) moved here from Toledo at this time.

The only outside firms other than these, and the only branch plant, is the Joseph & Feiss Company (# 136) of Cleveland. The firm has been operating since 1841 but it came here in 1945. The principal reasons for this move were the availability of an adequate building and the presence of cheap labor. The local plant makes men's trousers which are then shipped to the home plant where they are matched with suit coats made in a Rochester, New York, plant. It is significant that the textile firms are still coming here. Whether the recent industrial trends will discourage these firms remains to be seen.

Local investment and initiative are responsible for the growth of the four remaining firms which were established since 1936: The Columbus Glover Manufacturing Company (# 148), the Central Ohio Bag & Burlap Company (# 187), the Barry Corporation (# 185), and the White-Bush Manufacturing Company (# 184).

Sites -- A characteristic of the industry in Columbus is its Downtown location in rented second and third floor space. Generally, such locations are inadequate for any other manufacturers and they are limited for use by these firms. The Columbus Coated Fabrics Company, the largest firm in this industry, has a large factory in North Columbus. It was built in 1900 when this was rural Columbus but industrial and residential expansion has hemmed-in the plant.

Labor -- Cheap, non-union labor that was once a principal force in

permitting the successful development of these factories is no longer present. More than one-third of the working force is female. Women are employed in the cutting and sewing rooms of the smaller firms. The new companies which have come here in the past ten years have had a strong influence on labor. Textile firms charge that "pilfering" and "pirating" of labor has been extreme. The free labor market is gone.

Of the 2,190 workers, approximately 1,000 are employed by the Columbus Coated Fabrics Company. The two bag companies are the smallest employers with fewer than 15 workers apiece.

Female workers are used in those plants which do not normally operate at a full schedule. Where lay-offs are frequent, male workers cannot be retained, hence the heavy use of females. In these cases, many of the women are married; they work for "pin money." Where the male ratio is high, as in the Columbus Coated Fabrics factory, heavy and steady work is involved. Here huge machines, which print and coat fabrics, are handled by men. In the Columbus Glove plant men dip, dry, and pack industrial gloves.

**Markets** -- The principal markets for the industry are within 500 miles of the city. Favorable freight rates with the east coast supply centers add to the value of the city as a shipping point. On long hauls or when large quantities are shipped, railroad service is preferred.

**Raw Materials** -- A variety of textiles and accessories is purchased in east coast cities. The National Glove Company, one of the few manufacturing sheepskin gloves in this country, buys skins in France, Australia, and Iran. The Columbus Glove Company does not make a glove. It buys cloth gloves from firms in Chicago and Detroit and then coats them with

various protective agents. The Columbus Coated Fabrics Company buys its textiles and oils in the east and south although the rotogravure work is done in an adjacent plant.

National and Local Bonds -- The local textile industry is not tied to the national industry except through the raw material supply houses in New York City. Local ties between firms in this industry are completely missing. There are no important bonds between any plants.

Utilities -- Without exception, public utilities are satisfactory. The water supply is adequate, the gas supply is sufficient, and the electric service, to this large consumer, is very good. Public transit facilities are available at every plant, largely because they are near the Downtown. Expansion space and parking facilities are not satisfactory in every instance but this is most strongly felt in the crowded industrial communities.

Summary -- The Textile Industry, while not as homogeneous as the Shoe Industry, is a fairly large one in Columbus. Its great diversification of products binds it to no single market. The historic bonds between the producer and the eastern and southern mills remain a characteristic feature. It can trace its successful development to the initiative and investment of local men and to the satisfactory labor market that has prevailed in central Ohio for more than 50 years.

## Miscellaneous Industries

There remain eight companies (or industries, in this case) that can not be grouped satisfactorily with the other industry-groups. They are included in the study because they are basic manufacturing companies. Certain entire industry-groups were purposely omitted from the study because it was felt that they were examples of plants typical of many other areas. It was believed that the manufacturing activities in the metal, chemical, wood and paper, shoe and textile industries would be more representative of the maturing industrial community. A review of these activities would offer a comparison with other manufacturing cities. The firms in the Miscellaneous Industries-group are borderline firms that might justifiably fit into one of the other 19 groups. Each firm's activities are discussed, the forces analyzed, and their role in the industrial community considered.

Glass Products. The Federal Glass Company (# 18), organized here in 1900 and presently employing 1,100 workers, is a firm that has a nation-wide sales organization for its table and miscellaneous glassware. The company was founded by men who had worked in the glass industry in the cities of Fostoria, Tiffin, and Steubenville. While not natives of Columbus, they chose their location for two specific reasons: (a) land values were low at the turn of the century and some land, in South Columbus, was donated free of taxes to the company(47) and (b) natural gas was plentiful and the glass industry followed this supply throughout Ohio.

A principal handicap to its current operations is the limitation on

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47 It was at this time that the Chamber of Commerce and other groups offered limited inducements to interested firms.

natural gas. As residential and industrial uses of gas increase, a shortage of supply has become critical. Gas is now piped in from the southwest. The plant is well-located for its other raw materials. Sand is purchased in Michigan and soda ash and lime in Ohio. The company representative asserted it would be ". . . difficult to be better located," with respect to its market which is in most urban communities in the midwest, particularly.

Freight rates are a problem but the nature of the raw material usually dictates the method of handling. Railroads carry 60 percent of all shipments but trucks dominate local shipping and the movement of finished goods.

Of the 1,100 workers, 400 are females who are readily available in the South Columbus area and who afford a cheaper labor supply. Most of the labor is unskilled. Skilled men were brought to Columbus when the plant first organized but no class of skilled craftsmen has developed. One representative of a major glass firm in the city has stated that labor costs in Columbus will ultimately drive the glass industry from the city. Labor requirements are such that the company could easily relocate.

Quite in contrast to this firm is the Columbus Porcelain Metals Corporation (# 146) founded on East Fifth Avenue in 1946. Employing about 15 men, this small plant is an example of a planned location. The owners recognized a market in the city and surrounding area -- there is no comparable plant within 100 miles. The company does not manufacture; it applies porcelain enamel to fabricated metal parts. One of its major customers is the White Castle System which porcelainizes its metal buildings.

There are no handicaps in this location. Market is an advantage and transportation facilities are very satisfactory. Whereas the Lustron Corporation once competed for work, no such condition exists today. Labor is satisfactory, too, since the only skilled men required are the co-owners of the company.

Gas shortages handicap operations in both plants during the winter months. All other utilities are satisfactory. Adequate space is available for expansion (Federal Glass has 23 acres and Columbus Porcelain Metals has about 1/3 acre). These firms have no functional ties in Columbus even though the Federal Glass Company is the parent of the Hercules Box Company. These bonds have weakened.

Pumps. The Weirman Pump Manufacturing Company (# 29) was situated along the banks of the Scioto River from 1877 to 1908 when the city took the site for river improvements. Then the company produced hydraulic water pumps, but centrifugal pumps for water units are now made. Once many pump shops were in Columbus but 90 percent of the business is now handled by this firm which reaches national and international markets.

Minor local handicaps, such as the lack of space and limited accessibility to railroads, are outweighed by advantages. The mines of central United States are the principal markets and they are easily reached. All of the major industrial markets are served quickly by the good railroad and highway systems. Representatives of the firm say it would be hard to find a better location for its operations.

Bronze and aluminum castings are made in the factory but grey-iron castings come from Poulton Foundry which has been closely associated with Weirman's for more than 50 years. Steel and monel metals for machine

parts are purchased in Pittsburgh and Marion, Ohio. With no immediate access to the railroads, more than 90 percent of all shipping is by truck.

About 125 men, 25 Negroes, are employed. The Negro worker is used in the core and foundry rooms. A large machine shop is also maintained in the factory where planing, boring, shaping, and other operations are performed by skilled workers on the finished pump.

Sucker Rods. A local man organized the Columbus Sucker Rod Company (# 63) more than 50 years ago to make wooden sucker rods for the oil industry. Since that industry has shifted to deep drilling and since most of its activities have shifted from Ohio, the company now makes the rods for water wells.

Competition is light since only a firm in Delaware, Ohio, and one in Texas compete. The Columbus firm supplies all of the metal couplings for its competitors. While the company might be better situated in Texas for its market, raw materials, excellent transportation facilities, and favorable freight rates are all present in Columbus. Texas is the important market for water rods since much of the range land depends upon well water. Over 80 percent of all products are moved by rail -- this includes the finished rods which are shipped in carloads, and the lumber comes from the south and steel from Pittsburgh and Youngstown.

Only 25 men are connected with the firm but some of them have been with it for more than 40 years. There is little turnover and new firms have had virtually no effect upon this company.

It is adequately served by all public utilities. It is in the Northwest where its attractive site is adequate for its needs. No expansion

is anticipated since the market is stable.

Metal Seals. The United Seal Company (# 38) was organized in 1906 to make seals for all types of gas, electric, and water meters. It also makes seals for parking meters, rolls of wire, and machine castings. The founders were natives of Columbus who originally had a market free of competition within 500 miles. Today, competition is in the east and in Chicago.

Sales are extensive, reaching across the nation and to some Central American countries. All raw materials are obtained from local suppliers. Goods are transported by truck, rail, and parcel post, with occasional air service used. With less than 25 workers, the company is another example of the successful small local industry that manufactures a specific product for a national market.

Fire Extinguishers. The Fire Chief Company (# 147) assembles extinguishers from parts purchased on the national market. Valves from Pittsburgh, hoses from Newark, Delaware, and metal cylinders from Harrisburg, Pennsylvania, and Detroit, form the basic product. Competition is keen but the firm hopes to market its product nationally.

Fewer than 25 employees work in the small cement-block building in East Columbus. Land costs in the industrial areas were prohibitive; this company built in an area where space was available for expansion.

Glues and Adhesives. Neither the Commercial Paste Company (# 51), organized here in 1900, nor the Franklin Glue Company (# 138), founded in 1935, located here because of raw materials supplied by the meat-packing industry. Both firms are the product of local initiative and investment. The older firm had the backing of natives from the start

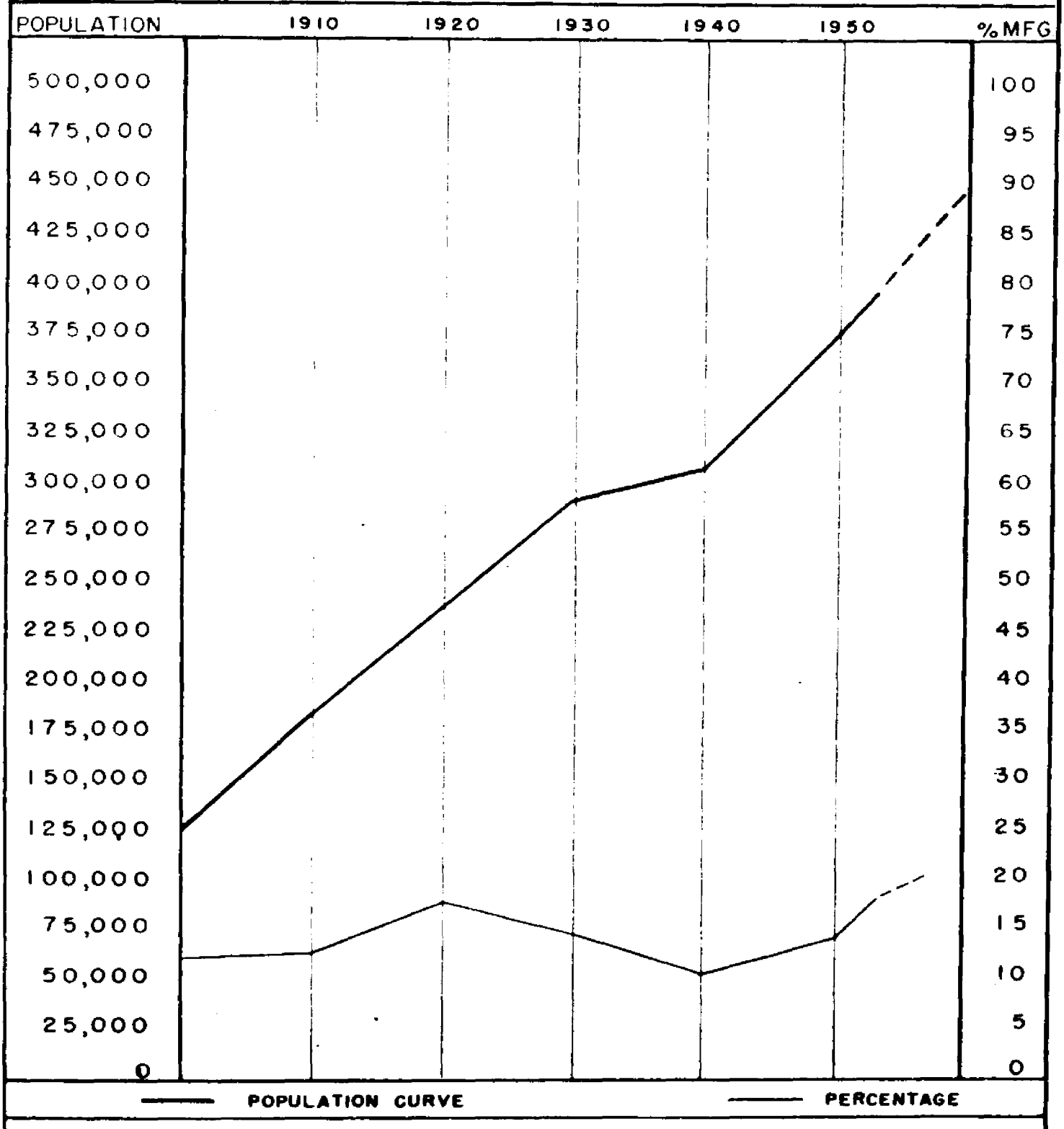
and available capital was a prime factor in the location of the Franklin Glue plant. The present buildings, even though multiple-stories and in crowded areas, offered superior facilities when occupied in 1920 and 1945, respectively.

The older firm makes school pastes, hardware pastes, and industrial glues (newspapers, printers, etc.). Franklin Glue produces glue for wood industries and for the over-the-counter sale in hardware stores.

The latter company depends upon animal hides for its raw materials but the other firm uses vegetable dextrones, flour and chemicals. Local warehouses supply some needs but the majority of materials are shipped in from Chicago and east coast centers.

The two firms employ about 25 males each. In addition, the Commercial Paste Company uses three or four women to label, fill, and pack the product. Of the 25 workers at Franklin Glue, about 20 are Negroes since much of the work is manual. The Negro laborer will do this work whereas the white worker can rely on other types of employment. Neither firm has suffered from a labor shortage, however.

# POPULATION GROWTH IN COLUMBUS, OHIO, 1900-1960: WITH PERCENTAGE ENGAGED IN MANUFACTURING




SOURCES: United States Bureau of the Census
Research Department, The Columbus Chamber of Commerce

H.L.H.'53

**Chart VI**

# V. CONCLUSIONS

## A. The Changing Value of the Forces that Influenced the Location of Industry in the Columbus, Ohio Area

The value of the several forces which influenced the location of each of the 206 manufacturing plants was established from the interviews with industry representatives. The individual forces are summarized here, roughly in the order of their importances, and a conclusive statement is made regarding each of the several forces.

Native Ingenuity and Initiative. All too frequently, the geographer considers only the traditional forces in plant location. Because a firm is concerned about its operating costs primarily, markets, raw materials, transportation facilities, and labor are presumed to be the principal factors influencing the location of a plant. By reviewing these factors alone, a good case can be established to explain the location of any of the manufacturing plants now operating in Columbus. In doing so, however, the geographer would be building his case on circumstantial evidence.

To emphasize the error in this, one needs to consider the fact that 125 companies now functioning in the city are doing so simply because the owner lived here. No other reason explains so well why the plant is in Columbus: the other factors may explain why it persists, however. In most cases, a mechanic or semi-trained worker may have begun a repair shop or made a few simple products in a small machine shop. As a wider market was made more accessible, his output was increased. Through suc-

cessive stages of expansion, a larger manufacturing company might result.

In a few instances, local inventions paved the way for the growth of manufacturing firms. Many stable, old-line firms were started here through the combination of inventiveness and initiative. In recent years, too, this combination has been responsible for the development of new industries.

Occasionally, local plants train men who establish their own independent companies after they have accumulted the skills and capital required. The best example of this in Columbus is in the Tool Industry where such "splintering" of industry occurred many times. (See Chart IV, page 130.) Other industries have experienced such growth. Many of the machine shops have been started by natives of the area who had previous training at the larger manufacturing plants. The smaller shoe firms commonly trace their real origins to the training their owners received while working for another concern. Thus, native ingenuity and initiative may be spurred on in its development by home industries.

While native ingenuity and initiative are the impelling forces in the location of nearly 65 percent of the manufacturing plants in Columbus, it is doubtful that any firm could have succeeded were it not for certain additional forces.

Market. The presence of a local market is the principal permissive force in the development of native industry. Limited by inadequate transportation, these market-oriented firms reached the farms and industries of central Ohio. At a later date, the railroads were a principal market for local products and a score of small plants developed to serve them. In the same way, numerous small companies sprang up in the city to sell

to the carriage industry. The bituminous coal mines of southeastern Ohio were a local market that encouraged the growth of the mining machine and conveyor equipment industries.

The geographical position of Columbus with respect to the major markets of the United States is the principal reason for the location of the many branch plants.(1) It is, however, an entirely permissive reason. It explains the success of native industry, as well. The firms within the Heating and Cooling Equipment Industry afford an example of the effectiveness of this position. They are exceptionally well-located to reach the major coal and gas consuming regions of the United States. In addition, the growing importance of oil heating equipment has opened a new market both in the lake states and in the southwest. In supplying the automobile and aircraft industries, these plants are ideally situated.

The major industries in Columbus, by size, have producing or consuming markets within 500 miles of the city. The Transportation Equipment Industry's market is centered in southern Michigan; the Electrical Equipment Industry has an industrial market in the Miami Valley and in northern Ohio, and a consumer's market throughout the east north-central states; and the Industrial Machinery Industry could not be better located to reach the industrial market of the nation.

There are also those industries that are strictly oriented to a market within 50 or 100 miles of Columbus. Generally, they are high-bulk, low-value industries and they may include local or branch plants. Includ-

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1 About 10 percent of the plants in Columbus are branch plants of national organizations and another five percent are firms of local origin that are not now controlled by local capital.

ed in this group is the Foundry Industry. The heavy castings are relatively low-value products so that the plants can not economically ship their products to distant markets. An important market throughout central Ohio has kept this industry busy but it has not attracted new firms. In contrast is the Casket Industry. Again, a high-bulk and relatively low-value product is limited to a consuming market within a few hundred miles of Columbus. Local and national firms are represented in this industry.

Labor. Whereas the Casket Industry is partially market-oriented, it is primarily oriented toward a relatively cheap labor supply. This is decidedly true of the Shoe and Textile Industry and it is true, perhaps, of others. Columbus has supported a low-wage working force throughout most of its history, but even though the area (including the city and Franklin County) currently ranks fourteenth among the 21 economic areas of the state, (2) the trend is toward higher wages. This trend will, in turn, influence the type of industry to locate here. Considering that Columbus is eighth in the number of workers employed and is the third largest city in the state, the working force is indeed low-wage.

The wage rate in Columbus is generally lower by five to fifteen cents than the wage rate for large and small northern Ohio communities, but it is approximately on a par with the wage rates of southern Ohio communities. The Ohio State Employment Service lists the following wage rates offered to beginning workers by Columbus manufacturing concerns as of March 1953:

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2 Monthly Business Review, Federal Reserve Bank of Cleveland, Vol. 34, No. 1, Supplement, pp. 22-23.

TABLE XIII

HOURLY WAGE RATES OF BEGINNING COLUMBUS WORKERS

| Males | Rating | Females |
|---|---|---|
| $1.00-1.20 | Unskilled | $ .75-1.05 |
| $1.15-1.35 | Semiskilled | $ .85-1.15 |
| $1.30-2.00 | Skilled | $1.10-1.50 |

SOURCE: Labor Market Information, Bureau of Unemployment, Ohio State Employment Service, March 1953.

Columbus has never supported a skilled labor force and less than one-tenth of its workers are skilled today. Its advantage has been the possession of abundant unskilled laborers who were available to industry at low wages. With increased industrialization, a better trained labor force is possible; it will also be a higher wage working force.

The Shoe Industry, perhaps more than any other in Columbus, is highly sensitive to the demands of labor. Just as shoe firms flocked to the city 50 years ago to enjoy the low-wage, non-union working force then present, some are leaving at the present time because of the threat of competition for labor. The G. Edwin Smith plant closed its operations entirely about three years ago and in the last six months the H. C. Godman Company moved its manufacturing facilities from the city. The trend toward high-paying, new firms may have influenced the move. North American Aviation, General Motors, and Westinghouse, to name the three new large companies, are national organizations. They tend to follow a national wage-scale and certainly their labor activities are affected strongly by national unions.

Except for the early years of its history, Columbus has always had a ready supply of labor. An accessible labor resource in southeastern Ohio and adjacent states could be used but it was not until the Curtis-Wright plant drew heavily upon this area for its labor force that Columbus industry turned to the area. North American Aviation has also used this force and it has drawn upon the rural labor force within central Ohio as well. (See Figure 8, page 159.) Other large plants in the city have also utilized these workers. Southern Ohio remains the only area of surplus labor in the states.(3) In April 1953, the Ohio State Employment Service estimated that more than 7,000 workers were available in the Columbus area. Of this number, approximately one-fourth would come from the surrounding towns and rural areas.(4)

Industry in Columbus benefited by the absence of competition for labor by other industries or by unions. This was due, in large part, to the diversification of manufacturing. The stability of the labor force which characterized the area in the past seems to be at an end as new firms come to the city and change the existing pattern.

Another characteristic of the labor force is the availability of female workers. The Shoe and Textile Industry is, perhaps, the largest employer of females in the city although many are employed in the Transportation Equipment and Electrical Equipment industries. No true example of symbiosis exists. Rather, a complementary use of labor occurs where the male workers are attracted to higher paying jobs and the females to

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3 "Ohio Labor Market, April 1953," Bureau of Unemployment Compensation, Ohio State Employment Service, No. 32, April 1953.

4 Labor Market Information, op. cit.

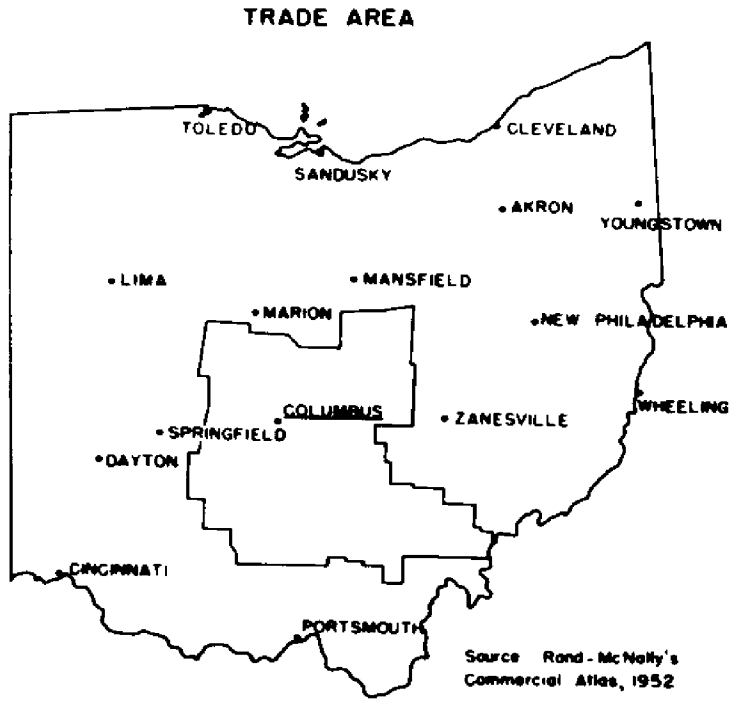
light industries with lower pay scales. As the labor market tightens, the females worker becomes a more important factor. While this is true, it is impossible to find a plant that located here specifically because of the female labor force.

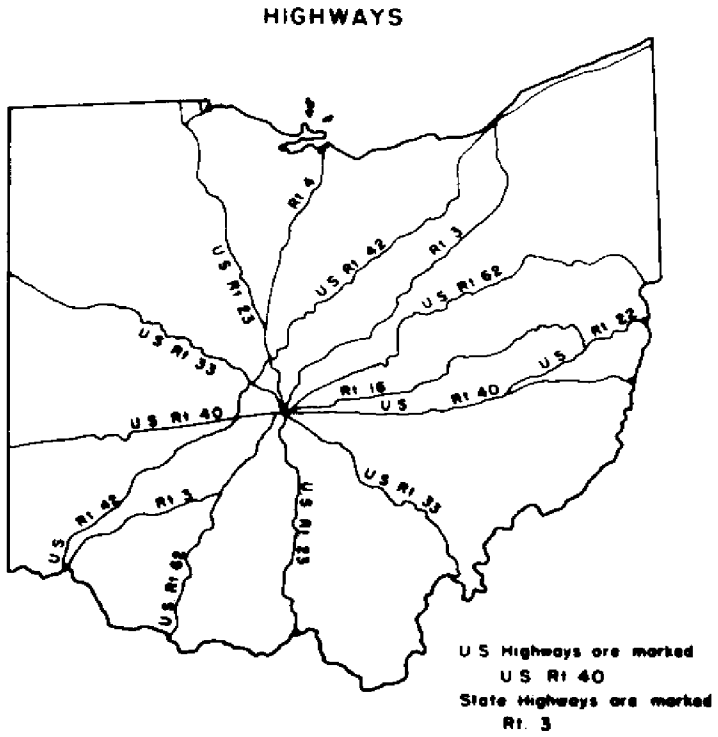
Transportation. Transportation, with respect to raw materials and markets, is entirely a permissive factor. Naturally, a manufacturing plant will not locate if transportation facilities are not available but rarely will good transportation alone attract industry. Transportation, linked to some other force, is the prime factor.

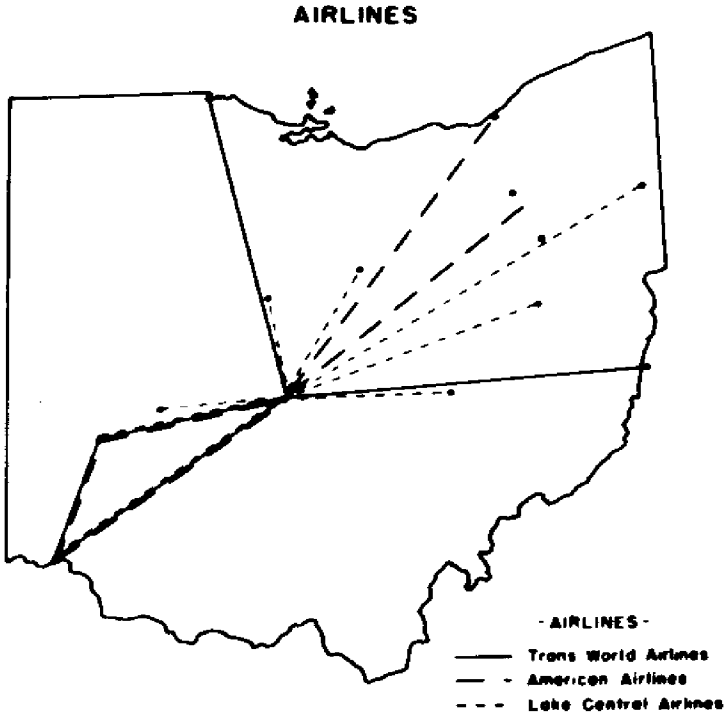
Five railroad lines enter the city. They are not branch lines nor are they intra-regional in scope; they are major passenger and freight lines of the east north-central states. They carry over 50 percent of the bulk goods coming into the city although more than 80 percent of the finished products is shipped out by truck. Highway facilities are excellent. Columbus is on a main east-west highway -- Route 40 -- and on, or adjacent to, principal north-south routes. Access to most parts of the city is easy. In addition, Port Columbus, as the nation's fifth busiest air port, offers good passenger and freight service. (See Figure 9, Trade Areas and Trade Routes of Columbus, Ohio, on page 237. The transportation routes within the city are shown on Figure 10, Transportation Routes and Industrial Zoning, on page 24 .)

The immediate trade area of Columbus extends toward the south and southeast into West Virginia. It can be reached in a matter of a few hours by any transportation route. Other major markets are only a few hours by rail or truck from the city.

# TRADE AREAS AND TRADE ROUTES OF COLUMBUS, OHIO



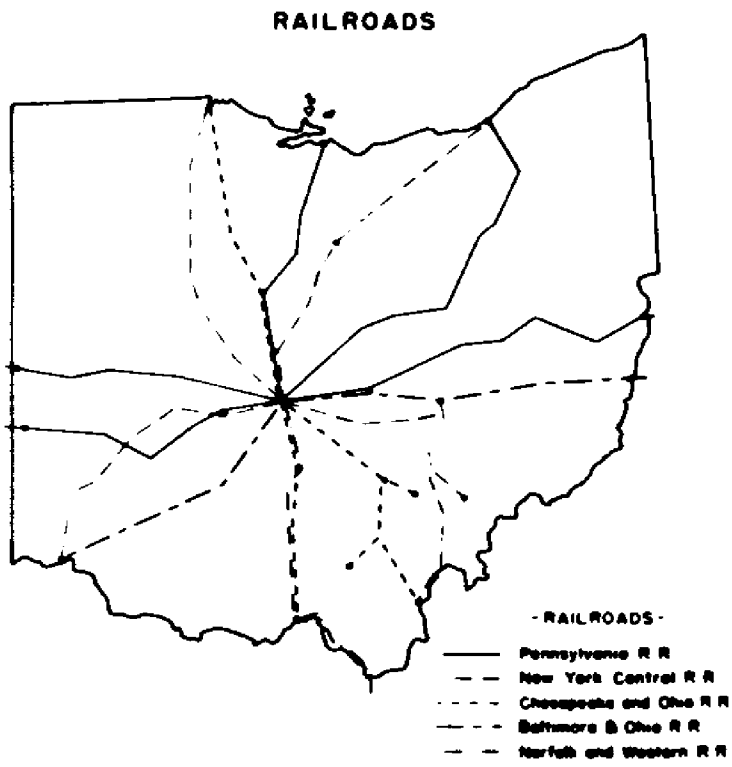




Figure 9

Raw Materials. Raw materials attracted industry to central Ohio in a 30 year period from 1870 to 1900 when coal, iron ore, natural gas, and timber were inducements. The Federal Glass Company, which came here at the turn of the century, did so to make use of the natural gas then available. This native raw material is no longer readily available nor are any of the others except coal. Consequently, there are few firms in Columbus that are raw material-oriented and it is unlikely that any new ones requiring cheap access to raw materials will locate here.

On the other hand, the geographical position of Columbus with respect to the major raw material supply centers of the nation is a force in location. As with market, there are many companies here not because their needed raw materials are here but because they can receive these materials easily and cheaply from nearby supply centers. Actually, Columbus is well-balanced between materials and markets. It does not possess the necessary raw materials for intensive industrialization but its favorable position permits access to them.

Capital. Columbus capital has never been freely available for investment in industry, but there are firms whose location was determined primarily by local capital. For the most part, capital influences the small firm. For months or years its success may be determined by the availability of capital in the city. The branch plants are an exception to this. Local capital has played no role in their location. These firms have expanded because their parent companies had sufficient capital to launch a building program.

The history of the Columbus Dental Manufacturing Company shows the role of capital as a force in location. When capital was available in

Columbus, this firm came here and eventually became one of the city's stable manufacturing concerns.

Local capital has also influenced the growth of native industries. It is unfortunate, however, that the timidity of the capitalists, recognized 100 years ago, continues into the modern period. It means that Columbus can not hope to attract the small party whose principal requirement for success is capital.

Structure of Industry. A factor of increasing importance in plant location is the national structure of industry or the functional organization of industry. It is most apparent in Columbus when the branch plants are considered. Quite commonly, the reasons for the situation of a plant in a community are summed-up by a review of the traditional forces of geographic planning. However, these may have been permissive: the impelling force in location may have been the dictates of the parent firm.

When more than one unit in an industrial organization is found in a community, the functional ties are probably the principal reasons for location. It seems that this interrelationship between units of an industry will play a greater role in the location of plants in the future. With the expansion of Columbus' industry and the continued growth of large firms, structure should assume a new importance as a force in location.

Institutional Force. Research facilities may influence the location of modern manufacturing plants. They have been responsible for the development of four plants in Columbus and they have influenced the location of many other manufacturing concerns.

The basic research facilities in Columbus are The Ohio State University and the Battelle Memorial Institute. The university serves a prin-

# THE INFLUENCE OF THE OHIO STATE UNIVERSITY ON INDUSTRIAL GROWTH

| TRAINING | RESEARCH |
| --- | --- |
| ANTENNA RESEARCH LABORATORIES | CERAMIC PRODUCTS INDUSTRY |
| HARROP CERAMIC SERVICE CO. | CHEMICAL INDUSTRY |
| INDUSTRIAL CERAMIC PRODUCTS INC. | ELECTRIC PRODUCTS INDUSTRY |
| INDUSTRIAL NUCLEONICS INC. | FOUNDRY INDUSTRY |
| ORTON CERAMIC FOUNDATION | INDUSTRIAL MACHINERY INDUSTRY |
| PERENY EQUIPMENT CO. | TRANSPORTATION EQUIPMENT IND. |
| STITT IGNITION CO. | OTHER INDUSTRIES |

HLH'53



Chart VII

cipal purpose of training men for work in engineering, electronics, chemistry, and like fields. It also carries on fundamental research through its contracting agency, the Research Foundation, which may benefit private industry. Perhaps the best example of its influence is evident in the Ceramic Products Industry. Much has already been said about this but it should be emphasized that the four companies in this industry developed in Columbus because of the university's training of their leaders and its continuing research into problems in ceramic engineering.

The Battelle Memorial Institute aids private industry in overcoming research obstacles, in cutting production costs, in setting-up new operations, or in designing effective plants. For the firm that does not have sufficient capital to maintain its own research department, Battelle Memorial Institute offers real assistance.

Such research facilities not only attract and hold local industry but they attract large outside industries as well. Furthermore, they attract other research groups to the city. The American Ceramic Society is erecting its headquarters in Columbus and a branch of the Bituminous Coal Research Institute will be constructed here.

The Federal Government is also an institutional force. Its role in the location of industry has increased considerably in the last 15 years. Governmental influence, which once meant the application of simple government services to industry, was extended during World War II to include the actual construction and operation of necessary war-time manufacturing facilities. With this entrance into the field of manufacturing, the government established its own plants throughout the country. What were emergency measures during the war-time period have emerged as accepted

practices. Many of the government-sponsored plants have continued in operation to give the community new types of industry.

In Columbus, the governmental force has been responsible for the location of one plant, but the influence of this plant upon the economy of central Ohio is far-reaching. The Curtis-Wright plant gave the city a new line of endeavor and one of considerable instability.

The effects of this plant did not end with the war. Columbus emerged from the war with a surplus of semi-skilled labor which, in turn, attracted new industries to the city. The huge aircraft plant was a potential manufacturing center and it first housed the Lustron Corporation and, in 1950, North American Aviation. Indirectly, dozens of little businesses boomed during the war as sub-contractors. (See Chart I, page 71.) This period also ushered in the national branch plants which viewed Columbus as a good location.

Other Factors. In other areas and with other industry-groups, factors that have not been listed here may also influence location. Two of these are noted below because they are important in other areas but have never been prime factors in Columbus. That these factors are regarded lightly may be because Columbus is favorably situated with respect to each of them.

Power -- Although adequate coal is available in southeastern Ohio and West Virginia, Columbus has never attracted such power-oriented industries as the heavy chemical group or the basic metals industries. Power is a permissive factor for those firms which are established in the city -- it has never been cheap enough or so abundant as to become a principal reason for plant location.

Public Utilities -- Frequently utilities are regarded as a feature of site and rarely are they the major factors in plant location. Generally adequate utilities are present in Columbus. Most firms use city water but some have their own wells which tap the glacial gravels within 100 feet of the surface. Ground water, because it is cheap and maintains an even temperature, is used by many large plants in cooling or cleansing operations. Occasionally it fits some specific need because of its constant chemical make-up.

The gas supply is the most critical of all utilities. Currently new manufacturers are having difficulties obtaining sufficient gas for their operations. Because of heavy residential use during the winter months, all industry may suffer from reduced gas supplies. A shortage of gas might be called a major handicap to plant location in Columbus.

Public transit service has affected a few plant locations within the city but it has never been a major force. With minor exceptions, the Columbus Transit Company does not penetrate the areas beyond the city limits. Those manufacturing plants in parts of South Columbus, in Northwest Columbus, and in the suburban areas of East and West Columbus are without this service. (See Figure 8, page 159. No traffic moves to the North American Aviation plant by public transit due to inadequate service.) While most drivers must use their cars, there are many who would use transit facilities if they were available and more efficient.

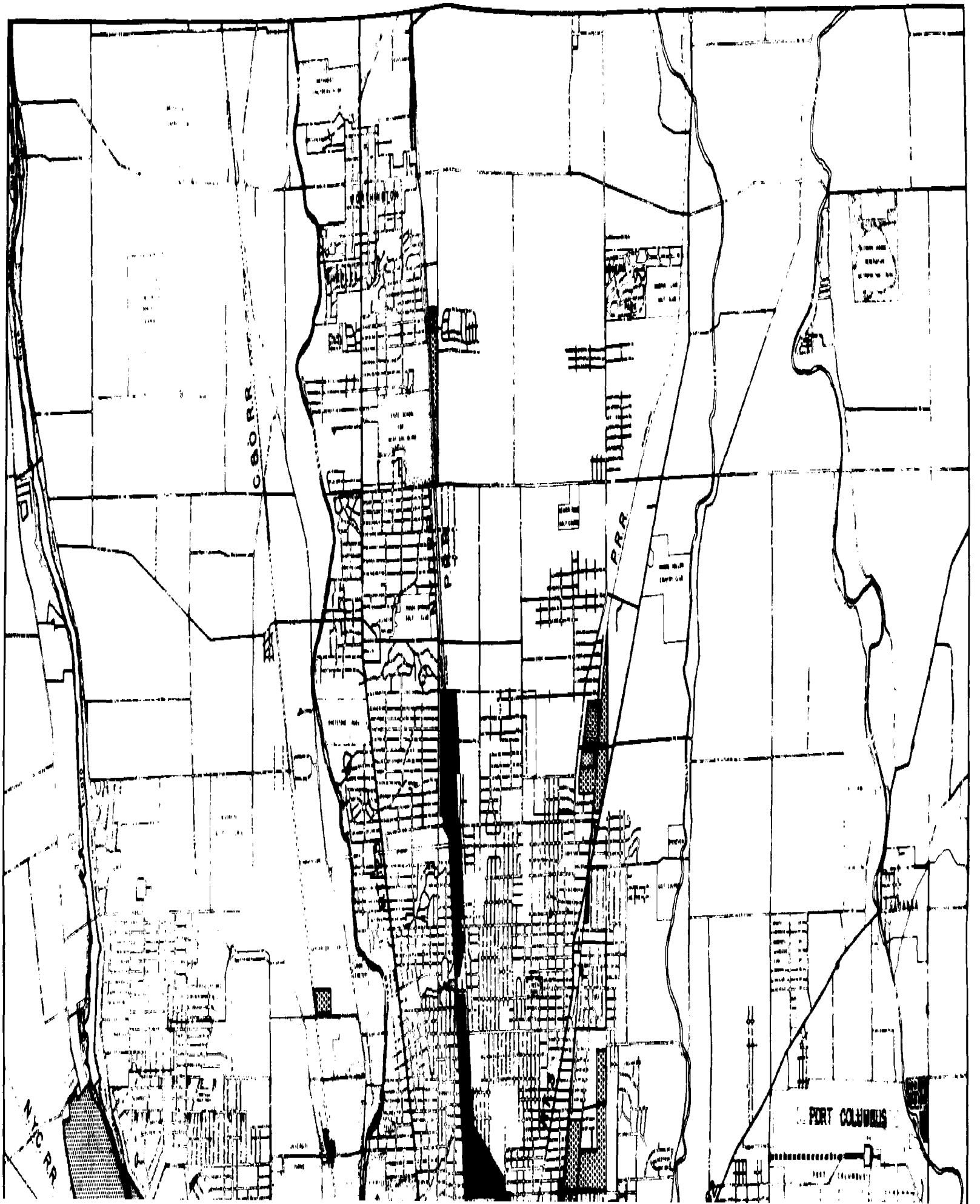
## B. Factors of Site Which Influence Location Within Columbus

The manufacturing company which chooses Columbus for the location of its plant must then find a suitable place within the area in which to construct its buildings. The final choice of site may determine where the company locates with respect to three or four favorable areas. Only four factors are considered here, but other ones, such as community relations, the attitude of the community toward manufacturing, the availability of housing, and the like, also influence the ultimate location.

Zoning and Taxation. This was not a major problem for any firm now situated in Columbus but frequently the differences in zoning and tax structure between the city and the county have affected locations. The old industrial community in South Columbus reflects this. Most of the plants are beyond the city limits in Marion Township. There zoning ordinances either did not exist or they were favorable to industry. In addition, industrial taxes were exceedingly low. The factories in this area received most of the benefits of location within the urban center without having to pay for them.

In a number of cases, especially in the Chemical Industry, the heavy chemical plants are out of the city. The fertilizer plants are all on the east side and the zinc oxide plant is beyond the city limits in northeast Columbus. These locations permit the firms to operate free of restrictive governmental measures at a time when residential and other industrial activities are entering the region.

The map of Transportation Routes and Industrial Zoning, on page 245, shows the land within the city that is currently zoned for heavy industry


C&O R.R.
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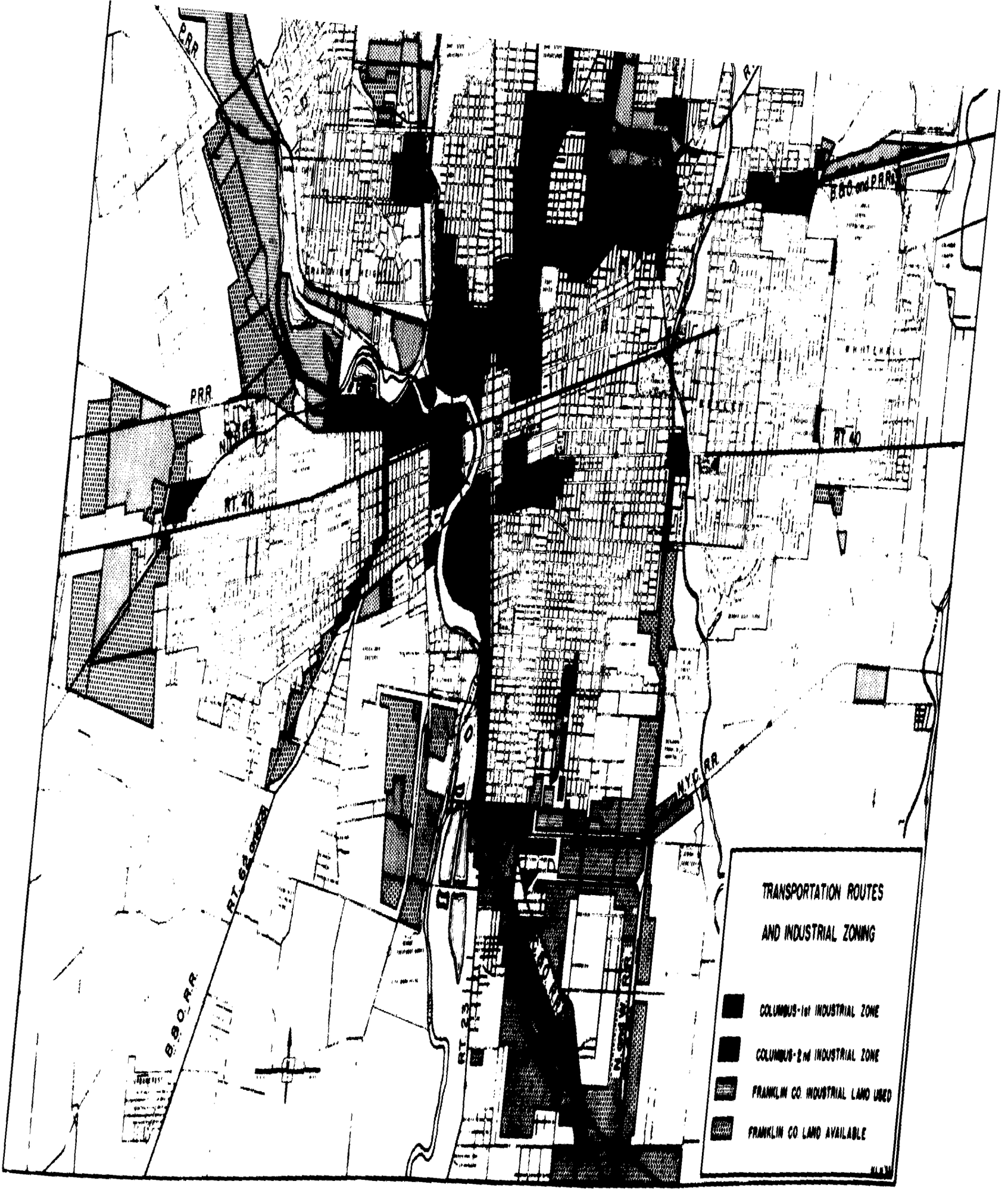
PORT COLUMBUS


PRR
PRR
RT. 40
RT. 40
B&O and PRR
N.Y.C. RR
B&O RR
RT. 62 and 23
TRANSPORTATION ROUTES
AND INDUSTRIAL ZONING
COLUMBUS-1st INDUSTRIAL ZONE
COLUMBUS-2nd INDUSTRIAL ZONE
FRANKLIN CO. INDUSTRIAL LAND USED
FRANKLIN CO LAND AVAILABLE

(2nd industrial zone) and that for light industry (1st industrial zone). Nearly all of the land within the city that is zoned for industry is now occupied. The surrounding industrial lands in Franklin County offer space for new plants but they are not always well-suited for industry in other respects. Generally, these lands have adequate transportation facilities available (see the map on page 245) but they lack many of the other requirements of modern industry. If Columbus is to continue its current rate of industrialization, one of its major requirements is for satisfactory land on which to locate industry.

Space. Whereas land is available for industry according to the zoning ordinances of the city and county, suitable building space with room for expansion and for parking facilities is becoming a premium within the urban community. No new branch plant has located in South Columbus or in the Downtown area. Both areas are old and crowded. Local firms, which are expanding, are moving to out-lying areas. Three large firms moved from the Downtown area within the past year and another heavy employer, now cramped for space in outmoded quarters, is considering a move. Unless Columbus can satisfy the spatial requirements of these firms, moves from the central Ohio area are contemplated.

Northwest, West, and East Columbus have attracted new factories largely because adequate space is available. Both General Motors and Westinghouse have asserted that the large tracts of farm land in West Columbus influenced their choice of site. The handicap of inadequate space which has hindered the development of many local firms must be overcome if industrialization is to continue at a high level.

Available Buildings. Seemingly an unimportant factor, the avail-

ability of cheap and adequate buildings often affects industrial location. Rarely is this an impelling force but with a small firm that has limited capital it becomes a strong one. Suitable space for the new, small firm is present within the Downtown area and adjacent sections but with expansion an outward move is necessary.

It is the exception rather than the rule when a branch plant of a national organization considers this the principal reason for its location. This has happened in Columbus when available buildings have attracted expanding firms which either did not have the capital or the time to construct a new building in a planned location. The government-built aircraft plant was a strong factor in bringing the North American Aviation Company to Columbus. Other cities were just as favorably located as Columbus but they did not possess such an attractive building. In such cases, an available building becomes a very persuasive force in the location of industry.

Traffic and Accessibility. All parts of a city are not equally accessible to workers or to transportation facilities. Consequently, this factor is a significant one in the choice of site. (See the chart which follows for a break-down of travel times by various routes to different sections of the city.) Less accessible areas are usually the older parts of the city. South Columbus, for instance, is handicapped by the absence of wide, through streets. The best north-south route is High Street, to the west of the industrial area, with Parsons Avenue and Champion Avenue as secondary, crowded routes. There is no through east-west route. Obviously, inadequate transportation routes are a limitation to the development of industry in South Columbus.

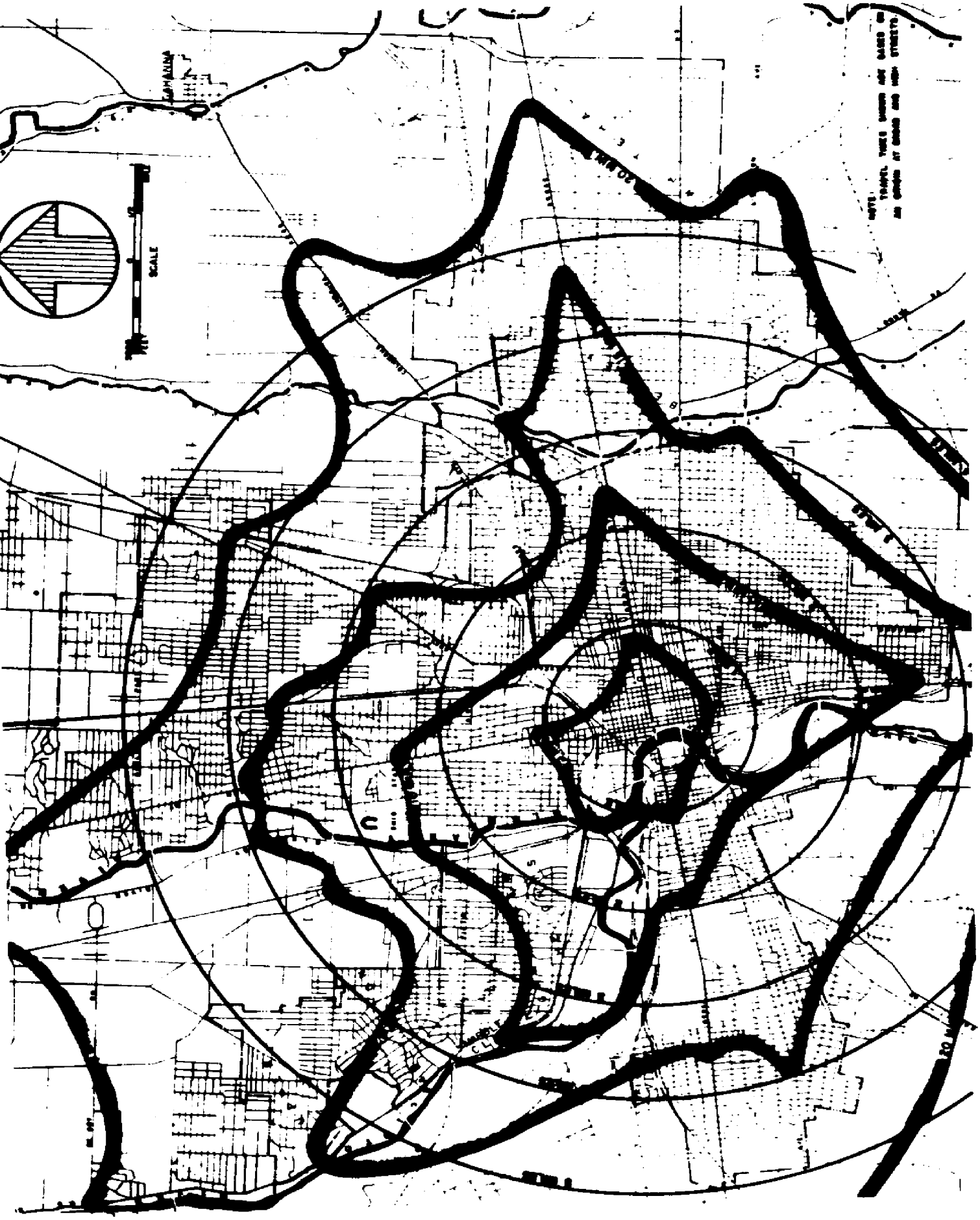



Chart VIII

A similar traffic problem exists in reaching the near North Columbus and near East Columbus industrial areas. Inadequate streets carry excessive traffic and hinder the movement of materials. When shifts change at North American Aviation, for instance, East Fifth Avenue is jammed. No alternate route can handle the majority of this traffic. (See Figure 8, page 159.) Most of this particular plant's working force lives within three miles of the center of the city thus creating more intensive traffic problems.

One of the outstanding advantages of the Northwest and of the suburban West industrial communities is their accessibility. It goes a long way in explaining the continued growth of these areas; inaccessibility explains why South Columbus has remained stagnant and why the older industrial communities in North Columbus and in the Downtown have added no new plants in recent years. Improved transportation facilities in the city and county are required not only to support the growing industrial population but to adequately handle the mass of people who travel in or through the city.

None of these latter factors explain original plant location in Columbus but they touch upon community problems that may affect the choice of site within this desirable geographic area.

## C. A Summary of the Conclusions Regarding Industrial Location

The following summary of the forces in the evolution of Columbus from a dominantly commercial center to a manufacturing center are conclusive so far as the location factors are concerned.

Prior to 1940, Columbus failed to keep pace with the growth of population and manufacturing in Ohio. Since 1940, however, the city has grown more rapidly than the state. The dominant force in the city's growth was its position with respect to the growing mid-west market, rather than any phase of the central Ohio environment. The city's position was enhanced by the rising transfer costs of raw materials and finished products.

It took the emergency of World War II to bring the city's location to the attention of big industry. The attention then focused upon the city was not the result of its position alone but was due, in part, to the availability of labor in this area. Spearheaded by the Federal Government's selection of Columbus as the site for a large aircraft plant, the movement of branch plants to the city was under way.

Between 1939-1947, the city experienced a 67 percent increase in the number of production workers; this was a larger percentage increase than that recorded for the nation, state, or central Ohio region. This growth is expected to continue; a population of approximately 625,000 is anticipated for Metropolitan Columbus by 1960.

The timing has been right for the industrial evolution of the city. Spurred on by the war and by the shifting market in the nation, Columbus assumed new stature as an industrial center.

There are certain characteristics that typify industry in Columbus. No one is unique but in combination they give a special quality to the industrial community. Manufacturing in Columbus is diversified; no single industry has dominated the city. Because diversification has existed, Columbus has remained a relatively stable industrial community. It has been responsible, in part, for the freedom from competition for workers, and it has kept labor from unionizing and has kept wages low.

Because local manufacturers do not produce prestige items, there is little or no attachment between the city and its plants. Many of the companies could locate as well elsewhere. Whereas Detroit is an automobile center, Akron a rubber center, and Pittsburgh a steel center, no such reputation exists for Columbus. The absence of prestige products suggests that Columbus can not hold specific industries or attract other ones in the same field of production. It is at once an element of weakness and of strength.

Because consumer goods are manufactured here, for the most part, the market for local manufacturers is a relatively stable one. This is an advantage to the community.

One of the characteristics of Columbus' industry has been the preponderance of locally-initiated plants; they have dominated the city until recently. This has tended to stabilize payrolls. It may also have discouraged new industry. This situation is now changing: about 20 percent of the manufacturing plants in Columbus today are branch plants of national organizations.

The local capital and management, which were important in the formative stages of a plant's development, are becoming less important --

there is a decreasing dependency upon the central Ohio market by these firms. Some of them have already moved; others probably will.

The type of manufacturing that has typified Columbus is such that it does not beget or attract other manufacturing. There has been no rapid growth of new firms, either local or national, to serve a special industry. This can be traced, for the most part, to the diversity of manufacturing -- no industrial "types" have evolved.

With one or two major exceptions, almost no linkage or integration occurs. The absence of linkage or integration has been common to Columbus in the past but with the increasing importance of branch plants, ties between local and national organizations will strengthen.

The commercial character of the city has given it no particular manufacturing activities. It appears that manufacturing in a commercial center differs in no important way from manufacturing in any other city.

Many of the characteristics which have marked the industrialization of Columbus up to the present period may change. The anticipated population of 625,000 for the metropolitan area indicates the trend. Paralleling this should be an increase in the manufacturing force. Cities of Columbus' size (including the metropolitan area) are the ones getting about 45 percent of the large (more than a million dollars) new plants. The continuing development of branch plants can be expected to influence the growth of the manufacturing force in the city.

The diversity of industry which has typified the past will probably continue. There will be modifications, of course, and changes will take place in the nature of manufacturing.

Market-oriented plants, which take advantage of the geographical po-

sition of Columbus, will continue to locate here. A continuing diversity of products might occur since the city is well-located to reach the major national markets of many industries.

Research by the Battelle Memorial Institute and The Ohio State University may be the modern equivalent of local initiative. Many research-oriented industries have located here in the past and their continued development seems assured. In this way, prestige will be gained by the city and its industries.

Instability of Columbus' manufacturing has lately increased. The aircraft industry is generally not considered stable and there is question whether this industry will continue as a permanent part of the industrial community. If it does, the diversity of Columbus' industry will be increased, but a loss of this industry could create serious industrial and community problems.

The labor force has changed in quality as the city has undergone its transition. It had often been said that one of the principal advantages of a Columbus location was the fact that the city stood alone in central Ohio and, therefore, experienced little competition for labor. This has been true, generally, and it is one of the major reasons for the branch plants locating here.

This advantage is naturally diminishing with continuing industrialization. Labor is relatively scarce within the city and competition with other areas has increased. Southern Ohio has experienced an industrial boom, a gaseous diffusion plant has come to the rural Scioto Valley, and more distant points are attracting labor.

Labor-oriented industries are experiencing a great change. One of

the principal attractions to the shoe, textile, and casket companies, was the low-wage labor available in Columbus. In the past, there was little competition for this labor. Neither unions nor competitive industries were present. These conditions no longer prevail. Wages have risen with increased manufacturing activity and competition within an industry and with labor unions has developed.

An old, established company, engaged in the manufacture of electrical equipment, fears that the large new electrical equipment manufacturers will create labor difficulties: national unions, national wage-scales, and competition for similar labor. Such forecasts have been made by representatives of other industries, as well.

The shoe and textile companies have been the first to give concrete evidence of this change. These low-wage, non-union firms have been forced to abandon their Columbus sites because of the recent influx of high-wage competitive manufacturing plants. For the most part, they have moved to rural communities where favorable labor may still be obtained. With two large shoe companies already gone and a large trouser manufacturing plant moved, the trend is well-established. Columbus' reputation as a low-wage city is declining. It would seem that a continued loss of labor-sensitive plants could be anticipated in the future.

Finally, this study has provided data for some observations on the problems of manufacturing concerns within the city. Many local problems must be met by the national firm that chooses to locate here.

Practically every new plant in Columbus has been built in the suburban areas. The older communities no longer attract manufacturing.

Industrial lands are crowded, parking facilities are limited, traffic is congested, and there is a psychological handicap that hinders the continuing development of these areas. An active program is needed to revitalize these older areas so that they can hold their present industry and attract new industry.

The growth of the suburban plant site has been due to the availability of desirable plant space in these accessible and attractive areas. Unfortunately, the continued growth of these sites may result in a "ringing" of the city by industry. Located from three to five miles out from the heart of the city, such a ring may disrupt residential development, surface transportation, and the normal movement of goods. Furthermore, it can mean the loss of important taxes to the city. In contrast, however, the suburban sites obtain many of their utilities and services from the central city.

Unless some changes are undertaken in the present industrial development, the city will continue to lose many of its larger plants to the suburban areas. The industrial core of Columbus, which has never been well-developed, will never be fully established.

Columbus' industry remains stable. The conservatism of local capital is being off-set by the location of national branch plants in this area. The rapid growth of the past 15 years should continue into the immediate future. There is every reason for optimism concerning Columbus' industrial future.

# APPENDIX A

# INDUSTRIAL QUESTIONNAIRE

1. COMPANY NAME:

2. PRESENT LOCATION:

3. DATE LOCATED HERE:

4. PREVIOUS LOCATION: DATE:

   REASONS FOR CHANGE:

5. TYPE OF PRODUCT:

   PRODUCER OR CONSUMER GOOD:

   COMPETITORS IN CENTRAL OHIO:

6. WHAT FACTORS INFLUENCED THE LOCATION OF THIS COMPANY IN COLUMBUS?
   (a)

   (b)

   (c)

7. (a) WHAT ARE THE HANDICAPS TO THE PRESENT LOCATION?
   IN COLUMBUS: IN CENTRAL OHIO:

   (b) WHAT ARE THE ADVANTAGES TO THE PRESENT LOCATION?

   (c) HAS THE CHANGE OF COLUMBUS FROM A COMMERCIAL TO AN INDUSTRIAL CITY PROMOTED OR RETARDED THE PARTICULAR COMPANY'S DEVELOPMENT?

8. WHAT HAS BEEN THE ROLE OF THE FOLLOWING FACTORS IN THE LOCATION OF INDUSTRY IN COLUMBUS, OHIO?

   (a) MARKET: % SALES IN COLUMBUS _____; % SALES IN CENTRAL OHIO _____

   (b) RAW MATERIALS: % PURCHASED IN COLUMBUS _____

   (c) TRANSPORTATION: SHIPPED BY TRUCK _____; IMPORTED BY TRUCK _____
   SHIPPED BY RAIL _____; IMPORTED BY RAIL _____

   TYPE OF GOODS SHIPPED OR IMPORTED BY EITHER SERVICE:

(d) LABOR: MALES EMPLOYED _____; FEMALES EMPLOYED _____
NEGROES EMPLOYED _____; ACTIVE UNION _____

ANY PARTICULAR REASONS FOR THE USE OF FEMALE OR NEGRO LABOR?

WAGE RATE: COMPARED TO CITY AVERAGE:

HAS A SURPLUS OF LABOR (W.W.II LABOR POOL) BEEN IMPORTANT:

HAVE NEW COMPANIES AFFECTED THE LABOR SUPPLY:

(e) WATER SUPPLY:

COSTS OF LAND:

EXPANSION FACILITIES:

PARKING FACILITIES:

PUBLI TRANSIT:

(f) POWER FACILITIES:

(g) PRESENCE OF BUILDING: _____ WHO PREVIOUSLY OCCUPIED SITE?

(h) PLACE OF COMPANY IN COLUMBUS IN STRUCTURE OF THE NATIONWIDE INDUSTRY:

FUNCTIONAL CONVENIENCE -- IS THE LOCATION IN COLUMBUS A RESULT OF CONVENIENCE WITH RESPECT TO OTHER INDUSTRIES FOR MARKET, RAW MATERIALS, ETC.:

(i) OTHER FACTORS:

ZONING:

PRESTIGE VALUE OF COLUMBUS:

9. VALUE ADDED TO PRODUCT BY MANUFACTURER:

10. ROLE OF COMPANY IN FOREIGN TRADE:

# APPENDIX B

COMPANIES AND REPRESENTATIVES VISITED AND INTERVIEWED

| Company Name | No.* | Address | Representative |
|---|---|---|---|
| Accurate Manufacturing Co. | 140 | 945 King Ave. | S. G. Todd |
| Acro Manufacturing Co. | 191 | 2040 E. Main St. | F. P. Maxwell |
| Advance Tool Stamping & Die Co. | 131 | 642 E. Fifth Ave. | H. M. Weinberg |
| Advern Casket Co. | 133 | 687 Henry St. | Mrs. R. Saum |
| Agricultural Laboratories | 130 | 1145 Chesapeake Ave. | H. E. Voltz |
| Alban-Theodo Dental Lab. | 80 | 247 E. State St. | Mrs. R. F. Theodo |
| Allen Manufacturing Co. | 153 | 88 W. Kossuth St. | A. Friedman |
| American Auto Parts Co. | 116 | 919 Bonham St. | W. L. Lewis |
| American Blower Corp. | 110 | 666 Marion Rd. | R. Wallace |
| American Solvent Recovery Co. | 47 | Eighth & Cassady Aves. | W. Whirl |
| American Zinc Oxide Co. | 58 | 1363 Windsor Ave. | A. C. Eide |
| Antenna Research Laboratory | 171 | 797 Thomas Lane | J. King |
| Armstrong Furnace Co. | 162 | 851 W. Third Ave. | D. H. Kinman<br>N. H. Deck |
| Artcraft Ornamental Iron Co. | 142 | 724 E. Hudson St. | A. L. Brown |
| Art-Mil Machine & Mfg. Co. | 176 | 170 Hosack St. | R. G. Wagner |
| Atlas Brass Foundry Co. | 28 | 32 W. Deshler St. | C. I. Cadot |
| Auld Co., D. L. | 50 | 1209 N. Fifth St. | S. G. Brooks |
| B & T Metals Co. | 119 | 425 W. Town St. | J. R. Jesson |
| Banner Die Tool & Stamping Co. | 89 | 1300 Holly Ave. | J. E. O'Brien |
| Barneby-Cheney Engineering Co. | 123 | Eighth & Cassady Aves. | W. Whirl |
| Barry Corp. | 185 | 78 E. Chestnut St. | M. Saul |
| Bell Sound Systems Inc. | 152 | 555 Marion Rd. | F. W. Bell |
| Belmont Casket Co. | 41 | 330 W. Spring St. | W. T. Murray |
| Berry Brothers Iron Works | 4 | 250 E. First Ave. | No interview |
| Blade Saw Co. | 161 | 909 W. Third Ave. | C. F. Callahan |
| Bonded Scale & Machinery Co. | 99 | 2176 S. Third St. | Mildred Roth |
| Bonney-Floyd Co. | 22 | 611 Marion Rd. | G. Moessner |
| Borger Brothers Boiler Works | 145 | 800 Curtis Ave. | Violet Santler |
| Boss Display Fixtures Co. | 88 | 856 Mc Kinley Ave. | Mrs. Nell Ezzo |
| Boyertown Burial Casket Co. | 68 | 1675 S. High St. | H. R. Anthony |
| Brightman Mfg. Co. | 11 | 659 Marion Rd. | W. B. Doherty |
| Buckeye Casket Co. | 91 | 1249 Essex Ave. | E. B. Bardon |
| Buckeye Engineering & Mfg. Co. | 180 | 368 West Park Ave. | J. Maclam |
| Buckeye Furnace Pipe Co. | 139 | 897 Ingleside Ave. | R. I. Wood |
| Buckeye Pump & Mfg. Co. | 35 | 415 S. 18th St. | L. Howard |

* Numbers refer to plant locations on Fig. 7 -- Location of Manufacturing Plants.

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|---|---|---|---|
| Buckeye Stamping Co. | 31 | 555 Marion Rd. | E. W. Hosler |
| Buckeye Steel Castings Co. | 21 | 2000 S. Parsons Ave. | A. G. Starrett |
| Buckeye Telephone & Supply Co. | 194 | 1250 Kinnear Rd. | W. C. Snyder |
| Buckeye Wire & Iron Co. | 97 | 203 S. Gift St. | J. A. Shook |
| Capital Bag & Burlap Co. | 100 | 83 W. Fulton St. | J. J. Lieberman |
| Capital Die Tool and Machine Co. | 76 | 456 E. Fifth Ave. | O. J. Krastel |
| Capital Elevator & Mfg. Co. | 62 | 424 W. Town St. | W. R. Edmister |
| Capital Machine Co. | 128 | 815 Grandview Ave. | G. H. Williams |
| Capitol City Mfg. Co. | 206 | 857 W. King Ave. | R. E. Young |
| Central Automatic Co. | 168 | 1591 E. Fifth Ave. | J. Hardman |
| Central Ohio Bag & Burlap Co. | 187 | 715 Curtis Ave. | H. Kress |
| Central Ohio Welding Co. | 81 | 253 E. Spring St. | N. W. Black |
| Chase Foundry Co. | 12 | 2300 S. Parsons Ave. | A. P. Johnson, Jr. |
| Clarite of Great Lakes, Inc. | 186 | 804 Mt. Vernon Ave. | D. S. Cannon |
| Clark Grave Vault Co. | 59 | 375 E. Fifth Ave. | R. Boehnke |
| Columbus Anvil & Forging Co. | 16 | 117 W. Frankfort St. | J. E. Finneran |
| Columbus Auto Parts Co. | 33 | Hudson Ave. & N.Y.C. R.R. | C. H. Clark |
| Columbus Bolt & Forging Co. | 1 | 291 Marconi Blvd. | R. M. Rex |
| Columbus Brass Mfg. Co. | 205 | 1284 Edgehill Rd. | E. A. Garrison |
| Columbus Coated Fabrics Co. | 14 | 1280 N. Grant St. | H. E. Nesbitt |
| Columbus Coffin Co. | 3 | Ingleside & Buttles | N. K. Snook |
| Columbus Conveyor Co. | 53 | 869 W. Goodale Blvd. | C. B. Isaac |
| Columbus Co-op Foundry | 114 | 310 W. Poplar Ave. | C. P. Oliver |
| Columbus Dental Mfg. Co. | 39 | 634 Wager St. | R. L. Morris |
| Columbus Die, Tool & Machine Co. | 36 | 955 Cleveland Ave. | C. C. Moelchert |
| Columbus Engineering Co. | 120 | 480 W. Broad St. | M. L. Mattlin |
| Columbus Forge & Iron Co. | 13 | 544 W. First Ave. | E. M. Tilton |
| Columbus Glove Mfg. Co. | 148 | 1836 E. Fulton St. | A. T. Francis |
| Columbus Heating & Ventilating Co. | 107 | 182 N. Yale Ave. | R. W. Sprague |
| Columbus Malleable Iron Co. | 101 | 760 Curtis Ave. | J. J. Witenhafer |
| Columbus Mfg. & Stamping Co. | 157 | 95 N. Glenwood Ave. | F. M. Rodgers |
| Columbus Mfg. & Supply Co. | 106 | 153 W. Fulton St. | S. G. Melton |
| Columbus Metal Craft Co. | 174 | 146 S. Yale Ave. | C. E. Isaacs |
| Columbus Metal Products Inc. | 172 | 1341 Norton Ave. | G. R. Galloway |
| Columbus Paper Box Co. | 54 | 338 W. Town St. | F. Duerler |
| Columbus Pharmacal Co. | 37 | 330 E. Oak St. | F. A. Kidder<br>R. O. Read |
| Columbus Plastic Products Inc. | 108 | 1625 W. Mound St. | W. J. Braley |
| Columbus Porcelain Metal Products Inc. | 146 | 3760 E. Fifth Ave. | H. Scott |
| Columbus Serum Co. | 60 | 2025 S. High St. | W. L. Ingalls |

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|---|---|---|---|
| Columbus Showcase Co. | 64 | 850 W. Fifth Ave. | W. F. Aschinger |
| Columbus Steel Industries | 48 | E. Eleventh Ave. | S. Ornstein |
| Columbus Stove Co. | 117 | 827 Reynolds Ave. | E. S. Goodwin |
| Columbus Sucker Rod Co. | 63 | 1281 Edgehill Rd. | F. H. Thorpe |
| Commercial Paste Co. | 51 | Buttles at Michigan | J. W. Hilbert |
| Corrugated Container Co. | 144 | 640 Shoemaker Ave. | S. S. Davis |
| Cranfill Dental Laboratory | 165 | 244 S. Third St. | V. Andrews |
| Cream Cone Machine Co. | 169 | 1195 Essex Ave. | R. T. Wise |
| Davison Chemical Co. | 32 | 3355 E. Fifth Ave. | C. E. Hayes |
| Dean & Barry Co. | 15 | 296 Marconi Blvd. | C. A. Rauer |
| Denison Engineering Co. | 129 | 1160 Dublin Rd. | C. Hughes |
| Dickerson Co., Walker T. | 79 | 326 S. Front St. | S. E. Burke |
| Dobson-Evans Co. | 115 | 1100 W. Third Ave. | W. A. Stevenson |
| Dresser-Stacy Co. | 159 | 875 Michigan Ave. | C. E. Ponkey |
| Ebco Mfg. Co. | 26 | 401 W. Town St. | A. R. Benua |
| Edwards Co., J. T. | 127 | 1241 Mc Kinley Ave. | J. T. Edwards, Jr. |
| Edwin Poulton Foundry Co. | 55 | 1071 Goodale Blvd. | E. Poulton |
| Eldred Co. | 143 | 2305 Cleveland Ave. | J. Legg |
| Exact Weight Scale Co. | 82 | 944 W. Fifth Ave. | K. B. Neff |
| Farmers Fertilizer Co. | 9 | 1380 Windsor Ave. | H. E. Wood |
| Federal Glass Co. | 18 | 515 E. Innis Ave. | J. Morris |
| Federal Steel Fabricators Inc. | 132 | 500 N. Stanwood Ave. | J. L. Peterson |
| Fire Chief Co. | 147 | 3740 E. Fifth Ave. | A. E. Brenner |
| Fournier Rubber & Supply Co. | 113 | 459 N. High St. | C. Mack |
| Frankenburg Brothers Inc. | 61 | 479 S. Ludlow St. | J. Yantis |
| Franklin Brass Foundry | 72 | 776 E. First Ave. | R. Ritzer |
| Franklin Glue Co. | 138 | 119 W. Chestnut St. | R. Snider |
| Franklin Lumber & Fixture Co. | 90 | 878 Michigan Ave. | S. Wasserstrom |
| Frey-Yenkin Paint Co. | 74 | 251 Sandusky St. | B. A. Yenkin |
| General Furniture Co. | 173 | 509 Charles St. | A. Flicker |
| General Machine Products Co. | 198 | 3871 Sullivant Ave. | G. D. Barok |
| General Motors Inc. | 156 | Georgesville Rd. | R. Woods |
| General Products Laboratory Inc. | 93 | 137 E. Spring St. | J. T. Lass |
| Godman Co., H. C. | 57 | 37 E. Fulton St. | J. O. Moore |
| Gordon Co., J. P. | 87 | 232 Neilston St. | T. J. Henson |
| H & E Machine Co. | 177 | 1646 Fairwood Ave. | E. Smith |
| Hamma Paint Mfg. Co. | 34 | 95 W. Long St. | J. Myers |
| Harrop Ceramic Service Co. | 189 | 35 E. Gay St.<br>3470 E. Fifth Ave. | T. W. Shook |
| Hatco Corp. | 158 | 947 W. Goodale Blvd. | H. B. Hill |
| Hearn Die, Tool, & Machine Co. | 8 | 115 Vine St. | Miss Cubbage |
| Henri La Prise & Co. | 203 | 550 E. Mound St. | D. W. Moss |
| Hercules Box Co. | 44 | 521 Marion Rd. | Mrs. C. Hockett |
| Hercules Trouser Co. | 56 | 570 S. Front St. | F. J. Vail |

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|---|---|---|---|
| Hertenstein Co., M. | 7 | 1409 S. High St. | A. A. Hertenstein |
| Hoffman Auto Body Service | 66 | 1480 N. Grant St. | J. H. Van Fossen |
| Hollywood Products Inc. | 137 | 288 N. High St. | Mrs. L. Patton |
| Industrial Aluminum Co. | 135 | 660 St. Clair St. | H. W. Hoglund |
| Industrial Ceramic Products Inc. | 103 | 965 W. Fifth Ave. | W. E. Cramer |
| Industrial Nucleonics Inc. | 182 | 1205 Chesapeake Ave. | C. J. Cooperrider |
| Ironsides Co. | 78 | 270 W. Mound St. | H. H. Bone |
| Jaeger Machine Co. | 30 | 550 W. Spring St. | F. J. Fowler |
| Jeffrey Mfg. Co. | 5 | E. First Ave. | C. J. Leifeld<br>G. R. Lucas<br>B. Norris |
| Jones Heel Mfg. Co. | 40 | 843 S. Front St. | G. Jones |
| Josephinium Church Furniture Co. | 25 | 351 Merritt St. | W. H. Frank |
| Joseph & Feiss Co. | 136 | 107 N. Sixth St. | S. Dorf |
| Joyce Shoes Inc. | 126 | 212 N. Fourth St. | R. H. Burlingame |
| Julian & Kokenge Co. | 85 | 280 S. Front St. | J. Farrell |
| Kilbourne & Jacobs Co. | 2 | Lincoln & N. Fourth Sts. | R. F. Egnor |
| Klein & Co., H. L. | 192 | 2237 Tuttle Park Pl. | J. Duncombe |
| Krouse Testing Machine Co. | 124 | 573 E. Eleventh Ave. | R. Briggs |
| Lattimer-Stevens Co. | 73 | 715 Marion Rd. | J. F. Drake |
| Leighton Fiber Products Co. | 112 | 433 W. State St. | E. W. Lauer |
| Leighton Heel Co. | 111 | 433 W. State St. | E. W. Lauer |
| Lennox Furnace Co. | 121 | 1711 Olentangy River Rd. | L. Di Cenzo |
| Lerch Industries | 196 | 1080 W. Goodale Blvd. | W. C. Lerch |
| Leukart Machine Co., J. | 175 | 195 Hosack St. | R. G. Wagner |
| Lilley-Ames Co. | 183 | 257 E. Broad St. | J. Mader |
| Mac Lean Co., J. S. | 69 | 470 S. Front St. | H. Mac Lean |
| Metalcrafters Inc. | 201 | 740 Jenkins Ave. | H. C. Houghton |
| Mid-West Machine Co. | 199 | 2128 Eakin Ave. | J. M. Rodgers |
| Miller Glass Engineering Co. | 96 | 148 S. Glenwood Ave. | R. E. Shirey |
| Modern Tool Die & Machine Co. | 188 | 1201 Essex Ave. | N. J. Hinterscheid |
| Morris Steel Co., C. E. | 122 | 731 Curtis Ave. | A. B. Hazard |
| National Aluminum Co. | 167 | 1133 Alum Creek Dr. | J. Friedman |
| National Dental Co. | 86 | 82 N. High St. | A. L. Baechle |
| National Electric Coil Co. | 95 | 800 King Ave. | J. W. Overstreet |
| National Glove Co. | 19 | 924 E. Main St. | L. C. Bush<br>M. Rhoades |
| Nippert Electric Products Co. | 155 | 1759 W. Mound St. | P. Nippert |
| Norman Products Co. | 141 | 1150 Chesapeake Ave. | E. A. Norman |
| North American Aviation Inc. | 190 | 4300 E. Fifth Ave. | L. W. Baird |
| Ohio Machine Products Inc. | 170 | 3077 Beulah Rd. | R. A. Connor |
| Ohio Malleable Iron Co. | 20 | 1343 Fields Ave. | C. J. Leifeld<br>G. R. Lucas |

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|---|---|---|---|
| Oran Co. | 109 | 2222 S. Third St. | Mrs. Rider |
| Orton Ceramic Foundation | 75 | 1445 Summit St. | J. L. Carruthers |
| Palmer-Donavin Mfg. Co. | 164 | 575 Olentangy River Rd. | No visit |
| Peerless Saw Co. | 84 | 571 S. Third St. | B. A. Hodapp |
| Peremy Equipment Co. | 163 | 893 Chambers Rd. | W. F. Stultz |
| Pfening Bakery Machine Co. | 104 | 1075 W. Fifth Ave. | F. Pfening, Jr. |
| Plastex Corp. | 118 | 402 Mt. Vernon Ave. | R. Zimmerman |
| Pollock Paper Co. | 151 | 780 Frebis Ave. | R. C. Lacey |
| Porcelain Steel Bldgs. Co. | 94 | 555 W. Goodale Blvd. | W. Tansley |
| Practical Burial Footwear Co. | 49 | 1397 Essex Ave. | C. F. Schulte |
| Prima Footwear Inc. | 166 | 706 Ann St. | H. Teterick |
| Puritan Products Inc. | 200 | 2319 S. Sixth St. | R. E. Smalley |
| Quad Stove Co. | 23 | 78 E. First Ave. | C. V. Price |
| Ralston Steel Car Co. | 24 | 2901 E. Fourth Ave. | W. E. Osborne |
| Ranco Inc. | 102 | 601 W. Fifth Ave. | E. D. Raney |
| Rockwell Tools, Inc. | 195 | 1314 Kinnear Rd. | C. H. Morrison |
| Rudolph Stern Dress Co. | 154 | 337 S. High St. | Mrs. E. Vogel |
| S & W Molding Co. | 150 | 990 Parsons Ave. | F. B. Hill, Jr. |
| Santeler Brothers | 125 | 950 E. Main St. | R. Santeler |
| Schodorf, A. L. | 70 | 370 W. State St. | O. L. Schodorf |
| Schoedinger Co., F. O. | 6 | 322 Mt. Vernon Ave. | W. O. Schoedinger |
| Schwartz-Showell Corp. | 52 | 842 W. Goodale Blvd. | F. Schwartz |
| Scott Viner Co. | 193 | 1224 Kinnear Rd. | G. A. Knorr |
| Seagrave Corp. | 17 | 2000 S. High St. | L. Stevenson |
| Shepard Paint Co. | 98 | 338 W. Broad St. | S. Ornstein |
| Simon & Haas Co. | 149 | 989 E. Main St. | W. Simon |
| Simplex Foundry | 71 | 681 Michigan Ave. | C. Emmons |
| Smith Agricultural Chemical Co. | 10 | 618 N. Champion Ave. | N. T. White |
| Smith Chemical Co. | 77 | 867 Mc Kinley Ave. | J. E. Jones |
| Stallman Gear Mfg. Co. | 179 | 527 W. Rich St. | W. A. Stallman, Jr. |
| Starwood Industries | 178 | 1455 E. Fifth Ave. | S. Southard |
| Stitt Ignition Co. | 65 | 86 E. First Ave. | A. R. Brenholts |
| Superior Die Tool & Machine Co. | 202 | 1432 Parsons Ave. | W. Book |
| Surface Combustion Co. | 83 | 400 Dublin Ave. | M. J. Strelecky |
| Thompson Metal Fabricating Co. | 204 | 1266 W. Goodale Blvd. | Mrs. Brooke |
| Thurman Machine Co. | 42 | 156 N. Fifth St. | H. Cummins |
| Timken Roller Bearing Co. | 46 | 1205 Cleveland Ave. | L. D. Gable |
| Timmons Metal Products Co. | 181 | 845 Harrisburg Rd. | K. K. Timmons |
| Triumph Brass Co. | 45 | 557 Wager St. | A. R. Benua |
| Union Fork & Hoe Co. | 27 | 500 Dublin Ave. | J. W. Rether |
| United Seal Co. | 38 | 450 S. Pearl St. | Mrs. O. B. Main |
| United Woolen Co. | 67 | 74-84 E. Spring St. | Mrs. Patterson |
| Warren-Teed Products Co. | 105 | 582 W. Goodale Blvd. | D. R. Griffith |
| Weirman Pump Mfg. Co. | 29 | 290 Spruce St. | P. W. Holstein |
| Welch Plastics Co. | 160 | 814 W. Third Ave. | A. R. Welch |

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|---|---|---|---|
| Westinghouse Mfg. Co. | 197 | 300 Phillippi Rd. | H. Dailey |
| White-Bush Mfg. Co. | 184 | 97 N. Sixth St. | Miss J. Young |
| Wright & Co. | 134 | 1999 Bryden Rd. | H. E. Parsons |
| Yardley Industries, Inc. | 92 | 138 Parsons Ave. | F. B. Hill, Jr. |

The interviews were made more successful by the fact that responsible executives took part in them. From the above list, the following is a break-down of the positions held by these mens Chairman of the Board (1), President (74), Vice-President (29), Secretary (12), Treasurer (5), Auditor (5), Manager (45), Purchasing Agent (4), Industrial Relations Director (5), Personnel Director (9), Engineer (3), and Office Secretary (8).

# BIBLIOGRAPHY

BIBLIOGRAPHY


Alderfer, E. B. and H. E. Michl, Economics of American Industry, Mc Graw-Hill Book Company, Inc., New York, 1942, pp. 566.

Annual Report of the Board of Public Works, Columbus, 1837-1888.

Annual Report of the Columbus Chamber of Commerce, Columbus, 1914, p. 28.

Annual Report of the Commissioner of Statistics, Public Document No. 8, Columbus, Numbers 1-5, 1858.

Annual Report of the Commissioners of the Canal Fund, Columbus, 1843, p. 22.

Annual Report of the Directors and Secretary of the Columbus Board of Trade for 1885, The Columbian Printing Company, Columbus, 1886, p. 69.

Annual Report of the Directors and Secretary of the Columbus Board of Trade for 1890, Nitschke Brothers, Printers and Binders, Columbus, 1891, p. 87.

Annual Report of the Directors and Secretary of the Columbus Board of Trade for 1895, Columbus, 1896, p. 119.

Bidwell, P. W. and J. I. Falconer, History of Agriculture in the Northern United States, 1620-1860, The Carnegie Institution, Washington, 1925.

Borth, Christy, True Steel, The Bobbs-Merrill Company, Indianapolis, 1941, p. 237.

Bowerfind, E. S., 1939. Notes on early Columbus. (In the Ohio State Archaeological and Historical Museum Library.)

Brown, Ralph H., Historical Geography of the United States, Harcourt, Brace and Company, New York, 1948, p. 596.

Bruce, Robert, The Old National Road, Clinton, New York, 1916.

Carney, Frank, "Geographic Influence in the Development of Ohio," Popular Science Monthly, November 1909, pp. 479-489.

The City Manual, Supplement to the City Bulletin, Columbus, 1932 and 1934.

The City of Columbus: The Capital of Ohio and the Great Railway Center of the State, Columbus Board of Trade, G. L. Manchester, Columbus, 1885, p. 98.

Columbus: A City of Men, Materials, and Management, Columbus, 1928, p. 6.

Columbus Board of Trade Bulletin, Vol. 2, No. 1, March 1900, p. 16.

The Columbus Business Directory for 1843-1844, J. R. Armstrong, Columbus, 1843, p. 201.

The Columbus Gazette, February 13, 1857.

----------, June 4, 1858.

----------, June 11, 1858.

----------, September 17, 1858.

Columbus, Ohio, The Board of Trade, Columbus, 1904, p. 48.

Columbus, Ohio: Industrially and Commercially, The Columbus Chamber of Commerce, Columbus, 1914, p. 32.

"Columbus: The Capital of Ohio," American Journal of Progress, 1899, p. 22.

Columbus: The Hub of Ohio, The Ohio State Journal, Columbus, 1890, p. 94.

Dial, George W., "The Construction of the Ohio Canals," The Ohio State Archaeological and Historical Society Quarterly, Vol. 13, 1904, pp. 460-482.

Directory of the City of Columbus for the Year 1848, John Siebert, Columbus, 1848, p. 264.

Directory of the City of Columbus for the Years 1850-1851, E. Glover and W. Henderson, Columbus, 1850, p. 239.

Distribution and Use of Bituminous Coal in Columbus, Ohio, The Bureau of Business Research, The Ohio State University, Columbus, 1933, p. 43.

Finn, Chester E., "The Ohio Canals: Public Enterprise on the Frontier," The Ohio State Archaeological and Historical Society Quarterly, Vol. 51, 1942, pp. 1-40.

Failing, Henry M., First Report of the Business and Prospects of the City of Columbus, Compiled for the Board of Trade, The Ohio State Journal Commercial Printing House, Columbus, 1873, p. 12.

The Geographic Distribution of Manufacturing Facilities Expansion, July 1940-May 1944, Government Printing Office, Washington, 1945.

Glover, John G. and William B. Cornell, The Development of American Industries, Prentice-Hall, Inc., New York, 1946, p. 1005.

Hooper, Osman C., History of the City of Columbus, Ohio: From the Founding of Franklinton in 1797 through the World War Period to the Year 1920, The Memorial Publishing Company, Columbus, 1920, p. 485.

Howe, Henry, Historical Collections of Ohio, C. J. Krehbiel & Company, Cincinnati, 1898, Vol. 1, p. 992, Vol. 2, p. 911.

Hulbert, Archer B., Historic Highways of America, A. H. Clark Company, Cleveland, 1902-1905, 15 volumes.

----------, "The Indian Thoroughfares of Ohio," The Ohio State Archaeological and Historical Society Quarterly, Vol. 8, 1900, pp. 265-295.

----------, Red-men's Roads: The Indian Thoroughfares of the Central West, F. J. Heer & Company, Columbus, 1900, p. 37.

Huntington, C. C., "A History of Banking and Currency in Ohio Before the Civil War," The Ohio State Archaeological and Historical Society Quarterly, Vol. 24, 1915, pp. 235-540.

---------- and C. P. McClelland, History of the Ohio Canals: Their Construction, Cost, Use and Partial Abandonment, The Ohio State Archaeological and Historical Society, Columbus, 1905, p. 181.

The Industries of Columbus: A Resume of Mercantile and Manufacturing Progress of the Capital City of Ohio, Enterprise Review Publishing Company, Columbus, May 1887, p. 120.

Isard, Walter, "Interregional and Regional Input-Output Analysis: A Model of a Space-Economy," The Review of Economics and Statistics, Vol. 33, No. 4, November 1951, pp. 318-328.

Jackson, W. B., "Industrial Columbus," The Ohio Illustrated Magazine, Vol. 3, No. 6, December 1907, pp. 454-466.

Jordan, Philip D., The National Road, The Bobbs-Merrill Company, New York, 1948, p. 442.

Labor Market Information, Bureau of Unemployment Compensation, Ohio State Employment Service, Columbus, 1953.

Lee, Alfred, History of Columbus, Ohio, Munsell and Company, New York and Columbus, 1892.

Martin, William T., History of Franklin County, Follett, Foster, and Company, Columbus, 1858, p. 449.

McGimnis, Robert D., The Columbus Produce Market, Unpublished M. A. Thesis, The Ohio State University, Columbus, 1924, p. 51.

McKenzie, Roderick D., "The Neighborhood: A Study of Local Life in the City of Columbus, Ohio," The American Journal of Sociology, Vol. 27, September 1921 and following numbers.

"Minutes of the Third Meeting of the Franklin County Regional Sanitary Survey Committee," Columbus, April 1952. Copy of typewritten notes.

Monthly Business Review, Federal Reserve Bank of Cleveland, Vol. 34, No. 5, Supplement, May 1952.

Moore, Opha, History of Franklin County, Ohio, Historical Publishing Company, Topeka, 1930, Vol. 1, p. 547.

Noble, Henry C., Historical Address, Ohio State Journal and Job Printing Rooms, Columbus, 1876, p. 95.

Ohio: An Empire Within an Empire, The Ohio Development and Publicity Commission, Columbus, 1950, p. 214.

The Ohio State Journal, May 15, 1953.

Peattie, Roderick (Editor), Columbus, Ohio: An Analysis of a City's Development, Industrial Bureau of Columbus, Chamber of Commerce, Columbus, 1930, p. 43.

Randall, E. C., "The Beginnings of Columbus: Primeval and Capital," The Ohio Illustrated Magazine, Vol. 3, No. 6, December 1907, pp. 439-454.

Reynolds, Esther C., Settlement of Licking County to 1840, Unpublished M. A. Thesis, The Ohio State University, Columbus, 1951, p. 140.

"Salute to Curtis-Wright," The Columbus Sunday Dispatch, November 30, 1941.

Sherman, C. E., Original Ohio Land Subdivisions: Vol. III of the Final Report of the Ohio Cooperative Topographic Survey, The Ohio State Reformatory, Columbus, 1925, p. 233 and map.

Special Report of the Board of Public Works Relative to the Rates of Tolls on the Canals of This State, Columbus, 1845, p. 22.

Stoddards, Paul W., "The Economic Progress of Ohio," The Ohio Archaeological and Historical Society Quarterly, Vol. 41, 1932, pp. 176-194.

The Story of Columbus, Johnston Publishing Company, Columbus, 1898, p. 100.

Studer, Jacob H., Columbus, Ohio: Its History, Resources, and Progress, Columbus, 1873, p. 584.

Sullivant, Joseph, Remarks on a Water Supply for the City of Columbus, Columbus City Council, Columbus, May 26, 1856, p. 23.

Tavenner, Robert L., Alvin Ketcham, Walter J. Boesal, E. Frank Miller, and F. J. Murray, Columbus Manufactures, Unpublished Seminar Paper, The Ohio State University, Columbus, 1906-1907, p. 129.

Taylor, William A., Centennial History of Columbus and Franklin County, Ohio, S. J. Clarke Publishing Company, Chicago, 1909, Vol. 1, p. 832, Vol. 2, p. 820.

Transeau, Edgar N. and H. C. Sampson, Primary Vegetation Areas of Ohio, Manuscript Map, 1934.

The United States Census Reports, The United States Bureau of the Census, Washington, D. C. Reports were used from the 1820 Census up to, and including, the 1950 Census.

Unstad, Lyder L., A Survey of the Industrial and Economic Development in Central Ohio with Special Reference to Columbus, 1797-1872, Unpublished Dissertation, The Ohio State University, Columbus, 1937, p. 571.

Wright, Alfred J., Economic Geography of Ohio, Ohio Geologic Survey, Columbus, 1953, p. 217.

----------, "Joel Wright, City Planner," The Ohio State Archaeological and Historical Society Quarterly, Vol. 56, 1947, pp. 287-294.

Year Book of the Columbus Chamber of Commerce, 1914-1915, Columbus, 1915, p. 78.

Zimmerman, Carrie B., "Ohio, The Gateway to the West," The Ohio State Archaeological and Historical Society Quarterly, Vol. 40, 1931, pp. 137-181.

# AUTOBIOGRAPHY

I, Henry L. Hunker, was born in Wilkinsburg, Pennsylvania, November 14, 1924. I received my secondary school education in the public schools of the city of Pittsburgh, Pennsylvania. My undergraduate training was completed at the University of Pittsburgh in 1945 when I received the degree Bachelor of Arts. In 1948, I obtained the degree Master of Arts from the University of Pittsburgh. While working toward this degree, I taught in the public schools of Allegheny County, Pennsylvania. In 1948, I was appointed an Instructor in the Department of Geology and Geography at Michigan State College, East Lansing, Michigan. In 1949, I received an appointment as an Assistant in the Department of Geography in The Ohio State University. I have held this position the last four years while completing the requirements for the degree Doctor of Philosophy.