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LORAIN, OHIO: A STUDY IN URBAN GEOGRAPHY*

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INTRODUCTION

On the south shore of Lake Erie between Buffalo and Toledo are nine cities that have evolved under the same general set of conditions. All occupy low, monotonously level, lake-plain sites; all have improved harbors with depths of 18–20 feet; all enjoy situation advantages with respect to the Appalachian coal-fields and the iron-ore-producing fields of the Upper Lakes region; all present landscapes that have developed through the same sequential stages of human occupance from that of rural simplicity to that of commercial and industrial complexity. Five of these cities now have progressed to a period when industrial landscapes are dominant.

Lorain, Ohio, located on the level lake-plain surface at the debouchure of the navigable Black River 70 miles east of Toledo and 200 miles west of Buffalo is one of these cities,

Fig. 1. Representative of the cities with a coal export and iron import trade, and also of those cities whose industrial imprint now dominates their character, this city, although smaller in size than some, epitomizes the present status of all these cities; and may, therefore, be taken as a type city.

The Lorain site has had at least 125 years of human tenure during which time the landscape has responded to occupation by Indian tribes; has experienced the stimulus of port activities during a formative period of early white settlement; was

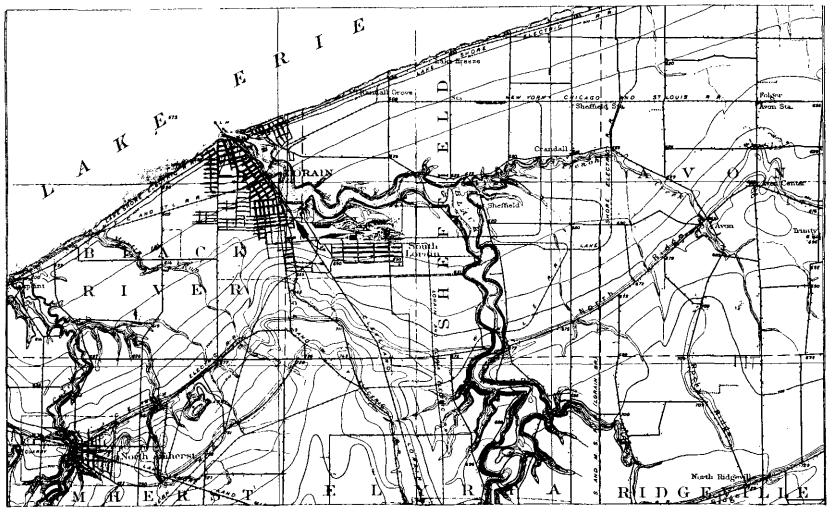

FIG. 1. Location of Lorain, Ohio, at the mouth of Black River (Oberlin Quad., U. S. G. S., scale 1: 62,500).

stimulated to growth during the early period of agricultural development; has been subjected to commercial adversity when the railroads first came; and has experienced a complete revival of trade and phenomenal modern industrial development in later years. Such changes have produced manifold urban forms, changed the urban functions and have been the means of producing a changed urban pattern.

In the following pages of Part I, the natural environment is described; Part II, the forms, functions and pattern of the past landscapes are depicted; and in the succeeding chapters of Part III the modern landscape of Lorain is described and analyzed.

PART I. NATURAL ENVIRONMENT

A. REGIONAL ASPECTS

1. *Lake Erie and the Great Lakes Chain*

From the mouth of Black River there extends toward the northeast, north, west and southwestward the broad expanse of Lake Erie. Although one of the smallest of the Great Lakes, being 241 miles in length and having a maximum width of 57 miles, Lake Erie is one of the most important links in this great chain, the largest inland waterway system in the world. By land route the distance from Buffalo, at the east end of the lake, to Toledo, at the other end, is 304 miles, or a reasonably good day's drive by automobile.

Lake Erie is the shallowest of the five Great Lakes having a maximum recorded depth of 210 feet but averages very much less than that. In fact, approximately one-half the area of the lake is less than 60 feet in depth. The smaller size, its shallowness and its more southerly location render Lake Erie less turbulent in stormy weather and less dangerous to navigation than the other Great Lakes. Among navigators Lake Erie does not command the respect accorded the other lakes and especially that of Lake Superior.

Four states (Ohio, Michigan, New York and Pennsylvania) and Canada have frontage on this waterbody which offers certain transportational advantages not enjoyed by many states. To any city located on its shoreline immediate contact is possible with any other city similarly located and is an advantage which, though placing a certain stamp of character upon the city, is a stimulus to growth and importance. And through an improved system of connecting channels, including the Detroit River, Lake St. Clair, the St. Clair River, the Straits of Mackinaw and the St. Mary's River, these regional contacts are extended infinitely more to include the entire chain of Great Lakes, with an aggregate shoreline of 8,300 miles, and upwards of one hundred cities and towns along it. Moreover, each town and city has its own trade area which it serves. In this way the sphere of trade and influence often reaches far beyond the shoreline of these Great Lakes. Like a magnet they draw the raw materials which originate in the service areas of these coastal towns and cities. The force that attracts raw materials to the lake shores is the low freight

rates which prevail on this 1,000 mile waterway system. Thus the sphere of influence and trade potential becomes vastly extended by reason of Lorain's location along the shoreline of such a waterway system.

2. *The Lake Plain*

On the landward side and running roughly parallel to the southern shoreline of Lake Erie is the Lake Plain. From a point near Cleveland, Ohio, where the plain is about three miles in width, it spreads out fan-like increasing in width toward the southwest until it attains a maximum width of 50 miles or more south of Toledo. Immediately south-eastward from the mouth of Black River and about at right angles to the shoreline, the lake plain is thirteen miles in width.

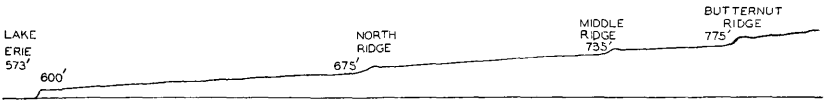

FIG. 2. Profile of site of Lorain, Ohio, showing Lake Plain Terrain. Total width, 12 miles.

Though the lake plain appears to the eye to be a perfectly level plain, actually it rises towards the south approximately 180 feet in twelve miles, or 15 feet per mile. Instead of being a continuous and uniform slope the rise is in three step-like surfaces each higher than the one on the north of it; the southernmost one being almost two hundred feet above the plane at the present lake shore. Each surface merges with and is bordered by a sandy, gravelly ridge averaging 20 to 30 feet in height and having a remarkably even crest. Each ridge in position forms a kind of retainer wall for the higher surface and as a distinct abandoned shoreline feature to the lower surface. (Fig. 2.) These ridges mark the shorelines of glacial lakes that stood over the land during the last stages of the glacial period. This marginal glacial lake at its maximum stage stood at an elevation of 790 feet and was known as the Maumee Lake. The ridge that marks the shoreline of glacial Lake Maumee is known locally as Butternut Ridge. As the continental icecap receded a lower outlet across the state of Michigan, called the Uhly-Cass River, lowered the level of the lake to an elevation approximately 735 feet. The waters stood at this level sufficiently long for another ridge to be formed

along the shoreline. This, the second stage of the lake was known as Whittlesley Lake and the beach ridge formed by it is known as Middle Ridge. As the ice melted back still further a lower outlet was opened which again dropped the level of the lake from that of the Whittlesley stage to an elevation approximately 675 feet. This stage of the lake is known as Warren Lake and the beachline formed by its waters is North Ridge.[1] The present level of Lake Erie is about 20 feet below the level of the surface at the shoreline and about 100 feet lower than the general level of North Ridge.

Since these three well developed surfaces represent the former lake bottoms of pre-existing glacial lakes they have a minimum slope of 10 feet per mile which increases to 30 feet per mile as each ridge or abandoned shoreline is approached. Beginning at the mouth of Black River and going in a southeasterly direction, the lake plain surfaces have widths of six, four and three miles respectively, or a total width of thirteen miles for the lake plain at this point.

Although seldom having a width of one-fourth of a mile, and often very much less, the beach ridges stand out as conspicuous features because of their elevated character, their uniform height above the lake plain, and their good drainage. This is in contrast to the low, level and poorly drained surfaces of the lake plain. There are a few short and discontinuous ridges intervening between those already named, but the importance of these is local and not general as is true of North, Middle and Butternut ridges.

(a) *Geological section*—The upper portion of the mantle rock over the lake plain consists of a stratum of thinly bedded and fine lake clays, four to ten feet in thickness. These clays are the sediments deposited on the bottoms of the glacial lakes that once stood over the lake plain surface. They are characteristically sticky during wet weather and relentive of surface waters.

The lower portion of the mantle rock consists of unassorted and unstratified glacial drift which varies in thickness from 0-80 feet or more, depending upon the nature of the preglacial surface over which it was deposited.

The bedrock of the region is that of the Ohio Shale. This formation is a thinly bedded, black, carbonaceous, slaty shale

[1]Geology and Mineral Resources of the Cleveland District, Bulletin 818. U. S. G. S. by H. P. Cushing, Frank Leverett and F. Van Horn, p. 96.

underlying the glacial drift. When eroded by streams this shale has the property of standing in an almost vertical cliff. Post glacial streams have in places eroded through the mantle of glacial drift and have cut their valleys from the shale bedrock. In such places the valleys are deep and gorge like.

(b) *Glaciated Plain*—To the southeast of the Lake Plain and immediately south of Butternut Ridge, extends the glaciated plain of Central and Northern Ohio. Its surface is level to gently rolling in the northern portion, where the glacial drift is thick and the preglacial topography less accentuated; but gives way toward the south to that of a distinctly hilly landscape, where the glacial drift becomes thinner and the preglacial topography more prominent. Here the topographic features are sufficiently prominent to give variety to the landscape, the glacial covering giving the landscape a subdued character. This is in pronounced contrast to the abrupt slopes and rock outcrops so characteristic of the unglaciated portion of the plateau. The relief increases gradually from north to south, as is also true of the general elevation above sea level. The glaciated portion of the Allegheny plateau merges into the till plain without a significant change in the character of the terrain.

3. *Appalachian Plateau*

The central Appalachian Plateau extends over southeastern Ohio, western Pennsylvania, almost all of West Virginia, a portion of eastern Kentucky and western Virginia, as well as the westward extension of Maryland. From the mouth of Black River to the southeastward, it is 160 miles to Pittsburgh; 200 miles to Connellsville; and approximately 300 miles to Charleston, West Virginia.

This plateau is a maturely dissected upland with an intricate dendritic pattern of drainage. The streams have cut their valleys so deeply into the upland surface as to develop a bold and rugged topography, which is often referred to as the "Allegheny Mountains." The relief is greatest in the eastern and southern portions of the central plateau where valleys 1000–2000 feet deep are found, and less pronounced in the northern and western parts where the relief is no greater than 300–400 feet.

Interbedded in the rock strata of this rough country are several seams of workable bituminous coal that constitute in

the aggregate the most extensive bituminous coal deposits known. Moreover, the territory contains at least twelve important producing fields in which are found many grades and varieties of coal. From the very high-volatile low-carbon steam coals to the low-volatile high-carbon coking coals the entire gamut of bituminous coal grades is run. The great number of coal grades makes possible the wide range of uses to which the coal may be put.

Although the main stream valleys of the plateau are narrow and circuitous, they favor the exploitation of these coal resources from the north and west. Such streams as the Big Sandy, Kanawa, Little Kanawa, Guyandot, Kiskiminetas, Monongohela, Kentucky, Licking rivers and Twelvepole Creek, as well as some of the important tributaries of these streams, flow in a northwesterly direction into the Ohio River. The principal streams of Ohio flow in a south or southeasterly direction as tributaries of the Ohio River, such streams as the Mahoning, Muskingum, Tuscarawas, Kokosing, Hocking, Licking rivers and many smaller streams, thus forming natural routes connecting the Allegheny Plateau with Lake Plain. Along these river valleys, and often many of the smaller tributaries of these streams have been constructed the railroads that serve the several different coal fields.[2]

4. *Climate and Aboriginal Forest Cover*

The mouth of Black River is near the borderline between Koeppen's Dfa and Dfb types of climate, that is, a constantly moist climate with at least one summer month having a mean temperature of 72° F, Fig. 3. The winters, however, are sufficiently cold that a shelf of ice 1–10 miles in width and 8–10 inches in thickness forms around the margins of Lake Erie and navigation is closed for three to four months.

Ordinarily the length of the growing season is expected to increase from north to south in the northern hemisphere, but southward from the shoreline of Lake Erie the length of the growing season decreases. Two sections, one along the Lake Erie shoreline and the other in the extreme southwestern corner of Ohio have growing seasons longer than 192 days. Elsewhere it is shorter, decreasing to 150 days in the higher

[2]The valleys of the Mahoning, Muskingum, Tuscarawas, Kokosing, Hocking, and Licking rivers and those of Little Storms Creek, Leading Creek, Short Creek, Wheeling Creek, Yellow Creek, Cross Creek, Wegee Creek, Raccoon and Chickamanga Creeks, are some of those utilized by railroads.

eastern portion of the state. The average date for the first killing frost in autumn along the lake shore is October 30th and that of the last killing frost in spring is April 15th. This is ten days later in the autumn than in the southern part of the state and over a month earlier in spring than in some other parts of the state. The autumn season is a long, mild and delightful one; but the cold, raw northerly winds from off the lake in spring are disagreeable even though the temperature remains above freezing.

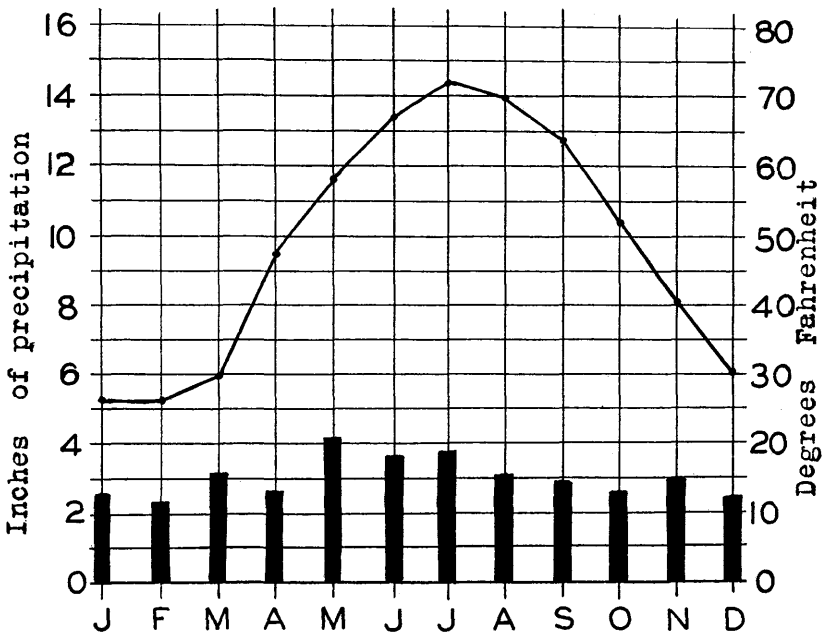

FIG. 3. Climatic Chart. Upper line shows mean monthly temperatures; lower vertical bars represent mean monthly precipitation.

At the time of the Indian occupance of the Lorain site, there was over the entire surface of the Lake Plain a magnificent forest of mixed hardwoods. Smith, a young captive of the Delaware Indians, wrote, "The timber is black-oak, walnut, hickory, cherry, black-ash, water-ash, buckeye, black-locust, sugar-tree and elm; there is also some land, though comparatively, but small, where the timber is chiefly white-oak or beach—this may be called third rate. In the bottoms, and also many places in the upland, there is a large quantity of wild apple, plum, and red and black haw trees. It appeared well watered,

and plenty of meadow ground, intermixed with upland, but no large prairies or glades, that I saw or hear of." . . . "About the falls (ridges) is thin chestnut lands . . ."[3] Because it was in the Temperate Zone of cyclonic storms, and because this was in a transition zone (between Koppen's Dfa and Dfb types of climate) with a July temperature of 72° F and a January temperature of 26° F, the region had also a forest transition between the Southern Hardwood (Oak-Hickory) Forest, the Northeastern Hardwood (Birch-Maple-Hemlock) Forest, and the Southern Chestnut (Chestnut-Chestnut Oak-Yellow Poplar) Forest. The climate was just cold enough for the southern extension of the northeastern forest and warm enough for the central hardwood forest and the soils were thin enough on the beach ridges for the Chestnut associations.[4] Moreover, the mean annual rainfall of 36 inches was well distributed, 57% falling in summer and 43% during the winter months.[5] With the Dunkirk clay soils that retained moisture and with the growing season lengthened to 167 days or more by the ameliorating influence of Lake Erie, forest trees grow to unusually large size.

The dense forests accentuated the poor drainage of the youthful Lake-Plain so that much of the surface was marshy. In crossing this section of the Lake Plain, Smith says, "Here the land is generally good, but I found some difficulty getting round swamps and ponds."[6] And again, "The only refuse (of land) is some swamps, that appear to be too wet for use, yet I apprehend a number of them, if drained, would make excellent meadows." The best drained surfaces are those close to the streams and immediately adjacent to the lake shore, where short ravines have had time to develop since glacial times.

B. SITE CHARACTERISTICS

1. *Black River and its Estuary*

Black River is formed by the confluence of East and West Branches of Black River approximately ten miles from its

[3]Smith, Col. James. An account of the Remarkable Occurrences in the Life and Travels of Col. James Smith during captivity with the Indians. John Bradford, Lexington, 1799, p. 17.

[4]Shantz, H. S. and Zon, R. Atlas of American Agriculture, Natural Vegetation. Government Printing Office, 1924, pp. 13–14.

[5]Curtis, H. S. Industrial Survey of Lorain, Ohio, 1928, p. 4.

[6]Smith, op. cit., p. 25.

mouth. The system is post glacial and rises near the crest of the low drainage divide in Central Ohio and flows northward to Lake Erie.

In crossing northern Ohio these streams flow through glacial drift except in the lower six miles of their course where the valley of Black River has been partially carved out of the Ohio Shale. The fall of the river from the confluence, ten miles upstream and almost a quarter of a mile below the falls, to mean lake level is 52.6 feet, but practically all of this fall is concentrated in the upper half of the river. Ten miles upstream the branches of Black River flow over an exhumed sandstone divided to form the waterfalls in Cascade Park at Elyria.

Since the close of the glacial period Black River has cut its gorge-like valley through the layers of lake clays, then through the glacial drift, and in places several feet into the Ohio Shale formation. The depth of the gorge increases upstream. Near the mouth and where the bluffs coalesce with the Lake Erie shoreline, the river flows about twenty feet below the surface and six miles upstream it is seventy feet below. Because the lake plain surface rises toward the south at about 10 feet per mile and because mean lake level extends almost six miles upstream, the gorge increases in depth toward the south. Near the mouth of Black River the gorge is 20 feet in depth; three and one-half miles upstream the depth increases to 50 feet; and ten miles upstream the depth is 90 feet. (Fig. 1.)

The gorge of Black River is slightly less than a quarter of a mile in width except in places where the river in meandering has undercut a bluff and widened the valley. But in no place does the width exceed one-half a mile and in most instances it is about one quarter of a mile.

The tributaries of Black River are few in number and small in size. French Creek a small tributary eight or ten miles in length is the largest one. The initial slope of the Lake Plain is much as it was following the lowering of the glacial lake waters and little disturbed by subsequent stream erosion. The upland surface slopes toward the lake and Black River gorge is an abrupt feature which interrupts the general continuity of the Lake Plain.

Except during spring flood season there is no appreciable current in the lower portion of Black River, even then it never

interferes with navigation but may cause ice jams at or near the mouth of the river. In most of its lower course the stream meanders back and forth across its low, marshy and cattail-covered flood plain in broad sweeping curves a quarter of a mile or more across. Occasionally the main channel of the stream undercuts a bluff to form a steep cliff which overlooks the flat, marshy flood-plain.

2. *Shorline of Lake Erie*

Except for the small delta filled embayment at the mouth of Black River the Lake Erie coastline is an erosional one twenty-five miles eastward to Cleveland. It is therefore cliffed, bold and uninviting to mariners. From Black River westward, the shoreline has been eroded for the most part from glacial drift and is straight and much lower than eastward where it is eroded from the Chagrin shale and stands in cliffs 60–80 feet above the lake.

Before modernization of the lower course of Black River and the dredging of a channel, the river mouth was choked by deposition of its own sediment. The greatest handicap was the sandbar obstruction at the mouth of the stream where the water was about three feet in depth. The sandbar developed into a real barrier only after the strong lake currents driven by northerly winds accentuated the deposit until it literally chocked the mouth and ponded the river. Not infrequently it was necessary for workmen to " . . . plow out a channel which the current would enlarge sufficiently to allow the passage of the bottled-up vessels."[7] Even in its natural state, the Black River harbor[8] was one of the best on the Great Lakes. From the mouth of the stream to the head of navigation the natural depth was ten to fifteen feet and the natural channel about one hundred feet in width.[9]

At present most of the sediment is deposited where the stream enters pool at the head of navigation.

The gradient of Black River is so slight that the stream meanders aimlessly back and forth across its floodplain. Mean lake level extends for six miles upstream and this portion of the stream is in pool, which, so far as navigation is concerned, may be considered an arm of the lake.

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[7]G. Frederick Wright. History of Lorain County, p. 89.

[8]Black River Harbor was the term given to the entire navigable portion of the river from the mouth to the head of navigation three miles upstream.

[9]House Document No. 985, 64th Congress, First session, p. 4.

PART II. SEQUENT STAGES OF HUMAN OCCUPANCE

A. LANDSCAPE DURING THE INDIAN PERIOD

1. *Indian Occupance*

The region which included the mouth of Black River[1] in northern Ohio was occupied by Indian tribes for an indefinitely long time before the coming of the white man. As late as fifty years before the appearance of the first white settler (1807), the region was known to have been occupied by the Delaware Indians, later by the Ottawas, and immediately before the time of the white surveyors, by the Wyandots.[2] In 1755 the immediate site at the mouth of Black River is known to have been the place of a Wyandot Indian village,[3] and a rendezvous for Indians engaged in hunting, fishing, and making intermittent raids upon the bordering white settlements in Western Pennsylvania and New York.[4] In this same year, a youth named James Smith, who had been taken captive by the Delaware Indians from a military camp in western Pennsylvania, visited the lake shore in the course of his hunting with the Indians. In coming to the lake shore and traveling east along it Smith says, "Where some time in the afternoon we came to a large camp of Wiandots at the mouth of Canesadoohorie (Black River)."[5] This establishes fairly definitely the camp on the west side of the stream. This campsite was the first form of human occupance on the site of present-day Lorain.

Thus, the first people to occupy the site at the mouth of Black River were exploiters of the wild animal life indigenous to the region. The great forest cover he left unmolested except to supply his few immediate needs. The Indian, therefore, built no permanent establishments or lasting institutions whose remains could be examined by posterity. Except for the few occasional arrowheads found, charcoal, fish or clam-shell remains left, an occasional Indian mound or breast works preserved, and the place names adopted by the white settlers,

[1]The name Black River is here used instead of the Indian name, Canesadooharie, even though the stream was not so named until after the white man came.

[2]Wright, George F. History of Lorain County, p. 32. Lewis Publishing Company, 1916.

[3]Ibid., p. 77.

[4]Smith, op. cit., p. 17.

[5]The historical account, which is written in considerable detail from a journal the author kept, gives no account of crossing the river.

there is little to testify to the long period of Indian occupance. He was a hunter and warrior who engaged in tribal struggles, before the coming of the white settler brought a newer and more powerful enemy. The peculiar nature of the resource he exploited, non-existent today, caused the Indian to be semi-nomadic in his mode of life.

Nevertheless, the Indian occupance of the land, semi-permanent though it was, sufficed to retard the white settlement of this site in northern Ohio until an agreement could be made with the Indians and they could be induced to move farther westward. Connecticut's claim to the lands of the Western Reserve was based upon a land grant to the Connecticut Colony by King Edward II, of England, in 1662.[6] However, the Indians occupied the territory and they were reluctant to give up excellent hunting territory which they deemed their inalienable right to occupy.

2. *Indian Removal*

The Treaty of Ft. Industry, July 4, 1805, was consummated between the United States Government and the chiefs and warriors of the Wyandot, Ottawa, Chippewa, Munsee, Delaware, Shawanese, and Pottawattamie tribes.[7] This agreement gave to the white man the title to the land of the Connecticut Western Reserve west of the Cuyahoga River. This was nine years after the titles to the lands east of the Cuyahoga River had been given to the Connecticut Land Company, corporate agent of the State of Connecticut. Those lands between the western line of Pennsylvania and the Cuyahoga River, or the eastern part of the Reserve, had been surveyed in the years 1796–97.

In Surveyor Tappan's manuscript field notes, written in 1807, after the survey had been made and while he was engaged in equalizing the lands, he says, "At the period of which I am writing not a person, white, red or black, lived on the tract of country we were about to explore."[8] This meant

[6]This claim embraced all the lands between the forty-first and forty-second parallels of north latitude, and from Providence plantations on the east to the Pacific Ocean on the west. Conflicting claims afterwards arose with other states. Final settlement between the United States and Connecticut gave that state the "exclusive right of soil to the 3,800,000 acres" included in the Western Reserve. Wright, op. cit., p. 40.

[7]Wright, op. cit., p. 62.

[8]Manuscript notes of A. Tappan, 1807, Western Reserve Historical Society Library, Cleveland, Ohio.

that in the brief period of two years all of the Indians living in that vast tract of aboriginal territory, comprising more than three and a quarter millions of acres (3,366,000 acres), had evacuated in accordance with their treaty agreement.

B. THE LANDSCAPE DURING THE PIONEER PERIOD

1. *Interim Period*

Following the Indian removal there was a brief interim period when the Western Reserve territory was occupied only by surveyors of the Connecticut Land Company, and possibly some wandering Indians. There was, therefore, no gradual transformation of the landscape from the period of Indian occupance to that of white settlement. Instead the period between 1805 and 1810 is marked by little change. During this interim period, there was considerable preparation to occupy the lands west of the Cuyahoga River. The surveys were made and the lands equalized. So that equal shareholders in the Connecticut Land Company participated equally in the drawing of the western lands. The value of the inferior townships was made equal to that of the best townships by adding on tracts of land reserved for equalization purposes. This method resulted in some holdings being very large, while others were normal sized townships.[9] Time was also consumed in establishing the ownership of the land which was drawn by lot after the surveys had been made and the lands equalized. Stockholders who became the owners of a township of land then subdivided the land and sold parcels to individual settlers.

Both the Indian occupance of the territory and the ownership by the Connecticut Land Company retarded the settlement of northern Ohio until a much later time than the settlement of similar lands in southern Ohio. Settlement was not long delayed after the drawing of townships and subdivisions had established the ownership of the tracts. The next year (1807) witnessed the arrival of the first permanent settlers when Nathan Perry, with Araziah Beebe and his wife

[9]The system of survey used by the Connecticut Land Company was somewhat different from that used by the Government at about the same time. Townships in the Western Reserve were made five miles square instead of six miles square where governmental surveys were made. A complete history and detailed account of the surveys in the Western Reserve may be found in the Western Reserve Historical Society volumes.

came west to the mouth of Black River.[10] They "saw that the country was fair to look upon and so built a log cabin on the site of the deserted (Indian) village." From this year onward settlement from New England was more or less continuous. It was slow in starting and was interrupted most by the beginning of hostilities between the United States and Great Britain in 1812.

2. *Village Birth*

The germ cell of the village organism at the mouth of Black River was really planted when in 1812 James Reid built a large house to be used as a dwelling and tavern. The Reid House stood not far from the edge of the bluffs and overlooked Black River.[11] A few years later, the "Mouth of Black River" Post Office and the office of the first Justice of the Peace were housed in the same building. Few settlers lived in the new Western Reserve country and the Reid House was constructed more in anticipation of its service to incoming settlers than to the actual service to local inhabitants it rendered at the time it was built.

Several advantages of the site at the mouth of Black River gave some assurance that the place had possibilities of considerable growth. Black River was the first navigable stream west of Cleveland, at the mouth of the Cuyahoga River. Moreover, the slight embayment along an otherwise cliffed coastline offered some degree of safety for the small sailing craft of that day, and the natural Black River harbor was one of the best on the Great Lakes. For those new settlers who came by boat from Buffalo and who wished to get as near as possible to their lands, located in the recently surveyed western portion of the Western Reserve, the mouth of Black River was the logical stopping place. Before roads had been cut through the dense forest wilderness, it was considered easier and safer to continue the journey by boat west from Cleveland than it was to stop at Cleveland and continue the overland journey to their lands.[12] A few years later, when the Fire

[10]Wright, op. cit., p. 94.

[11]The original Reid House stood near what is now the intersection of Broadway and Erie Avenue. Moore, W. M., "For a Greater Lorain." Bulletin of The Cleveland Trust Company, p. 3.

[12]Ichabod Terrell, the first settler in Ridgeville Township, came to Cleveland and thence overland to Ridgeville. To go to Ridgeville required "two days and three nights in route from Rocky River." They had to "cut a wagon road from Rocky River to the place of destination." Rocky River here referred to is just west of Cleveland. Wright, op. cit., p. 92.

Lands were opened for settlement the importance of Black River's position just east of these lands was emphasized.[13]

Although the War of 1812 retarded somewhat the settlement in the Western Reserve, it was not long after 1812 that settlers began to enter in considerable numbers. Immigrants with their belongings came and stopped temporarily at the mouth of the river before moving to their homesteads. Thus the first break-of-bulk functions of the embryo village were associated with the handling of passengers and their belongings, rather than with cargo freight.

Another industry which was later to play an important part in stimulating the village nucleus was that of shipbuilding. With an increasing number of settlers coming west and an increase in cargo tonnage of supplies for the settlers, there was a demand created for ships. As early as 1819 the General Huntington, the first ship to be built at the mouth of Black River, was launched. It had been constructed by F. Church out of the hardwood materials found near the river. The year previous, two men, who had owned shipyards during the war, took grants at the mouth of Black River for the purpose of constructing ships.[14] Early shipyards were small and occupied the narrow flood plain close to the mouth of the river and along the lake shore immediately east of the river. These early ships were small sailing vessels constructed of hewn timbers and planks, but offered employment to a few carpenters who added to the village nucleus.

As evidenced by the activities described above, there was near the mouth of Black River the beginnings of an urban growth, but, at the time, the organism was so clearly attached to its rural surroundings as to be inseparable. This urban nucleus had in no way shown itself to be an independent entity. Hence a consideration of the region immediately adjacent to and surrounding this urban nucleus seems essential to an understanding of the further growth of the village.

3. *Pioneer Developments*

The pioneer was a sedentary agriculturalist who came West to occupy the land acquired from the Connecticut Land

[13]The Fire Lands was a tract of land, consisting of 781 square miles or about one-half million acres, located in the western portion of the Western Reserve. This name was given to the tract because the State of Connecticut donated portions of it to citizens who had suffered destruction of their property during the Revolutionary War.

[14]Wright, op. cit., p. 87.

Company. Whenever possible he came in the early summer to escape the privations of the cold Ohio winters, to make a clearing in the forest for a subsistence crop the first season

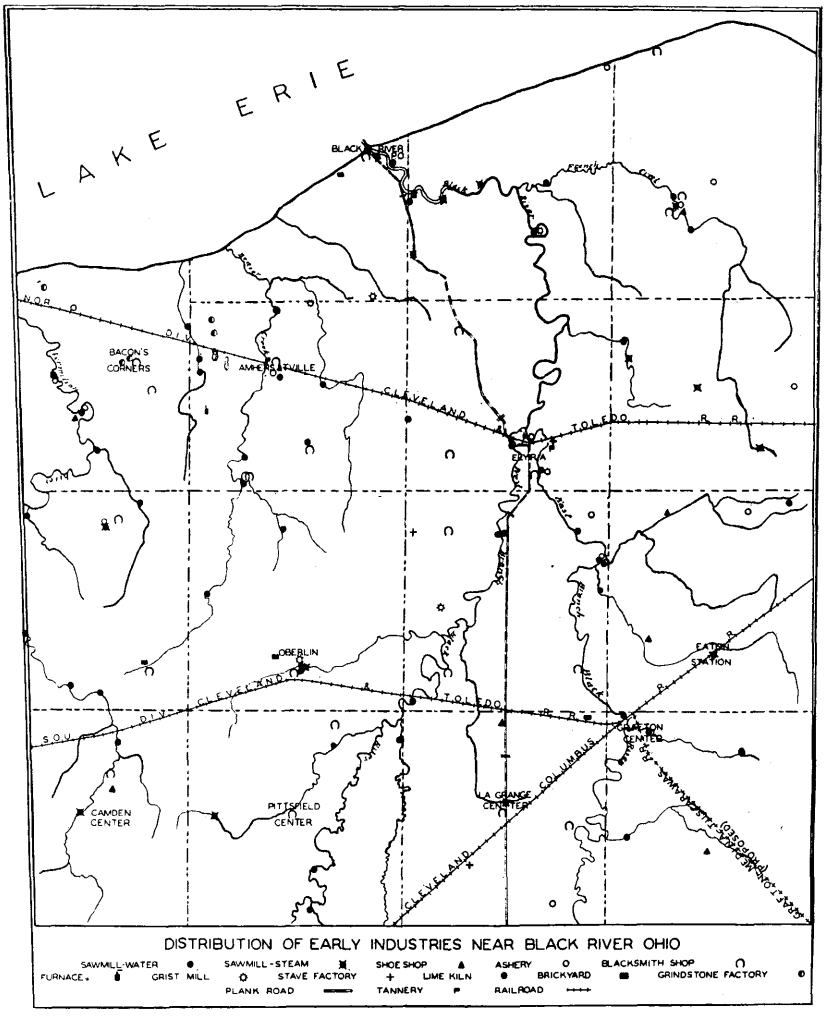

FIG. 4. The pioneer industries of the neighboring region in 1856 which furnished the impetus to early urban growth and importance of Charleston.

and to be thus prepared for the hardships of the approaching winter.

From the forests which the pioneer immediately set about clearing, he obtained his fuel, materials for his home, his furni-

ture, his fences, and many of his implements and tools. Even the fruits, berries, nuts, and wild honey were gathered from the forests and were important articles in his diet. The first money with which he purchased salt, clothing and paid his taxes was obtained from the sale of pearl and pot-ash made by burning the hardwood timber. Unlike the Indian who depended upon the generosity of nature for his food, the Connecticut Yankee was an exploiter of the soil and the forest cover.

Manufacturing industries in the pioneer and dominantly rural community were slow to make their appearance. Beyond the ability to make and repair shoes, the skill to fashion from wood the crude farm implements or tools and some blacksmithing there was little necessity for skilled mechanics or artisans.

The necessary manufacturies of the new country were the grist and saw mills. Suitable sites along the stream courses that cross the Lake Plain were the first to be occupied by the pioneer. Water wheels were established at waterfalls and along races cut across meanders in the streams. The principal objection to the early water wheel was that on many streams the fall was insufficient to develop much power, the streams had small volume, the water wheels became frozen in winter, or they failed entirely during the drought. The most dependable water wheels were those on Black River, located in Sheffield Township, now the present corporate limits of Lorain, and the other at the waterfalls in Elyria.

In spite of these early manufacturing attempts they were coincident with the subsistent agricultural development and were supplementary to it.

There was little surplus and no sale for farm produce. About the only farm income was from the sale of "Black Salts," made from ashes of burned, hardwood trees. This crude potassium salt was valuable enough when properly concentrated, to withstand the high transportation cost to the eastern markets. Each farmer's black salts were further concentrated into "Pearlash" or "Potash" at an "ashery." (Fig. 4.) This product was then taken to a trader at the mouth of Black River where it was exchanged in the proportions of one-third for cash and two-thirds for supplies. This money enabled the farmers to pay their taxes and buy salt, tea, and cotton goods which required cash.[15]

[15]Boynton, op. cit., p. 11.

C. LANDSCAPE DURING PERIOD OF GROWTH

1. *Agri-functional Character of the Village*

Scarcely twenty years after its inception the settlement at the mouth of Black River had crystallized into an incorporated village, taking the name of Charleston.[16] The growth from a rural settlement to a village with definite outlines was a slow but steady one. In 1834, the village townsite was surveyed and platted into lots by the Lorain County Surveyor. A public square, city blocks bounded by streets and lot lines tended to divorce the village from its purely rural surroundings and to give it the first manifestations of an independent existence.

Early growth of the village into a chartered town is attributed by most historians to the shipbuilding industry. But when the problem is studied closely this early stimulation seems to be more closely related to the break-of-bulk character of the village. Shipbuilding was a much more concentrated industry and contributed more sensationally to the growth of the urban nucleus than did the break-of-bulk activities, but, the business activities attached to the incoming ships, with new immigrants and supplies, and the trade that originated in the surrounding hinterland were real stimuli in the growth of the village. A commission warehouse for the storage of farm products and capitalized at $50,000 was the largest business establishment of the town.[17] The large stave landing on Black River, the two lumber yards that exported lumber products, the Reid Hotel, a blacksmith shop, and even many of the schooners that frequented Black River harbor and operated in the carrying trade, all gave break-of-bulk character to the new town.[18]

The village physiognomy retained many of the resemblances arising from its regional dependence and rural parentage. The sprawling aspect of the town plan, the scattered houses with acreage plots surrounding them, the rural interests of the business houses and the rural lineage of its leading men, gave

[16] Wright, op. cit., p. 290.

[17] Sixth Census of the United States. Government Printing Office.

[18] In 1835 the principal business men were: William Jones, merchant; Gates and Green, general merchandising; Delos Phelon and O. Scot, forwarding and commission merchants; Daniel T. Baldwin, farmer; Barna Meeker, proprietor of the old Reid House; A. T. Jones, blacksmith; E. Miller, shoemaker; Thomas Brown, tailor; W. E. Fitch, stave dealer; Quartus Gillmore, farmer and justice of the peace; and Conrad Reid, postmaster. At least five or six shipbuilders, most of whom operated their own ships in the carrying trade, should have been added to this list. (Wright, op. cit., p. 289.)

the village a distinctly rural aspect. Men employed as commission traders, stave dealers, the twelve men engaged in furniture making, and much of the exchange trade of the four stores further emphasized the regional dependence of Charleston.[19]

But the town character was not entirely dominated by the agricultural surroundings. Shipbuilding had grown to be a major industry locally and was fast gaining a reputation that reached well over Lake Erie. Shipbuilders, ship's carpenters, caulkers, and sailors appeared as an important stratum in the social order. Fishing, although considered a minor industry in relation to shipbuilding, engaged the attention of a few individuals and fishing shacks were found on the banks of Black River and along the lake shore.

2. *The Durand Survey*

The village plan as surveyed by Edward Durand in 1834 consisted of seven city blocks. The townsite pattern gave the appearance of a blunt wedge driven northward between the Black River and the lake shore, stopping just short of these bodies of water. This left a marginal strip of land on the lake shore and Black River that was subdivided into lots with frontage along these bodies of water. One side of the wedge was Elyria Avenue which followed roughly parallel to the bluffs of the river and the old road to Elyria. Thus, the direction of the street was almost exactly southeast. On the west side of the plat the street, later called Oberlin Avenue, followed the center of the lot line which trended south.[20] The converging ends of the townsite wedge were joined by First Street which paralleled the lake shore and was surveyed less than two hundred feet from the shoreline. In this way the first townsite of Charleston was planned so as to utilize as efficiently as possible the point of land at the mouth of Black River. Shortly after the survey, town lots were sold and the village granted a charter by the Ohio legislature in 1836.

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[19]Sixth Census, 1840, op. cit.

[20]The articles of incorporation relative to the boundary lines of the town of Charleston provided that: "Commencing on the shores of Lake Erie, center of Lot 26, Tract 2, south through center of Lot 26, Tract 2, till an east line will strike the southwest corner, set off from Lot 6, Tract 1, thence east across lots 6, 5, 4, 3 to Black River, thence down east bank of Black River, along east pier erected by United States to northern extremity thereof, thence through Lake Erie to place of beginning." The officers of the new town were to be: a mayor, a recorder, five trustees, an assessor, a treasurer, a street commissioner, a marshall, and "such other officers as the town shall create and appoint."—Acts of a General Nature, Thirty-fifth Ohio General Assembly, Vol. XXXV, 1837, p. 162.

3. *New Village Extensions*

In addition to the substantial support of the village, already referred to, there was a series of proposed developments that served to buoy up the new and ambitious village. This speculative buoyancy was manifest in the form of village extensions (subdivisions) and of high land values. In 1835, a five-acre tract adjoining the Durand Plat of Charleston was purchased for $1000 an acre and subdivided into city lots. All the lots having been sold, another tract of six acres adjoining the previous one was subdivided. Then the entire farm from which these tracts were taken was purchased for townsite purposes.[21]

These extensions to the town plan were made largely on anticipated developments and their hypothetical benefits. In 1832, the Ohio Railroad was surveyed through Black River. The following year work was started on the Ohio Canal which was expected to terminate at the mouth of Black River. When the canal was finally projected down the Cuyahoga River instead of the Black River, their hope for a canal was not entirely abandoned. The Ohio Legislature in 1837 ordered a survey made of the proposed Killbuck Creek-Black River Canal, which was planned to join the Ohio Canal system at Coshocton via Wooster.[22] These projected and planned proposals imposed on the new town of Charleston an inflated expectancy. When none of the projects was completed, the town suffered a relapse. Although the town plan as extended during the speculative times remained a fixture, the town functions regained normalcy as one by one the projects failed.

4. *Population Increase*

Black River Township,[23] in 1840 had 668 inhabitants. A large proportion of these people lived on farms, were definitely associated with agricultural development and were, therefore, not considered a part of the town. Listed under occupations in commerce, internal transportation, fishing, and manu-

[21]The sale of this farm (Conrad Reid farm) was contracted for the sum of seventy-five thousand dollars.

[22]Report of the Board of Public Works, Ohio Exec. Doc. (1836–7), No. 43.

[23]Black River Township is a civil division established in 1830 by a special act of the Ohio Legislature, because of a previous act prohibiting the formation of townships with less than an area of twenty-two square miles. The township is but one-half the average area of other townships in Lorain County, or approximately thirteen square miles.

facturing, and building are sixty who would account for a town of perhaps three hundred inhabitants.[24] One historian states that the population of Charleston "reached several hundred."[25] The growth of population during the decade 1830–40 was over 300% in the township.[26] Lorain county had a similar growth, but the state as a whole increased only 62% in the same period.[27] This extraordinary increase was due to the relatively few people that made up the urban nucleus at the time, but it also reflects the healthy expansion in those basic and substantial forms of nourishment upon which the village was dependent. Retail trade, commission and forwarding, commerce, shipbuilding, fishing and small-scale manufacturing, all contributed to stimulate this vigorous growth.

D. A DECADENT VILLAGE

1. *Effects of Railroad Expansion on Charleston*

Few greater contrasts in the evolution of an urban landscape can be presented than that experienced by Charleston during the period from 1850–70. From a vigorous, thriving, substantial organism of the former period to a decadent, lifeless, urban skeleton of 1855, is a story of urban starvation. From a town with an established commercial trade, based upon a virtual monopoly of the export trade from a large collecting territory, to a cluster of abandoned houses, commercial inactivity, and a trade circumference so diminished as to be of negligible value, are developments of painful reality in the life of Charleston.

In 1857 Charleston had three large warehouses, two hotels, several stores, two blacksmith shops, shipyards, a boarding house, a lime kiln, a steam sawmill, and many residential buildings, most of which were reminiscent of a more prosperous time rather than as a true expression of the existing time. The village functions were not in proportion to the cultural forms the town possessed. To quote, "Its hotels partially closed; its merchants departed; its warehouses were partitioned among the farmers of the vicinity for barns and fences; its corporate organization was abandoned and Charleston was placed in a

[24]Only township data are available for this period.
[25]Wright, op. cit., p. 290.
[26]Population of Black River Township was in 1830, 209; 1840, 668. Lorain County in 1830, 5,696; 1840, 18,467.
[27]Annual Report Commissioner of Statistics, Ohio Exec. Dec. (1860), Pt. 2, p. 435.

long list of defunct paper towns."[28] Many of the cultural forms of Charleston stood as mute representatives of a time when the town had sufficient nourishment to support these establishments. Although the town was legally known as Charleston in accordance with the charter granted to it, the name fell into disuse and the town was again called Black River.

2. *Decline of Population*

Although Charleston declined in population, it is not readily recognized from the census figures because the increase of population in the rural section of Black River township during the same period absorbed much of the loss suffered by the town. Between 1840–50 there was a slight decline in the township population, but an increase of 29% in that of the county. In the decade that followed both county and township gains in population were approximately 15%, while the gain for the state was 18%.[29] In 1850 there were only 659 people, nine less than in 1840, living in the entire township and it had the dubious distinction of having fewer people than any like area in the county.[30] The old citizens, many of whom had helped to clear the land and had moved to Black River to establish industry and commerce, died, and the young men of the town moved away in response to better opportunities found elsewhere.

3. *Decline in Trade*

The decline in the trade of Charleston was in keeping with the general decline experienced by most of the ports of Lake Erie when the railroads expanded westward into Ohio. Some ports were affected adversely before others, while some cities actually experienced a stimulation to their port activities by the railroad expansion. In 1851 the Cleveland, Columbus and Cincinnati Railroad was completed from Cleveland southwestward to Columbus. The railroad passed twenty miles south of Charleston. Trade which had heretofore gained an outlet through Charleston, was immediately turned toward the villages along the railroad. The decline in traffic over the

[28]Wright, op. cit., p. 290.
[29]Population increase for the state of Ohio. Ann. Report Commissioner of Statistics, Executive Document, 1860, Pt. 2, p. 435.
[30]Sixth and Seventh Censuses of the United States.

toll, plank road, which had been built to accomodate this trade, was immediate. This development had an immediate influence upon Charleston because it meant a portion of the town's dependable, agricultural hinterland had been withdrawn. Thus the southern portion of the hinterland had been cut off by a new means of land transportation which was in direct competition with lake transportation to eastern markets. Railroads were at that time operated as individual, disconnected lines, and formed no through line or system. Because Cleveland was the terminus of the railroad, the trade territory was annexed to that city and port activities were stimulated for a time.

Another railroad was formed by the Toledo and Cleveland Company, when that corpoation consolidated into one line the four short railroad lines than in existence. The railroad ran from Cleveland to Toledo passing through Elyria, just eight miles south of Charleston. So attractive became the market in the larger town of Elyria as a consequence of its railroad, that farm products were drawn almost completely away from the port at Charleston. Another factor also militated against the port town. During wet weather the only good road across the lake plain was the plank road and the toll charged on this road increased the cost of hauling to Charleston. Indeed, farm produce that originated within three miles of the port on Black River was taken to Elyria instead of Charleston. The all-weather ridge roads to Elyria, the county seat town, enabled people to make better contact with that town than was possible with Charleston on the lake. This about sealed the existence of Charleston because it removed practically all of the agricultural hinterland upon which the town had become so dependent.

This sudden change in the diversion of the country's surplus goods reflected profoundly upon the break-of-bulk functions of Charleston and upon lake transportation from the mouth of Black River. The sudden contraction of trade and transportation was only the beginning of a struggle that followed between the railroads and steamships engaged in lake coast trade. The amount Charleston shrunk was a good measure of the degree of dependence the town had become upon the surrounding agricultural region. Charleston, being without a railroad terminus which connected with a productive hinterland, was one of the first ports to be thus affected.

Harbor Decadence—The government withdrew its support of harbor improvements after a decline in trade activities was noted. Following 1838 only one appropriation of $5,000 was made during the twenty-five years ending in 1864.[31] During the time the lake shore had advanced along the piers about 400 feet. A renewal of prospects for trade was brought about by the erection of a charcoal furnace at Charleston and by a stimulation of activities that accompanied the Civil War. In the meantime the wooden piers had rotted and the harbor was badly silted leaving only a narrow channel with a depth of seven to ten feet near the west pier. The piers were repaired in 1865–66 and the channel at once began to improve. Subsequent improvements extended the piers into the lake to prevent the long-shore currents from shifting the sand around the outer ends of the piers.

TABLE I

TOTAL NUMBER OF WOODEN SHIPS CONSTRUCTED IN THE BLACK RIVER SHIPYARDS[32]

Year	No. Ships	Year	No. Ships	Year	No. Ships	Year	No. Ships	Year	No. Ships	Year	No. Ships
1819	1	1832	2	1839	1	1846	4	1854	3	1863	2
1821	1	1833	2	1840	1	1847	6	1855	7	1866	5
1825	1	1834	5	1841	5	1848	6	1856	6	1867	6
1827	1	1835	1	1842	4	1849	1	1857	3	1868	1
1828	1	1836	3	1843	2	1851	1	1858	1	1872	2
1829	1	1837	3	1844	3	1852	5	1861	1	1873	5
1831	1	1838	1	1845	3	1853	6	1862	5	1875	1

4. *Persistence of Certain Industries*

The Shipbuilding Industry—Charleston did not die as a result of the loss of its agricultural hinterland; instead, the town contracted to a size commensurate with the established industries upon which it had to depend for support. Shipbuilding was the outstanding industry and, although there was a decreasing demand for ships as a consequence of the serious competition offered by the railroads, ships continued to be turned out at the Charleston shipyards at a surprisingly uniform rate. In the decade between 1850–60 thirty-one ships, practically all of which were schooners and barks, were built in the Charleston shipyards. The banner years were 1855–56, when thirteen ships were launched.

[31]House Document No. 985, 64th Congress, First Session, p. 4.

[32]Compiled from a list of the ships given in Wright, op. cit., pp. 305–8.

Sailing vessels, being smaller, slower and less dependable than the steamships of that period, had long since been displaced in the regular, lake-coastal trade. Schooners were engaged, for the most part, in the mixed trade that originated all over the Great Lakes system. Because this class of trade was less affected by railroad competition than was the coastwise trade, there continued to be a demand for sailing vessels. The Charleston shipyards had from the very beginning specialized in the construction of the very type of ship that was now in greatest demand. Therefore, the shipbuilding industry of Charleston did not experience as quickly or as effectively the competition between railroads and water transportation on Lake Erie.

Charleston's Iron Furnace—The first iron furnace of Charleston was erected by S. O. Edison, who owned a considerable tract of timberland south of Black River. The furnace was located on the river and in close proximity to the forest lands. This furnace is interesting more because it was an example of a new and vastly different possibility that was opening up than for the support it actually contributed to the town. It exemplified new situation advantages that were at the time undergoing experimentation. In 1845 iron ore had been discovered in the Marquette Range of Michigan, and in 1855 the locks of the St. Mary's River had been completed. This event opened an all-water route from the mouth of Black River to Marquette, the port of shipment for iron ore. With iron ore from the Lake Superior region, with the limestone brought by boat from Kelley's Island, and with the charcoal made in the "pits" on the farm of S. O. Edison, the furnace was a success from the beginning. The capacity of the furnace was thirty tons of charcoal iron per day and the prevailing price was $87.50 per ton.[33] Iron production was stimulated at the time by the unprecedented demands for iron during the Civil War. The furnace continued to operate successfully until 1871 when it was burned to the ground and never rebuilt because by that time a shortage in charcoal could be definitely anticipated. The success of the first iron furnace at Charleston definitely established the mouth of Black River as a place where raw materials for iron production could be brought together economically. However, the continued depletion of the forests at

[33]Wright, op. cit., p. 311.

the time rendered hazardous any expansion of the industry based upon charcoal as a fuel.[34]

The Fishing Industry during the Decadent Period—The fishing industry was another dependence of Charleston that not only continued during the decadent period, but increased in vitality and scope. Small interests were combined, larger boats were used and the industry began to assume large scale proportions. Nearby railroads, although not directly touching Charleston, aided the industry by opening up a market vastly larger than there had been previously. Fishing methods were also modified during the period.[35] The new method of fishing with gill nets, replaced the old method of drag seining and added considerably to the annual catch. With a bountiful supply of fish in the lake and with improved methods of making the catch, the industry was definitely established as a commercial enterprise. The fishing sloop was superseded by the steam fishing craft and the natural fishing grounds of Lake Erie contributed liberally to the support of Charleston.

E. THE LANDSCAPE OF THE EARLY INDUSTRIAL PERIOD: A REVIVAL

1. *Functional Changes*

Landscape Characteristics—Lorain, Ohio, in 1880 typifies the period between 1872–1892, and is in marked contrast to the semi-dormant, fishing and shipbuilding town of the previous period. The landscape of this period is characterized by an epifunctional development—a regeneration of urban functions. Accompanying these functional changes were: a steady growth of population, a marked revision and extension of the town plan, a renewal of its commercial activities, a striking change in the character of the town's business, a decided reversal in the direction of traffic on Lake Erie, and a reincorporation of the town. Moreover, the many changes came suddenly and without much of a foundation of urban heritage which

[34]When asked one day whether the plant made money, Mr. Edison replied, "In 1865, we cleared $65,000." Ibid., p. 312.

[35]The drag seine, "the net of Biblical fishermen, was in use during the early eighteen-fifties. Then followed the pound net, 'a line of woven cord suspended on poles driven into the lake bottom, stretched in a straight line and ending in a circular pocket.' Fish, following the long straight leader, would enter the pocket and were unable to find again the opening by which they entered. The last stage in the evolution of fishing methods came with the gill net. It is a mesh net ingeniously designed to slip over the head of a fish and tighten just back of the gills."

characterizes the development of most urban organisms. From the former period was inherited the main urban skeleton, already described, but during this period, many new additions were made. The town's sudden awakening and growth were not unlike a mild town boom. Accordingly, the regional relationships of the town were vastly extended and enlarged to give the town a dependable, if not unique, means of nourishment that made for and assured permanency to the new organism.

The urban landscape of 1880 contained new cultural forms hitherto not identified with the town. A railroad entered the town from the south and acquired a large holding of land along Black River; three coal-loading docks, one ore-unloading dock, three planing mills, a stove factory, and the many ships that frequented the harbor were new cultural forms that signified a revitalization of port activities had occurred.[36] These forms also suggested that a change had occurred in the relative importance of break-of-bulk activities as compared with shipbuilding and fishing, the industries that kept alive the town during the former period.

Growth of Population—The population of Black River township increased from 838 in 1870 to 1595 in 1880, a gain of 90%. During the following decade the population gain was over 200%, or 4,863 people in 1890.[37] This rather phenomenal rise in the town's population accompanied other urban developments that opened up new opportunities for employment. By virtue of the town's position on the lake shore, in a direct line between the Appalachian coal fields and the Detroit River, certain geographical advantages obtained. The response to these potential advantages came in 1872 when a railroad connecting Black River harbor with the coalfields of southeastern Ohio was completed. With the revival of Port activities that followed, new opportunities for employment were created and Lorain became a revived and growing village.

The reincorporation of the village into Lorain came in 1874. The Lorain County commissioners renewed the old Charleston charter, which had been granted thirty-eight years before but which had not functioned. However, another post office in Ohio had been given the name of Charleston during the interim, and the postal authorities refused to recognize a second name

[36]Also see Wright, op. cit., pp. 312, 327.
[37]Tenth and Eleventh Censuses of the United States, 1880 and 1890.

of Charleston as a post office. The town then took the same name as the county, which had been named after the province of Lorraine in France.[38]

Areal Extensions of Lorain—The town plan of 1880 included at least eight parcels of land amounting approximately to forty blocks that had been subdivided and added to the town in six years.[39] With two exceptions, these subdivisions were peripheral extensions of the town toward the west, southwest and south around the original townsite of Charleston, which included the Durand Survey and the subsequent extensions already described. For the first time, two small subdivisions four blocks apart appeared along the lake front on the east side of Black River. One addition in 1874 added seven city blocks to the main commercial street, Elyria Avenue (now Broadway). These earlier additions stand out conspicuously on a map showing the lot lines because the lots are much larger in area. Seventy-five to one hundred-foot frontages were the common sizes, but many were well over one hundred feet. Especially is this true of the lots that run normal to the lake shore. Many of those lots were one hundred feet and over in width and three to four hundred feet in depth. These additions added more urban land to the townsite than the total land in the townsite up to 1872. Although the subdivisions were not filled immediately, the steady growth of the town assured their occupance in a few years.

Growth of Transportation—Perhaps the most far-reaching event in the life of Lorain was the extension of the hinterland by the completion of the Lorain branch line of the Cleveland and Tuscarawas Valley Railroad in 1872. The railroad was originally planned and built from Urichsville, Ohio, to Cleveland by a group of Cleveland capitalists. Two years after the main line was finished, the Lorain branch line of thirty-one miles from Lester, Ohio, to the south of Black River was completed. This, Lorain's first railroad, connected the harbor site of Black River with the coal fields of southeastern Ohio. Moreover, it opened up a marketing territory for products that came by boat to Lorain and thereby enlarged the possibilities of the

[38]Wright, op. cit., p. 292.

[39]The following is a list of the subdivisions and the year they were added to the town: Brownell's, 1st, May, 1872; Chamberlain's, Feb., 1873; Gawn's, 1st June, 1873; Brownell's, 2nd, Sept., 1873; Gregg's, 1st, Nov., 1873; Chamberlain, Edison and Mussey, April, 1874; Hogan's, 1st, Nov., 1878; Hogan's, 2nd, Mar., 1880. J. B. Nichols, of the firm of Nichols and Loofburrow, Civil Engineers, Lorain, Ohio.

town. It being one of the first north-south railroad lines to be constructed, the railroad ran transverse to the general direction of Ohio railroads at the time. By means of these rail connections the extent of the Lorain collecting and distributing territory was greatly enlarged. Until 1883 the southern terminus of the railroad was at Urichsville, where it connected with the Pennsylvania Railroad, which served the coal producing fields of western Pennsylvania and the iron-consuming Pittsburgh district.[40] When, in 1880, the Cleveland and Tuscarawas Valley was extended to Wheeling, W. Va., it greatly enlarged the coal-producing area which the road served and provided several other grades of coal in demand at the ports on the Great Lakes. Railroad connections with east-west lines were made at Wheeling with the Baltimore and Ohio; at Massillon, Ohio, with the Pennsylvania; at Sterling, Ohio, with the Erie Railroad; at Medina, Ohio, with the Baltimore and Ohio, and at Grafton, Ohio, with the Cleveland, Columbus and Cincinnati Railroad, and at Elyria, Ohio, with the Lake Shore and Michigan Southern Railroad.[41] These roads provided a network that connected with most of the large centers in the progressive and expending middle western country.

Early in the eighties the New York, Chicago and St. Louis Railway was completed through Lorain. This railroad connected Lorain directly with points west to Chicago and east, along the lake shore to Buffalo.

Because the Lorain and Tuscarawas Valley Railroad was Lorain's first railroad and because the town was anxious to have the line terminate there, the railroad acquired by grant and purchase over a mile of frontage along the west side of the navigable Black River. Included in the property were the point of low land at the very mouth of the river and the rather extensive tracts on the inside of the first two meander curves of the river.

To facilitate the transhipment of coal at Lorain, the Lake Shore and Tuscarawas Valley Railroad built three coal-loading docks and equipped each with a derrick type of loading machinery. Each crane had a large bucket which was filled by hand and conveyed to the hold of the ship. The coal

[40]Orth, op. cit., p. 742. Also, Wright, op. cit., pp. 284–5.
[41]Teague, Geo. H. Lorain, a pamphlet published by *The Daily News Democrat*, Lorain, Ohio, p. 67. Also Orth, op. cit., pp. 737–743.

docks were located, one at the mouth of the river on the west bank, and the other two just south of the Erie Avenue bridge also on the west bank.[42] Thus the railroad in entering the town from the south paralleled the course of the river, descended on a grade the bluff of the stream to the floodplain and was in immediate contact with ships near the mouth of the river. This eliminated the necessity of ships navigating the rather narrow and crooked river. An ore-unloading dock with two Erie cranes was located at Round House Bend, the second meander in the river. There iron ore from Lake Superior was unloaded from ships, dumped on the docks and transferred to storage bins by "man-powered" wheel barrows. In spite of the crudeness of the machinery thirty to forty thousand tons of iron ore were handled and fifty to sixty thousand tons of coal were loaded from the coal docks yearly.[43]

Transportation on Lake Erie experienced similar changes. The railroads had almost immediately captured the coastwise freight and passenger steamers became obsolete and the water-transported freight business greatly depressed. The dominantly coastwise trade of the former period gave way to the interlake trade in iron ore, coal, stone and pine lumber. When this change was made it gave Lorain an advantage that did not obtain in the coastwise trade. The directness of the route through Lorain for coal northbound and for ore and stone southbound favored the development of the port. Moreover, the loading and unloading facilities near the mouth of Black River were an advantage that saved time and insured greater safety. Lorain was thus enabled to develop in the face of competition with larger Lake Erie ports.

Iron ore in small quantities had been brought to the charcoal furnace at the mouth of Black River as early as 1857; but the ore and coal trade in 1880 dominated the life of Lorain. The harbor which had been all but neglected during the previous period, except for the activity nurtured by the shipbuilding industry, had a sudden awakening and was the focus of activity and development.

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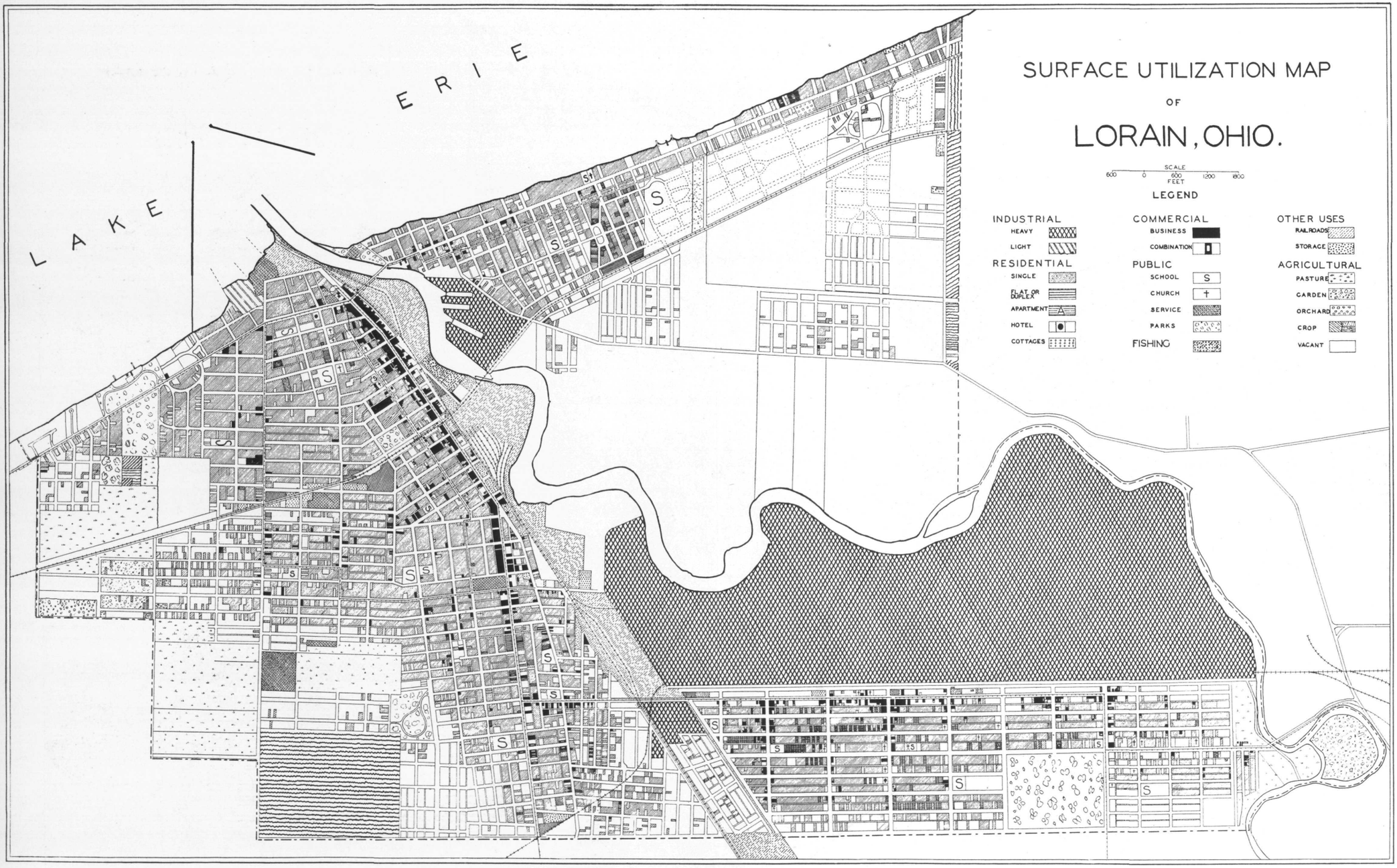
[42]Wright, op. cit., p. 328.
[43]Ibid., p. 327.



(171)

FIG. 5. SURFACE UTILIZATION MAP OF LORAIN, OHIO

(172)

PART III. MODERN LANDSCAPE (1894–1934)

A. RECENT GROWTH AND EXTENSION OF LORAIN

1. *Landscape Characteristics*

Lorain, Ohio, is a modern commercial and industrial city of 44,512 people. The city has experienced an extraordinary growth of population from 4,863 in 1890, a gain of 39,649, or an aggregate of 815% in forty years. This increase is almost phenomenal in its proportions and far-reaching in its influence upon the city character. That Lorain developed rapidly and is largely the product of the last four decades is shown by the addition of approximately one hundred subdivisions which increased the areal extent of the city to ten times what it was

TABLE II

Year	1890	1900	Gain	1910	Gain	1920	Gain	1930	Gain	Agg.Gain
Population	4,863	16,028	230%	28,863	80%	37,295	32%	44,512	19%	815%

in 1880. Most of the growth has occurred since 1894, when the Johnson Steel Company located its plant in Sheffield Township near Lorain.

The city shows its modernism by the relatively new residential sections where present-day architectural styles prevail; by the broad streets and roomy plan; by the long, drawn-out commercial core; by the absence of a congested, squalid tenement district, so characteristic of the older industrial cities; and by the obvious effects of building regulations and city planning that are manifest in the landscape. So recent has been the growth and so numerous and well regulated have been the city's extensions, that it is difficult to locate evidences of former periods. Included in the present corporate limits are 6,335 acres of land of which area about three-fourths is occupied.

Present-day Lorain is a city of churches and schools, especially parochial schools, of foreign club houses, and of Americanization and other social settlement houses. These cultural forms show the population to be a heterogeneous one of many ethnic groups. The numerous combination business and residential houses, and the stores with the names of the business displayed in foreign languages suggest that a high percentage of the population is foreign and that the foreign influence dominates certain sections of the city. More than

50% of the population is classified as foreign, including those of foreign birth and those native born of foreign parents.

Although the city is divided into East Lorain and West Lorain by the river, and separated from South Lorain by distance and inconvenience; and although racial groups are separated among themselves along ethnic lines and there is a general contempt on the part of the American for living in the "foreign" sections, the city is unified politically. This political unity dates from 1895, shortly after the Johnson Steel Company located at Lorain. The officials of the steel company agreed that their property should be taken into the city provided the city voted bonds to widen the river and build a turning basin for ships. The bond issue carried, the work of improving the river started and the corporate limits subsequently extended to include all of South Lorain. By the addition of the steel plant property and the South Lorain townsite the taxable property valuations were greatly increased. At present there is a well developed allegiance to and respect for the city government located in West Lorain.

Bifunctional Character—The evidences of the bi-functional character of Lorain are many. Piles of red iron ore and grey limestone in storage, the parallel railroad tracks of the car storage yards, switching locomotives, and the unloading machinery with capacities far in excess of local plant consumption, all bespeak the break-of-bulk function of Lorain; while the manufacturing establishments, with their employees filing in and out as they punch the time clock, are reliable evidences of the local industrial development.

By the heavy character of the materials used, by the specialized manner in which the transfer of freight is accomplished, by the size and type of the manufacturing, one sees that Lorain has developed into a highly specialized city in the performance of the bi-functional activities.

As already stated, the first opportunity for the growth of Lorain was initiated by the transhipping trade (Table IV). Although this trade, especially in coal and iron ore, has increased enormously since 1890, the manufacturing industries have developed to a point where they are much more important than the break-of-bulk activities. Lorain still retains its reputation over the Great Lakes as an important transhipping port, by virtue of an increase in coal and ore tonnages at the expense of some of the other lower lake cities. However,

the industrial stamp has been placed upon Lorain by the development of industrial plants which reduce at the point of transfer some of the raw materials hitherto shipped through the city. In a normal year one-half of the total tonnage of ore received at Lorain is reduced in the local plant of the National Tube Company. During the previous period exports from Lorain far exceeded the receipts. Due largely to local plant consumption, this condition has been reversed and the

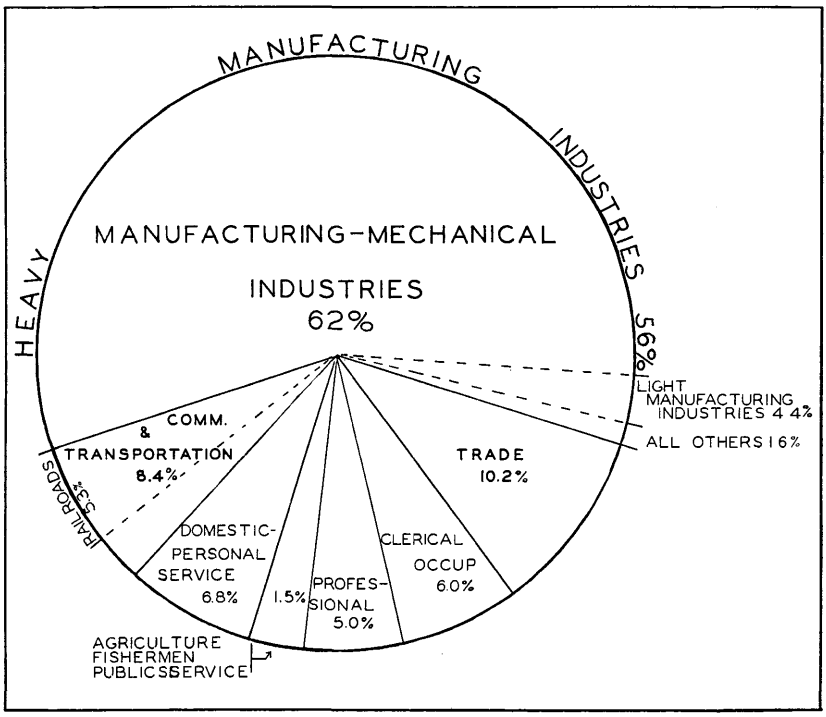


FIG. 6. Occupational distribution of the population of Lorain (U. S. Census).

imports of iron ore and limestone for both consumption and transhipment now far surpass outgoing freight which consists principally of coal.

Local benefits from industrial developments are many more than those derived from the transhipping trade. This is more true today than it was in the past because most of the transfer of products is now done by machinery directly and in one operation. Thus the number of men employed in making the transfer from water to land has been greatly reduced.

Where once hundreds of men were employed in unloading cargoes of ore and transferring the ore to stock piles, fifty times as much ore is now unloaded by twenty or thirty men operating machines. Most of the ore is transferred directly to trains instead of it being stored as formerly. Thus the tendency has been increasingly to reduce the benefits that accrue to the town from its break-of-bulk activities. On the other hand, factories employ thousands of workmen and the factories become taxable property helping to support other urban institutions.

In the heavy industries alone there are employed in Lorain 9,160 people, while employed on all steam railroads there are 938 people and in all forms of tranportations only 1,367 people.[1] Of the number employed on railroads only a small proportion is engaged in the actual transfer of freight, while the number of employees assigned to the heavy industries is definitely engaged in manufacturing local products. Thus the land utilization and occupational analyses have proved to be complementary indices of the relative importance of manufactural and transhipping functions of Lorain.

2. *The Present Plan*

Evolution of the Urban Plan—The plan of Lorain is but the modernized and expanded outgrowth of the city in the previous period. This expansion has been accomplished by the addition of many small townsite subdivisions always attached to the outside of the main urban nucleus. Each urban patch so added does not always fit closely into the previous additions, thus giving variety to the present plan. The present areal extension is 6,335 acres of land within the city limits available for residence, industry, transportation, retail stores, etc.[2]

Adhering closely to the lake shore and to the bluffs of Black River the city has been drawn out into a peculiar shape. Two arms of city development extend well beyond the city limits, one eastward toward Cleveland and another westward along the lake shore (Fig. 5). This development also parallels the principal highway from Cleveland west through Lorain to other cities along the lake shore. The main body of the city is almost at right angles to these arms and parallels

[1]Fifteenth Census of United States. Ohio Supplement on Composition and Character of the Population. Table 25.

[2]Lorain, the City. Op. cit., p. 8.

the Black River Valley until the valley turns eastward. Here the city's axial line turns eastward to parallel the bluffs of Black River. This latter elongation of the city plan has come about through the location of the vast property of the National Tube Company on the river and the large residential section associated with the plant. Thus the city is divided into three parts or sections which are popularly known as East Lorain, West Lorain (or just Lorain) and South Lorain.

East Lorain—East Lorain is in areal extent about one-sixth of the total occupied surface of the whole city. It is essentially a residential overflow across the river from the main city on the west side, since its principal growth has been after the county bridge was constructed across the Black River gorge just two blocks upstream from its mouth. This bridge erected in 1898 connects the two ends of Erie Avenue at the same level and is the transportational thread that holds East Lorain. Except the Nickel Plate railroad bridge, there is no other bridge that crosses the gorge for a distance of six miles upstream. This dependence upon one bridge has prevented East Lorain from developing and expanding over much of the space available for occupation. Except for the long arm that parallels Erie Avenue, this section of Lorain is considerably condensed around the end of the bridge and the plant of the American Shipbuilding Company. For a person living in East Lorain to go to the steel plant one half mile straight across the Black River gorge, it would be necessary to cross the river near the mouth, then go through West and South Lorain, a distance of approximately seven to eight miles.

The street pattern of East Lorain is a simple rectangular one, with the Main Erie Avenue running parallel to the Lake Erie shoreline and the other group of streets at right angles to it. Where the townsite projects westward on the narrow point of land between the lake shore and the first meander in Black River, there are short cross streets with dead ends. For a distance of almost two miles there is no cross street between Erie Avenue and the lake shore. Here Erie Avenue runs within four hundred feet of the lake bluff, and since the strip is not deep enough for another block, the other set of streets is absent and the lots are therefore very deep. Near the mouth of the Black River the lakeshore trends away from Erie Avenue and there is room for one street which parallels Erie Avenue.

Another main street and road which skirts the bluffs of Black River for a distance and continues around the southern edge of East Lorain connects with the ends of the cross streets, thus giving an outlet to the streets that would ordinarily develop into dead ends.

West Lorain—West Lorain is the principal part of the city, having the main commercial-retail stem and constituting approximately three-fifths of the occupied surface of the entire city. Moreover, West Lorain shows much more independence in its development pattern than does East Lorain. It has the main residential sections, most of the schools, the principal churches, and the city administrative offices.

The main outline is radial in plan having inherited these characteristics from former surveys. From a point near Black River one street, Elyria Avenue, runs southeast parallel to the course of Black River. Another, Oberlin Avenue, extends southward, and a third is West Erie Avenue extending southwest parallel to the lake shore. There is a slight crook in Erie Avenue to gain a right angle crossing of the river gorge, otherwise the street would run in a straight line through the entire city.

As these main streets radiate from the center, between Oberlin Avenue and Broadway, the radial pattern is further perfected by the introduction, at later periods and as the town expanded, of other streets which trend in directions between southeast and south. These streets begin only after the divergence has been sufficient to allow the introduction of north-south streets which would separate blocks three to four hundred feet long. Because of this radial pattern of streets and the successive divergence of streets, city blocks may get successively longer toward the south until the introduction of another north-south street shortens the block. A few subdivisions with rectangular lines have been laid out but these are conspicuous misfits in the radial scheme because the streets do not join other streets directly but offset them. In the interests of efficiency the city has had to condemn property in order to bring about proper street connections. On the other hand, the radial pattern has led to an overburdening of a few through streets which have to carry most of the city traffic as it nears the downtown section. Only four converging streets in West Lorain run without being interrupted from the outer edge of the occupied townsite to the downtown part of the city, while there are fourteen other streets that run a portion of the way.

The streets which run at right angles to a radiating series would theoretically have to be curved. But in order to get straight frontages along the block, the streets are resolved into angular patterns. That is, they run straight for a distance then turn at a low angle to run straight again before turning still another time. Near the center of town the street turns are more frequent than in the outer, newer portions. Therefore in the downtown section there are more short, oddly-shaped blocks than in the outer, newer sections where the divergence of the streets has led to less frequent turns in the street, hence a more nearly perfect retangular pattern of blocks.

Between Oberlin Avenue and West Erie Avenue, all subdivisions have been laid out in accordance with compass directions. One group of streets runs north-south parallel to Oberlin Avenue and another east-west at right angles to it. Blocks are rectangular in shape and reasonably uniform in size.

Between West Erie Avenue and the lake-shore is a strip of land about a block and half wide where the subdivisions have been planned so that the blocks run parallel to the lake shore. This scheme permits frontages along Erie Avenue and Lake Erie the most desirable features.

South Lorain—South Lorain is that section of the city extending from the Sheffield township line west to the Black River on the east and is as orderly in plan as West Lorain is disorderly. The entire section, constituting approximately 2,000 acres of land embracing all of South Lorain and a small section west of the B. & O. R. R. tracks, is encompassed by the River on the North and East. This rather sudden addition represents Lorain's greatest growth and corporate extension. It dates from the time when the Johnson Steel company, predecessor of the National Tube Company, located there in 1894. It was really a removal of a part of the Johnson's plant from Johnstown, Pennsylvania. Company officials desired a location where iron ore could be economically reduced, steel made and steel rails manufactured.

The establishment of the steel plant at Lorain was a capitalistic undertaking and resulted in an almost cataclysmic change of the landscape from a semi-primitive natural state to that of industrial complexity. Without divulging their plans the Johnson Company's representatives working incognito obtained an option on a block of land 4,000 acres in extent.

Most of the land was located in Sheffield Township and along the south bank of the Black River, although a small tract on the north side of the river was also acquired. These lands at that time were entirely outside of the city limits or urbanized portions of Lorain.

Plans of the company were subsequently announced, options on the lands closed, hundreds of men were put to work cutting the trees, sawing the logs, and clearing the rubbish. The block of land on the south side of the river was divided into two parts. A block of 1700 acres lying adjacent to the river was reserved for industrial purposes, and another portion consisting of 2,300 acres and adjoining the plant property on the south was reserved as a residential townsite for plant employees. A subsidiary company, the Sheffield Land Company, was organized to develop the residential townsite. The plant layout was planned in accordance with the cardinal points of the compass and the rectangular pattern of the streets and avenues was similarly oriented. In a short time the plant site appeared absolutely clear of all forest growth and, in the townsite, the streets appeared as avenues without forests.

According to the plan of the Sheffield Land Company a townsite of approximately sixty blocks was laid out. Land was plentiful and (the Company had paid an average of only $30. per acre for it), as a consequence officials were generous in the amount of land allotted to streets, parks, and the lots in every block. Streets were surveyed 80 to 100 feet wide, while standard size lots were 50 feet in width by 120 to 150 feet in depth. Blocks were cleared of the forest cover, lots were sold, houses were erected by the company, a sewer system installed, sidewalks were laid, curbings installed, streets improved and a new town was born. Now the main street, East 28th Street, runs in front of the steel plant property. Seven other streets lying south of 28th Street run east-west parallel to it. Cross streets run north-south from 28th Street to 36th Street, the corporate limts of the city. Thus the blocks contained in the addition are long, but uniform and orderly.

This capitalistic enterprise, comprising a large industrial plant and an adjoining residential townsite covering approximately 3,000 acres of land, was planned and partly built before there was any production or profit made from manufacturing. The whole South Lorain addition was a typical large-scale

capitalistic venture conceived, planned, and built upon the knowledge of the advantages such a location offered.

Site Advantages—The steel plant site was an elevated lake plain of remarkable levelness lying fifty to sixty feet above Black River. The descent to the river, or river bottom, was over a steep cliff. This factory site overlooking the Black River gorge a quarter of a mile in width was an excellent place for a steel plant. Black River was navigable for three and a half miles upstream which placed the head of navigation well within the boundary lines of the Johnson Company's property and, for twenty years, iron ore had been brought to Lorain and transhipped to the furnaces of the interior.

A curved ore dock was constructed on the outside curve in the river to take advantage of the deep water where the river undercuts the bluff. Morover, the river at this point cuts farthest southward into plant property thus placing the ore nearest to the proposed plant site.

Covering the surface of the level plant site was a thin layer of compact clay soil four to seven feet thick that offered a good base for railway tracks and superficial structures. Directly under the soil mantle was the Ohio shale, a geological formation that has a capacity of standing almost vertical when exposed. Yet the shale was thin-bedded and easily broken so that excavating for foundations was relatively easy. This shale formation was good solid foundation material for the heavy mechanical installations necessary in a steel plant.

The steel plant was first planned and designed to produce steel street car rails (girder rails) and standard railroad rails. In 1907 the plant shared "with Steelton the work of making all the rails and most of the equipment for the street railways of the United States, and both of these plants have taken a part in foreign trade in this line of work."[3]

The site also offered excellent facilities for dumping factory refuse. This is an important item in the location of a steel plant because of the bulky nature and great volume of slag, cinders and ashes, that come from the different units. Hot slag from the blast furnaces was dumped over the bluffs of Black River to the flood plain. And although the steel plant has been dumping slag, ashes, and other factory refuse over this bluff since 1895 and has built two immense slag piles, there

[3]Campbell, Harry H. The Manufacture and Properties of Iron and Steel, Fourth edition, third impression, 1907. McGraw-Hill Book Company, New York.

continues to be ample space left on company property for future operations. Increase in the use of slag for road building material and in concrete construction work has greatly retarded the accumulation of slag on the dumps.

Water is a necessity in a steel plant. Great quantities are used to cool and help preserve the blast furnace linings, to generate steam, to wash the blast furnace gases, to quench the coke from the by-product ovens, and many other uses. To supply this need, the Johnson Company created a reservoir by damming a small ravine that entered Black River from the south. The constant replenishment of water to the reservoir by an evenly distributed rainfall sufficed for plant needs many years. But more recently a short tunnel has been driven from the main power unit to Black River where water for plant use is now obtained.

While the major outlines of Lorain are very materially influenced by the two natural features, the Lake Erie shoreline and Black River, the minor irregularities in the town plan have been influenced by a great number of forces. Plant locations, dependence upon a crossing of Black River, inherited plan, compass directions, Lake Erie shoreline and personal choice have all been potent influences in forming the landscape pattern of Lorain.

B. ELEMENTS OF THE CULTURAL LANDSCAPE

1. *Heavy Industrial*

National Tube Company—The enormous plant of the National Tube Company, subsidiary of the United States Steel Corporation, is today by far the largest single industrial form in the cultural landscape of modern Lorain. Covering 1442 acres of land, this plant with all of its manufacturing and supplementary units, ore docks, ore storage yards, and pipe storage yards, occupies over 95% of the surface classified as heavy industrial and one-fifth of the total surface within the city limits of Lorain. The entire plant is set apart from the residential and commercial sections of the city by a high iron fence which completely surrounds the land exposed side of the plant. Access to the plant is gained through four large gates, three on the south side and one on the west side, which lead to different manufacturing units.

The National Tube Company's property is located at the head of navigation on Black River, three and one-half miles

from its mouth, and extends up-stream for a distance of three and one-half miles more. The property has seven miles of water frontage and is well protected on the river side by the gorge.

Within this great inclosure are located, an ore dock, a by-product coke plant, one bar mill, a shape mill, a large rock crusher, five blast furnaces, two Bessemer converters, twelve open hearth furnaces, three blooming mills, five skelp mills,

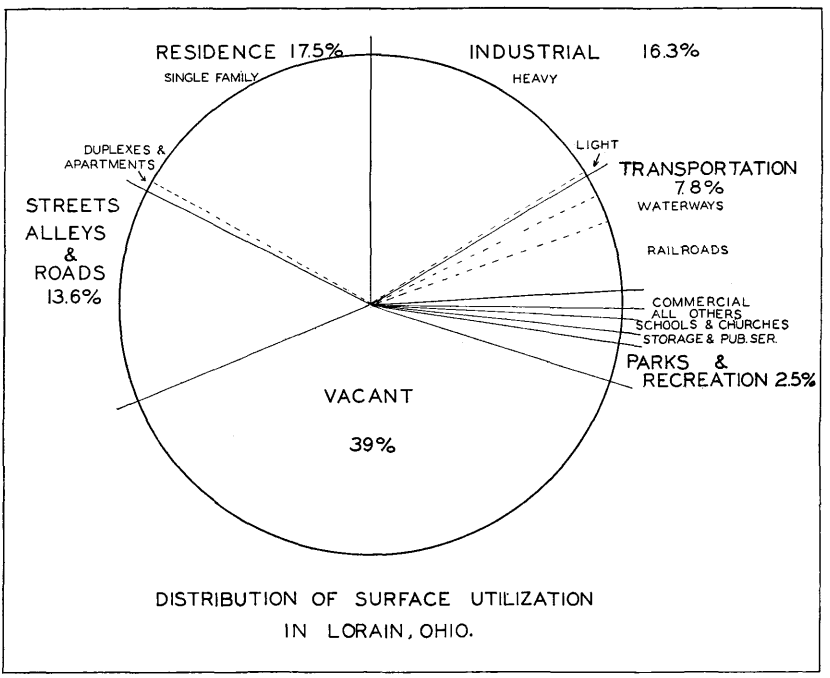


FIG. 7. Distribution of urban land utilization. Included is all the land in the present corporate limits of Lorain, Ohio. Compare with Fig. 5.

six butt-weld mills, and three seamless pipe mills (Table III). In addition, there are many smaller auxiliary units such as machine shops, paint shops, power units, carpenter shops, laboratories, electrical shops and chemical units. Three systems of transportation are used in the plant. The standard-gauge plant railroad, the Lake Terminal, handles all freight within company property. This railroad has a complete system of trackage to all the plant units and connects with the four railroads serving the plant from the outside. A narrow-gauge railroad system for the purpose of hauling the heavy materials

from one plant unit to another ties the several units together. A highly specialized electrical system is used in several plant units. The system includes the electrical machinery for conveying the materials and charging the open hearth furnaces, electrical conveyors and hoists for handling the retorts of molten iron and steel, etc.

Employing in normal times 5,000 to 7,000 men, this plant supports directly 20,000 to 30,000 people which is between one-half and two-thirds of the total population of Lorain.[4] However, 1,500 or more including a few of the administrative officials live outside of Lorain.[5] Many live in Elyria, eight miles south and in the adjoining rural sections near Lorain. These employees commute daily by interurban or by automobile. Indirectly the steel plant influence is much more widely felt because of the dependence of business concerns and professional people upon these plant employees.

The steel plant is really made up of several manufacturing units that are more or less complete within themselves. However, the units are so closely associated in ground plan and complementary in operation that the manufacturing processes may be continuous throughout the plant to form finished products such as pipe, rails and tubes, or they may be terminated at several points to produce such semi-manufactured products as billets, blooms, ingots, skelp, bars, etc. Manufacturing processes are progressively more advanced from the iron ore storage yard on the west to the steel pipe storage yards on the east, about two miles distant. By-products originate at many points in the plant. Some are finished and go directly to the markets for consumption while others are processed and become the raw mateials for other manufacturing concerns. The processing of these by-products to render them marketable is done in the many small plant units. Ammonium sulphate, ammonia, coal tar, crude naphtha, naphthalene, phenol, toluol and slag are the end products of the local plant units and the most important by-products of the National Tube Company's plant. The local plant is independent to the extent of manufacturing pipe, rails and tubes, and is supplementary to other outside manufacturing plants in the manufacture of most of its remaining products.

[4]No exact figures on the total population affected by this plant are available. However, the *Lorain Journal's* industrial series (issue Dec. 10, 1928) states that "60% of population of city attributed to National Tube Co. Plant."

[5]Statement of Secretary of Lorain Chamber of Commerce.

The Plant Lay-Out—The arrangement of the units in ground plan is designed to give maximum efficiency. The curved iron-ore dock, 2400 feet in length and easily accommodating three 600-foot ore boats, is located where the river cuts against the bluff and into the property of the National Tube Company. Four modern clam-shell unloaders with a capacity of a million tons of ore each in a season transfer the ore from the boat to the dock. Three ore bridges then place the ore in storage piles.

TABLE III[6]

No. of Plant Units	Types of Units	Annual Capacity of Units	Product of Units
1	Ore unloading dock	4,000,000 tons	Ore
1	Coke plant 208, By-product ovens	1,213,000 tons	Coke
5	Blast furnaces	1,170,000 tons	Pig Iron
2	Bessemer converters	600,000 tons	Steel Ingots
12	Open hearth furnaces	900,000 tons	Steel Ingots
3	Blooming mills	1,245,000 tons	Ingots
1	Shape mill	150,000 tons	Steel Rounds
1	Bar mill	500,000 tons	Steel Rounds
5	Skelp mills: Includes 13-inch and 14-inch continuous mills, 24-inch reversing mill, 48-inch universal mill and 90-inch plate mill with range of from 1 inch to 78 inches in width	465,000 tons	Skelp
6	Butt weld mills	190,000 tons	⅛ in. to 3 in. pipe
3	Lap weld mills	130,000 tons	2 in. to 23 in. pipe
3	Seamless mills	350,000 tons	2 in. to 24 in. seamless pipe

Total pipe capacity, 670,000 tons annually.

Limestone is handled in much the same way except most of the "stone" boats are equipped with self-unloading machinery. (Figs. 8 and 9, page 189).

Next in plan are the five blast furnaces located as closely to the ore storage yard as possible to eliminate long hauls and facilitate the charging of the blast furnace. Coke from the coke plant is conveyed in skip cars a few hundred feet west and limestone and iron ore move a similar distance east which completes the blast furnace charge. In the power unit next adjacent the air is heated, compressed and conveyed to the blast furnaces. The closeness of the power unit insures a

[6]From "Your visit with the National" pamphlet of National Tube Company.

minimum loss of heat in delivering the blast to the furnace. The very high temperatures necessary to maintain iron and steel in a molten state or workable condition, requires a tremendous amount of fuel. Therefore every precaution is taken in the modern plant to prevent any greater loss of heat than is necessary. Two Bessemer converters and 12 open hearth furnaces manufacture steel out of the blast furnace iron and are placed next eastward from the furnaces. Without the loss of any more heat than is required to permit the steel to solidify, the steel ingots are reheated and run through the rolling mills. These buildings are long, one-story, spacious structures with ample room overhead for an electric conveyor system. The manufacturing process may terminate at this point to form the semi-manufactured steel products—billets, blooms, rounds, etc. But if pipe is to be manufactured the process continues through a long, continuous set of buildings, housing the skelp and pipe mills.

Raw Materials—In a modern steel plant such as that of the National Tube Company, there is a surprisingly large number of raw materials used in varying quantities. However, coke, iron ore, and limestone are the materials of greatest bulk and are used in the greatest quantities. Even with these primary minerals there is often a variation in locational origin because of a variation in their chemical or physical character. For example, the different ore stock piles represent different grades of ore that often originate in widely separated localities. The local coke plant consumes two grades of coal, one from Connelsville, Pennsylvania, district and another from Gary, West Virginia district. One is a high-volatile, low fixed-carbon coal and the other is a low-volatile, high fixed-carbon coal. Because there is no dependable local supply of natural gas and because the company must have a gas of a certain b. t. u. rating, it is necessary to mix the two kinds of coal even at greater freight cost to get the quality of gas desired for use in the steel furnaces.

Besides the primary minerals there are used in the steel plant large quantities of dolomite, refractory magnesite, fuel oil, scrap iron, three or four grades of brick and tile, sulphuric acid, several ferro-alloys—speigeleissen, aluminum, ferro-silicon, ferrochrome, ferro-manganese, zinc shingles, and rust prevention materials.

There are many other materials used in smaller quantities.

In this list are represented may raw materials that are the finished products of numerous other factories located throughout the country.[7] So that in the modern steel plant there is an intricate system of inter-factory dependencies. And while the total quantity of these materials is not so great as that of coal, iron ore and limestone, the aggregate amount consumed is surprisingly large.

Economic Aspects

In the location of a steel plant at the point where there is a break in the bulky freight several economies are possible. Especially is this true when the plant is a unit of a larger corporation and performs a transhipping service for member plants of the interior. The National Tube Company at Lorain performs such a service for the plants of northern Ohio and the Pittsburgh district. Enough iron ore and fluxing limestone must be imported during the navigation season and held in reserve to keep both the local and interior furnaces going. By unloading the raw materials with plant equipment and storing on plant property, there is an aggregate saving of eight to thirty-three cents per ton gross on ore and thirteen to twenty-three cents on limestone or dolomite.[8] When ore is held in storage the cost increases rapidly. Therefore, there is a greater tendency either to make immediate and direct ore shipments or to store the ore in stock piles on company property.

The two grades of coal, one from the Connellsville district and the other from the Pocahontas field, are brought to Lorain at a freight cost of $1.84 and $2.64 per ton respectively. When processed these two tons of coal will yield one and one half tons of coke, 18,000–20,000 cubic feet of gas, and many valuable by-products. The ton and a half of coke thus produced is sufficient to reduce three tons of 50% iron ore in the presence of two-thirds of a ton of fluxing limestone. The minimum

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[7]A further treatment concerning locational origin and quantity movements of these raw materials will be found under the Transportational section.

[8]The port charges are:

	Ore	Dolomite
From rail of vessel to car for direct shipment	8 cents	13 cents
From rail of vessel to dock	20 cents	.....
From dock to car	13 cents	13 cents
Transfer from dock to storage pile	12 cents	6 cents
Reloading from dock or storage to car	13 cents	10 cents
Monthly storage charge	1 cent	1½ cents

Ports of Sandusky, Huron, and Lorain, Ohio, Lake Series No. 8, Corps of Engineers, United States Army, pp. 131–32

cost of handling and shipping the three and two-thirds tons of raw materials to the furnaces in the Pittsburgh district is $4.51 (8 cents handling charge and $1.15 per gross ton freight).[9] Since the cost of shipping the coal is three cents less than the cost of shipping the raw materials to the interior, the by-products may be obtained for the cost of the coal at the mine mouth, plus the cost of extraction. When the coal mines are operated by the consuming company further economic advantages develop.

American Shipbuilding Company—The second largest unit in the heavy industries of Lorain is the plant of the American Shipbuilding Company. Occupying forty-three acres of urban land on the east flood-plain of Black River, the plant covers less than 1% of the total area of Lorain and only 3% of that of the National Tube Company alone. The property extends from the river's east edge to the east bluff of Black River, and from the tracks of the Nickel Plate railroad northward to within 2,000 feet of the mouth of the stream. Dredged out of the soft marshy floodplain alluvium are two launching slips over 400 feet long and one dry dock 747 feet in length which is said to be "the largest on fresh water."[10] The southward curve of the river bank made it possible for the launching and dry dock to be dredged almost in line with the lower course of the river, thus facilitating the berthing of ships entering for repairs or launching new ships going out of the river. Construction berths for six new vessels and ten vessels in repair at one time is the maximum capacity of the plant. To effect repairs to marine craft the plant equipment includes: a machine shop, boiler shop, punch shop, a pipe shop, tin and electric shop, joiner shop and two large blacksmith shops. Ample facilities are provided for the building and repairing of the largest ships on the Great Lakes. (Fig. 10).

This company employes anywhere from 50 to 1,000 men, since the work is of a highly seasonal nature and subject to oscillations. The early spring is the outfitting and general repair season for ships in preparation for the opening of the navigation. Throughout the navigation season, the shipyards are kept busy in servicing, repairing and building new craft. One service launch and four scows used in making repairs to

[9]Transportation on Great Lakes, Transportation Series No. 1 (Revised edition, 1930), Supt. of Documents, p. 282.

[10]Wright, op. cit., p. 322.

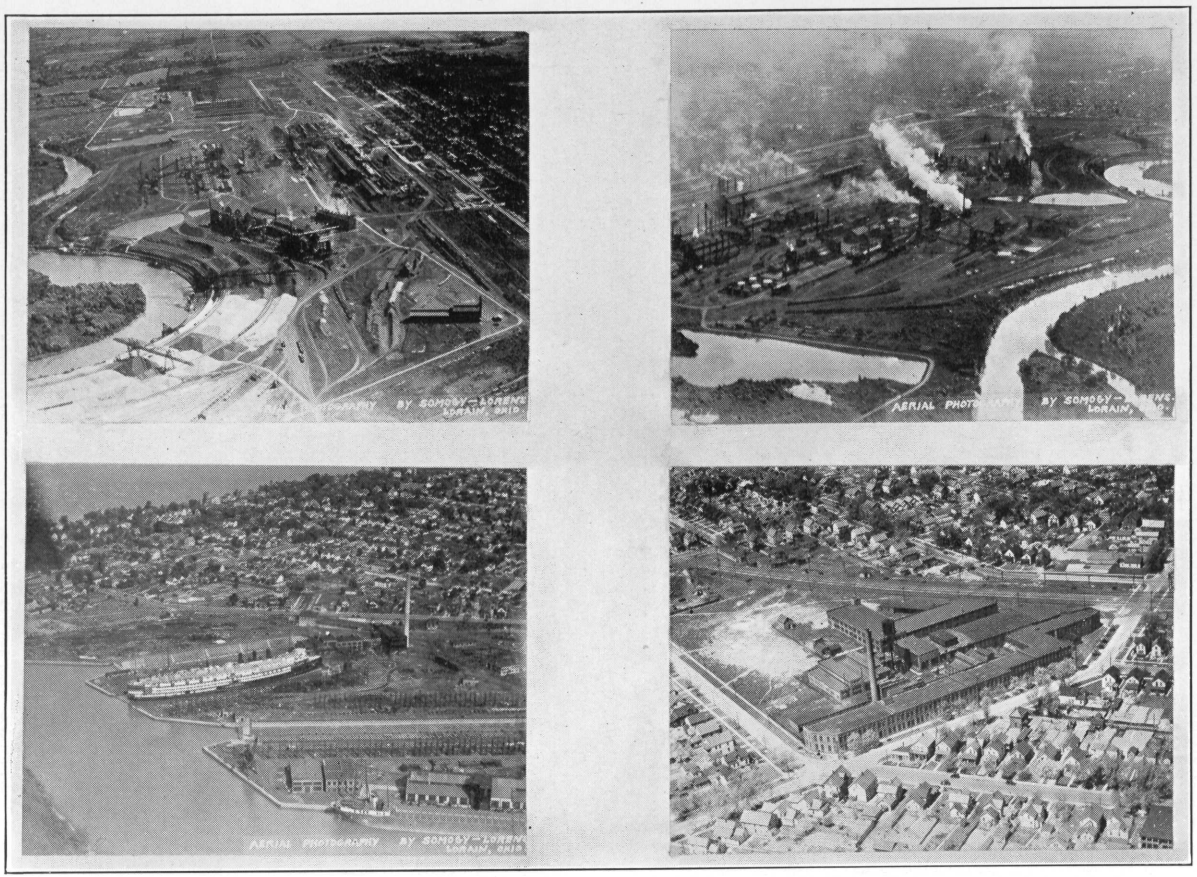


FIG. 8 (upper left). Plant of the National Tube Co. Looking east over the entire plant layout.

FIG. 10 (lower left). Plant of the American Shipbuilding Co., on the river flood plain. The river bluff marks the beginning of residential East Lorain.

FIG. 9 (upper right). Aeroplane view looking southwestward. In the middle ground are the open hearth furnaces, the by-products coke ovens and the blast furnaces.

FIG. 11 (lower right). Factory of the American Stove Co., near the Nickel Plate R. R. tracks in West Lorain.

Photo by Somogy-Lorens, Lorain

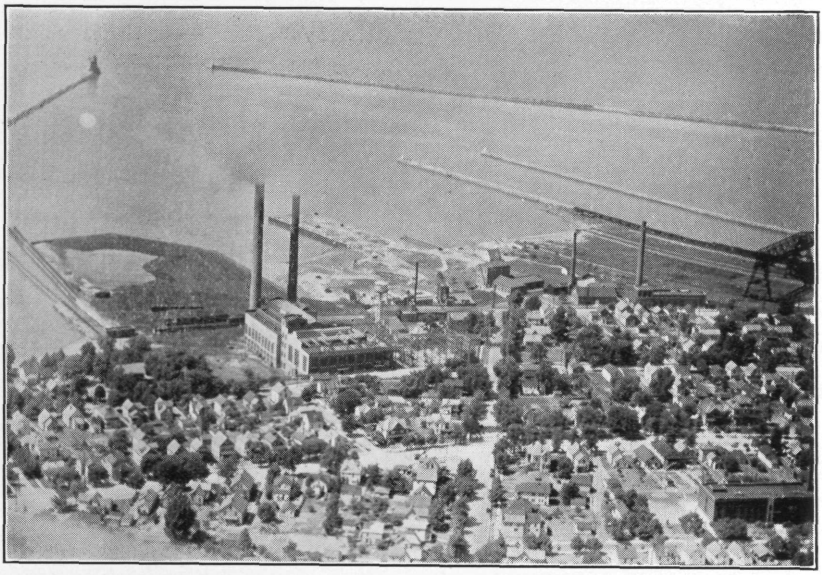


Photo by Somogy–Lorens

FIG. 12. Aeroplane view looking north and showing the outer harbor, a portion of the inner harbor, Ohio Public Service Generating Plant, the Ice Plant, the Lorain Waterworks and the B. and O. ore bridge.

Photo by Michael Studio

FIG. 13. Inner harbor of Lorain, looking north. Ore docks, storage yard and tracks of the Baltimore and Ohio Railroad.

boats in the harbor are additional equipment that are confined to the harbor.

The era of steel shipbuilding in the Lorain shipyards did not follow immediately the abandonment of wooden ship construction. Steel shipbuilding is a capitalistic enterprise and did not begin in Lorain until 1897 when the Cleveland Shipbuilding Company was formed. This expansion is related to the expansion in the ore carrying trade at the same time. Ore, limestone and coal boats in increasing size and numbers were needed in this trade and the Lorain shipyards increased in areal extent and functional importance as a consequence. The depth of Black River and the nearness to the mouth have enabled this company to build some of the largest vessels on fresh water and for all sizes of ships to enter Lorain harbor for repairs.[11]

The Thaw Shovel Plant—Based upon areal extent of urban land used, the number of factory workers employed, size of the factory buildings and plant equipment, and the value of the products produced, the Thaw Shovel Company and its affiliate, the Lorain Castings Company, are the third most important of the heavy industries of Lorain. The two plants occupy a level, lake plain site between the South Lorain townsite and the Baltimore and Ohio right-of-way. The plant includes five large brick structures and a spacious storage yard around the factory buildings for reserve equipment and finished steam, gas and electric shovels, cranes and other mining and excavating machinery. Together with the supplementary plant of the Lorain Castings Company, which occupies a separate building and grounds just across the Baltimore and Ohio Railroad tracks, the factory and storage yard cover almost exactly 1% of the heavy industrial land of Lorain. Employing three to four hundred men, this factory has been stimulated by the general acceptance of its products in mining, road building, construction work, quarries, clay pits and in other similar work.

The factory is somewhat more than an assembling plant though that work is the principal phase of factory employment. Although some of the shovel parts are made in its supplementary

[11]Up to 1913, 129 ships had been constructed classified as follows: freighters, 109; oil steamers, 2; oil barges, 7; tugs, 9; salvage lighter, 1; mountain summer resort catamaran, 1. Of the 109 freighters the tonnages were: 6, 12,000 tons; 11, 10,000 tons; 1, 9,000–10,000 tons; 2, 8,000–9,000 tons; 15, 7,000–8,000 tons; 40, 6,000–7,000 tons; 8, 5,000–6,000 tons; 36, under 5,000 tons. Source: Wright, op. cit., p. 323; also in Annual Reports Chief of Army Engineers, U. S. Army.

plant at Lorain, many of the parts come from other widely scattered factories to be assembled into the finished product in this plant. Waukesha motors, and iron and steel shovel parts from Chicago, St. Louis, Pittsburgh, Erie, all find the way into the finished "Lorain" shovel.

The location of this industry at Lorain is related to its history, while the areal extent of the factory and industrial magnitude of the business are explained by the specialized nature of the finished product, which is now protected by several patents. In 1898 a retired captain of an ore boat started manufacturing in a small plant a shovel for removing iron ore on the dock.[12] This device had been developed and patented by Captain Thaw and was used many years on the ore docks of the lower lake ports. Subsequent development of the ore bridge replaced the shovel for the removal of ore, but its use was adapted in a large way to all kinds of excavation work and the plant expanded to its present proportions. This factory differs markedly from that of the National Tube plant in the manner in which the cultural landscape has been affected. By the smaller size and gradual growth, the Thaw Shovel Company has been absorbed into the expanding urban landscape without greatly altering it, while the plant of the National Tube Company not only metamorphosed the surface landscape but greatly changed the plan of Lorain.

Because of the specialized nature of the shovel, its high value in relation to bulk, and the varied industries in which it is used, markets for the "Lorain" product are all over the world. Although these shovels are shipped to England, France, Spain, Italy, Cuba, Chile, Peru, New Zealand, Mexico, Tasmania and Canada, this country is the greatest consumer. The central position of Lorain with respect to the center of population in this country together with the excellent railroad facilities for shipping in almost any direction give Lorain an excellent market advantage.

Other Establishments—Several other industries have contributed a proportional share toward the expansion and now help to sustain Lorain as an industrial city. And it is only in relation to other larger industries that they are of lesser importance. But because they occupy less urban land, their factory buildings are much smaller, they employ fewer people and their finished products have less value than the enter-

[12]Industrial Survey, *Lorain Journal*, issue of May 5, 1928.

prises already considered, these industries must here be considered en masse.

The National Stove factory, the American Crucible Products plant, the Steel Stamping works and the Brunk Machine and Forging Shops conclude the list of the heavy industries of Lorain.[13] (Fig. 11). The first three have factory locations along railroad sidings, while the last maintains a plant which fronts on Broadway, the principal commercial-retail street. All combined, these four industries occupy only ten acres of land surface, which is slightly more than .5% of the total surface devoted to heavy industrial. The National Stove Works occupies a three-story, box-shaped factory building with four times as much floor space as all three others combined. This plant has enough floor space and equipment for 250 men working to complete 300 stoves a day.[14]

In the plant location pattern of the heavy industries in Lorain two important influences stand out, the navigable Black River and the railroads. The former makes possible an industry based upon marine activities and enables raw materials for factory consumption to be imported, while in the latter case the railroads offer shipping facilities.

2. *Light Industries*

The light industrial establishments in the Lorain landscape are small and inconspicuous when compared with the ponderous character of the heavy industrial plants. For this reason they are likely to be overlooked or relegated to a place not commensurate with their actual importance in the life of Lorain. Nevertheless, there are twenty-four establishments so classified here. The light industries are of three types: the factory, employing many workers in one building but occupying relatively small ground space; the small individual establishments, but important because of their aggregate number; and the public utility generating and manufacturing plants. There are two establishments manufacturing clothing that belong to the first

[13]The American Crucible Products employs 30 to 40 skilled workmen in making bronze castings and bearings, babbit metal, faucets, etc. The Steel Stamping manufacturers metal toys (telephones, automobiles, wagons, etc.), sink strainers, mail boxes, milk bottle holders, map sticks, etc. Markets for these articles are in the 10 and 25-cent chain stores throughout the country. Employment in this plant is highly seasonal because of the seasonal nature of the market. However, fifty to sixty men are employed during the months preceding the Christmas season. The Brunk Machine and Forgings Company does custom machine work.

[14]This concern is, perhaps, best known through its products, the Direct Action Stove and the Lorain Oven Regulator, which were developed in this plant.

class; twelve bakeries, and thirteen dairies and creameries belonging to the second group; and the electric generating station and ice plant are in the third class.

All light industries combined employ approximately 10% of the total number employed in heavy industries, and only 13% of the number employed at the National Tube Company's plant alone.[15] On the other hand, the total value of the manufactured products is relatively high. These industries occupy a place in the landscape, and help to lend variety to the type of employment.

Clothing Industries—The large factory of Richmond Brothers now the Goodall Company, manufacturers of men's ready-to-wear clothes and the smaller factory of Printz-Biederman, manufacturer of woman's apparel conclude the list of factories in this group. The former occupies a large five-story box-shaped structure formerly a wholesale house, while the latter is housed in a modern brick factory building.

These two plants together employ 65% of the total number of wage earners in the light industrial group. The Richmond Brothers factory employs 400 women and 50 men, almost exactly 50%. Both of these establishments are specialized branches of main factories located in Cleveland. In each case the materials from which clothing is made are cut in the main factory and sent to Lorain to be assembled. This policy of dividing the work together with the recent establishment of the branch factories shows them to be the result of expansion growth in the parent concern.

Thus the location of these factories in Lorain reflects three advantages: (1) the closeness of the branch to the main factory and the relative ease with which the piece-goods may be transported from Cleveland twenty-five miles; (2) the surplus of women workers in a city dominated by the heavy industries; and (3) the lower tax rate of 21.6 mills in Lorain as compared with 27.6 mills in Cleveland. These two factories draw their labor supply from the homes of other industrial workers and are, in that respect, dependent upon other industries.

Baking Establishments—Lorain at one time had nineteen bakeries, mostly small individually owned establishments, but today the industry has contracted until there are only twelve

[15] In computing these percentage figures compiled from the Census of U. S. 1930 were used. In the three classes of light industries there are 934 employees and 7,302 workers in blast furnaces and rolling mills. Table 25, Ohio Supplement, Fifteenth Census of United States, Composition and Characteristics of Population.

concerns operating. However, one bakery, a link in a large Cleveland chain, dominates the baking field. Because of the retail nature of bakeries in addition to their manufactural characteristics, there is a marked tendency for these establishments to concentrate in the commercial-retail section along Broadway and in the other retail sections. However, the largest baking concern in the city occupying a plant covering almost one-half an acre has a manufactural location three blocks off Broadway.[16] This location is possible because the company operating a fleet of thirty-six trucks offers a house-to-house delivery service and does the retailing directly from these "bakery wagons." These trucks carrying a full supply of bakery goods traverse daily established routes which include the rural sections and the neighboring urban communities beyond. This scheduled retail service has been sufficiently popular for this company to grow and to expand its manufactural unit. Emphasis on the manufacturing phase of the business is in definite contrast to the other baking establishments in which the emphasis is placed on the retail phase of the baking business. Their locations are primarily in the commercial core where better retail advantages are offered.

Other Light Industrial Plants—Standing on the lake front are three average city blocks west of the mouth of Black River and two large plants, the carbo-electric generating station and ice plant.[17] These two plants with their coal storage yards occupy private properties in juxtaposition and together occupy approximately eleven acres of urban land. Their position on the lake front and with properties extending into the lake enable them to pump from the lake the tremendous quantities of clear water needed for condensing purposes. The electric generating plant alone pumps between 30 and 40 billions of gallons of water annually or approximately twenty times the amount used for domestic purposes in Lorain.[18]

Coal for these plants is switched over a short spur line of the Baltimore and Ohio Railroad, a switch extension off of the

[16]The exact location of this plant is at the corner of 22nd Street and Oakdale Avenue.

[17]The rather questionable nature of classifying these plants in the light industrial group is recognized. Perhaps a separate classification into public services would be more inclusive. But in the interests of economy in space and time and more especially to shorten the list of industrial classes, the manufactural character of these urban industries is here recognized as dominant.

[18]Industrial Survey, *Lorain Journal* gives 43 billions (issue June 6, 1929). In an interview, Engineer in charge gave 40 billions (1931).

main road to the ore docks. Since 140 to 150 cars of coal are consumed and it is necessary to keep a reserve supply, much of the urban land within property lines is used for the storage of coal. Other plant equipment which, in the case of the generating concern, is large, is also stored on company property.

This Edgewater plant is an important generating unit of the Ohio Public Service Company which operates a superpower system serving a large territory in northern Ohio. (Fig. 12). The favorable location of this generating unit with respect to ample supplies of good water and the relative ease in which coal may be obtained have influenced its enlargement until its present production is approximately 60% in excess of the local needs for electric energy. Lorain consumed in 1931 over 47 million kilowatt hours of electric energy which was slightly more than one-third of the amount generated.

The consumption of ice in Lorain and a limited territory outside is sufficient to support a manufacturing plant with a daily capacity of 100 tons. Because the consumption in summer is often twice the capacity of the local plant a large storage plant with a capacity of 3,000 tons is operated in connection. During the months when consumption is below the plant capacity, the surplus ice is stored until a time when consumption is in excess of the manufacturing capacity of the plant. This plant is sufficiently large to keep 16 trucks and thirty to forty men employed, more being employed during the summer when there is the greatest consumption.

C. TRANSPORTATIONAL UTILIZATION

1. *Commercial Relations of Lorain with the Upper Lakes Region*

Lake Transportation and Commerce—Lorain's open door on the navigable waters of Lake Erie has for over one hundred years kept the town in touch with the outside world. Before the railroads came the town's commercial connections were eastward; after the railroads were built, the town profited by the connections with the territory to the north and west. The city landscape of Lorain has always borne the cultural expressions of these connections.

In the modern landscape of Lorain there are not only the cultural forms that express the regional connections, but the magnification of the forms attest the degree of economic

specialization now existent. The modern ore docks on which there are seven unloaders with a total seasonal capacity of approximately seven million tons of ore; the coal-loading machinery with a capacity of more than three million tons annually; the modern steel plant capable of consuming two millions tons of iron ore; and all the necessary harbor facilities, tugs, supply boats, a coal barge for bunker coal, ship repair facilities, etc.; all suggest the regional limitations placed upon the city by specialization.

Modern Lorain has developed as a consequence of the stimulation through trade attracted to the harbor. This modern harbor of Lorain consists of an outer harbor of 60 acres set off by breakwaters and an inner harbor made by extending the river between projecting piers attached to the mainland. This harbor in its modern aspects is largely the result of one hundred years of steady improvement. The continued use of the river mouth encouraged the continued governmental and local expenditures for its improvement. There have been periods (individual instances of which have already been cited) when the main programs of improvement were neglected, but over long periods these projects have gone forward toward completion. The existing project adopted in 1898 provided for the construction of an outer harbor protected by artificial breakwaters and dredged to a depth of 20 feet, is now practically completed. Now only two harbors on Lake Erie are deeper and one as deep as that of Lorain.[20] The completion of the sixty-acre outer harbor and an inner harbor of similar size makes a total of approximately 120 acres in navigable water surface in Lorain harbor. (Fig. 13).

Harbor scenes during the year present two marked contrasts. In the winter the inner harbor is literally filled with long ore and limestone boats lying idle because ice in the river channels prevents their passage into the upper lakes. But the opening of the navigating season is preceded by considerable port activity. Ships in winter quarters are thoroughly cleaned, painted, inspected, boiler and machinery repairs are made, and the port teems with seamen seeking employment. Though there is some shipping on Lake Erie as soon as the ice clears Lake Erie ports, the active navigating season is officially opened when the ice has cleared the channels of the

[20]Transportation on the Great Lakes, op. cit., Chart opposite p. 11.

TABLE IV

Year	No. of Ships		Imports					
	Arrival	Departure	Ore	Limestone	Sand	Lumber, Misc.	Fish	% of Ore
1884	232	319	.....	.....	.....	.....	.....	.....
1885	188	211	.....	.....	.....	.....	.....	.....
1886	259	286	.....	.....	.....	.....	.....	.....
1887	301	342	.....	.....	.....	.....	.....	.....
1888	281	365	.....	.....	.....	.....	.....	.....
1889	.....	.....	.....	.....	.....	.....	.....	.....
1890	383	431	.....	.....	.....	.....	.....	.....
1891	288	305	270,240	46	.....	17,917	.....	91
1892	285	314	187,000	.....	.....	9,000	.....	95
1893	220	293	171,562	2,134	.....	7,135	.....	95
1894	481	411	170,278	1,336	.....	14,566	.....	93
1895	518	508	239,924	14,224	.....	23,315	.....	86
1896	532	263	215,160	.....	.....	16,138	1,143	93
1897	725	740	394,511	13,440	.....	27,406	.....	91
1898	469	451	627,054	10,800	.....	80,212	.....	85
1899	638	645	1,068,913	36,186	.....	39,246	110	96
1900	489	485	1,103,962	450	.....	.....	.....	93
1901	357	403	808,409	250	.....	.....	.....	91
1902	526	515	1,605,421	32,700	19,500	16,299	2,244	96
1903	571	578	1,103,468	26,325	23,000	37,080	500	93
1904	530	567	1,126,514	34,149	114,950	19,031	400	87
1904	792	735	2,016,573	39,948	2,500	19,318	800	99+
1906	854	726	2,417,109	52,268	.....	16,927	30,836	96
1907	903	835	2,921,660	57,003	.....	9,223	64,089	97
1908	746	730	2,286,356	929	3,842	7,205	2,344	100—
1909	804	764	3,124,656	.....	8,491	8,910	2,036	99
1910	1111	1119	2,835,591	.....	.....	9,912	6,715	90
1911	1303	1300	3,305,357	.....	6,990	4,203	250	99
1912	.....	.....	.....	.....	.....	.....	.....	.....
1913	.....	.....	.....	.....	.....	.....	.....	.....
1914	973	974	1,872,567	50,856	.....	584	2,024	97
1915	1149	1158	3,940,195	31,784	.....	797	1,302	99+
1916	2619		5,167,825	57,959	52,215	771	971	98
1917	3287		4,291,044	157,194	55,084	1,128	790	95
1918	4091		3,913,694	103,328	43,165	.....	615	97
1919	2899		3,784,952	275,499	6,397	.....	285	93
1920	3676		4,508,600	457,073	34,710		680	90
1921	1725		2,002,756	273,791	29,738	.....	345	87
1922	2039		3,113,741	435,222	38,310	.....	406	87
1923	2240		3,917,653	497,185	15,509	.....	508	89
1924	777	770	3,430,828	413,824	17,392	.....	410	89
1925	1316	1319	4,610,168	539,558	108,200	.....	584	88
1926	1516	1518	4,165,723	556,824	84,100	.....	609	87
1927	1528	1526	3,942,412	564,565	161,076	.....	719	86
1928	1506	1512	3,822,497	593,783	208,475	5,125	729	83
1929	1414	1417	4,232,579	545,352	235,310	.....	564	88
1930	1171	1172	2,835,950	549,267	180,394	1,529	560	79
1931	460	453	2,031,184	226,301	73,415	2,812	773	87

TABLE IV (*Continued*)

Year	Exports				Aggregate Tonnage of Cargo		
	Coal	Billets Rails, Skelp	Misc.	% of Coal	Imports	Exports	Total
1884	.....	.....	.....	.....	50,889	78,847	129,736
1885	.....	.....	.....	.....	43,379	66,525	109,904
1886	.....	.....	.....	.....	84,593	89,498	173,091
1887	.....	.....	.....	.....	94,796	130,662	225,458
1888	.....	.....	.....	.....	158,481	185,219	343,700
1889	.....	.....	.....	.....	.....	.....	.....
1890	.....	.....	.....	.....	166,093	185,148	351,241
1891	450,513	.....	31	100	288,203	450,544	738,747
1892	35,200	.....	.....	100	196,234	35,200	231,434
1893	550,194	95,433*	.....	85	180,976	645,527	826,503
1894	347,835	.....	.....	100	186,180	347,835	534,015
1895	281,241	3,164	158	99	277,463	284,582	564,055
1896	332,167	511	.....	100	232,439	332,780	565,219
1897	195,000	9,744	.....	100—	435,357	207,244	642,581
1898	319,072	.....	1,315	97	737,881	329,134	1,067,015
1899	278,102	600	.....	97	1,114,345	278,812	1,423,157
1900	402,662	1,055	.....	100—	1,124,641	422,068	1,546,700
1901	275,707	.....	1,233	96	824,591	276,940	1,101,531
1902	861,739	7,677	3,906	100	1,676,164	873,332	2,549,496
1903	1,148,015	27,800	2,294	98	1,190,373	1,178,109	2,368,482
1904	1,083,719	14,475	.....	97	1,295,044	1,098,194	2,293,238
1905	1,180,516	.....	18	99	2,084,952	1,180,534	3,265,486
1906	1,807,098	34	1,419	100—	2,517,140	1,808,551	4,325,691
1907	2,166,273	.....	473	100—	3,051,974	2,178,446	5,230,420
1908	2,098,674	.....	.....	100	2,300,676	2,098,674	4,399,350
1909	2,075,911	.....	413	100	3,144,093	2,076,324	5,220,427
1910	2,818,715	.....	3,134	100—	3,192,489	2,821,849	6,014,338
1911	.....	.....	.....	100—	3,316,800	3,137,467	6,454,267
1912	3,133,672	3,710	85	100—	.....	.....	7,400,591
1913	.....	.....	.....	.....	.....	.....	8,609,897
1914	2,579,834	577	633	100—	1,926,031	2,581,044	4,507,075
1915	3,036,339	.....	.....	100	3,974,078	3,036,339	7,010,460
1916	3,668,105	.....	.....	100	5,279,714	3,668,105	8,947,846
1917	3,023,841	.....	.....	100	4,505,240	3,023,841	7,529,081
1918	3,525,884	.....	.....	100	4,060,802	3,525,884	7,686,686
1919	2,750,599	.....	.....	100	4,067,130	2,750,599	6,817,729
1920	3,471,804	46,449	.....	99	5,501,063	3,518,253	8,519,316
1921	2,633,304	1,948	.....	100—	2,306,630	2,635,252	4,941,882
1922	1,887,277	23,700	.....	99	3,587,679	1,910,977	5,498,656
1923	3,843,866	4,488	.....	100	4,430,855	3,848,354	8,279,209
1924	2,247,992	34,446	.....	99	3,862,454	2,282,432	6,144,892
1925	1,546,515	34,705	.....	98	5,258,510	1,581,220	6,839,730
1926	2,067,655	35,946	.....	98	4,806,647	2,103,601	6,910,257
1927	2,704,130	51,830	.....	98	4,688,053	2,755,960	7,444,013
1928	2,097,780	64,017	.....	97	4,630,609	2,162,697	6,793,306
1929	2,264,670	63,414	1,792	97	4,777,931	2,328,084	7,341,889
1930	1,989,916	31,035	7,407	97	3,585,378	2,028,358	5,613,734
1931	1,450,228	.....	18,075	99	2,334,485	1,468,303	3,802,788

upper lakes and the marine insurance rates are declared in effect. This usually occurs around the first of May depending upon the severity of the winter in the region of the Upper Lakes, particularly in St. Mary's River. The season of navigation closes as abruptly. When there is danger to cargoes from ice forming in the channels and the marine insurance is no longer in effect, the season is declared closed. The date of closing varies between the first and fifteenth of December.

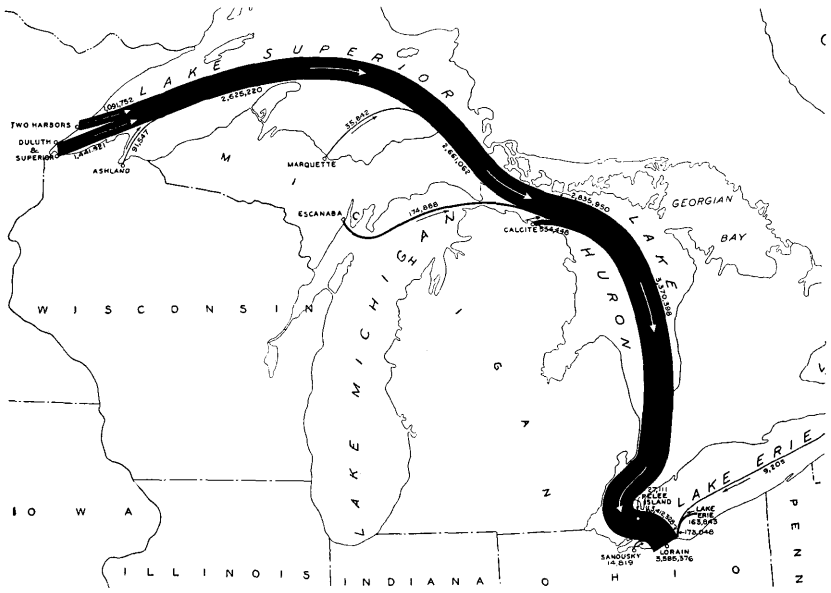
In normal times there is a considerable rush and anxiety to get out of port and under way as soon as the season opens officially. The two tug boats used in Lorain Harbor tow the massive 600 foot ore carriers down the crooked river to the harbor entrances and the local navigating season is open. From the beginning of the season, actually initiated by the departure of the first large carrier, there is a prodigious stream of boats arriving and departing from the harbor throughout the season. In recent years, there have been between 2,300 and 3,000 arrivals and departures in a single navigating season of approximately seven months in length.

Further emphasis of the degree of specialization which grips Lorain is best shown by an analysis of the harbor use. The total average annual tonnage of water-borne freight into Lorain for the years 1921–30 amounted to 6,056,558 short tons of which 65% represented receipts and 35% shipments (Table IV).[21] Iron ore for use in the local steel plant and for transshipment to the interior averaged 3,314,400 tons annually, or 87.9% of the total imports of the city.[22] And when an average annual tonnage of 443,385 of limestone, or 11.8% of the total receipts, is added, making the total 99.7% of receipts composed of bulky freight, the true picture is presented. This leaves only .3% for all other import freight which includes: sand, fish, steel and spiegeleisen. While iron ore dominates the local import tonnage, Lorain ranks only fifth among the lower lake cities in this trade. Cleveland, Conneaut, Ashtabula and Buffalo all import greater amounts of iron ore than Lorain.

Although Lorain has connections by water with all the iron-ore-exporting cities on the Great Lakes, 85% of the total

[21]The ports of Sandusky, Huron, and Lorain, Ohio, Lake Series No. 8, Superintendent of Documents, p. 139. 1932.

[22]The words imports and exports as here used mean, "to carry in" and "to carry out," rather than the usual connotation limiting the words to international trade. The words as here used include both internal and foreign trade so far as Lorain is concerned.



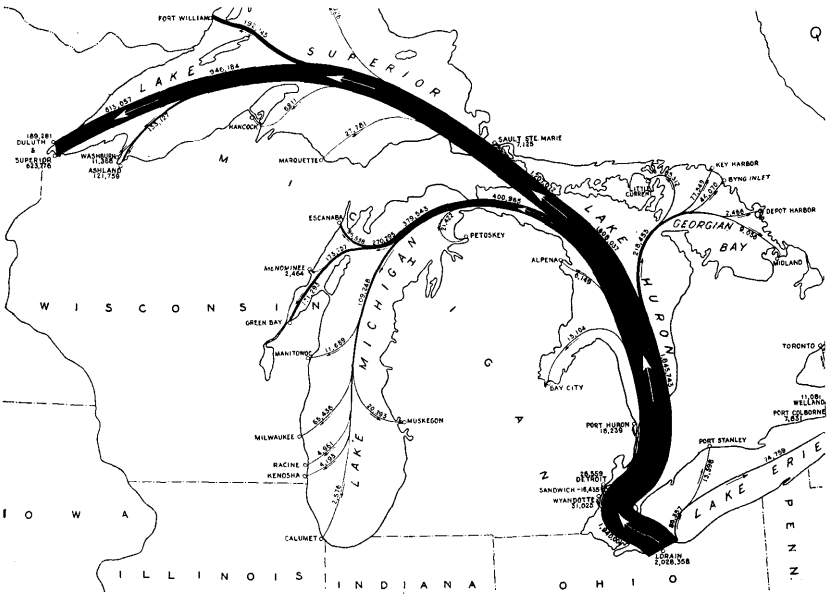


FIG. 14 (upper). Origin of lake receipts at Lorain, Ohio, during 1930, expressed in short tons (Corps of Engineers, U. S. Army).
FIG. 15 (lower). Destination of lake shipments from Lorain, Ohio, during 1930. (Corps of Engineers, U. S. Army).

ore tonnage received at Lorain comes from the cities at the head of navigation on Lake Superior, namely, Duluth, Superior, and Two Harbors. (Fig. 14). Ashland, Marquette, and Escanaba contribute the remaining 15%. So cheaply and efficiently is this iron ore transported over the thousand-mile lake route, that, from the standpoint of rates, Lorain is closer to Duluth by water than to the furnaces of the interior by rail. The rail hauls vary between 100 and 200 miles. Through this water connection with the iron ore fields, Lorain has been enabled to develop industrially and commercially.

TABLE V

IRON ORE SHIPMENTS

BY WATER TO LORAIN		BY RAIL FROM LORAIN	
From	Rate Gross Ton	To	Rate Gross Ton
Duluth	.70	Dover, Ohio	.88
Superior	.70	Wheeling, W. Va	1.15
Two Harbors	.70	Scottsdale, Pa	1.30
Escanaba	.82	New Castle, Pa	.88
Marquette	.63	Pittsburgh, Pa	1.15
		Youngstown, Ohio	.82
		Steubenville, Ohio	.99
		Sharon, Pa	.82

The export trade of Lorain is even more specialized than the receipts. Over 99% of this tonnage is coal consigned to the fringe cities on the upper lakes in both Canada and the United States, and in bunker coal for vessels in and out of Lorain (Table IV). Although the foreign trade in coal is only 7.3% of the total exported and is entirely with Canada, this tonnage is far greater than the imports from foreign countries which amount to less than .1% of the total port tonnage. (Fig. 15).

Among the coal exporting cities of the Lake Erie shore line, Lorain ranks fourth, following Toledo, Sandusky, and Ashtabula. This condition exists in spite of the fact that Lorain is on a more direct route from the Appalachian coal fields to the navigable channel of the Detroit River where all Lake Erie sailing routes converge (Fig. 16). This is because the differences in length of the land hauls, and the consequent difference in rates that would ordinarily occur, are absorbed by

rate adjustments on cargo coal, thus placing coal export cities on a more nearly even basis.

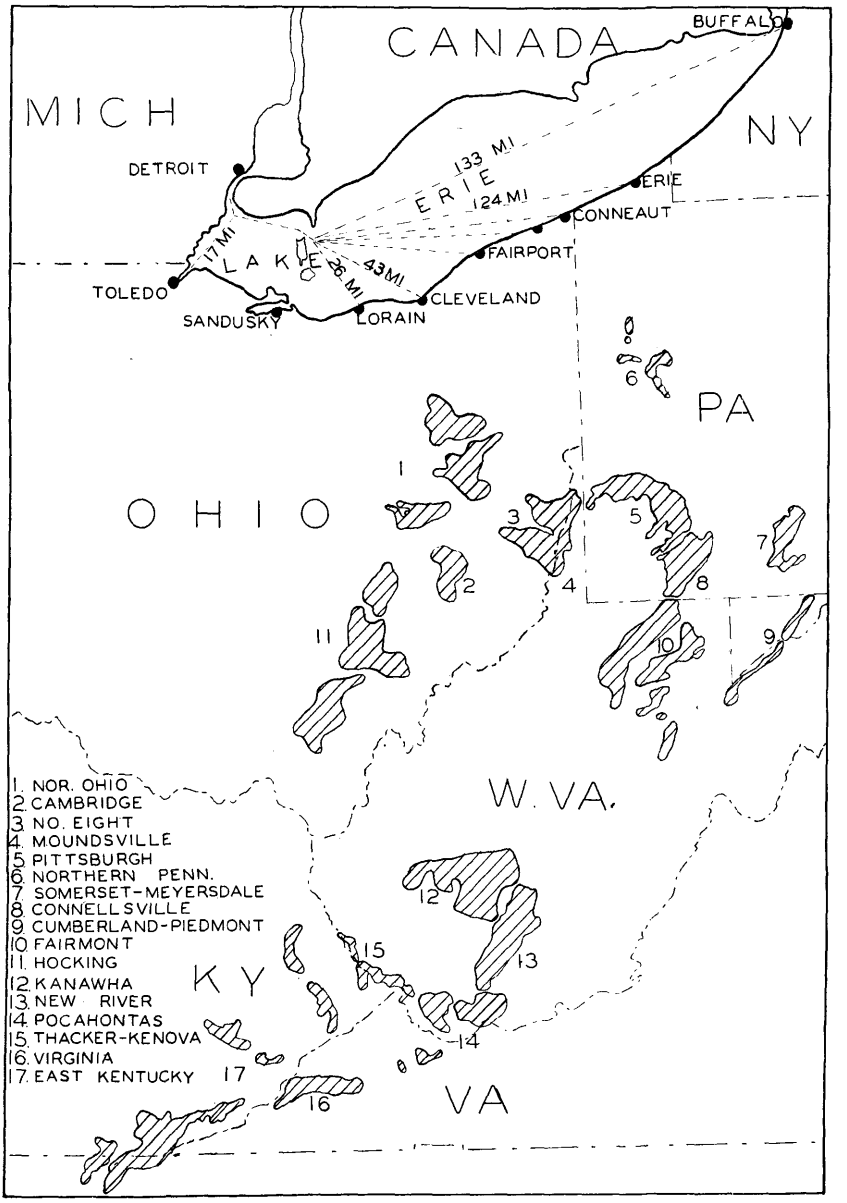


FIG. 16. Location of Lorain in relation to the principal coal fields of the Appalachian Plateau.

Comparisons with other cities to give relative ranks are somewhat misleading, as regards the relative importance of the trade in the local community, because ranks give a regional picture. For example, Lorain ranks fourth as a coal exporter, fifth as an iron-ore importer, and third after Cleveland and Buffalo as an ore consumer. But not until these relative tonnages are placed upon a per capita basis, or on a basis of unit area of urban extent, is the importance of these imports and exports to each city fully realized. On a per capita basis, the consumption of iron ore in Lorain is 41.3 tons, in Cleveland 3.1 tons, and in Buffalo 9.3 tons. In this way the relative importance of the iron and steel industry in each community is pictured.

2. *Hinterland of Modern Lorain*

The Railroad Pattern—Four steam railroads and one electric line help to serve the land transportation needs of modern Lorain. Two roads, the Baltimore and Ohio and the Wheeling and Lake Erie, extend in a southeasterly direction; while two others, the New York Central and the Nickel Plate (New York, Chicago and St. Louis), besides the Lake Shore Electric run in east-west directions from Lorain. Only two of the steam roads, the Baltimore and Ohio and Nickel Plate, offer passenger service out of Lorain. These roads have depots in West Lorain at Eleventh Street where they cross (Fig. 5). No other steam railroads serve West Lorain though they all have connections with South Lorain. The Lake Shore Electric running from Toledo to Cleveland follows the lake shore, passes through Lorain, and gives excellent passenger and freight service east and west. This line, is said to be the longest in the United States under one management and is a link in a very complete system that extends as far south as Louisville.[23]

The railroads of Lorain are characterized, not by their passenger facilities and service, for these are unimportant, but by their facilities for handling and transporting bulky goods. Since all railroads derive most of their revenues from the freight business, they place an emphasis upon a development of this service. And, although South Lorain has connections with four steam railways, no passenger depot or service is offered from there. Only the electric railroad offers

[23]Wright, op. cit., p. 287.

passenger service from South Lorain to neighboring towns and cities. (Fig. 17).

Although the same lines of railroads are essentially the same as during the previous period, there have been marked local changes. All roads have made connections with South Lorain since the establishment of the Johnson Steel Company there in 1894. Moreover, there have been enlargements made in the car storage and switch yards to accomodate increased tonnages both in and out of Lorain. The combined capacities of port facilities for handling and shipping ore is approximately seven millions of tons, or almost twice the average annual tonnage received at Lorain harbor.

Next to residential and industrial, the greatest amount of urban land utilized in Lorain is devoted to transportation (Fig. 5). This condition reflects both the time when urban land was cheap and the modern needs of the carrier roads for large amounts of land at the place where the bulk freight is broken. Most of the urban land devoted to transportational use lies along Black River. Of the total river frontage of 31,350 feet, railroads own 14,330 feet or 46% while industries own 28% and private owners less.[24]

The total tonnage carried on all railroads is one-fourth to one-third greater than the water-borne tonnage. This difference represents the consumption of raw materials by the local industries of Lorain. The business, initiated by the demands of the local manufacturing plants for raw materials of the hinterland is quite separate from the business of transhipping freight. In order to show the character of this dependence as well as the specialization in the regional aspects of each railroad connection, a separate treatment of each road is necessary.

Baltimore and Ohio—Next to the National Tube Company, the Baltimore and Ohio Railroad owns and uses the greatest amount of urban land in Lorain. Upwards of 150 acres, or approximately 3% of the urban land is controlled by title. The land lies along the banks of the navigable Black River to the north of the stream giving a water frontage along company property of approximately one and a half miles. This represents the greatest water frontage along the navigable section of the river owned by any individual or corporation.

This railroad has developed on this property the necessary

[24]Ports of Sandusky, Huron and Lorain, Ohio, op. cit., p. 108.

facilities for exporting coal that originates in its territory and for unloading ore to be transported to the furnaces located in the territory served by the railroad. A coal wharf 790 feet in length and equipped with a Motylor car tipple having a capacity of 25 cars hourly, is located on a bend in the river opposite Fourteenth Street.[25] (Fig. 18). This is the only coal exporting equipment in Lorain. Immediately adjacent to the coal docks, the company's car storage yard with a capacity of 2,500 railroad cars has been constructed.

At the mouth of the river the company has constructed an iron ore dock 710 feet in length and equipped with three electrically operated, 15-ton clam-shell unloaders. An electrically-operated ore bridge of 500 tons hourly capacity is used to transfer the ore to stock storage piles for customer furnaces located inland.[26] In addition there are freight car repair shops and a locomotive roundhouse.

As related in detail elsewhere, the Baltimore and Ohio Railroad connects Lorain with the Appalachian Coal fields, particularly those of southeastern Ohio, southwestern Pennsylvania, eastern Kentucky, and West Virginia. In order further to ascertain the local benefits to industry and contributions to Lorain's development this railroad connection makes, it is necessary to analyze its tonnage. (Fig. 17.)

The iron ore tonnage out of Lorain to the interior furnaces over the B. & O. railroad is for the most part consigned to independent steel companies and amounts to less than 150,000 tons annually, or less than 5% of the total iron ore tonnage received at Lorain. Because most of the ore is for direct shipment the tonnage, when isolated from that of other freight, shows a distinct seasonal allegiance.

Lorain's development into a coal transhipping port has come about through the connection the city has had via the Baltimore and Ohio railroad with the coal fields, particularly those fields that produce steam and domestic fuel coals, those in greatest demand around the fringes of the Great Lakes. Moreover, the Baltimore and Ohio railroad employs between 400 and 500 workmen in the roundhouse, the car shops, on the coal and ore docks, in the offices and in running the trains. This number is about one-half of the total number of railway employees in Lorain.

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[25]Ports of Sandusky, Huron and Lorain, Ohio, op. cit., p. 120.
[26]Ibid., p. 119.

The Wheeling and Lake Erie Railroad—The Wheeling and Lake Erie railroad does not enter West Lorain, but approaches the city from the southwest, continues eastward three miles south of the city and enters South Lorain from the east. Connecting South Lorain with the Pittsburgh District, the road parallels for a distance the Baltimore and Ohio already referred

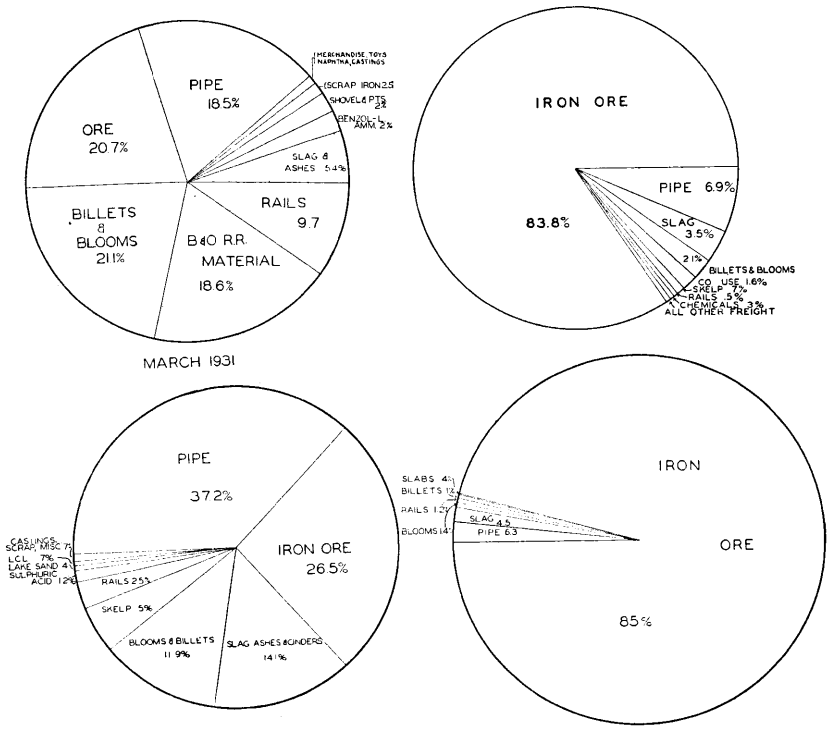

FIG. 17. Commodity analysis of outbound freight over individual railroads. Upper left, B. and O. R. R.; upper right, Nickel Plate R. R.; lower left, New York Central R. R.; lower right, Wheeling and Lake Erie R. R.

to. This road is strictly a freight line, no passenger service is offered and no depot facilities provided. The road connects the National Tube Company's plant with the coal producing western Pennsylvania and iron-ore-consuming Pittsburgh and Steubenville districts.[27]

By taking a circuitous route around the city and entering

[27]Pittsburgh district includes: North Bessemer, Clairton, Donora, Etna, Rankin, McKeesport, Midland, Monessen, South Duquesne, and Woodlawn. The Steubenville District includes Mingo Junction and Weirton.

the National Tube Company's property soon after crossing the corporate limits of the city, this railroad has only a narrow right-of-way with a very limited urban extent. Therefore the amount of urban land used by this railroad is so small in relation to that occupied by other carriers, it may be considered negligible.

That this is a railroad specializing in raw materials is best shown by the tonnage. Coal into Lorain makes up 80–95% of the total inbound tonage (Fig. 19). Practically all of this coal consists of two grades, one from Standard, Penn., and another from Gary, W. Va., used in the coking plant of the National Tube Company. An average of over 98% of the total inbound freight of this railroad represents materials used in the National Tube Company's plant.

The outbound tonnage shows the same degree of specialization. The entire tonnage originates in the National Tube Company's plant and moves to interior iron and steel centers, particularly to the U. S. Steel plants at McKeesport and Denora. The iron ore, constituting 85% of the outbound tonnage represents a portion of that from the ore docks of the National Tube Company. There are not the seasonal fluctuations in this flow of tonnage that characterize the tonnage of the Baltimore and Ohio, because the National Tube Company has the facilities for storing the ore thus permitting it to flow more regularly to interior furnaces through the winter season.

While the total tonnage of this railroad is only about 30% of the total tonnage of the Baltimore and Ohio railroad, the Wheeling and Lake Erie connection is of great importance to local industries of Lorain.

Nickel Plate Railroad—Giving Lorain a fast east-west freight service, the Nickel Plate connects with the large eastern and western urban centers. Toward the west Sandusky, Fort Wayne, Lima, Indianapolis, Chicago, Peoria and St. Louis are urban centers connected by this railroad to Lorain; while toward the east, the connection is with such important cities as Cleveland, Buffalo, Rochester, Syracuse, Troy, and New York. In Lorain a narrow right-of-way averaging 150 feet in width and running in a northeast-southwest direction straight through the city, has been developed with switch tracks, warehouses, and both passenger and freight depot facilities. The crossing of Black River is accomplished over a structural tressel interrupted by a 400-foot swinging bridge that spans

the river (Fig. 5). The bridge is located three-fourths of a mile upstream from the mouth and is on a level with the lake plain surface, about thirty-five feet above the water.

Another Nickel Plate connection is made by means of a spur-line which branches off of the main line two and a half miles east of the city limits. This spur line avoids Black River gorge, runs south, and enters South Lorain from the east.

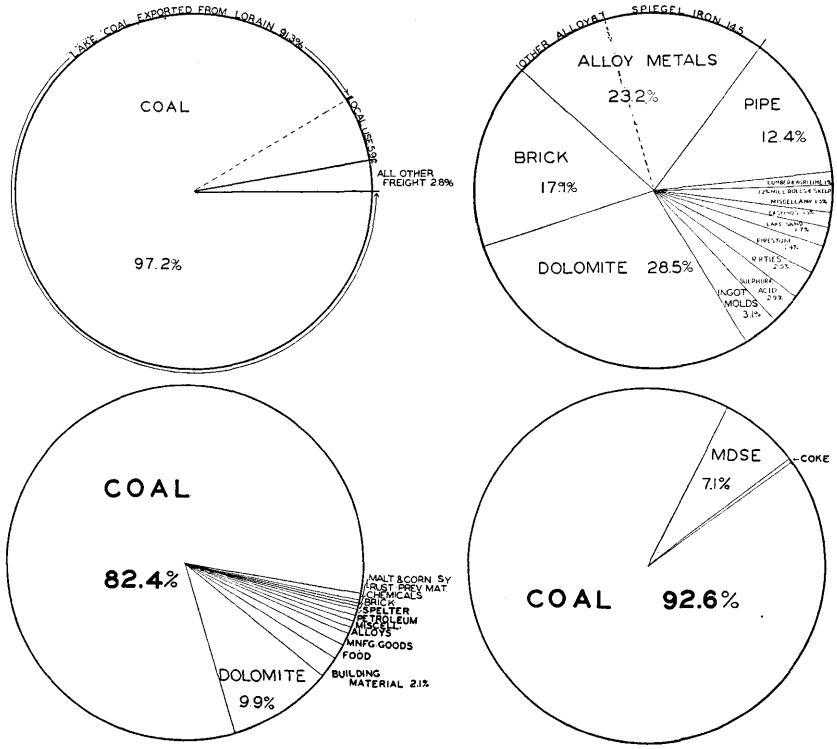

FIG. 19. Commodity analysis of inbound freight over the individual railroads serving Lorain. Upper left, Baltimore and Ohio R. R.; upper right, New York Central R. R.; lower left, Nickel Plate R. R.; lower right, Wheeling and Lake Erie R. R.

These two Nickel Plate connections with Lorain have divided the business in such a way that two railroad offices are maintained. The one in South Lorain is a consolidated freight office handling the South Lorain business for three roads, the Nickel Plate, the Wheeling and Lake Erie and the New York Central; while the Lorain office (on the main line) handles exclusively the business of Lorain.

This road is Lorain's second largest freight carrier with a total tonnage equal to approximately 40% of that carried by the Baltimore and Ohio railroad. Although the downtown office is on the main line of the railroad, only 20–25% of the tonnage is handled through that office and 75–80% in the South Lorain office. Two distinctly different classes of freight are handled at the two different offices. Long trains of raw materials coming in and of heavy bulky materials going out is characteristic of the South Lorain, while the Lorain freight is characterized by package freight, and individual carload shipments and receipts. The significance of this road to the industries of Lorain is shown by the commodity distribution of the South Lorain division of the road. The two most important are coal, principally for the coke plant, and dolomite for use in the blast furnace. This coal originates in the Pittsburgh district (Muse, Pa., and Mifflin Junction, Pa.) and from Gary, West Virginia, but is fed northward to the Nickel Plate by other railroads that serve the coal fields. Raw materials for industries being in constant demand there is a regular flow of traffic in the inbound tonnage.

The outgoing tonnage of the Nickel Plate is dominated by the transhipments of iron ore from the National Tube docks. The volume of freight in the summer months over this road is as much as fifteen times what it is during the winter months. Often the railroad facilities are taxed to the limit for a short season, then there is a quiescent period when most of the ore is moved to furnaces in the Mahoning Valley. When conditions like this prevail men are placed on a waiting list and employed from day to day. Pipe from the National Tube Works is the next most important article shipped. This pipe moves in two directions over the Nickel Plate—southwest to oil fields and east to export points.

Although coal also dominates the freight business of the Lorain office of the Nickel Plate, food supplies make a sizeable showing. This railroad connecting as it does with eastern and western cities is the general household supply road for the city of Lorain. Monthly consignments of eighteen to twenty carloads of meat from Chicago, ten carloads of wheat flour from Kansas and Minnesota, manufacturers from New York, malt and corn sugar from Argo, Illinois, are important household supplies carried and are examples which show the significance of this railroad connection. This freight is character-

ized by an almost incredible number of articles and provisions needed in the homes of Lorain. The coal that enters so prominently into the tonnage is the steam coal used in the carbo-electric generating plant and domestic coal to local coal dealers of Lorain. No export coal shipments are brought to Lorain over any railroad except the Baltimore and Ohio.

New York Central—The main line of the New York Central railroad from Chicago to New York does not touch Lorain but runs through Elyria eight miles south. However, a spur line extends from the east edge of Elyria northward parallel to the course of the Black River to connect with the other three railroads that enter South Lorain from the east. This gives a rather indirect connection with the main line but is important because the road makes available a certain territory not served by other railroads of Lorain. Only freight service is offered over this railroad, and the business is handled at the South Lorain consolidated railroad office.

By reason of the indirectness of its connections with Lorain and because this railroad serves no particular section of the country that is exclusive in the production of raw materials, the railroad tonnage of the New York Central is the least of any line serving Lorain. That it is not a transporter of raw materials for local industries but rather a service railroad transporting finished products is shown by the excess of outbound freight over inbound tonnage. This excess reaches a maximum during the summer when iron ore for transhipment to "Valley" furnaces is added to the finished products of the National Tube Company. And for some months during the summer iron ore tonnage surpasses the tonnage of steel pipe, but manufactured steel pipe moving to world markets normally dominates the outbound tonnage. Shipments of pipe are characteristically large scale. Long trainloads move out in response to the orders from oil and pipe-line companies. Orders for pipe sufficient to construct a pipe line five miles to one hundred miles in length are not uncommon. Of all the outbound freight over this road, manufactures from local industries make up more than 72% of the total and the industries are responsible through organization for 98% of the total. (Fig. 17).

The inbound freight over the New York Central railroad is shown to be dominantly raw materials of a specialized nature. Refractory brick, alloy metals and dolomite make

up 68.8% of the total tonnage. Pipe made in other plants and which constitutes 12% of the tonnage is transported to the Lorain mills for further processing or to help fill very large shipments out of Lorain.

By the more even distribution of commodity tonnage over this road, hence a less tendency toward seasonal fluctuations, the number of employees affected by the temporary nature of these jobs is less than for other railroads. However, the employment of men is done through the consolidated office in South Lorain, the monthly expense of which is borne by the participating railroads in proportion to the monthly tonnage handled. This cooperative practice of the railroads militates against the seasonal fluctuations of railroad employment.

Highways—Lorain has a network of concrete and macadam highways consisting of one major through highway, four secondary highways, and several county feeder roads. The highway of primary importance in truck and car traffic is the "Lake Road," or Erie Avenue through Lorain, which connects with Cleveland on the east and Vermillion, Sandusky and Toledo towards the west. This road, known as Federal highway No. 2, is of the boulevard type through Lorain, being sixty-six feet wide from curb to curb and well improved. The traffic over this trunk highway is heavy and of three types: tourist traffic attracted to the route because of its scenic location along the lake shore; the heavy truck traffic between the cities, particularly Cleveland and Toledo; and the local automobile traffic that is made heavy by the many north-south county feeder highways. No other highway in Lorain approaches this one in the volume of traffic handled. Fleets of heavy trucks bearing supplies from Cleveland to the local merchants, and long trailer trucks hauling automobiles, automobile bodies and parts between Cleveland and Detroit, or Toledo, characterize the heavy traffic on this important highway.

The Lorain system of seconday highways consists of three highways which enter Lorain from the south, and one highway which enters South Lorain from the east. None of these roads is continuous through Lorain but function as important cross highways between the "Lake Road" and the "Ridge Roads," which parallel roughly the former. In its functions, the South Lorain highway is the same as the north-south system for West Lorain. Only one, Leavitt, at the west edge of Lorain, has been designated as the beginning of highway No. 58 (Ohio

state highway) and carries a limited traffic in a southerly direction. For Lorain this secondary system performs two important functions: (1) it connects with the county's system of local roads, thus making connections with the rural labor supply for Lorain industries; and (2) it concentrates cross country travel by the converging pattern, which terminates at Lorain. The abrupt ending of these roads at the Lake Shore highway brings some business to the city which would be lost if these roads were through highways. Although these highways are important locally, they are narrower, less direct, and have more of a perfunctory nature than the Lake or Ridge roads. In every instance, these roads merge with the important through traffic streets in the local pattern. But these have been fully described elsewhere.

D. COMMERCIAL UTILIZATION OF LORAIN

1. *Segmental Character of the Commercial-retail Section*

General Characteristics—The retail-commercial development really consists of one long commercial core along Broadway in West Lorain, one commercial-retail nucleus in East Lorain, and four distinct nuclei in South Lorain. And while there is a tendency for these quite isolated nuclei to be joined to the main commercial-retail core of the city by means of street railways, through uninterrupted street traffic, etc., they are quite separated from each other by long sections of undeveloped urban land. Except in the case of the Pearl Street commercial-retail section in South Lorain, this segmentation is due to physical separation rather than independence of function.

Of these major concentrations two-retail-commercial centers, or nodes developed early. One node occurs on Broadway near the intersection of Erie Avenue and Broadway, and the other at the intersection of Pearl Avenue and Twenty-eighth Street, the location of the general offices of the National Tube Company. (Fig. 21). These two nodes, located three miles apart and each maintaining a considerable degree of individuality, have been persistent centers of later development.

The total area devoted to commercial-retail development is large.[28] An abundance of land has been available throughout

[28]The commercial-retail section is made somewhat larger by the inclusion of certain business types that sell their services as well as those that are purely retail business types. Such are: cleaning establishments, gasoline filling stations, garages where the retail function predominates, printing offices, as well as the purely retail establishments have been classified as commercial-retail. (Fig. 5).

all periods of Lorain's expansion and as a consequence the characteristic development has been to occupy much surface rather than to develop vertically. The commercial-retail pattern, therefore, presents a sprawled aspect instead of a much concentrated nuclear form. Tall buildings are the exception and not the rule. There is but one five-story building and five four-story structures, three in West Lorain and two in South Lorain.

There are in Lorain approximately 610 business establishments here classified as commercial-retail.[29] Of this number 25% are grocery stores, 7% are meat markets, 14% are clothing, dry goods and department stores, 5% hardware stores and 1% drug stores. The preponderance of these provisional stores is evidence of the dominantly laboring characteristics of the population, and harmonized with the industrial-commercial functions of the city.

Because of the secondary and concentrated nature of retail and commercial establishments, the true proportional importance of these establishments in the life of the city cannot be measured by the surface utilization alone. Where an occupational measure is applied, it shows that the commercial-retail activities of Lorain actually support over 3,000 wage earners and is next to the basic iron and steel industries of Lorain. Thus the commercial-retail section is not only important from a functional standpoint, but also supports a large aggregate[30] number of people who in turn constitute a large portion of the city's population and are in part responsible for its institutions. The provisioning establishments which are so characteristic of Lorain employ 55% of the wage earners in the group of secondary establishments.

In order better to present the local picture of the large commercial-retail development of Lorain it is necessary to refer separately to each of the commercial nuclei that make up the whole picture.

Broadway Core—The principal commercial-retail section of Lorain starts at Erie Avenue and stretches southward along both sides of Broadway for a distance of two miles (Fig. 5). The west side of the street being much more intensively utilized than the east side where there exist some conflicting

[29] "Lorain, the City," publication of the Chamber of Commerce, p. 16, 1928.
[30] Fifteenth Census of United States, Supplement on Character and Composition of the Population, Table 25.

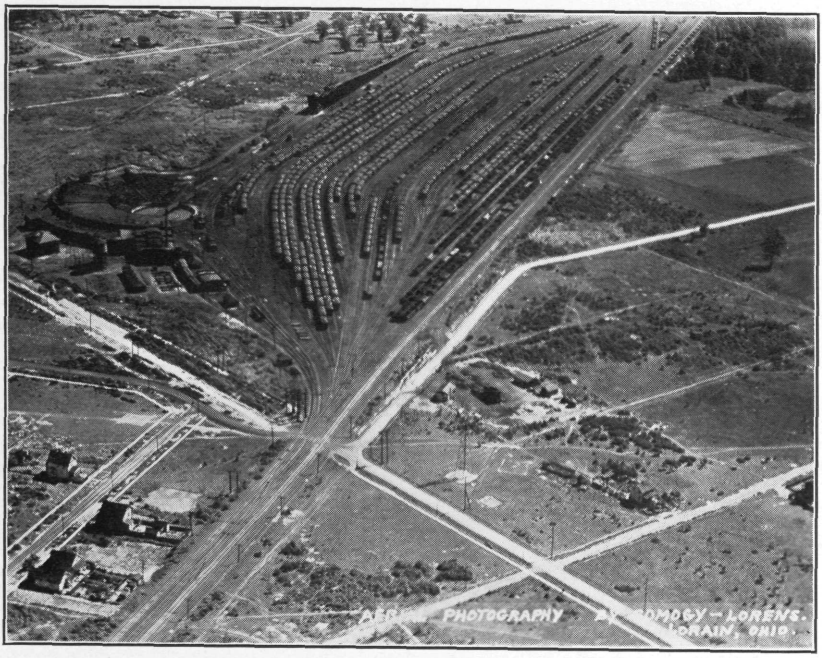

FIG. 18. Aeroplane view of Baltimore and Ohio Shops and Car Storage Yards adjoining the corporate limits of Lorain.

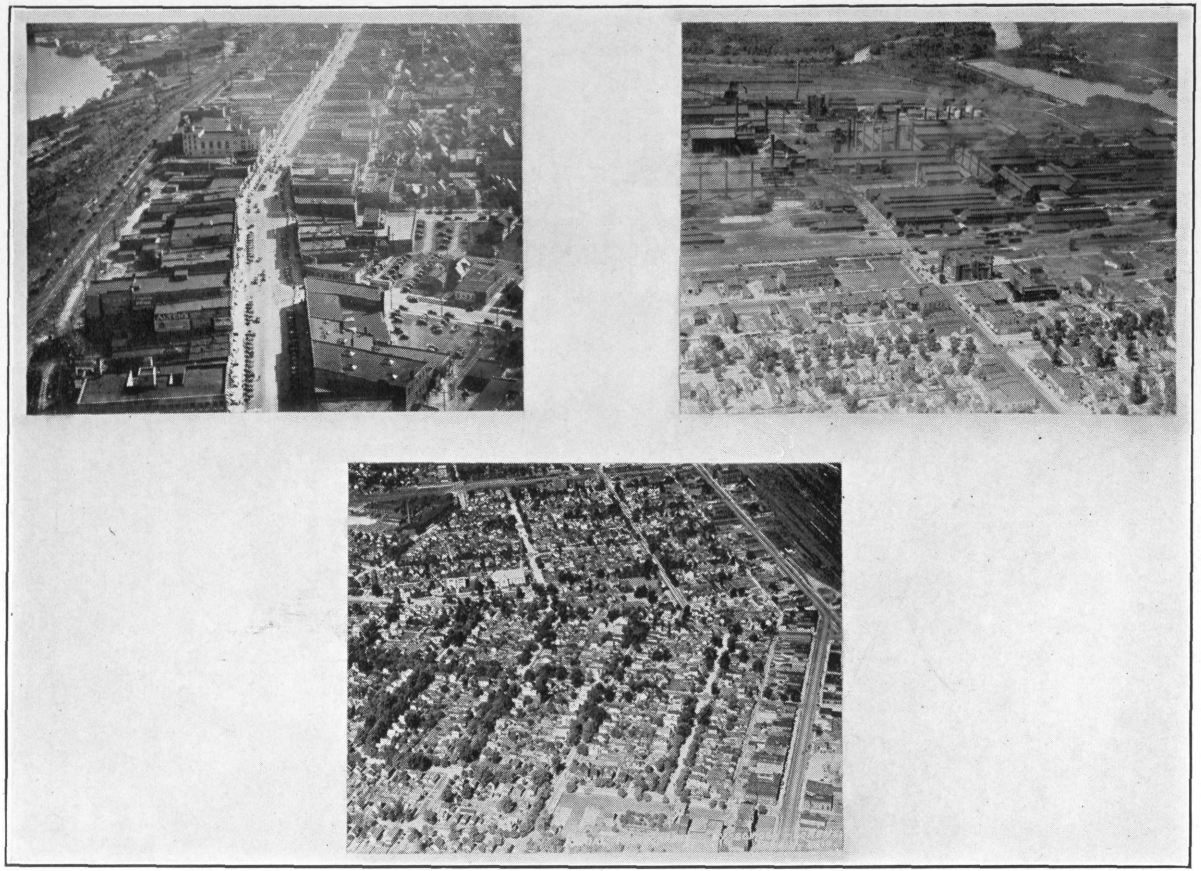

FIG. 20 (upper left). Broadway looking south, a portion of the long commercial retail core of Lorain.

FIG. 21 (upper right). Principal commercial retail nucleus of South Lorain. Main offices and a portion of the National Tube Company's plant are also shown.

FIG. 22 (lower). Residential section of West Lorain between Broadway and the plant of the National Stove Co.

Photos by Somogy–Lorens, Lorain

urban associations. Commercial-retail development has possessed generally about one-half the block along the side streets at right angles to Broadway so that the zone of commercial encroachment upon the residential area is a rather limited one. In no other single instance throughout the entire length of Broadway, except along Erie Avenue, has the development fully occupied the first block along the side streets. While the Broadway side of the block is commercialized, the other three sides away from Broadway are mostly residential. (Fig. 20).

On the east side of Broadway no opportunity for side-street development occurs. There exists only sufficient space between Broadway and the Baltimore and Ohio railroad tracks for one fourth of a block, which faces Broadway. Thus, all the east-west streets that cross Broadway terminate at the railroad tracks less than half a block east of Broadway. Therefore, there is no space for any side street commercial development on the east side of the core. This and the frequent vacant lots on the east side of the street give an unbalanced appearance to Broadway.

Although this main commercial-retail core gives the appearance of being continuous, there exists a local segmentation due apparently to an unevenness of opportunities for retail trade along this long street. Beginning on Broadway at Erie Avenue and continuing south, there is intensive utilization and an even skyline with closed structures until the railroad tracks are approached. Open spaces and less desirable structures then continue for seven or eight blocks. Where Broadway turns more directly south and thus avoids merging with Elyria Avenue, the opportunities for retail trade are increased by the intersection of two busy streets carrying through traffic. There results a more intense commercial utilization of the land and three blocks of closed structures. From this point the commercial-retail intensification again diminishes progressively south until Broadway intersects Twenty-eighth Street, which runs east in front of the National Tube Company's property. Again on this corner there exists a retail nucleus.

The profile of Broadway is a monotonously even succession of low, flat buildings. Only in the first two blocks on the east side of Broadway and the first four blocks on the west side are there enough three-story buildings to break the generally even two-story skyline. Brick and stone structures prevail on the west side of Broadway and are only interspersed with

frame buildings in the open associations that tie together the commercial segments of Broadway. While on the east side brick buildings extend generally only four blocks south from Erie Avenue before giving way to frame structures.

The occupation of Broadway as the commercial core of the city was in part inherited from the former periods when commercial-retail contacts with Black River were imperative, hence the first street that paralleled its course was the one occupied. This is shown by the intensive development in former periods of the block on Broadway west of Erie Avenue. Here the closeness of the river made business property much in demand. This condition obtained as long as Black River was used for general shipping activities. At present the vacant lots, decadent frame buildings, and the recognized undesirability of North Broadway (north of Erie Avenue) as a location for business houses show the change to be a relatively recent one. However, modern development has been south on Broadway and has resulted in an extremely long, drawn out, interrupted commercial-retail core. This development shows an allegiance to two important market forces, South Lorain where there live and work approximately one third of the population of Lorain, and West Lorain by inheritance the center of the city.

While there are in Lorain approximately six hundred business establishments that run the whole gamut of business types, the Broadway core possesses certain characteristics that harmonize with the city's industrial character. The preponderance of supply stores, such as grocery stores, meat markets, dry goods and notions, etc., show that the merchants cater to a laboring population. Many of the stores, especially the small provisioning establishments, are run by foreigners and cater to the special demands of the foreign element in Lorain.

Away from Broadway there is a surprisingly large number of retail establishments, most of which are grocery stores. The average number is three in every city block in the older sections of West Lorain. Practically all are small combination retail-residential establishments. These combination stores are especially numerous in the foreign sections where the store is run to supplement the family income. The man of the family usually works in the steel plant, and the store is run by members of the family who live either upstairs or in the back portion of the same building. While these combination

retail-residential establishments are more numerous and more uniformly typical of the foreign districts of the city, they also appear, usually modified, in other parts of the city particularly along the streets leading out of the city.

Along the east side of Broadway there exists some striking business associations not wholly commercial-retail. Along the narrow blocks may be found small factories, retail stores, coal yards, lumber yards, and old residences. Such uses reflect the relative abundance of commercial land and the rather extensive ways in which it is utilized. The coal and lumber yards extend to the Baltimore and Ohio railroad tracks where they receive their supplies. The retailing is done from offices which front on Broadway. These are relics of a former day which have remained because of the adequacy of commercial frontage on Broadway.

South Lorain Nuclei—The commercial-retail development in South Lorain is in contrast to the long Broadway core of West Lorain. Instead of being one long, more-or-less unified, commercial core, there are five business nuclei that exist quite apart from each other. All begin at Twenty-eighth Street (the street in front of the steel plant) and have their extensions along the north-south streets of South Lorain. Thus each nuclear development has the form of a T. The most important commercial-retail nucleus is at the intersection of Pearl Avenue and Twenty-eighth Street where the General office of the National Tube Company is located. Others are located at the Twenty-eighth street intersections of Vine Avenue, Globe Avenue, Seneca Avenue, and Grove Avenue.

The whole nuclear development shows considerable independence from the main core. Here are located separate real estate offices, the oldest bank in Lorain, the main offices of the National Tube Company, and independent railroad office, and many other smaller types of business that have little connection with the commercial core of Lorain proper. Yet all are enough unified to show that although they have developed individually as a consequence of the local market, they have collectively been the commercial-retail node that has tended to draw out the commercial-retail core on Broadway. The attractive market in South Lorain and the street electric railway connecting the Broadway core with the South Lorain nuclei have enchanced the desirability of the intervening urban land along Broadway. Good retailing opportunities occur at

points between the South Lorain Market and the commercial-retail node at Broadway and Erie Avenue.

Not only do the South Lorain nuclei show that they have developed as a consequence of the local market afforded by thousands of employees of the National Tube Company, but they are quite independent of each other. Each South Lorian nucleus is located in front of an important gate to the National Tube Company's plant. At each entrance hundreds of employees, or even thousands in normal times, enter and depart daily. In order best to serve the employees the commercial-retail establishments have selected sites along those streets most frequented by the workmen as they go and return daily from their homes to work in the plant. This local market condition has caused the elongation of the commercial-retail nuclei in the direction of the residential South Lorain rather than an intensive utilization of the Twenty-eighth street frontage. Moreover, the marked localization of business types in these nuclei is related to the same condition. Along the side streets are for the most part the home provisioning stores such as grocery, small hardware, drug and clothing stores; while along the Twenty-eighth Street frontage are the more general business types; pool halls, restaurants, rooming-houses, banks, garages, etc.

Each nucleus is an intensive cluster of brick buildings in close association, near the street intersection, but gives way quickly to open associations of frame and brick structures away from the street intersection. On Twenty-eighth Street less than half of the block is occupied by buildings, the remainder being left vacant.

Every retail-commercial cluster presents an abundance of evidence of an ethnic influence.[31] Since racial groups attempt so far as possible, to collect in certain residential sections and to work in the same plant units, these business establishments in certain nuclei show a racial affinity.

The combination retail-residential buildings reach their maximum frequency in South Lorain (Fig. 5). More than one-half of the buildings housing retail establishments also

[31]The following named business establishments selected at random exemplify the cosmopolitan atmosphere of those commercial-retail nuclei: Magyar Konyha, restaurant; El Morelos, pool room; Samaha's restaurant; Hungarian-American Barber Shop; Zboray's Haberdashery; A. Donerkeil, grocery; Repertorio-National-Mexicano; Andrew Mitre, notary public; Valeff, real estate; Palagyi Shoe Shop; J. J. Ockajik, grocery, etc.

provide the living quarters for the proprietor's family. As in West Lorain, these establishments usually attract a certain racial clientele and are run by members of the family while the man is employed in the steel plant. Occasionally the establishment has been sufficiently successful for the owner to devote his entire time to the business. The presence of so many of these supplementary business houses gives a peculiar foreign character to the commercial-retail sections in South Lorain.

East Lorain Nucleus—The commercial-retail section of East Lorain has developed across the river from West Lorain is in reality very closely related to the Broadway core. Except for its physical separation, this section is so small in comparison with the others considered that it hardly warrants separate treatment. Here are located the filling stations, the low, broad buildings housing automobile agencies, as well as several small provisioning-supply stores conveniently located for the people living in East Lorain. The first five blocks eastward from the end of the bridge and fronting on Erie Avenue are recognized by a city zoning ordinance as commercial and these are the only ones where any commercial development occurs. A few provisioning stores, mostly grocery stores, are located along Colorado Avenue and in front of the plant of the American Shipbuilding Company. While the isolation of East Lorain from the main commercial has been the means of some retail-commercial development, contacts are sufficiently easy to discourage any pronounced development. Little retail development occurs on East Erie Avenue because of the through nature of the traffic and ordinance regulations which prevent that form of development.

E. RESIDENTIAL UTILIZATION

1. *Residential Sections and Types of Houses*

Lorain as a Residential City—Modern Lorain is essentially a residential city for its own industrial wage-earners. Though the city has over 44,000 people, of whom 12,000 are employed in the primary industries, there remain approximately 5,000 wage-earners who live in Lorain but who are employed in other industries.[32] There are 8,307 dwellings in Lorain which are

[32]There are in Lorain 17,726 gainful workers. Fifteenth Census of U. S., Ohio Supplement, Occupational Statistics, Table 8.

required to house these people and which utilize approximately 60% of the occupied urban land in the corporate limits.[33]

The modern appearance of Lorain's residential sections results from the recency with which the city has had its maximum growth. Seven-eighths of the population has come to Lorain since 1890 and the residential sections have been extended proportionately. Architectural styles have not changed sufficiently in the last forty years to render any residential section conspicuous because of the age of its buildings. Any old structures that have remained tend to be lost in averages or rendered inconspicuous by the modern structures that surround them. Most of the old residences that occupied the downtown streets have been destroyed to make space for either more modern residences or for commercial purposes. Moreover, most of the residential types have been constructed since building and zoning regulations came into effect which have operated to produce an equality of appearance, value and conditions.

Although there exists some variation in the quality of the residences and of the residential sections, or even with residences within the same locality, there is a remarkable evenness of quality and appearance that blankets most of the city. This is due apparently to the similarity of building sites and the general equality of employment that exists in Lorain. Approximately 60% of the families own their own homes and of these 72% have a value of $3,000 to $7,000; while 18% are above $7,000 and only 10% below $3,000.[34] However, some sections, notably those along the lake shore and some others that front on city parks, have by their more desirable sites, more expensive homes, and greater spacing, been recognized by the city zoning ordinance as type "A" residential sections. But even in these localities, there does not exist the great disparity in residential values, in residential types and in diversity of sites that are so frequently present in other cities. Therefore no separate classification based upon degrees of inequality has been made on Fig. 5. But the disparity in residential desirability will be apparent from the regional residential descriptions.

Another residential classification which is typical of Lorain and which harmonizes with the industrial and commercial

[33]Fifteenth Census of U. S., Ohio Supplement, Classification of Families, Dwellings, etc., for cities and towns, Table 21, p. 42.

[34]Fifteenth Census of U. S., op. cit., Table 21, p. 40.

development is one based upon residential types. In Lorain there has been an attempt to decrease the rental costs to the individual family by building two-family, three-family or even four-family (duplex, triplex or quadruplex) houses. There are 1,076, or 12% of the total number of dwellings in Lorain, which are such residences. But in practically all cases, the lots are large and the spacing so well regulated that there is no over-crowded district where slum conditions prevail.

Another general condition that obtains and which is made manifest in the generally improved appearance of the residential sections, is the high percentage of home owners in the foreign population. Although 55% of the population of Lorain is foreign (being those born of foreign parents as well as those foreign born) and 68% of the total number of families in Lorain are foreign, yet these people own 71% of the total number of homes owned in Lorain.[35]

The residential picture can best be presented in parts by a regional treatment.

Residential East Lorain—East Lorain presents the greatest extremes in residential types, desirability and conditions to be found in Lorain. From the small cottages closely set on the narrow lots in front of the American Shipbuilding plant, to the large homes with spacious, landscaped lawns found along the lake shore, are presented the greatest residential contrasts in Lorain. But these are rather localized extremes. Many more homes which occupy a much greater amount of urban land are more typical of East Lorain.

Elsewhere in East Lorain are the average 1½-story bungalow and 2–2½-story cottages of 5–6–7–rooms each that range in value between $3,000 and $7,000. The average type of home occupies approximately 50% of the land devoted to residences and constitutes the basic characteristics of the East Lorain residential section. Practically all houses in this group occupy 50-foot lots with a depth of 120 feet, though the depth varies more often than the width. Houses are placed 15 to 20 feet from the sidewalk with ample spacing for a driveway between and there is enough variety in architectural styles.

This residential section is so isolated by the continuous gorge of Black River that the difficulty of getting to the active sections of Lorain is almost as great as living in the neighboring city of Elyria, eight miles south. The closest street car line is

[35]Op. cit., p. 40.

three-fourths of a mile away, and by road West Lorain is two miles and South Lorain two and one half miles away with no regular means of transportation in either direction.

A few other peripheral residential subdivisions exist in East Lorain, but under existing conditions they are on the outer margins of present maximum development. While these residential extensions lie well inside the city limits, they are undeveloped.

Residential West Lorain—Perhaps the best way to picture the residential conditions of West Lorain is to show the average conditions first, and the variations as exceptions. (Fig. 22).

Approximately two-thirds of the residential land in the entire city is located in West Lorain. Block after block and street after street have the same general appearance (local exceptions will be pointed out later). Houses occupy 50-foot lots with variable depths, the spacing between houses and in front is regularly 15 to 30 feet, and 72% of the homes vary in value between $3,000 and $7,000.[36] Approximately 90% of the residential section is classified as "B" type by the city zoning ordinance. Practically all houses have a small lawn and with gardens on the vacant lots.

However, there is a zonal arrangement that changes the appearance and breaks the sameness throughout. In the inner zone are blocks in which almost all building sites have been fully occupied by buildings with older styles of architecture; while on the residential periphery are new homes with the latest architectural features embodied and often spaced irregularly apart because of the irregular occupancy of the lots. This gives a new and open appearance to the latter, and a more crowded appearance of older buidlings to the former. The relative desirability of residence in either of these zones would depend upon individual selection rather than any great difference in the conditions that obtain.

One other section is possessed with a condition that militates against it for residential purposes. In the first two tiers of blocks west of Broadway, there has been some commercial encroachment. Residences in this location are characterized, not so much by the actual encroachment, but by the increase in value of the land and the consequent alterations that have been made in the residences to make them yield a greater

[36]Fifteenth Census of U. S., Ohio Supplement, Families, etc.; op. cit., Table 21, p. 40.

income. Large residences, and most of the older houses were large, have been converted into flats or apartment buildings. Very often semi-commercial establishments such as beauty parlors, funeral homes, small barber shops, florists, patent medicine agencies, tea rooms, occupy the first floor or a portion of it. Although this commercial encroachment increases the value of the property for commercial purposes, it decreases the desirability of such sections for residential purposes. Also the commercial influence causes a pronounced desire to utilize the yard space to the edge of the sidewalk. Small shoe shops, barber shops, or pop corn stands often appear as separate buildings in the corner of the yard. Throughout the length of this tier of blocks there is this encroachment and various forms of residential modification.

One exception to the average in residential types and conditions, is a superior residential section bordering Lake View Park and the lake front, on West Erie Avenue. Here are located some of the most expensive and attractive homes in Lorain. Although the lots are uniformly 50 feet wide by 120 feet long, houses often occupy two lots. The houses are of brick with spacious landscaped lawns, and are individually placed near the center of the building site. These homes vary in value between $10,000 and $30,000. The site is a level lake plain, which is true of all the residential sections. However, the west side of the city the peripheral location of the subdivision, the open park development, and the relatively short distance to the lake front across the park make this section the most desirable for the wealthier individuals of Lorain.

A second exception, which is as much below the general average of residential condition in Lorain as the former above is a section of only twelve or fourteen blocks. This small section is located between the Nickel Plate railroad tracks and Broadway, and extends south to Seventeenth Street and west to Long Avenue. In the original survey the lots were large, 75 feet, but subsequent development caused these lots to be divided and houses to be erected on half the lot. The houses were small 4–5 and occasionally 6–room, one-story or one and a half story cottages. Moreover, the residences are six to eight feet from the sidewalk, leaving only a miniature lawn with little or no landscaping. This section of the city is occupied mostly by Italians and colored families and is crowded in places.

Residential South Lorain—As referred to in more detail elsewhere, the residential section of South Lorain proceeded according to the plan of the Johnson Steel Company. Here live more than 12,000 people of over twenty nationalities on sixty blocks of urban residential land.[37] Residences were planned and regulated one to each lot with a 50-foot frontage. However, the lots were deep and the houses were spaced uniformly 15–20 feet away from the sidewalk which in turn is laid allowing a 10–15-foot parking. Houses are 1½ to 2½-story cottages well kept and pleasing from the outside. In many places small hedges are set along the property line; while in other sections a small fence incloses the yard. Shade trees set along the parking which faces an exceptionally broad street are impressive because of its spaciousness.

Duplex houses are found in almost every block and usually several in every block. These houses are simply double houses with a single porch divided into two parts and with two entrances, all under one roof. These houses are almost all alike but they have been so interwoven into the entire pattern that they are not conspicuous. Only in two or three blocks does this type of residence predominate. One short block (30th Street and Vine Avenue) where there are twelve such 2½-story brick duplexes is the densest settled block in the city of Lorain. But in spite of the increase in the number of people in each block, the residential appearance is generally a pleasing one. The entire residential section of South Lorain is classified as "B" by the zoning ordinance. This classification makes the section little less desirable than the classification on the lake shore. The most degrading element in the residential section of South Lorain is that some of the east-west residential streets have not been paved but left graded and with gravel surface.

F. OTHER SURFACE UTILIZATIONS OF LORAIN

1. *Public*

Public Functions—Lorain, as a dynamic organism, is called upon to perform manifold public functions. Some are those common to all cities, but a few are in response to local needs.

[37] The population in Sheffield Township in 1930 was 15,873. (Fifteenth Census of U. S., Ohio Population Bulletin, first series, Table 4, p. 21.) Less than 2,500 of these live in the Sheffield Township's portion of East Lorain.

Such important functions as the construction and maintenance of streets and roads; police and fire protection; construction, maintenance and administration of public schools; establishment and operation of an adequate and safe water system; provide and maintain a sewer system; establish and administer parks, playgrounds, bathing beaches, and other recreational facilities; and many other functions of lesser importance are all performed by the City of Lorain. For every public service there is usually some cultural form, and in some cases there are many forms, in the landscape. Very often the number and size of the forms are criteria of the magnitude of the municipal performance. In addition, there are in Lorain cultural forms which are established to perform governmental functions, such as light houses, life-saving stations, a harbor and ship inspection boat, postoffices, etc. While there is a third group of forms that perform public services, but which are semi-public in their maintenance. Churches, hospitals, foreign and domestic clubs, social welfare houses, etc., are such forms in the Lorain landscape. All of these cultural elements have here been interpreted broadly and mapped (Fig. 5) as public utilization because in them the general public participates and by them the people of Lorain benefit.

Schools and Churches—There are in Lorain twenty-two school buildings located, three in East Lorain, seven in South Lorain and twelve in West Lorain. The many school buildings in a city the size of Lorain reflect not only the divided city and its extended plan, with the consequent necessity of placing the public schools in several sections of the city; but it also reflects the many religious sects among the foreign population who maintain parochial schools in connection with the church of their choice.

The aggregate amount of urban land provided for school purposes is in excess of 180 acres or second after parks in the utilization of land devoted to public uses. This is probably a more generous allotment than is found in many other cities: (1) because of the large number of schools and (2) because of the abundance of urban land in Lorain.

The large size and excellent condition of the school buildings, particularly the public schools, reflect the wealth of industrial-commercial Lorain. The taxable assets of the large industrial plants and extensive railroad properties support

proportionately much of the public school system. Moreover, bond issues for constructing new and better school buildings are readily voted by the laboring populace when industrial plants pay a large proportion of the bonded indebtedness. To maintain good school buildings in this way is often possible without the taxes becoming too burdensome as attested by the tax rate of 21.6 mills in Lorain, which is materially lower than the tax rate in most of the neighboring cities.

The emphasis that is placed upon religion in Lorain by the erection of thirty-one churches, some of which are magnificent structures, is occasioned by the very large number of racial groups. There are sixteen churches in South Lorain, fourteen in West Lorain and one in East Lorain. Over one half of the churches are supported by foreign racial groups and many of the large churches operate parochial schools in connection.

Public Services—Lorain's first water system was installed in 1884, when water was pumped from the adjacent lake directly into the city mains.[38] At this point in Lake Erie the water is less than 30 feet deep for two miles out in the lake and lake bottom consists of a very fine blue clay. When agitated by strong winds, the water becomes laden with fine silt, and when mixed with the contaminated organic matter added by Black River, unhealthful conditions prevailed.[39] To complicate and render more difficult the problem of obtaining a pure water supply, the first sewage system in Lorain was installed about eight years after the water system (1892). The sewer emptied into Black River within two-thirds of a mile from the water intake. During this early period Black River earned the sobriquet, "a mudhole, tainted with malaria and typhoid fever."[40] The silt-laden water that was available and the recurring typhoid epidenics in Lorain caused the city to construct in 1897 a filtration plant which had "the distinction of being the first municipal filter plant in the country to be built upon a bacterial guarantee."[41]

These earlier water and sewage systems have been greatly enlarged in subsequent years of city expansion. Now the systems consist of eighty-nine miles of water mains and eighty-eight miles of sewage lines. The same direct system of sewage disposal has been used up to the present time. However,

[38]Wright, op. cit., p. 293.
[39]Teague, op. cit., p. 29.
[40]Ibid., p. 31.
[41]Wright, op. cit., p. 293.

the city has been ordered by the State Department of Health to provide a sewage disposal plant to improve the condition of the lake water. The present water pumping and filtration plant is located two blocks west of the mouth of Black River. This location partly on the lake-plain level and partly on the lake level facilitates the intake of water, its filtration, and the distribution through the city system.

Due to the low gradient of the sewage system, occasioned by the relatively low relief of the lake plain above the lake, some difficulty is experienced with water backing up in the mains and causing damage by flooding the basements. Particularly during the summer when there is a sudden downpour of 2½ inches or more of rain from thunderstorms.

The construction and maintenance of streets and roads is another important urban function in Lorain sufficient to keep about thirty men employed. The city system includes one hundred and eleven miles of streets, of which seventy-eight miles, or 70%, are paved mostly with brick and asphalt, and thirty-three miles, or 30% are unpaved. Most of the latter are improved by grading and surfacing with gravel, but a few streets, particularly on the periphery of East Lorain, are yet unimproved.

The high percentage of improved streets is encouraged by the soggy nature in wet weather of the lake-plain terrain. Unless streets are improved they become literally impassable for a large portion of the year, and thus may not be used in a semi-improved condition. The relatively great taxable wealth added to Lorain by the heavy industrial plants and extensive railroad transportation properties make possible the improved condition of the urban street system.

Many other municipal and public functions are provided by the City of Lorain, but these are of lesser geographic importance and interest.

Parks and Recreational Facilities—Lorain has an extensive system of parks and playgrounds well distributed throughout the city. The greatest amount of urban land devoted to public use in Lorain is in parks and playgrounds. This is significant in view of the great proportion of open spaces available throughout the city. This may be attributed to the recency of the city's development and the consequent agitation of the public for using urban land in such ways. Also, the city's location along the lake shore provides bathing and recreational possibilities not accorded inland cities.

Two large city parks with piers and bathing facilities are conveniently located along the lake shore one in West Lorain and the other in East Lorain. The greatest handicap in these two locations is that the lake shore is an erosional one and considerable money has necessarily been expended to build protective piers and otherwise render the beaches suitable for bathing.

Another large park containing seventy acres of urban land and yet in a semi-primitive wooded state is located in South Lorain. This park was set aside as a part of the urban developmental plan of the Johnson Steel Company. Later the park was donated to the city by the Sheffield Land Company and was added to the park system. The present undeveloped state of the park is due to the relative abundance of park and playground facilities available on vacant lots and in the open spaces of South Lorain.

Several other smaller parks and playgrounds are provided by the city. Throughout the summer season the parks teem with the cosmopolitan people who take advantage of such facilities.

The natural clayey soil when baked by the hot summer sun provides an excellent play-ground surface that requires little maintenance. The abundance of tennis courts, baseball fields and playgrounds in the city parks is related to the relative ease with which they can be provided and afterwards maintained.

2. *Fishing*

Fishing is Lorain's oldest industry and the only one that has continued as an element in the landscape without interruption through all periods in the city's development. At present it is only of minor relative importance from the standpoint of urban land utilized, number of fishermen employed, and the total annual catch. This industry has long passed its heyday of great "catches" and must be reckoned as a decadent, though persistent, industry.

Three fishing companies now occupy about five acres of land on the west banks of Black River about three-fourths of a mile from the mouth of the stream. Six or eight fishing tugs and twenty–thirty men are employed in the industry during the fishing season. The season begins just as early in the spring as the fishing tugs can get into the open lake water, which averages around the 15th of March and continues until

the 15th of December, or when navigation is no longer possible on Lake Erie. Fishermen recognize two seasons during which time different methods of making the catch are employed.

The continued exploitation of the fish resource has caused an alarming decline in fish production. The present annual catch of the Lorain fisheries, though very erratic, has declined from about 4,000,000 pounds in 1900 to around 1,000,000 pounds annually.[42] The white fish, herring and sturgeon, which were the fish in greatest demand in the early days have now become almost entirely exhausted and are replaced by lake perch and pike. The annual decline in fish production and consequent contraction in the fishing equipment characterize the present industry.[43]

3. *Agricultural and Vacant Land*

Quasi-Agricultural—On the outer fringe of the residential sections of Lorain is an irregularly bordered concentric zone of vacant land. The zone varies in width up to one-quarter of a mile and is most continuous around the residential sections of the city. The zone is made up of acreage tracts varying in size from 9 acres to over 96 acres each. Nor is the zone everywhere within the corporate limits. On the south it avoids the residential sections of West and South Lorain which here extend to the city limits. From all appearances the land is suitable for agricultural purposes or excellent for gardens, but it is left in grass on which milch cows and goats are grazed. This land is held for speculative purposes. The value of the land is around $500 to $1500 per acre, depending upon its location, and is, therefore, too valuable to be farmed. To have growing crops on the acreage tracts would lower their value for subdivision purposes. The land is held without being developed, and, except for occasional small gardens, is allowed to be utilized only as grasslands. After the tracts are sold and have been subdivided they are then used for growing large gardens.

Very little purely agricultural land is found in the city limits of Lorain. In every instance the tracts that are used for agricultural purposes are located outside the quasi-agricultural zone.

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[42]Teague, op. cit., p. 51.

[43]Prior to the World War, the Ranney Company operated seven other fisheries in addition to the one in Lorain. These fisheries were located in Cleveland, Port Clinton, Vermillion, Fairport, Menominee, Ashtabula and Erie. At present the Lorain fishery is the only one operated by this company.

Quasi-Industrial—Just across the river from the steel plant and bordering on Black River are nine rectangular tracts of vacant land. These tracts vary in size between 7 acres and 121 acres each. The aggregate acreage of this land lying partly on the flood-plain and partly on the upland lake-plain is in excess of 610 acres, or 10% of the total amount of urban land. Five of the tracts have exposures on the navigable section of Black River while four have frontages too far upstream. This great block of urban land has industrial potentialities.

Potential Residential—Classified under potential residential is all land in Lorain that has been subdivided for residential purposes but which is yet largely vacant. There are at least fourteen such subdivisions ranging in size from two to fourteen city blocks each. In all subdivisions so classified, at least 50% of the total space, and in most instances 75% or more, is not occupied at the present time and is, therefore, available for residential development. Most of the potential residential land is in East Lorain where isolation, due to lack of transportation facilities across Black River gorge, renders the land less desirable. But in West Lorain the zone of potential residential land is rapidly being occupied to the extent of encroaching upon the zone of quasi-agricultural land outside. The potential-residential land, which is all immediately available for residential purposes, is in excess of one-fourth of the total amount of land now occupied by residences.

G. RELATION OF LORAIN TO ITS REGIONAL SURROUNDINGS

1. *Market Situation of Lorain*

In the foregoing pages the integral organic parts of Lorain have been shown. The following pages will be devoted to a unification of these parts and an explanation of how they function collectively in the regional picture.

The position of Lorain near the population center of the United States and in respect to the markets for the products manufactured in Lorain is a favorable one. Moreover, the intricate railroad network, that emerges from the narrow lowland in northeastern Ohio to radiate fan-like in a southwesterly direction, offers Lorain excellent regional connections with these markets. From Lorain there is a surprisingly large number of optional routes to the same market centers. So

many, in fact, that the practice is for the large shipper to designate the route, including all connections, which the shipment makes.

The two manufactured articles of greatest volume and which move directly to market centers for consumption are pipe and rails. The former is consumed in all sections of the United States where pipe is used, but in greatest volume in the oil and gas fields of the southwest and of California, as well as to oil producing foreign countries. For example, three general routes are used for shipments of pipe to the California oil fields. One is over any one of four railroads to export points on the North Atlantic coast where by boat the shipment is coastwise; another is by rail to the Ohio River, then by barge to New Orleans and by boat through the Panama Canal and to its destination; and the third is an all-rail route to California. However, the first two are used more often than the last because the cost is somewhat less. Not infrequently the time saved in an all-rail shipment is sufficient to absorb the increased costs of such routes. Particularly is it true in pipe shipments to the mid-continent oil fields where the cost-difference between all-rail consignments and mixed rail-and-water shipments is less. In any event the shipper or the consignee designates the route over which the shipment goes. The value of steel pipe is sufficiently great to insure its movement from Lorain. The choice in routes is often determined by local circumstances or conditions.

With patented "girder" rails and with "Lorain" shovels the market situation is slightly different. These products, by their specialized nature and patent protection, move to widely distributed markets throughout the world in spite of the shipping costs. However, the central location of Lorain with respect to centers of greatest consumption of these products is favorable to the city.

While for most of the other steel plant products the closeness of Lorain to the iron and steel districts where billets, blooms, skelp, etc., are used, and to the chemical centers where many of the by-products are consumed is an important factor in the distribution of these products of the local plants.

2. *Metropolitan Influence*

That the influence of Metropolitan Cleveland reaches out and encircles Lorain is obvious from the local landscape. The

Lorain branch factories with headquarters in Cleveland; the almost total absence of large wholesale concerns; the direct contact by truck that retail establishments have with Cleveland and the indirect way in which Lorain is dependent upon the rural hinterland; the very much greater volume of traffic over the Lake Road to Cleveland than over other roads from Lorain; the small size of the department and clothing stores of Lorain; and the several daily editions of Cleveland newspapers sold on the streets of Lorain; all suggest the nearness of a metropolitan district with well over a million people. While this nearness may be beneficial to Lorain in many respects, it also stifles the growth of local establishments. No coal dealers in Lorain are engaged in a large way in the coal export trade. Nor do the local merchants carry large stocks of goods from which a wide selection can be made when the very large stores of Cleveland distribute the shopping news in Lorain and vie with each other for the Lorain trade.

The advantages to be gained by such nearness are shown by the recency with which the branch clothing factories have been added to Lorain. Also the recent decision (1932) by the United States Steel Corporation to remove the operations of the Newburg Steel plant of Cleveland to Lorain. This is in part the result of the depression and the consequent contraction, in the interest of economies, that is taking place in the steel-making industry. Because the Lorain plant is modern, and is well situated on a navigable waterway where raw materials are easily obtained; and because the present capacity of the plant is far in excess of the present production, the steel corporation decided to remove the steel-making operations of the Newburg plant to Lorain. The obsolete Newburg plant, valued at $2,239,000, is to be dismantled.[44] The nearness of Lorain to the Cleveland district, where the raw steel will be used in the plant of the American Steel and Wire Company, enables the raw materials to be shipped at a cost of 80 cents per gross ton, which is lower than the cost of producing the same raw material in the Newburg plant. Also, there is the advantage in Lorain of a lower tax rate of $2.16 per hundred dollars value, as compared with $2.76 per hundred in the Newburg location.[45] In the Lorain plant, are enough steel-making equipment and sufficient labor, now idle, to supply the raw materials for the

[44] *The Cleveland Press*, issue of December 7, 1932.
[45] Op. cit., p. 174.

American Steel and Wire plant. The move is simply to utilize more fully the modern equipment now installed in the Lorain plant.

Thus the metropolitan sphere of influence funtions in two ways.[46] The centripetal force of Cleveland's retail district tends to attract from and limit the healthy growth of the retail districts in the smaller urban cities; while the centrifugal force of the city's higher taxes, plant obsolescence, and less favorable geographic situation accelerates the industrial function of Lorain.

H. LOCAL PROBLEMS

1. *Depression of 1932*

When a city becomes as specialized and as dependent upon heavy industrial and commercial activities as Lorain has become, a depression like that of 1932 makes a profound imprint upon the landscape. Iron ore imports in 1932 dropped to one-third the normal tonnage; one blast furnace out of five was operated on a reduced draft; steel production was approximately 20% capacity; full time employment ranged between 15 and 20%; and the city was left with little supporting structure. Actual removal of laborers from Lorain was encouraged and resulted in the transfer of many foreign families. Twenty-two hundred families were at one time dependent upon the city and charitable institutions for direct support.

The commercial-retail section reflected the same depressed conditions. Buildings became vacant, merchants became bankrupt, and, except for hordes of unemployed laborers on the streets, the commercial core was inactive. Vacant buildings constituted approximately 25–30% of the total, and in some commercial nuclei of South Lorain 75% of the brick and frame buildings were vacant.

2. *Harbor Improvement Recommendations*

The previous long-period programs of improvement in the Lorain Harbor having been completed, recommendations have been approved by the Chief of United States Army Engineers for two new projects. One calls for the elimination of the two bends in Black River below the Nickel Plate railroad bridge

[46]See Colby, Charles C. "Centrifugal and Centripetal Forces in Urban Geography." Annals of Association of American Geographers, Vol. XXIII, No. 1, March, 1933.

and the enlargment of the turning basin near the plant of the National Tube Company, and the other is for deepening and improving the channel in the outer and inner harbor. The total expenditure would be $745,000 of which the governmental share would be $600,000. This improvement is expected to put the harbor in a first-class condition to receive large ocean-going vessels that will navigate the Great Lakes when the Great-Lakes-to-St. Lawrence-Waterway is completed. The bends in Black River have long been obstructions in the passage upstream of the long 600-foot boats, which increases the cost of tug-boat service in the river. Two of these have now been removed at a cost of $142,000 and there are now three basins instead of one. These most recent improvements have made the harbor one of the best on the Great Lakes.

With an improved and easily accessible harbor, with a very large amount of potentially industrial land which is now vacant and has frontage on navigable water, with a large supply of labor and with an almost unlimited area over which the city can spread, and with a relatively low tax rate, Lorain, Ohio possesses the essential advantages for continued growth and industrial development.

BIBLIOGRAPHY

Books

A Commemorative Biographical Record of Huron and Lorain Counties. J. H. Beers and Co., Chicago, 1894.

Annual Business Review of Lorain County, 1890.

BOYNTON, JUDGE. Early Settlement and History of Brownhelm, published address, Jubilee Celebration, July 4, 1867.

BARTON, JAMES L. Commerce of the Lakes and Erie Canal. New York Misc. Pamphlets, Vol. 6. Buffalo, 1851.

CAMPBELL, HARRY H. Manufacture and Properties of Iron and Steel, 4th ed. New York, 1907, McGraw-Hill Book Co.

CURTIS, H. G. Lorain, the City: An Industrial Survey. Lorain Chamber of Commerce, 1928.

Fisher's National Magazine, Industrial Record, Vol. II. Redwood Fisher, Publisher, New York, 1846.

HOWE, HENRY. Historical Collections of Ohio. The Laning Printing Co., Norwalk, Ohio, 1896.

JAMES, PRESTON E. Regional Geography, a Chorographical Study of the World, Vol. 1. Edward Brothers, Ann Arbor, 1929.

JENKINS, WARREN. Ohio Gazeteer and Traveler's Guide. Isaac N. Whiting, Columbus, 1837.

Lorain County Commercial Review, 1897. The Eclipse Printing Company, Canton, Ohio.

Lorain Steel Company Catalogue No. 13, April, 1904. Philadelphia, Penn.

MCCLUNG, JOHN A. Sketches of Western Adventure, 1755–1794. Ells. Claflin & Co., Dayton, Ohio, 1847.

MOORE, MRS. O. H. Lorain County, Ohio, Picturesque and Industrial Features, 1906.

MOORE, WM. For a Greater Lorain. Pamphlet, Cleveland Trust Company, 1926.
NEWBERRY, J. S. Catalogue of Ohio Plants. Columbus, 1859.
ORTH, SAMUEL P. A History of Cleveland, Ohio, 1910. The S. J. Clarke Publishing Company.
TEAGUE, GEORGE H. Lorain, 1903. The Daily News Democrat, Lorain, Ohio.
TOWNSHEND, N. S. Agriculture of Lorain County. Nevins and Myers, Columbus, 1867.
The Western Reserve Historical Society Tracts 73–84, Vol. 3. Cleveland, 1892.
WHITTLESEY, COL. CHAS. Early History of Cleveland, Ohio. Cleveland, Ohio, 1867.
WRIGHT, G. FREDRICK. A Standard History of Lorain County, Vols. I and II. Lewis Publishing Company, Chicago, 1916.

GOVERNMENTAL PUBLICATIONS

(Ohio)

Ohio Executive Documents (1860), Part II.
Ohio Legislative Doc. 16, 1837–38.
Twenty-eighth Ohio General Assembly, Laws of Ohio, XXVIII.
Ohio Legislative Doc. No. 28, Special Report State Auditor, 1848.
Ohio Executive Doc. 1850–51; 4th Ann. Report, Comm. of Statistics.
Ohio Executive Document, 1860, Pt. 2, Annual Report, Comm. of Statistics.
Ohio Legislative Doc. No. 43, Forty-fifth General Assembly, Vol. II, Pt. 1, 1847.
Ohio Executive Doc. No. 43, 1836–37, Report of Board of Public Works.
Ohio Legislative Document, House Journal, 1807–8.
Ohio Executive Document No. 6, 1836–37.
Census of Lorain County, 1827, Senate Journal, Twenty-sixth Ohio General Assembly.
Lorain Harbor, Ohio, House Document No. 254, 66th Congress, 1st Session.
Zoning Ordinance, City of Lorain, Ohio. A pamphlet, 1926.

(United States)

Atlas of American Agriculture, Part II, Climate, Section I.
Atlas of American Agriculture, Part II, Climate, Section A.
Atlas of American Agriculture, Part II, Climate, Section B.
SHANTZ, H. L. AND ZON, R. Atlas of American Agriculture, Natural Vegetation, 1924.
Sixth Census of United States, 1840.
Seventh Census of United States, 1850.
Eighth Census of United States, 1860.
Ninth Census of United States, 1870.
Fifty-fifth Congress, 2nd Session, House Document No. 131.
Fifteenth Census of United States, Ohio Supplement, Composition and Character of the Population, 1930.
Fifteenth Census of United States, Ohio Supplement, Families, Dwellings, etc., 1930.
Fifteenth Census of United States, Ohio Supplement, Manufacturing, 1930.
Fifteenth Census of United States, Ohio Supplement, Occupational Statistics, 1930.
Fifteenth Census of United States, Ohio Supplement, Population Bulletin, first series, 1930.
The Ports of Sandusky, Huron, and Lorain, Ohio, Lake Series No. 8, 1932.
Examination of Rivers and Harbors, House Document No. 985, House Documents Vol. 24, 64th Congress, 1st Session, 1915–16.
Transportation on the Great Lakes, Transportation Series No. 1, Revised edition, 1930, Corps of Engineers, U. S. Army Bureau of Operations, U. S. Shipping Board.
United States Bureau of Soils, Soil Survey of the Cleveland Area, 1905.

MISCELLANEOUS PUBLICATIONS AND MAPS

Annual Reports of City Clerk and Superintendent of Water Works, Lorain, Ohio, for years 1897, 1898, 1901, 1902.

Atlas and Directory, Lorain County, Ohio, 1896. American Atlas Company, Cleveland.
Atlas of Lorain County. Titus, Simmons and Titus, Philadelphia, 1874.
GEIL, JOHN F. Map of Lorain County, 1857.
Lorain City Directory. Lorain, Ohio, 1891. Mains and Disbro.
Lorain City Directories, for years 1900–1901. Whitworth Bros. Co., Cleveland.
Lorain, Ohio, in 1894. A Volume of Newspaper Clippings. Oberlin College Library.
RANNEY, M. F. A Volume of Newspaper Clippings, Property of C. E. McGee. Lorain Chamber of Commerce.

PERIODICALS

AUROUSSEAU, M. The Distribution of Population: A Constructive Problem. Geographic Review, 11: 563–592, 1921.
COLBY, CHAS. C. Centrifugal and Centripetal Forces in Urban Geography. Annals Assoc. Amer. Geographers, 23: 1–20, March, 1933.
BINGHAM, MILLICENT TODD. A Method of Approach to Urban Geography. Bul. Phila. Geog. Soc., 20: 285, 1928.
BLANCHARD, RAOUL. Une Methode de geographie urbaine. La Vie Urbaine, 4: 301–319, 1922.
DE GEER, STEN. Greater Stockholm: A Geographic Interpretation. Geog. Review, 13: 497–506, 1923.
FLEURE, H. J. Some Types of Cities in Temperate Europe. Geog. Review, 10: 357–374, 1920.
JAMES, PRESTON E. Vicksburg: A Study in Urban Geography. Geog. Review, 21: 243–255, April, 1931.
LEIGHLY, JOHN B. The Towns of Malardalen in Sweden, a Study in Urban Morphology. Univ. of Calif. Publications in Geography, Vol. 3, No. 1, 1928.
LEVAINVILLE, JAQUES. Caen: notes sur l'evolution de la Function urbaine. La Vie Urbaine, 5: 233–278, 1923.
MACKAYE. "The New Exploration, a philosophy of Regional Planning. New York, 1928.
MURPHY, RAYMOND E. The Geography of Johnston, Pennsylvania.
MURPHY, RAYMOND E. The Economic Geography of York, Pennsylvania, Bulletin 17 Mineral Industries Experiment Station.
PLATT, ROBT. S. An Urban Field Study: Marquette, Mich. Annals, Assoc. Amer. Geographers, 20: 52–73, March, 1931.
WHITAKER, J. RUSSELL. Negaunee, Michigan: an urban center dominated by iron mining. Bulletin, Philadelphia Geographical Society, Vol. 29, 1931. (A reprint.)
TREWARTHA, GLENN T. The Prairie du Chien Terrace: Geography of a Confluence Site. Annals Assoc. Amer. Geographers, Vol. 22, No. 2, 119–158, June, 1932.