A LOOK AT THE EFFECT OF TWO EXTRACTIVE INDUSTRIES ON THE
ECONOMY OF MIDLAND MICHIGAN FROM 1850 TO 1949

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This thesis will investigate the effect of extractive industries on the economy of an average midwestern town from the mid-1800s until the conclusion of the WWII. Primary and secondary sources were studied to gain an understanding of the effect of extractive industries on the development of Midland Michigan. Due to its complete reliance on extractive industries for its economic welfare Midland suffered extreme economic upheavals. In conclusion Midland’s intensive boom and bust economy mirrors Michigan’s own rocky relationship with extractive industries.

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**Introduction**

“Welcome to Pure Michigan” reads the signs at the Michigan state line. An interesting tagline for marketing the natural landscapes of the state, but also a misnomer. European immigrants drastically shaped Michigan, and its natural landscape, over hundreds of years of settlement and industrialization. The extractive industries that resided in the state especially took their toll on the natural environment, creating a new landscape suited for agrarian settlement. From fur trapping to lumber, European settlers moved into Michigan from the east coast, to take advantage of the abundance of natural resources, relying on extraction of resources as an economic basis. This trend continued with brine and copper extraction into the early 1900s. However, as natural resources dwindled, new industries soon rose to take their place. This ever-changing landscape of industrialization led the state through economic booms and busts, powered by industrial capitalists like Henry Ford, Charles Mott, and Herbert Henry Dow. The rise and fall of extractive industries and the resultant effect on the environment and economy is easily seen on a smaller scale in Midland, Michigan. Midland is located in the Saginaw Bay region of Lake Huron in the lower peninsula of Michigan. Founded in 1855 the city was home to two extractive industries, lumber and brine which controlled the local economy. By looking at the impact of these two extractive industries on a small-scale economy, we can clearly see the larger economic trends created by both extraction and industrial capitalists.

The multiple treaties of Saginaw in 1819, 1837 and 1855 extinguished claims of the Saginaw tribe of the Chippewa nation to a large area of East Central Michigan, including the location of what would become Midland when it was founded in 1855. This
land contained vast reserves of old growth forest, composed largely of white pine, hemlock, oak, birch, and maple. The pine would provide the raw material for a timber industry that thrived in the region from about 1850 to around 1890. The future site of Midland was located on the Tittabawassee River about twenty miles inland from the Saginaw Bay and Lake Huron. (Please refer to reference Map One in Appendix One.) This waterway provided for convenient shipping of products through four of the five Great Lakes and via the Erie Canal completed in 1825 to the Hudson River and the Port of New York. The Saginaw River and its tributaries, which included the Tittabawassee, drained many thousands of acres of forest. Loggers could cut and pile in the fall and winter and float the buoyant conifers to saw mills lining the Saginaw River in the spring. Midland proved an ideal location for lumber camps and processing lumber into boards, tubs, and shingles. Midland grew rapidly from its founding in 1855, riding the crest of an economic wave generated by the lumber boom. When that boom collapsed in the 1890s, another extractive industry, the manufacture of salt and bromine from brine found in subterranean deposits in the surrounding area, took over the economy of the town.

By the early 20th century, The Dow Chemical Company (hereafter referred to as TDCC), was manufacturing bromine and chlorine from brine, becoming the leading employer in Midland. During periods of economic boom, the population of the town expanded resulting in increases in platted neighborhoods, infrastructure, and services for citizens. The opposite, of course, occurred during economic busts, which include decreased population, limited housing expansion, and reduction or termination of services. This paper will explore the booms and busts, of Midland’s economy as related to two extractive industries, lumber (1850-1890) and chemical production (1890-1949).
Economic trends of these two extractive industries acted as both a help and a hindrance to the city. The intrinsic nature of both businesses made their longevity limited. Eventually lumber ran out, and inevitably, the same would happen to the brine used as a basis for chemical production.

This paper will fulfill part of the requirements for a graduate thesis, which will also include a nomination to the National Register of Historic Places (Appendix Two) and two historic marker texts (Appendix Three) following the guidelines issued by the Michigan Historical Commission. The National Register Nomination and historic marker text will help illustrate the themes of economic development related to extractive industries by linking the history of Midland to the current built environment.
Lumber Industry Boom and Bust

Midland’s early economy and growth as a community relied on the lumber industry, specifically the industry in the Saginaw Valley. This paper will begin with a brief history of the lumber industry in Saginaw and Bay City, located about twenty miles southeast and east of Midland respectively. The boom and bust of Midland’s economy mirrored that of these two towns closely after logging began along the Tittabawassee, though the physical development of Midland differed from Saginaw and Bay City, due to its use as an outpost along lumbermen’s trails from camps to logging establishments in Saginaw and Bay City.

Settlement in Michigan’s interior began slowly. Professor of Land Resource Management, Raleigh Barlowe, writing in The Great Lakes Forest, notes that though land settlement in what became Michigan began as early as 1671 with French settlers establishing a trading post and fort in St. Ignace, by 1820 there were only 8,765 white settlers living in the area that later became the states of Michigan and Wisconsin. The lack of significant markets along the Great Lakes, and rivers deep enough for barges retarded settlement in the interior of the state.¹ As Forestry Professors Dickman and Leefers at Michigan State University, noted in The Forests of Michigan, the vast forests of the lake states, however, soon sparked a rush of settlers with the completion of the Erie Canal in 1825, and the formation of Michigan as a state in 1837. Lumber barons and other speculators viewed the virgin forests around the Great Lakes as a way to continue

the lumber boom that was petering out along the east coast. They considered the uncut forests as a resource that could only be put to use through extraction.\(^2\)

The General Land Office (GLO) surveys and first-hand accounts helped establish the Saginaw Valley as a perfect region for lumbermen. While the federal government established the GLO surveys as a way to organize the land into parcels for sale, surveyors also took notes on the condition and volume of standing timber. Surveys of the Saginaw Valley indicated not only an abundance of hardwood and conifer trees, but also a system of shallow rivers that extended for miles west and south from a bay connected to Lake Huron.\(^3\) (Please see reference Map Two in Appendix One.) First-hand accounts of the area also describe the region as a sea of trees, likening the vastness of the forest to the vastness of the ocean.\(^4\) Mr. William Vance, an early settler to Midland, noted, “in any direction it was a dense forest of pine, hemlock and hardwood timber, with an abundance of game, and as fine a river with plenty of fish as you could wish to see.”\(^5\) This glowing description of the area’s forests attracted the attention of settlers looking for stands of white pine trees.

The Saginaw Valley became the site of the first large-scale lumber industry on the east side of the state. Lumbering began along the Saginaw River and continued

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\(^5\) The river Mr. Vance refers to is the Tittabawassee River, which extends past Midland to the Saginaw River. Mr. Vance’s published his memoirs in pieces in the local newspaper The Midland Republican. “Sixty-two Years of Life at the Forks,” The Midland Republican, April 28, 1911, 1. Accessed via ProQuest Historical Newspaper Index: https://search.proquest.com/hnpmidlandnewspapers.
systematically along its tributaries. In 1832 Gardener and Ephraim Williams built the first sawmill, and commercial cutting began soon afterwards. However, growth was slow during the industry’s first ten years after the national Panic of 1837 and the recession that followed. By 1850, the Saginaw Valley contained eight sawmills producing a little more than six million board feet of lumber annually. The area experienced only small-scale progress until new investors from the East sank money into large-scale lumber production. Between 1854 and 1867, the number of mills along the Saginaw River tripled and old mills expanded to increase production, with one mill producing upwards of three million board feet a year. The first rivers logged were closest to the mills, including the Saginaw, Cass, Bad, Shiawassee, and Flint rivers.

The lumber industry by nature created a transient population. Lumber camps mostly operated during the fall, winter, and spring, with many camps moving further north or west year by year in search of uncut stands of pine. After surveyors located a stand during the summer, the company built a camp and cleared roads for lumber transportation to a river. Loggers came during the fall to chop down the designated trees, which sawyers then squared (removed limbs). Drayman came in with horses once snow

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8 Lumber mills measured production in board feet as a general practice, a trend that continues today. A board foot is a one-inch thick, one-foot square of cut lumber.


covered the ground and dragged the logs to the river. Areas on the riverbanks called banking grounds would hold the logs until spring brought a rise in the water level. River hogs would use pikes to guide the logs downriver in the spring to the various sawmills. Saginaw and later Bay City proved to be ideal locations for sawmills due to the close proximity of Saginaw Bay and Lake Huron for transportation of cut lumber.\textsuperscript{11}

Lumbering in the Saginaw Valley developed first along the Cass River, though the Bad, Shiawassee, and Flint rivers soon followed. By 1864, Saginaw contained 40 mills producing over 57 million board feet of lumber a year.\textsuperscript{12} After Michigan passed an act authorizing the formation of raft or booming companies in 1855, logging along the Tittabawassee River also increased. Boom companies were interested parties that banded together to help transport logs downstream, however, by 1864 the state legislature essentially gave boom companies unilateral control over log transportation on a given river.\textsuperscript{13} Charles Merrill organized the first boom company along the Tittabawassee in 1856. Merrill’s boom company transported over 110 million board feet of logs the first year of its operation. Merrill had the right idea as an estimated 1.7 billion board feet of logs came down the Tittabawassee River between 1856 and 1864.\textsuperscript{14} The large volume of logs soon became too much for Merrill to handle alone, and the Tittabawassee Boom Company organized in 1864. With capital of $50,000, the company completed a series of “pocket booms,” small areas in the river where logs from lumber companies could be

\textsuperscript{11} Benson, \textit{Logs and Lumber}, 90-96
\textsuperscript{13} \textit{Acts of Legislature for the State of Michigan, passed at the regular session of 1855} (Lansing: G.W. Peck 1855), 40; \textit{Census and statistics of the state of Michigan 1864}, 375.
\textsuperscript{14} Writers Program of the Work Project Administration in the State of Michigan, \textit{Michigan Log Marks: their function and use during the great Michigan pine harvest}, ed. Clifford Allen. (East Lansing: Michigan Agricultural Experiment Station, 1941) 11.
linked together, that ran for twelve miles at the mouth of the river. The company grew and exceeded over 236 million board feet of wood rafted down the river by 1867.15

Due to the heavy logging in 1867, production along the Cass, Saginaw, and Flint Rivers decreased dramatically, dropping to under 100 million board feet.16 Luckily the Tittabawassee and its tributaries helped offset the decline along other rivers, with over 238 million board feet of logs transported in 1867 alone.17 The number of mills also expanded across the state with an additional 200 mills added by 1872, making the total board feet produced in Michigan over three billion per annum.18 A larger volume of logs from the Tittabawassee demanded a corresponding industrialization of sawmills. One of the largest operations in the Saginaw Valley was John McGraw’s sawmill in Bay City which covered over six hundred acres and employed over 350 men in 1877.19 Despite the money brought in through Saginaw and Bay City, sawmill owners still considered operators unskilled laborers, which meant they only earned $1.56 a day by 1882 and were only employed seasonally.20 A Bay City attorney noted in a partisan publication called The Labor Leaf from 1885 “Sawmill men are part of their machines. They could not even stop for a drink of water but must keep up the labor just as the inanimate machinery. The

16 Please see Chart One in Appendix One related to the amount of logs cut by Saginaw Mills. While the chart does not specify its unit of measurement, all other figures in the document relied on board feet.
17 Benson, Logs and Lumber, 70-72, 164-166; M.A. Leeson, The History of Saginaw County, Michigan: together with portraits and biographies, 392
20 Kilar, “From Forest & Field to Factory,” 239.
men are a cog in a vast machine.”21 The sawmill owners’ attitudes contributed to worker discontent which erupted in a strike during 1885.

Called the Great Strike in the Valley, the Saginaw Valley sawmill workers strike of 1885, prompted questions as to the conditions of workers, and marked the first hint of the economic bust to follow. A drop in the price of lumber during the spring of 1885 resulted in a lowering of the average wage for workers, which coupled with the adoption of a new ten-hour work day law that would not go into effect until September, when the mill workers were no longer employed, resulted in very unsatisfied workers. When several sawmill owners refused to adopt the shorter ten hour days in July, laborers took to the streets shutting down the mills in Bay City and Saginaw. Mills sat empty for two months as workers unsuccessfully tried to persuade owners to either increase wages or adopt shorter hours. By the end of August, workers returned to jobs at old hours and wages.22

Overall Michigan’s lumber production peaked in 1888 with 4.2 billion board feet of lumber produced.23 While Saginaw Valley lumber production had peaked earlier in 1882 when 112 sawmills lined the Saginaw River, the influx of logs tapered off slowly during the next ten years. Settlers had believed that timber, like other natural resources, was inexhaustible, but in fact it did not last forever.24 By 1895 Saginaw mills cut only 433 million board feet of lumber, and lumber men transported a little over 15 million board feet of logs down the Tittabawassee, a decrease of over 50% and 90%

21 The Labor Leaf, Detroit, July 22, 1885.
respectively. Dickman and Leefers noted in *The Forests of Michigan*, the lumber boom gradually migrated northward to the Upper Peninsula; in the Saginaw Valley, the industry left cutover and scorched forestland, as well as a crippled economy. Towns like Saginaw, Bay City, and Midland that were economically dependent on lumber were especially hard hit.

Midland’s economy mirrored the booms and busts of Saginaw and Bay City closely due to the overwhelming dependence on the lumber industry. Midland’s economic reliance on extractive industries began early, as the town grew to support the large sawmills in Saginaw and Bay City. This industry not only shaped the economy, but also the people moving to the area, the types of stores available, and even the physical layout of the town itself.

Unlike the Saginaw Valley, settlement of the Midland area began after the establishment of the lumber industry along the Saginaw River. This delay was due in most part to several Chippewa reservations established in 1819 that dominated the Tittabawassee River area. Though the Treaty of Saginaw in 1837 officially gave the reservation land to the United States, many native peoples still lived in the region by the mid-1850s. (Please see Map Three in Appendix One). Charles H. Rodd, owner of a

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trading post on the Tittabawassee, noted dealings with over seventy different local 
natives between 1854 and 1856. The establishment of a reservation in 1855 in Isabella 
County, due to urgings of Lutheran and Methodist missionaries, soon opened land along 
the Tittabawassee for Euro-American settlers and lumber interests. One of the first 
settlers in the Midland area was John Larkin looking to purchase land for lumbering. 
Larkin arrived in Saginaw during 1850 determined to start fresh after his career on the 
Erie Canal. Larkin came to Michigan at the beginning of a massive surge of settlement. 
Between 1850 and 1900, the population of Michigan increased by 2 million people, many 
of whom came for work in the lumber industry. Larkin found good land for lumbering 
along the Tittabawassee and built a log cabin for his wife at the edge of the river in 1853. 
Larkin eventually purchased 52 acres of land along the “bluffs” from lumberman in the 
Saginaw area. With his land purchased, Larkin began lumbering in the winter of 1853 
along with E.G. Buttles, his brother in law. This land would become downtown 
Midland a few years later.

Spurred by the abundance of local lumber and the central location between 
lumber mills and camps, locals pushed for the organization of Midland County in 1850. 
By 1855 several local men, including E.G. Buttles, located the new county seat along the 
Tittabawassee River, where the Chippewa River joins, at the site of John Larkin’s
homestead. The newly established county seat soon experienced its first business boom, as John Larkin built a hotel for lumbermen and travelers traversing from lumber mills to lumber camps. *The Portrait and Biographical Index of Midland County* acknowledged the importance of this structure to the new town as a social gathering point and a source of income for the new town.34

The newly appointed county seat made it possible for lumbering interests to expand further west along the Tittabawassee and gave the economy a boost. The earliest influence of the lumber industry on Midland’s economy was the number of lumber camps and lumbermen traveling through the area. The early onset of the Saginaw lumber industry in 1832 meant that by 1856 many of the camps were moving further west in search of prime lumber land. Several lumber camps situated along the Tittabawassee River west of Midland, included camps at Averill and Sanford.35 (Please see Map Four in Appendix One for the location of Sanford in relation to Midland, and Photograph Two in Appendix One).

Between 1850 and 1860, Midland County began to exhibit the same robust, logging-related growth as Saginaw, as the number of lumber mills increased to handle the logs streaming in from the surrounding forests and the population expanded from 65 to 791. The 1860 federal census listed a majority the new residents as laborers, carpenters, and lumberman, no doubt due to the reliance on lumber products for employment. Two boardinghouses in town, as well as the hotel, provided sleeping quarters to lumbermen

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34 *Portrait and biographical album of Midland County, Mich.*, 352
and laborers passing from camp to mill. Lumbermen like David Ward helped bring the
boom to the Midland area. During the winter of 1860, he operated camps three miles
south of Midland that extended west into Mount Pleasant. In his autobiography, he wrote
that the amount of lumber from the two camps “during the winter of 1860 and 1861
[totaled] some three and a half million [board] feet of logs.”

The large number of lumbermen traveling through the area resulted in additional
secondary businesses locating to Midland. In this case secondary businesses were those
services that are needed to support a population, including blacksmiths, grocers, and
physicians. John Larkin, owner of most of the land in town, established the platt of
Midland in 1856, and actively sought new businesses including L.P Bailey’s dry goods
store. Additional services, including a blacksmith, physicians, attorneys, teachers, a
shoemaker, and a carriage maker, located to the new town. However, travel to and from
Midland remained difficult for people and goods, as poor roads from Saginaw prevented
widespread growth. Lumberman David Ward commented on the lack of transportation
in his autobiography, stating that the lack of services made the establishment of new
camps costly and tedious. To help facilitate transportation services, Larkin built a

riverboat in 1858, and hired Captain Philo Sumner to operate a round trip route to and from Saginaw along the Tittabawassee River.\textsuperscript{41}

The lumber industry contributed not only to the population and services of the town, but also in the establishment of several industrial lumber interests. Philo Sumner erected the first sawmill in Midland County along the Snake Creek, three miles north of the new Midland village, though the shallow waterway prevented growth.\textsuperscript{42} Between 1858 and 1860, John Larkin, along with William Patrick, bought out Philo Sumner’s mill and transported it to the bank of the Tittabawassee River. He improved the mill works and invested over $40,000 into the mill.\textsuperscript{43} Larkin also augmented his lumber cutting interests, and by 1869 owned an additional 480 acres of lumber land in Midland County.\textsuperscript{44} Samuel Sias also constructed a planing and shingle mill on the south bank of the Tittabawassee River in 1864, where he also purchased an additional fifty acres to log.\textsuperscript{45} Both mills generated a significant amount of revenue for the town, $35,000 by 1864 alone, and collectively produced over 3 million board feet of logs annually.\textsuperscript{46} (See Photograph One in Appendix One). In 1870 Wilcox Stone, Henry Northrup, Stark and Bill Co., and A.N. Naught and Company used Midland mills for finishing their logs.\textsuperscript{47}

\begin{footnotes}
\item[42] Portrait and biographical album of Midland County, Mich., 379.
\item[45] Portrait and biographical album of Midland County, Mich., 309.
\item[46] Census and statistics of the state of Michigan 1864, 375.
\end{footnotes}
The volume of logs passing through the area though was enormous, with over 347 million board feet transported down the Tittabawassee in 1870 alone. This number continued to grow as lumber operations expanded in Saginaw and Midland over the next ten years.  

Cycles of boom and bust as described by Barbara Benson in her book, *Logs and Lumber*, drastically affected Midland’s economy due its reliance on one industry. However, due to the growth of the lumber industry and local lumber interests, some national economic trends only registered peripherally. While the panic of 1873 caused a national economic depression, Midland continued to expand as manufacturers of wood products moved to the town. These included the Peter Bros, manufacturers of hoops and headings, as well as the Cleveland Woodenware Co., manufacturers of tubs, pails, staves and hoops. The expansion of additions to the small village gives a good indication of boom years. Between 1862 and 1879, the village of Midland platted eight additions and incorporated the village in 1869. The 1870 census also shows an increase in the number of mills in Midland County from two in 1864 to nine in 1870, with over eight million board feet of lumber produced.

The additional mills also increased the number of jobs in Midland. The population of Midland grew from 631 in 1864 to over 1,500 by 1874. New businesses also moved to

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49 Wooden products were often used in house construction, including headings for doors and shingles for roofs, or to make useful products like barrels, with staves and hoops, or tubs and pails to haul water or hold food. *Portrait and biographical album of Midland County, Mich.*, 398; Sanborn Map & Publishing Co., 1884.  
51 Michigan, Department of State, *Statistics for the state of Michigan collected for the ninth national census 1870* (Lansing: W.S. George & Co., 1873) 420-421.
town, including two stove and wire factories, two boot or shoe factories, and a tile works.\(^{52}\) Eight additions to the village of Midland expanded the platted areas north and west with small lots.\(^{53}\) Midland, like Detroit, Saginaw, and Grand Rapids, expanded outward rather than upward due to the availability of cheap land.\(^{54}\) Cheap land was beneficial to lumbermen, as wages remained low into the 1880s as evidenced by Saginaw’s Great Strike.\(^{55}\) Sanborn maps of the village indicate that houses consisted of one or two story separate wood dwellings with porches facing the street, which are consistent with worker housing across Michigan as described by Jeremy Kilar in *Michigan Visions of Our Past*.\(^{56}\) To support the increased population additional skilled tradesmen relocated to the town including several blacksmiths, tailors, druggists, store clerks, lawyers, physicians, masons, carpenters, teamsters, and tinsmiths.\(^{57}\)

Part of the economic boom in Midland was due to the railroad. As Francis Blouin Jr. noted in *Michigan Visions of Our Past*, by the mid-1870s railroads played an increasingly important role in the lumber industry by providing access to timberland far from water routes.\(^{58}\) While the Tittabawassee River still provided sufficient access for lumber transportation in the local area, construction completed on the Flint & Pere Marquette Railroad through Midland in 1867 provided a new mode of lumber

\(^{52}\) *Census of the State of Michigan, 1874* (Lansing: W.S. George & Co., 1875) 4, 337, 355, 348.

\(^{53}\) Midland Additions, Midland County Historical Society Archive, Midland Michigan; *Portrait and biographical album of Midland County, Mich.*, 309.


\(^{55}\) Kilar, “From Forest & Field to Factory,” 239.


\(^{57}\) *Census of the State of Michigan, 1874*, 417–418.

transportation. (See Map Four in Appendix One). John Larkin, owner of the largest mills
in town, donated much of the right of way and placed the railroad adjacent to his mill. In
1868 the line extended all the way to Averill, an important lumber banking area west of
Midland, and in 1872, the first shipment of logs from Midland County made it safely to
Saginaw by train.\textsuperscript{59} However, the total percentage of logs transported by train remained
small into the early 1880s and the cost of transporting logs by train would not prove a
wise investment until 1896.\textsuperscript{60} Instead, Midland used the railroad to transport products
made in town from the lumber coming down the river, including boards, bails, staves, and
barrels.

The city of Midland continued to grow despite a series of setbacks to the local
economy during the early 1870s, in the form of fires that destroyed much of the
downtown. Like many lumber towns, Midland’s businesses and residential buildings
tended to heavily rely on the local lumber for construction materials. Dry conditions
during the summer months and strong winds often spelled trouble for Michigan lumber
towns, as sparks could easily start large-scale fires.\textsuperscript{61} During the summer of 1870,
Midland saw its first fire, as the Sias sawmill burned down on the south side of town.\textsuperscript{62}
The following summer, part of the downtown area caught fire due to the overabundance
of log trimmings, and by 1876, a spark thrown off a passing train hit some straw causing
a fire that destroyed over 50 buildings in town. Articles in the \textit{Detroit Free Press} and
\textit{Midland Times} tallied the total loss at $100,000. Unfortunately, 20 of the 38 businesses

\textsuperscript{59} Portrait and biographical album of Midland County, Mich, 425; George Lewis, “Transportation of
Lumber,” \textit{Lumberman’s Gazette} 1, no. 2 (August 1872) 15.
\textsuperscript{60} M.A. Leeson, \textit{The History of Saginaw County, Michigan: together with portraits and biographies}, 392,
394; Correspondence. C.S. Bliss and Company Collection. Boxes 12, 23, 29, and 31. Clarke Historical
\textsuperscript{61} Dickman and Leefers, \textit{The Forests of Michigan}, 152-165; 169.
\textsuperscript{62} Portrait and biographical album of Midland County, Mich, 309.
lost in the fire did not have insurance, which meant that out of $100,000 worth of damage, insurance would only cover $40,000. F.S. Burton of Midland wrote in a Detroit Free Press article on May 30, 1876, “This event has cast a gloom over our entire community. Several of our citizens by this sudden stroke have lost their homes and contents, and have been reduced from competence to beggary or starvation. Several of our enterprising business men find themselves without store and are crippled in their resources.”

Recovery of the Midland economy was surprisingly fast, owing to the need for lumber. In 1882 alone, the board feet of lumber cut in Saginaw mills reached over 1 billion and the amount of logs floating down the Tittabawassee River, bound for Midland and Saginaw, peaked at 611 million board feet. To help facilitate the transfer of logs down the river, the Tittabawassee Boom Company constructed a series of dams, and over the next 8 years transported over 100 million logs to mills in Midland and Saginaw.

Census records show that population increases in Midland stalled between 1874 and 1880, most likely due to the still recovering downtown area. By 1884, however, Midland’s economy showed definite signs of recovery as the population began to rise and the county boasted 46 manufacturers. The Larkin and Patrick mill upped production to

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65 Writers Program of the Work Project Administration in the State of Michigan, Michigan Log Marks: their function and use during the great Michigan pine harvest, 32.

66 Writers Program of the Work Project Administration in the State of Michigan, Michigan Log Marks: their function and use during the great Michigan pine harvest, 32; “The Board of Supervisors,” The Midland Republican, February 12, 1885, 1.

67 Census of the State of Michigan, 1884 (Lansing: W.S. George & Co., 1885), cxcvii, xxiii.
take advantage of the additional logs along the river, expanding operations to include one
circular and one cross cut saw, as well as two block saws run by steam engines. The
growing operation also needed additional housing for employees and added a
boardinghouse and four houses southwest of the sawmill itself. By 1884, the Larkin and
Patrick mill was producing 6 million feet of lumber and 25 million shingles annually. 68

Part of that recovery translated into amenities for new and current residents.
Village officials began improvements with the three bridges over the Tittabawassee and
Chippewa rivers in 1884. (See Map Five in Appendix One). A new water system was
also a large priority to accommodate the increase in population. 69 Officials also made
improvements to Main Street, where cedar planks replaced the dirt road. In 1884, city
officials assumed that the Saginaw lumber boom would continue to bring money into the
small village. The Portrait and Biographical Album of Midland County Michigan noted
that “A great deal of enterprise has been manifested by the officials of the Midland
City…. [It] is largely in debt, however, the total, including the water works bonds and
street paving amount to $37,795.31. The city valuation is about $500,000, which makes
the rate of taxation quite heavy.” 70

Expansion of Midland County lumber camps corresponded with the increased
lumber production in Saginaw. Local businessman Samuel Sias started logging almost
1,000 acres of land that he purchased in Midland County, and by 1883 Sias employed
upwards of 300 men for his operations. Sias claimed that he was able to chop over 18

68 Portrait and biographical album of Midland County, Mich., 398; “The Business Men of Midland,”
Detroit Free Press, November 13, 1891, 6; Midland Michigan Nov. 1884, Sanborn Map & Publishing Co.,
1895.
70 Portrait and biographical album of Midland County, Mich., 397
million feet of lumber in a single winter.\textsuperscript{71} A.W. Wright and P.H. Ketcham, both prominent Saginaw lumbermen, formed the Wright and Ketcham Company during 1880. The company purchased over 10,000 acres in Midland County, and built their headquarters northwest of the city, along Sturgeon Creek. The company also employed lumbermen at an additional seven camps in the county. At one of the larger camp operations in the county the company employed over 400 men in a year.\textsuperscript{72} (See Photograph Three in Appendix One). The Wright and Ketcham lumber camps, and others like them in the county, helped contribute to the economy of Midland during the Saginaw lumber development. Lumbermen would often go on a “big drunk,” as they called it, often traveling to Midland in search of entertainment and liquor.\textsuperscript{73}

From 1860 to 1880, the population of the village doubled from around 700 to just over 1,500 people.\textsuperscript{74} City government authorized two additions to the existing plat for the city, which would be the last additions recorded until after the lumber industry bust.\textsuperscript{75} While still considered a walking city, Midland expanded housing to the north and west of the main downtown core. The 1884 Sanborn map of the village of Midland gives a good indication that the village was dependent on the lumber industry for economic stability. The number of manufacturers and merchants located along Main Street indicate a reliance on lumbermen for business with a plethora of hotels, boarding houses, saloons,

\textsuperscript{71} Portrait and biographical album of Midland County, Mich., 309
\textsuperscript{72} Portrait and biographical album of Midland County, Mich., 367; Wright and Ketcham Lumber Camp and Headquarters, Midland County Photographic Collection. Midland County Historical Society Archive. Midland, MI: M.A. Leeson, The History of Saginaw County, Michigan: together with portraits and biographies, 708
\textsuperscript{75} Midland Additions, Midland County Historical Society Archive, Midland Michigan.
and dry goods merchants.⁷⁶ By 1887, Midland incorporated into a city, dependent on lumber as its main source of income.⁷⁷ Several manufacturers contingent on the availability of cheap lumber opened doors in Midland before 1891 including the Reardon Pail and tub factory, the Brown Lumber company, the Anderson Brothers shingle works, the Cleveland Woodenware Company, the Midland Woodenware Company, and the Midland Furniture Company.⁷⁸ (See Map Six in Appendix One) However the aggressive extraction of lumber eventually had to end, and by the early 1890s, the volume of logs moving down the Tittabawassee River entered a long-term, accelerating decline sending Midland’s economy spiraling downward from boom to bust. The city of Midland began a ten-year economic slide. In 1892 a portion of the Midland Salt and Lumber Company, the old Larkin and Patrick mill, exploded. (See Photograph Four in Appendix One). Two years later, after a $5,000 rebuild, the mill burned down.⁷⁹ An article from the Midland Republican expressed the concern everyone in town felt when it wrote, “we can ill afford to lose an institution employing from 90 to 120 men.”⁸⁰ Likewise, by 1893 the Tittabawassee Boom Company, feeling the loss of lumber revenue, started closing operations along the Tittabawassee River, until it lost its charter in 1894.⁸¹ In a last ditch effort to keep logs floating down the river, two Midland companies, petitioned the

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⁸⁰ “A $20,000 Loss,” *The Midland Republican*, February 9, 1894, 1.
County Commissioners to keep the dams along the Tittabawassee open. They argued that the loss of water control would have a detrimental effect on the manufacturers that used logs.\footnote{“That Tittabawassee Dam,”\n\textit{The Midland Republican}, August 4, 1893, 5.} However, the dams quickly fell into disrepair and by 1896; the water flowing downstream was substantially lower.\footnote{“Dam,”\n\textit{The Midland Republican}, April 3, 1896, 5.} Without a cheap source of wood, production at Midland’s lumber-dependent companies soon declined.\footnote{“Shipments of Lumber,”\n\textit{The Midland Sun}, November 24, 1899, 5. Accessed via ProQuest Historical Newspaper Index: https://search.proquest.com/hnpmidlandnewspapers.} The population of Midland in turn plummeted as people moved away from the failing city, dropping by almost a thousand in six years.\footnote{\textit{Midland, Midland County, Michigan Sep. 1893}. Map. New York: Sanborn - Perris Map Co. Limited, 1893; \textit{Midland, Midland County, Michigan June 1899}. Map. New York: Sanborn - Perris Map Co. Limited, 1899.} One news article described Main Street as neglected with the loss of money from the “lumber kings.”\footnote{“As Outsiders See Us,”\n\textit{The Midland Sun}, June 11, 1897, 1.} (See Photograph Five in Appendix One).

Midland had relied on the lumber industry for its development, basing its manufacturing interests on the availability of lumber and its businesses on the local lumbermen. The extractive nature of the lumber industry and the aggressive way in which it was harvested in the 19\textsuperscript{th} century without any intent to conserve or provide for sustained yield, meant that the timber could not last forever. Caught up in the profit of the boom, industrialists and business men did not see that inevitability until lumber began to wane. The result was a town on the verge of economic collapse by 1897. The town soon rallied around a new extractive industry, chemical production from underground reserves of brine, and heralded H.H. Dow as a savior.
Chemical Industry Bust and Boom

The rise of the bromine and the chemical industry overlapped with the decline of the lumber industry in Midland County. Midland and Midland County sit on a large pocket of underground brine, which is salt water left over from an inland sea that sank below the surface. The original General Land Office (GLO) survey of 1832 noted the existence of salty water rising to the surface, near the Salt River.\(^{87}\) In 1841, the state of Michigan sank a brine well just west of Midland in Jerome Township under the direction of the State Geologist to extract brine for the purposes of salt production. This early salt manufacturing process used heat to evaporate the water from the brine, leaving the salt behind.\(^ {88}\) Due to the abundance of wood scraps leftover from lumbering, the manufacture of salt became a popular secondary product for local lumber mills, most notably after Michigan used a tax break as an incentive for salt production. The Salt Bounty Act of 1859 sparked the addition of brine wells to lumber mills in the Saginaw Valley by 1861, with some companies producing upwards of 550 barrels of salt daily.\(^ {89}\) A few sawmills in Midland, including those run by John Larkin, William Patrick and Samuel Sias, dug wells for salt and later bromine production.\(^ {90}\)


\(^{88}\) Portrait and biographical album of Midland County, Mich., 384.


While the first product extracted from the local brine was salt, the discovery of large quantities of bromine and other chemicals in the local brine soon eclipsed the demand for salt. Bromine (also referred to as bromides) first discovered in 1826 by Antoine-Jerome Balard, became a desired product during the 1860s due to its use in the photography industry, not only as a developing agent but also in the making of light sensitive plates. Midland brine had the highest concentration of bromine in the Midwest. The process for extraction involved heating and reducing the liquid after freeing the bromine by adding sulfuric acid. By 1882, several prominent businessmen, including John Sias, William Patrick, A. Dickey, and John Larkin, joined to form the Michigan Bromine and Salt Company. An annual report posted to the Midland Republican in 1885 stated that the bromine company had over $15,000 in capital stock. Production numbers remained low, as the lengthy process of extraction through heat application could only produce 4,500 pounds of bromine annually. Despite the hopeful start, the Michigan Bromine company struggled to survive and by 1889, the company abandoned production.

Herbert Henry Dow (referred to as H.H. Dow in this thesis) came to Midland at the beginning of an economic depression in August of 1890 in partnership with J.H. Osborn of Cleveland to start a bromine company, relying on the abundance of bromine and other chemicals in Midland brine to make a profit. H.H. Dow started in rented

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91 The Business Men of Midland, Detroit Free Press, November 13, 1891, 6.
property on the west side of Main Street, and perfected his bromine process by January of 1891, using electrolytic cells, which employed electricity to quickly extract the bromine from the brine.\textsuperscript{94} In late 1891, H.H. Dow bought 10 acres of property on the east side of Main Street, to build his new plant. The proximity to downtown provided access to the rail line for shipping purposes, easy walking or biking distances for new employees, and access to the lumberyards for scrap lumber.\textsuperscript{95} Construction of the Midland Chemical Company manufacturing buildings started in early 1892, and by October, the new plant opened its doors. A newspaper article from the \textit{Midland Republican} described the new manufacturing plant as “of the finest make.”\textsuperscript{96}

The economic depression of the 1890’s hit Midland particularly hard. The financial panics of 1893 and 1896 fueled the depression and corresponded to events occurring in Midland. Between 1894 and 1897, the number of manufacturing jobs in town dropped from 293 positions to a little over 100.\textsuperscript{97} An article from the \textit{Midland Sun} in 1897 described the many problems facing the small city, which included a rotting cedar plank Main Street, high taxes due to previous improvements, and little employment since lumber interests had fled to greener pastures.\textsuperscript{98} The city refused to raise taxes and

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\textsuperscript{94} H.H. Dow Papers, Folders: 900007 and 900008, The Dow Chemical Historical Collection, Othmer Library of Chemical History, American Chemical Heritage Foundation, Philadelphia Pennsylvania; Hereafter cited as Dow Papers, Folder(s), Dow Collection, Othmer Library. H.H. Dow Correspondence, Folders: 910001, 910002, and 910005, The Dow Chemical Historical Collection, Othmer Library of Chemical History; Hereafter cited as Dow Correspondence, Folder(s), Dow Collection, Othmer Library. \\
“Midland Matters,” \textit{The Midland Republican}, December 18, 1890, 7; E.N. Brandt, \textit{Growth Company: Dow Chemical’s First Century} (East Lansing: Michigan State University Press, 1997), 14-1.f
\textsuperscript{95} “General View of Dow Chemical Company’s Plant,” \textit{The Midland Sun}, December 29 1905, 4; \textit{Midland, Midland County, Michigan Sep. 1893}, Map. New York: Sanborn - Perris Map Co. Limited; “Midland: Facts Concerning Her Manufacturing and Mineral Importance,” \textit{The Midland Republican}, June 14 1897, 1; Dow Correspondence, Folder(s) 910002, Dow Collection, Othmer Library.
\textsuperscript{98} “As Others See Us,” \textit{The Midland Sun}, June 11 1897, 1; “The Right Ring,” \textit{The Midland Sun}, November 2, 1894, 1.
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halted all infrastructure improvements. While Midland Chemical did introduce new jobs in 1892, the impact on Midland’s failing economy was negligible, as the works employed only around eight to a dozen men between 1892 and 1895.

By 1895, Midland Chemical appeared on the brink of disaster when H.H. Dow’s experiments with the commercial production of chlorine from local brine resulted in an explosion at the plant. H.H. Dow knew that chlorine extracted from brine would provide one of the raw materials necessary for the manufacture of bleach (sodium hypochlorite), and allow the company to expand its product line. However, H.H. Dow’s Board was reluctant to risk the fledgling company on experimentation, which produced a major falling out between H.H. Dow and his Board. The trustees decided, in H.H. Dow’s words, “that they did not care to do any expanding.” For his part, H.H. Dow foresaw that bromine sales would eventually dwindle, and that bleach had the potential to boost the output and sales of Midland Chemical. H.H. Dow left the company and the city soon after his falling out with the Board to gain support in Cleveland for his new process of chlorine production.

The depression of 1897 coincided in Midland with the last of the lumber dams failing, leading to an economic collapse and an industry vacuum. Luckily H.H. Dow

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99 “Midland Matters,” The Midland Republican, March 6, 1894, 9; “The Right Ring,” The Midland Sun, November 2, 1894, 1.
100 Herbert H. Dow, “Why I came to Midland,” The Midland Sun, November 1926, 1-2; Dow Chemical Company, “Our Founder,” Dow Diamond Magazine, (Midland, MI: Self-Published) February 1938, 53-55, Accessed via the Grace A Dow Public Library; Dow Correspondence, Folder(s) 940012, 950003, 950004, and 950005, Dow Collection, Othmer Library.

The Dow Diamond magazine was one of several magazines created by Dow Chemical for its employees. Self-published by Dow Chemical, the first extant issue is from 1937 and includes propaganda pieces about the company, as well as articles about topics employees may be interested in, like housing and vehicles. The last extant issue of the Dow Diamond is from 1971, as the company later combined several magazines together to form The Brinewell magazine.
returned to Midland in 1897 with money to start a new chemical company, specializing in bleach production and utilizing the chemicals extracted from the local brine and his patented electrolytic cell manufacturing process. With $83,333 in hand to start a bleach manufacturing company in Midland, H.H. Dow started work quickly on a new plant intended to extract chlorine from Midland’s abundant, subterranean deposits of brine. The *Midland Sun* heralded the news with a glowing article stating “Dow Did It!” H.H. Dow purchased a plot of land between the Midland Chemical Plant and downtown. He explained in a letter to Charles A Post, one of the members of the Board of Directors for the new company, that it was “the most desirable piece of land in this locality. It is within the city limits and has one fairly good house on it.” On a scale larger than Midland Chemical, the new plant stretched along the Tittabawassee River with a long laboratory/absorption house, several brine tanks and wells, a generator building, a carpenter’s shop, and a cooperage. The company initially employed from 50 to 75 men, with an article noting that H.H. Dow preferred to employ locals over “outsiders.” The house on the property also proved useful to the company, as it became the home of the midnight shift manager Thomas Griswold Jr. and his wife, H.H. Dow’s sister Helen Dow. Griswold played a crucial role in the company over the next 25 years, as he helped H.H. Dow with design and layout of plant buildings and infrastructure.

Due to the Panic of 1896 and the lumber industry bust, until H.H. Dow returned in 1897, the city council could not afford city improvements or upkeep. The initial influx of

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101 “Dow Did It!” *The Midland Sun*, May 21, 1897, 1.
102 Dow Correspondence, Folder(s) 97000, Dow Collection, Othmer Library.
103 “Dow Did It!” *The Midland Sun*, May 21, 1897, 1; E.N. Brandt, *Growth Company*, 16-19.
104 E.N. Brandt, *Growth Company*, 32.
money from the construction of the TDCC (The Dow Chemical Company) plant resulted in a renewed city government. H.H. Dow also took a very active role in the government and planning in his now permanent home. After construction began on the new TDCC plant, H.H. Dow successfully ran for alderman of Ward Three, the area located closest to his newly purchased property. Operating in enlightened self-interest, H.H. Dow used his new city council position to push for city improvements and infrastructure.\textsuperscript{106} He started with additional sidewalks in 1897, and moved on to street resurfacing and telephone exchanges in 1898. The city improvements were mutually beneficial to the city and the new company. Safe sidewalks and roadways allowed employees to get to work on time, and additional phone services improved communication for Dow and the city.\textsuperscript{107} Alderman Dow continued to promote mutually beneficial city improvements as the company grew.

The Dow Chemical Company plant officially opened doors for bleach production in January 1898, though as H.H. Dow noted “it will, however, be a month or more before we get things to [run] at all smoothly.”\textsuperscript{108} Explosions, large and small, and chlorine gas leaks punctuated the bumpy start.\textsuperscript{109} After the chemists resolved the problem of hydrogen gas buildup along the electrodes in the electrolytic cell, which caused the explosions, operations at the plant ran day and night.\textsuperscript{110} Like his process for bromine production, H.H. Dow’s electrolytic cell had a distinct advantage over competitors, and produced

\textsuperscript{106} “Council Proceedings,” \textit{The Midland Republican}, April 16, 1897, 8.
\textsuperscript{108} Dow Correspondence, Folder(s) 980040, Dow Collection, Othmer Library.
\textsuperscript{109} Dow Correspondence, Folder(s) 980040, Dow Collection, Othmer Library.
chlorine faster and cheaper than did other manufacturers. Over the next three years, H.H. Dow continued to expand the production line to include chloroform (an anesthetic), and carbon tetrachloride (a solvent, fire extinguishing agent, and cleaning fluid) calcium chloride (used on roads to keep dust down), and magnesium chloride (a building agent), refusing to let the company stagnate with just a few products. From 1900 to 1901, he increased the production of bleach with the addition of two large buildings for bleach production, and constructed buildings for potassium bromide (also used in the photographic industry) production. By 1900, the company produced around 35 tons of bleach per week, which increased in 1901 to 90 tons a week. 111 With the new plant up and running, TDCC expanded the amount of product and pushed into international markets. The electrolytic cell process allowed H.H. Dow to sell his product with a 60-cent profit per pound in 1901. Due to the overwhelming success of bleach sales, H.H. Dow raised employee wages that year, with even unskilled laborers like the bleach handlers receiving $2.02 per eight hours. 112 This translates to 20 cents more per day for unskilled laborers than the U.S. average. 113 (See Map Nine and Photograph Six in Appendix One).

Profit sharing also began at TDCC in 1901 with the first check for employees a pleasant surprise in May. A notice posted by the company explained, “it was decided to set aside each month a fixed and invariable percentage of the profits derived from the manufacture of bleach during the preceding month. The profits as set aside will be

111 Dow Correspondence, Folder(s) 010002, Dow Collection, Othmer Library.; Dow Correspondence, Folder(s) 010031, Dow Collection, Othmer Library; The Midland Republican, February 8, 1901, 1.
112 Dow Correspondence, Folder(s) 010002, Dow Collection, Othmer Library; Dow Correspondence, Folder(s) 010031, Dow Collection, Othmer Library; E.N. Brandt, Growth Company, 44.
divided among those employees who have worked steadily for a year or more……The proportion of profits that each employee will receive is according to the amount of wages he earns.” H.H. Dow explained to a reporter from the *Midland Republican*, that this practice came from the “belief that the employees have served the companies interests faithfully, and will continue to do so.” Margaret Crawford notes that while profit sharing is part of the paternalistic ideals that a large company can have towards its employees, it would ensure that employees remained satisfied with their positions. Profit sharing though, was still a relatively new practice embraced by only 50 companies between 1869 and 1896, which definitely puts H.H. Dow ahead of fellow Michigan industrialist Henry Ford.115

Between 1897 and 1905, TDCC continued to grow due to the demand for cheap chlorine and bromine, both domestically and internationally. The company needed additional employees to help with production, and employed 335 men by 1905, which accounted for 16 percent of the total population of Midland.116 While these numbers may seem small, it is important to keep in mind that the total employable adult male population was much smaller than the total population of Midland. Additionally, the greater impact of the company can be seen in the amount of growth to the small city. Businesses and skilled tradesmen moved to the city to help support the workers for Dow. New residents included lawyers, doctors, butchers, tailors, blacksmiths, teachers, and

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115 Henry Ford began profit-sharing with his $5 a day initiative in 1914, which was praised by Andrew Carnegie as forecasting a new industrial era. Crawford, *Building the Workingman’s Paradise*, 33-34.
laundresses. Additionally the increase in employees along with the raise in wages started to break Midland out of a recession. New businesses opened up along Main Street replacing the closed down saloons with restaurants, bakeries, tailors, milliners, and drug stores. For entertainment, residents could partake of the Electric Theater (a theater for short films and performances) in town by 1909 or the free reading room.

Additional employees also called for new housing and construction. In 1902 a small addition to the platted portion of Midland heralded the first construction since the loss of the lumber industry. The modest addition extended along Jerome Street for 52 city lots. By 1905, however, with over 200 more employees at TDCC Midland felt a bit full. H.H. Dow noticed the lack of housing and convinced the TDCC board of trustees that rental properties were the only way to provide enough housing for incoming employees. TDCC as early as 1905 bought property near the plant to help house employees. In a letter dated July 11, 1905, H.H. Dow outlined the need to purchase two properties close to the chemical plant, as well as another fifteen to twenty additional houses, to his board of directors. The plan was to rent the properties for $5.00 a month. This in turn set the stage for several new additions to the platted city in the coming years, designed by TDCC as housing for new employees. (See Map Seven in Appendix One).

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118 Midland, Midland County, Michigan February 1909. Map. New York: Sanborn - Perris Map Co., Limited, 1909. Midland County Historical Society Archive, Midland, MI. Dow Correspondence, Folder(s) 010059, Dow Collection, Othmer Library; Dow Correspondence, Folder(s) 160147, Dow Collection, Othmer Library.
119 Post’s Addition in Midland Additions, Midland County Historical Society Archive, Midland Michigan, June 14, 1902.
120 Dow Correspondence, Folder(s) 050011, Dow Collection, Othmer Library.
121 Dow Correspondence, Folder(s) 050011, Dow Collection, Othmer Library; State of Michigan Twenty-sixth Annual Report of the Bureau of Labor and Industrial Statistics Including the Sixteenth Annual Report of State Inspection of Factories (Lansing: Wynkoop Hallenbeck Crawford Co., 1909), 197; Dow Correspondence, Folder(s) 110136, Dow Collection, Othmer Library.
H.H. Dow’s push into international markets, while beneficial for the economy of Midland, created resentment internationally among other chemical manufacturers. In 1902, the large quantities of potassium bromide and bleach produced by TDCC attracted the attention of both the Deutsche Bromkonvention, a collective of German bromine producers, and the United Alkali Company, a group of British bleach manufacturers. Both groups took steps over the next ten years to shut TDCC and other American chemical companies out of the international market. Pressure started early in 1902 from the British United Alkali Company as they dropped the price for bleach per hundredweight by 40 cents. This drop hit TDCC especially hard after their two large bleach expansions in 1901, totaling an investment of over $500,000. The silent price war continued until 1904 when United Alkali, ended the war when it raised its price from 88 cents to $1.25. While this event signaled the end of the price wars, H.H. Dow had already signed contracts for his product at 86 cents for 1904. H.H. Dow commented in a letter to C. Staley “it seems too bad, that we have to bear the entire cost of bringing the United Alkali Co. to recognize outside production.” H.H. Dow felt that TDCC bore the brunt of the United Alkali price war during 1904, due in most part to the overwhelming loss of profits.

No sooner did the war over bleach production end, than a struggle over bromine sales begin. It started with a surprise visit from Hermann Jacobsohn, a representative of the Deutsche Bromkonvention, to Midland in 1904. Jacobsohn told H.H. Dow that the sale of bromines to international interests needed to stop; otherwise, the Bromkonvention

122 E.N. Brandt, Growth Company, 44; Dow Correspondence, Folder(s) 020045, Dow Collection, Othmer Library; Dow Correspondence, Folder(s) 040030, Dow Collection, Othmer Library.
123 Dow Correspondence, Folder(s) 030041, Dow Collection, Othmer Library; Dow Correspondence, Folder(s) 040030, Dow Collection, Othmer Library.
would flood the American market to discourage TDCC and other American manufacturers.\textsuperscript{124} A 1905 article in the \textit{Midland Sun} explained to the people of Midland that TDCC “created enmity of the German producers” by selling internationally “and there has been a continual warfare on this product for the last year.”\textsuperscript{125} By 1906, H.H. Dow confirmed to stockholders at a local meeting that the company was at war with the German manufacturers, but he defended the company’s efforts by stating that they “have increased their business in foreign hands and even in the territory of their competitors.”\textsuperscript{126} While this price war would limit production at the bleach and bromine buildings, H.H. Dow again diversified his products. He sank money into new buildings for production of sodium benzoate, used as a food preservative, to help keep the plant in Midland afloat.\textsuperscript{127}

Unfortunately, the two price wars combined with a financial panic in the United States in 1907 put pressure on TDCC and, in turn, the city of Midland. Between 1907 and 1911, Midland suffered through an economic slump. A \textit{Detroit Free Press} article from February of 1907 heralded Midland as a booming community, with three new manufacturing interests in town.\textsuperscript{128} TDCC had nearly 300 employees by September 1907; however, by January of 1908 the company felt the effects of the growing economic crisis as the number of unemployed across Michigan rose. H. H. Dow closed the bromine plant for a few weeks in January 1908, a pattern that would continue over the next few

\textsuperscript{124} Don Whitehead, \textit{The Dow Story: The History of the Dow Chemical Company} (New York: McGraw Hill, 1983) 54-62; E.N. Brandt, \textit{Growth Company}, 45-48; Dow Correspondence, Folder(s) 080015, Dow Collection, Othmer Library; Dow Correspondence, Folder(s) 080015, Dow Collection, Othmer Library.
\textsuperscript{125} “General View of Dow Chemical Company’s Plant,” \textit{The Midland Sun}, December 29 1905, 4.
\textsuperscript{126} “Dow Chemical Stockholders,” \textit{The Midland Republican}, August 3, 1906, 1.
months as TDCC fought to recoup losses from the business depression and the continued German onslaught on prices. A newspaper article about the shutdown in the *Midland Sun* concluded with “The shutdown has demonstrated the value of the local industry to the business of Midland. It has also brought home with force that it is a bad thing for any community to be dependent on any one industry.”129

Additionally Midland found itself a pawn in a larger international market that it was not economically stable enough to survive. In fact, as of 1907 Midland was still in debt by $37,000, left over from the decline of the lumber industry.130 The city could not afford the risks that H.H. Dow was taking, but with the economy almost exclusively supported by TDCC, the city became an unwitting victim to a brutal international market. H.H. Dow’s fight with the German Bromkonvention continued through the financial panic of 1907 and both parties continued to undercut prices until 1909.131 Of the 2,528 individuals, living in Midland during the 1910 census, 236 of them worked for TDCC, a decrease of over 100 employees from 1905.132 The tide in Midland’s economy did not completely turn until 1911 when TDCC began production on five new products, which included two insecticides (lead arsenate, and lime sulphur), zinc chloride (used to manufacture soldering flux), soldering flux (for use in canning industry), and ferric chloride (pharmaceutical industry).133


130 Dow Correspondence, Folder(s) 080090, Dow Collection, Othmer Library; “Midland Almost Broke,” *Detroit Free Press*, March 20, 1907, 1.


H.H. Dow stressed research and diversification from the very beginning of his company, and often used research into new processes and chemicals to keep the company afloat during economic slumps. To help facilitate research, H.H. Dow placed small laboratories in or near the manufacturing facilities for products, thus allowing research and manufacturing to work jointly towards a goal. By the end of World War I, TDCC would have twelve of these small labs scattered across the facility.\textsuperscript{134} H.H. Dow’s investment in research paid off by 1911 when the plant added buildings for chloroform, an anesthetic, and insecticide, which included lime sulfur and lead arsenate production.\textsuperscript{135} By November of that year, H.H. Dow wrote to Professor Smith at his old alma matter, Case School of Applied Science in Cleveland, that he was in desperate need of good supervisors to help handle the larger workforce required for the manufacture of these additional products.\textsuperscript{136}

Between 1911 and 1914, TDCC and the city of Midland began a period of steady growth. The increased profits from TDCC resulted in an overall expansion of the economy and city of Midland. The outcome was 14 additions to the original plat of the city, as well as improvements in the form of a new water system and new streetlights.\textsuperscript{137} The additions provided needed space for housing located within walking distance to H.H.

\textsuperscript{135} Dow Correspondence, Folder(s) 110021, Dow Collection, Othmer Library; Dow Correspondence, Folder(s) 110021, Dow Collection, Othmer Library; “Dow Chemical Co. Expanding,” \textit{The Midland Sun}, May 13, 1910, 1.
\textsuperscript{136} Whitehead, \textit{The Dow Story}, 74-75; “Improvement in Chemicals,” \textit{The Midland Republican}, June 18, 1909, 1.
Dow’s plant, which expanded the city north and east.\textsuperscript{138} TDCC’s power plant and generator system also helped to support these improvements. The company sold the surplus electricity to the city at a rate of 2½ cents per kilowatt or 4½ cents for general use.\textsuperscript{139} The excess electricity allowed the city to construct a water works with an electrical pump in 1914, as well as add electric streetlights.\textsuperscript{140} These improvements also attracted new residents to the city, and made it more desirable for current and potential TDCC employees.

A “good roads” movement across the state in 1913 pushed Midland to begin work on grading and macadamizing the local roads.\textsuperscript{141} By 1915, H.H. Dow also added his voice on the condition of roads, and began discussions with the Saginaw Board of Trade to improve transportation services between the two cities. The lack of macadamized roads between the two cities hindered the exchange of goods and people, which could improve the economy of both cities. When prompted by the Board of Trade to explain why Dow products were absent in Saginaw, H.H. Dow criticized the lack of rail service and roads. He stated, “my wife has found it so impossible to go to Saginaw that she is now learning how to trade in Bay City, and I think this applies to scores of other Midland people.”\textsuperscript{142} The Board responded back with a proposal for a stone road running from Midland to Saginaw. H.H. Dow suggested that the Tittabawassee River Road would be the best solution, as it ran right by the plant, “to the average tourist this beautiful angling

\textsuperscript{138} Midland Additions, Midland County Historical Society Archive, Midland Michigan.
\textsuperscript{139} “City Fathers,” \textit{The Midland Sun}, March 2 1894, 1; “Shall the People Rule or Shall the Mayor Rule?” \textit{The Midland Sun}, June 11, 1914, 1.
\textsuperscript{141} “Secures Opinion of Att’y General,” \textit{The Midland Sun}, May 8, 1913, 1; “First Crushed Stone on New Road Tuesday,” \textit{The Midland Sun}, May 7 1914, 1.
\textsuperscript{142} Dow Correspondence, Folder(s) 150075, Dow Collection, Othmer Library; Dow Correspondence, Folder(s) 150075, Dow Collection, Othmer Library; Dow Correspondence, Folder(s) 150075, Dow Collection, Othmer Library.
river road would remove the monotony of travel by the ever changing view.”

Beyond the beautiful vistas, H.H. Dow also wanted the road to provide easy access for his goods to get to another market. However, improvements did not begin until after World War I.

Increased tensions in Europe during 1913 and 1914 would completely change Midland and TDCC. With the outbreak of World War I in July of 1914, Midland and TDCC experienced an economic boom. TDCC began work on several plant additions in 1913, including an expansion of its chloroform plant. (See Photograph Seven in Appendix One). The company also expanded its product line to include phenol (used as a disinfectant and in explosives), caustic soda (used in cleaning agents), magnesium salts (used in medication) and synthetic indigo (used to dye fabric). Apart from the development of synthetic indigo, which relied on aniline (derived from coal tar) as the raw material, TDCC derived all of these products from either bromine or chlorine foundations. The European blockade in World War I made it increasingly difficult for American buyers to purchase foreign products, especially chemicals and dyes, as the largest chemical companies were located in Europe. To help offset the lack of foreign chemicals, TDCC upped production of chlorine and bromine products to fill the gap left by foreign companies. The war increased the consumption of certain chemicals, most

143“The Midland- Saginaw River Route is now Assured,” The Midland Sun, March 14, 1918, 1.
144“The Midland- Saginaw River Route is now Assured,” The Midland Sun, March 14, 1918, 1.
notably phenol and chloroform, and by the end of the war, TDCC held the spot as the nation’s largest producer of both products.\textsuperscript{146}

The increase in production at TDCC meant a corresponding increase in employment for the company. Between 1910 and 1915, the number of employees jumped from 235 to almost 800 men; by 1916, the total reached 1,225, and by 1918, the number soared to over 3,000.\textsuperscript{147} Additionally after the U.S. entered the war on April 6, 1917, TDCC received several government contracts for research into chemical warfare, which further increased the number of employees. Construction began on a new plant in Midland specifically for military purposes in January of 1918 and production started later that month. The plant focused on reverse engineering (taking a final product and working backwards to determine how it was created) tear gas (bromacetone and xylyl bromide) and mustard gas (dichlorethyl sulfide) to be used on the battlefront.\textsuperscript{148} H.H. Dow also began research into the production of magnesium for use in engines.\textsuperscript{149} Profits also increased as chemicals flew out the door and the company expanded facilities to more than 125 buildings.\textsuperscript{150} Synthetic indigo and phenol were some of the biggest sellers, with the plant producing upwards of 10,000 pounds of dye per day, and by the end of the war over 30 tons of phenol a day.\textsuperscript{151}

\footnotesize
\textsuperscript{146} E.N. Brandt, \textit{Growth Company}, 93; Dow Correspondence, Folder(s): 150035, Dow Collection, Othmer Library; “War Demand for Chloroform Big,” Detroit Free Press, November 26, 1914, 8; “City of Midland World Famous for Chemicals,” \textit{The Midland Sun}, January 18, 1917, 1-2
\textsuperscript{149} “May Manufacture Another Product,” \textit{The Midland Sun}, August 10, 1916, 1.
\textsuperscript{151} “City of Midland World Famous for Chemicals,” \textit{The Midland Sun}, January 18, 1917, 1-2; The Northeastern Michigan Development Bureau, \textit{Northeastern Michigan: Midland County Special}, 21; Dow Correspondence, Folder(s) 150052, Dow Collection, Othmer Library; E.N. Brandt, \textit{Growth Company}, 93.
The influx of new employees and their pay produced an economic boom in Midland. As early as 1915 the Detroit Free Press valued the company at over $3,000,000, and in 1916 H.H. Dow suggested that even men employed for fewer than six months should be included in profit sharing. Among the most important and visible effects of the boom was a surge in housing construction and additions to the city. Beginning in 1912 and extending through 1918, fourteen new additions dramatically increased the size of Midland. Larkin’s Addition, platted in 1913, added roughly 1,000 plots to the city, and expanded housing east of the downtown core. The number of new houses increased to the point that by 1919 Midland was nicknamed the “city of homes.” However, the construction could not keep up with demand and many new employees were forced to find housing in Saginaw, and commute into work daily. In 1916 fire at the Madill House, a local boarding house, compounded the issue and put over 60 employees on the streets. H.H. Dow concluded that “there is apparently only one solution, and that is for the Dow Company to spend between fifty and one hundred thousand dollars on a new allotment.”

Between 1916 and 1918, TDCC funded construction of single-family homes in two new additions to the city, specifically designed to combat the “strenuous congestion.”

152 Dow Correspondence, Folder(s) 160009, Dow Collection, Othmer Library; “War Booms Business of Midland Chemical Firm,” Detroit Free Press, October 3, 1915, 2; Dow Correspondence, Folder(s) 140003, Dow Collection, Othmer Library.
155 The Northeastern Michigan Development Bureau, Northeastern Michigan, 9
156 Dow Correspondence, Folder(s) 150075, Dow Collection, Othmer Library; “Yea, Bo, We’re Sure Expanding,” The Midland Sun, September 12, 1918, 1.
157 Dow Correspondence, Folder(s) 160009, Dow Collection, Othmer Library; “Yea, Bo, We’re Sure Expanding,” The Midland Sun, September 12, 1918, 1.
Located north of the plant, employees could purchase homes directly from TDCC for a small down payment, and then pay off the rest of the balance in monthly installments. What started in 1916 with a few houses, by 1918 contained over 150 finished homes, but the demand continued to increase with an additional 2,200 employees at the plant. In 1918, the company funded a second series of “Dow homes” to add additional employee housing. In this regard H.H. Dow followed in the footsteps of Carnegie and Pullman, in creating housing for employees. However, unlike a company town TDCC did not own all of the housing and stores in the city, nor was it the only employer.

With increased employment at TDCC, the population of Midland doubled from 1910 to 1920, and most were young men employed at TDCC. The increased population put a strain on facilities across the city. The city worked on paving the local streets, and began preparations for a new jail as well as a hospital. H.H. Dow was also greatly motivated to help improve the civic facilities of the town, both to help his current employees and to make the town more appealing to potential new employees. Due to the demand for troops, finding young men to work at TDCC became increasingly difficult as the war progressed, making it imperative to expand the amenities provided in Midland. H.H. Dow’s push for improvements began in in 1915 with an idea for a community

158 “Midland’s Growth is Permanent,” The Midland Sun, September 19, 1918, 1; Midland Additions, Midland County Historical Society Archive, Midland Michigan; Dow Correspondence, Folder(s) 16009, Dow Collection, Othmer Library.
159 “Midland’s Growth is Permanent,” The Midland Sun, September 19, 1918, 1; Dow Correspondence, Folder(s) 160148, Dow Collection, Othmer Library.
recreational facility. H.H. Dow was ultimately concerned about healthy extracurricular activities, both to improve his unskilled workforce and as a way to attract young chemists to his company. H.H. Dow with the help of Myron E. Adams, a clergyman and social worker from Chicago, drafted plans for a recreational building that would provide “natural social recreation and the moral and spiritual training that comes from association with men who have the best ideas of life.” H.H. Dow and Adams pitched the idea to the Midland City Council, and provided additional incentive with $10,000 to fund the project. Located close to the TDCC plant on the east side of Main Street, construction began on the Midland Community Center in 1918. The facility first opened its doors in January of 1919, and included an auditorium, a basement clubroom, bowling alleys, and showers facilities. H.H. Dow’s push for a facility of this sort was as much about the city as it was about his own employees. In order to attract skilled employees, H.H. Dow needed to push to make Midland a more modern city, and provide amenities that young men would need and enjoy. Operating in enlightened self-interest, H.H. Dow’s contributions to the city of Midland benefitted TDCC as much as the city.

Midland also needed additional education facilities by 1917, when the school census data recorded over 1,200 school-age residents in the city. H.H. Dow proved to

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162 Dow Correspondence, Folder(s) 140002, Dow Collection, Othmer Library; Dow Correspondence, Folder(s) 180208, Dow Collection, Othmer Library; Dow Correspondence, Folder(s) 160140, Dow Collection, Othmer Library; Dow Correspondence, Folder(s) 160140, Dow Collection, Othmer Library; Dow Correspondence, Folder(s) 160140, Dow Collection, Othmer Library; “On the Map Midland and Dow Chem. Co.,” The Midland Republican, July 26, 1917, 5; E.N. Brandt, *Growth Company*, 70-71; The Northeastern Michigan Development Bureau, *Northeastern Michigan*, 9.

163 Dow Correspondence, Folder(s) 160140, Dow Collection, Othmer Library; Dow Correspondence, Folder(s) 160148, Dow Collection, Othmer Library; E.N. Brandt, *Growth Company*, 70-71.

164 “Drawings of Midland’s New Community Center Building,” The Midland Sun, January 10, 1918, 1; Dow Correspondence, Folder(s) 160148, Dow Collection, Othmer Library; Dow Correspondence, Folder(s) 170210, Dow Collection, Othmer Library; Dow Correspondence, Folder(s) 190240, Dow Collection, Othmer Library; E.N. Brandt, *Growth Company*, 70-71.

165 “Returned Soldier finds a new landmark in Midland,” The Midland Republican, January 16, 1919, 1.

166 “Still Growing,” The Midland Sun, June 14, 1917, 4.
be the driving force behind this movement as well, as in 1917 H.H. Dow completed an educational facility at the TDCC plant. The $20,000 building contained over 12 classrooms, as well as laboratory space for chemical and physical experiments, and a library.\textsuperscript{167} The company also offered a 10-week summer program to recently graduated high school boys, with half of the time spent in classroom work and half on the production floor. H.H. Dow provided $10 a week in wages, as well as the opportunity for room and board.\textsuperscript{168} TDCC’s employment needs continued to expand with the war effort and the military draft severely depleted the pool of available young men. By providing ongoing chemistry education to local high schoolers, H.H. Dow created his own skilled workforce. The educational benefit to the city was more an added bonus than a goal. By the end of World War I in 1918, the efforts of TDCC had almost doubled the size and population of Midland. The dramatic increase in employment at TDCC changed the shape of the city, and spurred improvements to draw coveted skilled laborers.

Germany surrendered on November 11, 1918, which ended wartime production across the United States. Midland quickly fell into an economic depression as chemical needs drastically declined. The \textit{Midland Sun} questioned H.H. Dow’s ability to transition to peacetime operations stating, “Can a plant be converted from 90 percent war production to 100 percent peace production?”\textsuperscript{169} From 1918 into the 1920s, TDCC sales dropped off as war contracts ran out and the company went into a decline. To save his company from shutting down completely, beginning in 1919, H.H. Dow closed some of

\textsuperscript{167} “Dow Educational B’ldg Completed,” \textit{The Midland Republican}, December 27, 1917, 1 Dow Correspondence, Folder(s) 160144, Dow Collection, Othmer Library; Dow Correspondence, Folder(s) 160144, Dow Collection, Othmer Library; Dow Correspondence, Folder(s) 160144, Dow Collection, Othmer Library; Dow Correspondence, Folder(s) 160144, Dow Collection, Othmer Library; Dow Correspondence, Folder(s) 170012, Dow Collection, Othmer Library.

\textsuperscript{168} Dow Papers, Folder(s) 180210, Dow Collection, Othmer Library; “Special Offer to High School Boys,” \textit{The Midland Republican}, June 3, 1920, 1; Crawford, \textit{Building the Workingman’s Paradise}, 32.

\textsuperscript{169} “Professional Men Banqueted by Dow,” \textit{The Midland Sun}, March 20, 1919, 1.
the production lines in Midland and only ran a few lines four days a week or less.\textsuperscript{170}

TDCC also cut back on employee hours and laid off non-essential employees to conserve costs.\textsuperscript{171} Midland residents generally disliked this approach as the local economy suffered the loss of wages from fewer hours and layoffs. In an attempt to stave off employee malcontent, TDCC placed a full-page ad in the \textit{Midland Sun}, which explained the lack of profits from war work to the city.\textsuperscript{172} H.H. Dow continued to believe that research was the key to success in the manufacture of chemicals and funded an organic chemistry research laboratory in Midland despite the hard times in 1919.\textsuperscript{173} The focus on research led to a diversification of products, which slowly improved chemical sales from 1919 to 1921.\textsuperscript{174}

Chemical research continued to push the company forward through the development of new products, such as ferric chloride (cleans water), chlorohydrin (ethylene, the precursor to plastics), and hydrobromic acid (a very strong industrial acid).\textsuperscript{175} A map of TDCC in 1924 shows over 192 buildings on the property, which stretched from Bay City road south along the Tittabawassee.\textsuperscript{176} In fact, the size of the chemical plant was roughly a quarter of the size of the city of Midland.\textsuperscript{177} Sales gradually improved such that by 1927 several additions to the plant increased production in phenol,
mono-chloride benzyl (a chemical building block that can make anything from perfumes to pharmaceuticals), calcium chloride, and chlorine.\textsuperscript{178} (See Photograph Eight in Appendix One). By focusing large-scale production on chemical building blocks like chlorine, and phenol, H.H. Dow was able to utilize his products to fund research into new chemicals. H.H. Dow’s focus on research was his true company strategy, and it continued until his death in 1930.\textsuperscript{179} (See Photograph Ten in Appendix One).

Unfortunately, the city of Midland faced an economic slump after the end of World War I. Three empty storefronts appeared in the downtown area by 1919, and the population of the city decreased.\textsuperscript{180} While this slump was not as systemic as the economic depression of the 1890s, with layoffs and decreased hours, many of TDCC workers were not spending money as freely. The lack of growth at TDCC also contributed to a brief hold on new housing construction.

After two years of a post-World War I economic slump, the production of magnesium resuscitated TDCC and Midland. Research into magnesium had started at TDCC as early as 1916, and the company continued to work with improving the alloy until 1919.\textsuperscript{181} After 1921, sales increased in TDCC’s magnesium alloy, called Dowmetal, when a car with Dowcast magnesium pistons won the Indianapolis 500.\textsuperscript{182} Magnesium was highly sought after in the manufacture of automobile and airplane parts, as it is the

\textsuperscript{178} Dow Papers, Folder(s) 270016, Dow Collection, Othmer Library; Dow Correspondence, Folder(s) 290001-A, Dow Collection, Othmer Library.
\textsuperscript{181} “May Manufacture another Product,” \textit{The Midland Sun}, August 10, 916, 1; “Chemists Make Metal of Brine,” \textit{The Midland Sun}, June 30, 1921, 1.
lightest structural metal, and TDCC soon cornered the market in magnesium production.\(^{183}\) By 1926, magnesium production and the establishment of several manufacturers including two creameries, the Emerson Drug Company, two concrete block factories, a pickle plant, two oil companies, and a chicory plant (a coffee additive), poured money back into Midland’s economy.\(^{184}\) (See Map Eight and Ten, and Photograph Nine in Appendix One).

Hebert Henry Dow passed away in 1930, just after the stock market crashed in 1929. Willard Henry Dow (Herbert Dow’s oldest son) took over as president of the company soon after. Groomed to run Dow Chemical, Willard Dow was privy to his father’s dreams and plans for TDCC and Midland. Willard Dow began expansion of the company through partnerships, based on several research projects established by his father, and ambitiously sought to move pieces of the manufacturing process away from the plant in Midland.\(^{185}\) The first such venture of this sort was the Ethyl-Dow plant in Wilmington, North Carolina. This enterprise with Ethyl Gasoline took bromine from ocean water as an additive to ethyl gasoline.\(^{186}\) The second plant established outside Midland was Io-Dow in Long Beach, California. By 1932, TDCC produced a significant portion of the nation’s iodine from the waste brine at Long Beach. In Midland research also remained a top priority as the Dowell product line was born out of the need to extract

\(^{183}\) Brandt, *We Called It MAG-nificent*, 31; Dow Chemical Company, *Dow History*, 3-5.


\(^{185}\) Prior to Willard inheriting the company the plant in Midland Michigan is the only plant producing chemicals owned by TDCC. The Ethyl-Dow plant in Wilmington, North Carolina established in 1933 was the first plant outside of Michigan to be owned and operated by Dow.

\(^{186}\) Dow Chemical Company, *Dow History*, 3-5; *Dow Diamond Magazine*, August 1938; *Dow Diamond Magazine*, 1939 Golden Gate Exposition supplement; E.N. Brandt, *Growth Company*, 155.
as much oil from Michigan wells as possible. Dowell, established in 1932, produced acids for use in local oil wells to increase flow from the well. In this way, Willard Dow used research to “ride out” the Great Depression in Midland with only a few slowdowns and slack periods. \(^{187}\)

By 1935, demand for the new product lines increased the size of the TDCC, especially at the Dow headquarters in Midland. \(^{188}\) The success of Ethyl-Dow, Dowell, Iodow, and magnesium alloys dramatically increased the number of employees. By 1938, TDCC employed nearly 4,000 people, including over 700 scientists and technicians, at the headquarters in Midland. The Midland plant in 1938 stretched over 525 acres and included 325 buildings and 18 miles of rail line. \(^{189}\) TDCC’s growth would boom during the next six years beginning with the outbreak of World War II in 1939.

The influx of new jobs at the TDCC headquarters in Midland increased the population and resuscitated the housing market. Midland’s population jumped to over 9,700 residents by 1937 from a little over 5,000 in 1920. Public utilities doubled in size to handle the increased number of residents and manufacturers. \(^{190}\) The housing market also went through another surge of construction, as employees needed new housing. In 1935, Willard Dow proposed plans for additional rental properties for employees, called


\(^{190}\) Midland Chamber of Commerce, Midland Michigan: City of Modern Explorers, 3-5.
Homestead Addition #1.\textsuperscript{191} Construction began in April of 1935 on ten rental homes in the subdivision, each house costing around $2,000 and renting for $15 to $18 dollars a month. The subdivision of small houses was “expected to meet in part the atrocious shortage which has existed in Midland for several years,” stated the \textit{Midland Republican}.\textsuperscript{192} Willard Dow proposed another addition in 1938 called Homestead Addition #2, which had a standard contemporary design with four dead end courts surrounding a park.\textsuperscript{193} To help combat the shortage of housing in Midland, an article in the \textit{Dow Diamond} from October 1938 helped guide employees through the rental and then home building process.\textsuperscript{194} The next edition of the magazine even provided employees with advice on how to choose a lot for their new home, stressing the importance of purchasing improved lots within the city limits for new development.\textsuperscript{195} Though Willard helped provide rental properties and resources for his employees about housing in Midland, like his father before him, his actions were as much self-serving as altruistic. The restrictions TDCC placed on the housing lots of Homestead Addition #2 shows these qualities most clearly, as they include clauses on allowing TDCC’s chemical interests to pass over and under the property.\textsuperscript{196} In order to draw potential employees to

\begin{footnotesize}
\begin{enumerate}
\item Homestead addition #1 in Midland Additions, Midland County Historical Society Archive, Midland Michigan; Abstract of Title for lot number 9 in Block C of Homestead addition #1, Midland County Historical Society Archive, Midland Michigan.
\item The \textit{Midland Republican} April 25, 1935, 1.
\item Homestead Addition #2 in Midland Additions, Midland County Historical Society Archive, Midland Michigan.
\item Dow Chemical Company, \textit{Dow Diamond Magazine} 2 no. 1, October 1938, 3-6 (Please see note 100 on page 27 for a background of the \textit{Dow Diamond Magazine}); Crawford, \textit{Building the Workingman’s Paradise}, 86, 137.
\item Dow Chemical Company, \textit{Dow Diamond Magazine} 2 no. 2, December 1938, 7-9.
\item TDCC placed sixteen restrictions on housing for Homestead Addition #2, which included restricting lots to only one dwelling, the spacing of the buildings on the lot, and restricting landowners to only ornamental fencing. Of the sixteen restrictions number eleven is the most thought provoking in that it only allowed dwellings to be occupied by members of the Caucasian race, except those members of other races that were operating as domestic servants of the owner or occupant. Warranty Deed from the Dow Chemical Company to Edward R Wright, December 27, 1939 (Midland County, MI, Liber. 140, Page 331-332)
\end{enumerate}
\end{footnotesize}
Midland, he needed housing, and he needed the additional employees to support the growth in chemical needs presented by World War II. The additional employees also supported the local Midland economy by spending their money at local businesses.
Conclusion

An article from the *Midland Sun* in 1908 summarized the effect of large singular industrial interests on the city of Midland when it stated, “the shutdown has demonstrated the value of the local industry to the business of Midland. It has also brought home with force that it is a bad thing for any community to be dependent on any one industry.” This article shows that the citizens of Midland, including its political leaders, were intimately aware of the risks associated with reliance on an extractive industry for their economic stability. However, Midland failed to change the economic core for the town, and continued to rely on the chemical industry into the mid-twentieth century.

The two extractive industries that made their home in Midland controlled the local economy in both positive and negative ways, and through both direct and indirect means. As with any economy what the employers pay employees will eventually makes its way back into the community, and when employees were paid well then they were more likely to spend their money. Thus, leading to a prosperous economy. The opposite can then be said when employers failed to compensate employees or even begin cutting down the size of the workforce. On one hand, these are indirect ways of influencing the local economy. The lumber industry was a good example of this methodology. When the lumber industry boomed, more employees were hired and the local economy prospered. When the lumber industry failed, layoffs and lack of wages meant closed shops and rotting plank streets. More employees meant more housing and expansion to the city, while layoffs ensured that the city stayed the same size or reduced.

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On the other hand, the Dow Chemical Company led by Herbert Henry Dow and its employees, directly influenced the local economy and growth of Midland through active involvement in local politics and public donations. As an alderman, H.H. Dow directly pushed for city improvements that would be mutually beneficial for both the company and town. Additionally, he purchased rental properties and erected housing for his employees, ensuring that the city expanded along streets closest to the company. As time progressed, however, H.H. Dow’s improvements often benefitted the company more than the town. This enlightened self-interest is most evident with the educational facility constructed by Dow in 1917. While the structure did peripherally help the city, the main purpose was to train a skilled workforce for the company.

For much of its history, Midland was dependent on two extractive industries for its economic welfare. The lack of industrial diversification in Midland’s economy intensified the booms and busts experienced by the lumber and chemical industries. This in turn mirrors Michigan’s rocky relationship with extractive industries. Extractive industries were the bedrock that built the economy of Michigan, and many of the other states. Industrial capitalists viewed extraction as the proper use of the natural resources, and not as anything destructive to the landscape or economy. It is only by looking back on the nature of these industries that we can see their impact on the natural environment and the economy.
Appendices

Appendix A: Figures

Figure 1: Reference map of Midland’s location in Michigan. Image Location: https://thefiresidecollective.com/google-maps-lansing-michigan.html (Accessed October 5, 2017).
Figure 4: Midland County in 1873. Note the location of the Flint & Pere Marquette Railroad. "Michigan (Lower Peninsula)" in Atlas of Calhoun Co. Michigan: from recent and actual surveys and records / under the superintendence of F.W. Beers. New York: F.W. Beers. 1873.
National Register of Historic Places Registration Form

1. **Name of Property**
   Historic name: _Andrew Muir House________________________
   Other names/site number: ________________________________________

   Name of related multiple property listing:
   _____________________________________________________________

   (Enter "N/A" if property is not part of a multiple property listing

2. **Location**
   Street & number: _1415 Haley______________
   City or town: _Midland______ State: _Michigan______ County: _Midland______

   Not For Publication: [ ] Vicinity: [ ]

3. **State/Federal Agency Certification**
   As the designated authority under the National Historic Preservation Act, as amended,
   I hereby certify that this nomination _x_ request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60.
In my opinion, the property _x_ meets ___ does not meet the National Register Criteria. I recommend that this property be considered significant at the following level(s) of significance:

___ national         ___ statewide         _x_ local

Applicable National Register Criteria:

_x_ A ___ B ___ C ___ D

____________________________________________
Signature of certifying official/Title:                                Date

State or Federal agency/bureau or Tribal Government

In my opinion, the property ___ meets ___ does not meet the National Register criteria.

____________________________________________
Signature of commenting official:                                Date

Title:                                State or Federal agency/bureau

                                or Tribal Government
4. National Park Service Certification
I hereby certify that this property is:

___ entered in the National Register

___ determined eligible for the National Register

___ determined not eligible for the National Register

___ removed from the National Register

___ other (explain:) __________________________

_________________________________________________________________

Signature of the Keeper Date of Action

5. Classification
Ownership of Property

(Check as many boxes as apply.)

Private:  

Public – Local

Public – State

Public – Federal
Category of Property

(Check only one box.)

Building(s) x
District
Site
Structure
Object

Number of Resources within Property

(Do not include previously listed resources in the count)

<table>
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Number of contributing resources previously listed in the National Register __________

6. Function or Use

Historic Functions

(Enter categories from instructions.)

Domestic/ single dwelling __________
Current Functions
(Enter categories from instructions.)

Domestic/single dwelling

Description

Architectural Classification
(Enter categories from instructions.)

Early 20th century: Gable

Materials: (enter categories from instructions.)

Principal exterior materials of the property: concrete block, wood windows and asphalt

Narrative Description
(Describe the historic and current physical appearance and condition of the property. Describe contributing and noncontributing resources if applicable. Begin with a summary paragraph that briefly describes the general characteristics of the property, such as its location, type, style, method of construction, setting, size, and significant features. Indicate whether the property has historic integrity.)

Summary Paragraph

The Andrew Muir House is located in an early 20th century suburban setting located approximately 0.75 miles from downtown Midland, Michigan. Originally
built as employee housing for the Dow Chemical Company, the setting contains similar modest sized dwellings, on small lots with mature trees. The Andrew Muir house sits towards the south end of the property with an unfinished drive running from the road close to the left elevation of the house. A small red and cream wood paneled, shed roof, wood shelter is located to the rear of the house.

The house is a detached single-story, wood-frame, gable front dwelling with a small-enclosed hipped roof porch on the front façade. The dwelling has a rectangular foot-print of approximately 28 feet by 40 feet. The house is clad in red, patterned, asbestos and features original, one over one, wood-framed windows. All of the trim is cream colored. The house is topped by a low-pitched gabled roof with exposed rafter tails. A fascia board that extends around the house. The Dow Chemical company constructed the house in 1918.

Narrative Description

The Andrew Muir House sits on a foundation of molded cement blocks, in a faux stone design typical of the period. The walls rise approximately ten feet and are topped with the white fascia. The gable roof is covered with black, asphalt shingles with a small red brick chimney toward the rear of the house. The dominant feature of the roof is a large shed dormer centered above the right elevation with red clapboard siding and cream trim. The dormer contains three pane fixed sash windows to provide light, one facing the front façade and two facing the right elevation.

The dominant feature of the façade is a nearly full width, one-story enclosed porch, with a centered doorway. There is a small electrical light to the right of the doorway over
the numbers of the house. The wood door has a single fixed rectangular window and is covered by a modern aluminum storm door, and approached by a concrete walkway and two concrete steps. The doorway is flanked by a pair of one over one double hung wood windows, which is also present on the left elevation of the porch. The right porch elevation only contains a single one over one window, rather than a pair. Rising above the porch on the façade is a single rectangular fixed window, centered in the gable end.

The left elevation features two sets of three windows and on the far left, at the rear of the house, a wood door covered with an aluminum storm door, and topped with a small shed roof canopy. On the right side of the left elevation is a large rectangular fixed window flanked by singular one over one double hung windows on either side, with a similar but smaller sized arrangement in the middle of the elevation.

The right elevation contains four evenly spaced singular windows across the elevation. The two windows furthest on the left are replacement horizontal sliding windows, with one next one pane configuration. The third window from the left is a small original one over one double hung wood window. The last window on the elevation is also a replacement horizontal sliding window, with a one next to one arrangement.

The rear elevation of the house is dominated by an enclosed hipped roof porch that stretches the width of the house. The porch contains two evenly spaced rectangular fixed pane windows.
7. Statement of Significance

Applicable National Register Criteria

(Mark "x" in one or more boxes for the criteria qualifying the property for National Register listing.)

☐ A. Property is associated with events that have made a significant contribution to the broad patterns of our history.

☐ B. Property is associated with the lives of persons significant in our past.

☐ C. Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.

☐ D. Property has yielded, or is likely to yield, information important in prehistory or history.

Criteria Considerations

(Mark “x” in all the boxes that apply.)

☐ A. Owned by a religious institution or used for religious purposes

☐ B. Removed from its original location

☐ C. A birthplace or grave

☐ D. A cemetery

☐ E. A reconstructed building, object, or structure

☐ F. A commemorative property

☐ G. Less than 50 years old or achieving significance within the past 50 years

Areas of Significance

(Enter categories from instructions.)
Period of Significance

1918-1919

Significant Dates

1918

1919

Significant Person

(Complete only if Criterion B is marked above.)

N/A

Cultural Affiliation

N/A

Architect/Builder
**Statement of Significance Summary Paragraph** (Provide a summary paragraph that includes level of significance, applicable criteria, justification for the period of significance, and any applicable criteria considerations.)

The Andrew Muir house meets the requirements of Criterion A as significant to the industrial history of Midland Michigan, which is located in the Saginaw Bay region. The Andrew Muir house, built in 1918, is the best surviving example of employee housing constructed by the Dow Chemical Company at the tail end of World War I. Contextually the house relates to housing construction for employees by the Dow Chemical Company during the economic boom which resulted from World War I from 1916 to 1919. Dow Chemical sold the homes to employees for discounted rates through 1920.

**Narrative Statement of Significance** (Provide at least one paragraph for each area of significance.)

The history of the Dow Chemical Company (TDCC) starts in 1890 when Herbert Henry Dow moved to Midland Michigan to form a company to industrialize the bromine process.\(^{198}\) The company expanded operation into chlorine and bleach production by January of 1898. Between 1897 and 1905, TDCC continued to grow due to the demand

\(^{198}\) H.H. Dow Papers, Folders: 900007 and 900008, The Dow Chemical Historical Collection, Othmer Library of Chemical History, American Chemical Heritage Foundation, Philadelphia Pennsylvania; Hereafter cited as Dow Papers, Folder(s), Dow Collection, Othmer Library. H.H. Dow Correspondence, Folders: 910001, 910002, and 910005, The Dow Chemical Historical Collection, Othmer Library of Chemical History; Hereafter cited as Dow Correspondence, Folder(s), Dow Collection, Othmer Library. “Midland Matters,” The Midland Republican, December 18, 1890, 7; E.N. Brandt, *Growth Company: Dow Chemical’s First Century* (East Lansing: Michigan State University Press, 1997), 14-1.f
of cheap chlorine and bromine, and his sale of products internationally. By 1905, the company needed additional employees to help with production, and employed 335 men, which would account for 16 percent of the total population of Midland.\textsuperscript{199} TDCC continued to increase their employee roll as the company expanded their product range to include chloroform, and insecticides like Lime Sulfur and Lead Arsenate by 1911.\textsuperscript{200}

With the outbreak of World War I in June of 1914, Midland and TDCC experienced an unprecedented economic boom. TDCC began work on several plant additions in 1913, including an expansion of its chloroform plant. The company also expanded its product line to include phenol (used as a disinfectant and in explosives), caustic soda (used in cleaning agents), magnesium salts (used in medication) and synthetic indigo (used to dye fabric).\textsuperscript{201} To help offset the lack of foreign chemicals; TDCC upped production of chlorine and bromine products to fill the gap left by foreign companies. The war also increased the consumption of certain chemicals, most notably phenol and chloroform, and by the end of the war, TDCC held the spot as the nation’s largest producer of both products.\textsuperscript{202}


\textsuperscript{200} Dow Correspondence, Folder(s) 110021, Dow Collection, Othmer Library; Dow Correspondence, Folder(s) 110021, Dow Collection, Othmer Library; “Dow Chemical Co. Expanding,” \textit{The Midland Sun}, May 13, 1910, 1.


The increase in production at TDCC meant a reciprocal increase in employment for the company. Between 1910 and 1915, the number of employees jumped from 235 to almost 800 men; by 1916, the total reached 1,225, and by 1918, the number soared to over 3,000.\textsuperscript{203} Additionally after the U.S. entered the war on April 6, 1917, TDCC received several government contracts for research into chemical warfare, which further increased the number of employees. Construction began on a new plant in Midland specifically for military purposes in January of 1918 and production started later that month.\textsuperscript{204}

The influx of new employees and their pay produced an economic boom in Midland. Among the most important and visible effects of the boom was a surge in housing construction and additions to the city.\textsuperscript{205} The number of new houses increased to the point that by 1919 Midland was nicknamed the “city of homes.”\textsuperscript{206} However, the construction could not keep up with demand and many new employees were forced to find housing in Saginaw, and commute into work daily.\textsuperscript{207} In 1916 fire at the Madill House, a local boarding house, compounded the issue and put over 60 TDCC employees on the streets. Herbert Henry Dow concluded that “there is apparently only one solution,

\textsuperscript{206} The Northeastern Michigan Development Bureau, \textit{Northeastern Michigan}, 9
\textsuperscript{207} Dow Correspondence, Folder(s)150075, Dow Collection, Othmer Library; “Yea, Bo, We’re Sure Expanding,” \textit{The Midland Sun}, September 12, 1918, 1.
and that is for the Dow Company to spend between fifty and one hundred thousand dollars on a new allotment”

Between 1916 and 1918, TDCC funded construction of single-family homes in two new additions to the city, specifically designed to combat the “strenuous congestion.” Located north of the plant, employees could purchase homes directly from TDCC for a small down payment, and then pay off the rest of the balance in monthly installments. What started in 1916 with a few houses, by 1918 contained over 150 finished homes. In 1918, the company funded a second series of “Dow homes” to add additional employee housing.

Constructed in the first Dow addition in 1918, TDCC sold the house at 1415 Haley Street to Andrew Muir on March 26, 1919. Listed as a laborer at TDCC in the 1920 census rolls, Andrew Muir bought the property for $678.90. All of the houses built by TDCC have a similar style, being simple gable or hip roof single story detached dwellings with cement foundations. An article in the *Midland Sun* described the houses as being unpretentious and only consisting of five or six rooms. The area in 1918 as an almost complete neighborhood with graded streets, electrical lights and sewers in place. However, less than a year later, the demand for houses drastically dropped as

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208 Dow Correspondence, Folder(s) 160009, Dow Collection, Othmer Library; “Yea, Bo, We’re Sure Expanding,” *The Midland Sun*, September 12, 1918, 1.
209 “Midland’s Growth is Permanent,” *The Midland Sun*, September 19, 1918, 1; Midland Additions, Midland County Historical Society Archive, Midland Michigan; Dow Correspondence, Folder(s) 160009, Dow Collection, Othmer Library.
210 “Midland’s Growth is Permanent,” *The Midland Sun*, September 19, 1918, 1; Dow Correspondence, Folder(s) 160148, Dow Collection, Othmer Library.
211 “Midland’s Growth is Permanent,” *Midland Sun*, September 19, 1918, 1; The Dow Chemical Company to Andrew Muir, Land Deed for Lot 11 Block 5 of the Dow Chemical Company’s Addition, Liber 94 page 219.
212 “Midland’s Growth is Permanent,” *Midland Sun*, September 19, 1918, 1
chemical sales declined when TDCC converted back into peacetime production.\textsuperscript{213} TDCC no longer concerned itself with housing construction after 1919 as the company tried to stay afloat after World War I.

1415 Haley Street has undergone very few changes since its construction in 1918. The property retains many of its original features, including original windows, siding, and doors. A 1931 Sanborn map of the property does show a small-detached garage along the south property line, which is still present by 1950.\textsuperscript{214} While the garage is no longer extant the Andrew Muir house still retains many of the original features that are no longer present on other houses constructed by TDCC from 1916 until 1919.

\begin{flushleft}
\textbf{8. Major Bibliographical References}
\end{flushleft}

Bibliography (Cite the books, articles, and other sources used in preparing this form.)

Please see also bibliography in large attachment.

\textbf{Previous documentation on file (NPS):}

\begin{itemize}
\item preliminary determination of individual listing (36 CFR 67) has been requested
\item previously listed in the National Register
\item previously determined eligible by the National Register
\item designated a National Historic Landmark
\item recorded by Historic American Buildings Survey  \# \underline{________________}
\end{itemize}

\textsuperscript{213} Dow Correspondence, Folder(s)200006, Dow Collection, Othmer Library; “Everyone Waiting Readjustment,” \textit{The Midland Sun}, February 13, 1919, 1.

9. Geographical Data

Acreage of Property _______0.165________

Use either the UTM system or latitude/longitude coordinates

**Latitude/Longitude Coordinates (decimal degrees)**

Datum if other than WGS84:________

(enter coordinates to 6 decimal places)

1. Latitude: 43.615061  
   Longitude: -84.228653
2. Latitude: 43.615090  
   Longitude: -84.229015
3. Latitude: 43.615166  
   Longitude: -84.228884
4. Latitude: 43.614914  
   Longitude: -84.228809

**Verbal Boundary Description** (Describe the boundaries of the property.)
The boundary of the property is the parcel of land laid out by the Dow Chemical Company when it platted the Dow Chemical Company Addition in 1917.

**Boundary Justification (Explain why the boundaries were selected.)**

The boundaries are the parcel boundaries for the property as laid out by the city of Midland Michigan.

**Photographs**

**Photo Log**

Name of Property: Andrew Muir House

City or Vicinity: Midland

County: Midland  
State: Michigan

Photographer: Kristen Getzin

Date Photographed: 12/19/2017

Description of Photograph(s) and number, include description of view indicating direction of camera: Photograph 1 facing west on Haley Street, front façade of 1415. 1 of 3.
Description of Photograph(s) and number, include description of view indicating
direction of camera: Photograph 2 facing northwest on Haley Street, south façade of
1415.

Name of Property: Andrew Muir House
City or Vicinity: Midland
County: Midland
State: Michigan
Photographer: Kristen Getzin
Date Photographed: 12/19/2017

Description of Photograph(s) and number, include description of view indicating
direction of camera: Photograph 3 facing southwest on Haley Street, north façade of
1415.
Appendix C: Marker Text for Historical Markers

Midland County Lumber Industry

The United States surveyed the area that became Midland County between 1830 and 1832 which recorded the abundance of pinewood forests in the area.\(^\text{215}\) By the 1850s, lumber interests moved west from the already depleted bay area into land that the U.S. reserved for Native peoples.\(^\text{216}\) John Larkin was one such lumberman. He settled in the Midland area in 1853 and established the Larkin Mill at the confluence of the Tittabawasee and Chippewa Rivers in 1858.\(^\text{217}\) In 1884 alone the Larkin (& Patrick) Mill produced 6 million feet of lumber and 25 million shingles.\(^\text{218}\)

The lumber industry continued to expand along the Tittabawasee from 1870 until 1890 with a lumber camp located at Averill (also called Red Keg), and smaller lumber interests owned by John Sias, Henry C. Rose, John Clark, and E.H. Brown.\(^\text{219}\) Additional mills were placed along the river and the city of Midland grew to accommodate the transient population with 14 saloons and 3 hotels.\(^\text{220}\) After 1890, much of the land along the


\(^{217}\) \textit{Portrait and biographical album of Midland County, Mich.: containing portraits and biographical sketches of prominent and representative citizens of the county, together with portraits and biographies of all the governors of Michigan and of the presidents of the United States: also containing a complete history of the county, from its earliest settlement to the present time} (Chicago: Chapman Bros, 1884) 351-353.

\(^{218}\) \textit{Portrait and biographical album of Midland County, Mich.}, 398.


Tittabawasee was cut-over and the lumber industry slowed production. As more and more lumberman moved north, many of the mills were torn down or repurposed for the growing salt and bromine industries.\textsuperscript{221}

Dow Chemical Company

Herbert Henry Dow arrived in Midland Michigan during August of 1890 with the express purpose of establishing a bromine manufacturing company, using a new method of extraction via electrolytic cells. This method would provide a quicker and more cost effective approach than boiling brine.\(^{222}\) He formed the Midland Chemical Company in 1890, and after a fall out with the Board of Directors formed the Dow Chemical Company in 1897.\(^{223}\) Founded with research as a goal the company grew exponentially during World War I to manufacture nearly 80 different chemicals with a plant that included over 125 buildings.\(^{224}\) During the great depression, Willard Dow guided the company through the turbulence by cutting hours, and refusing to lay off workers. This allowed the company to add additional facilities in Marquette, California, North Carolina and Texas.\(^{225}\)

With the start of World War II Dow Chemical increased production and added 200 additional structures to the now 525-acre plant in Midland, which employed 3,800 people in the city.\(^{226}\) Research into plastics soon produced Styron, saran wrap and latex, which became leading products by 1955.\(^{227}\) The company became global by 1958 and into the


\(^{226}\) Dow Chemical Company, *Dow History*, 4.

1960s as they incorporated plants in England, Bombay and Australia.\textsuperscript{228} By 2015, Dow Chemical spans the world and drives scientific innovations that help address many of the world's most challenging problems.\textsuperscript{229}


References

Primary Resources

Newspapers


**The Midland Republican.** 1871-1940. Accessed through ProQuest Historical Newspapers:


**The Midland Times.** 1872-1874. Accessed through ProQuest Historical Newspapers:


Manuscript Collections


*Portrait and biographical album of Midland County, Mich.: containing portraits and biographical sketches of prominent and representative citizens of the county, together with portraits and biographies of all the governors of Michigan and of the presidents of the United States: also containing a complete history of the county, from its earliest settlement to the present time.* Chicago: Chapman Bros, 1884.


Maps


Census Data


Federal Governmental Records


State and Local Governmental Records

Acts of Legislature for the State of Michigan, passed at the regular session of 1855.
Lansing: G.W. Peck 1855.

Abstract of Title for lot number 9 in Block C of Homestead addition #1. Midland County Historical Society Archives. Midland Michigan.


Secondary Sources


Curriculum Vitae

Kristen Marie Getzin

Education

Indiana University-Purdue University Indianapolis, Indianapolis, IN
Master of Arts in History, Museum Studies Certificate (July 2022)

Grand Valley State University, Allendale, MI
Bachelor of Science in History, with a minor in Anthropology

Professional Experience

Programming & Youth Services Librarian, Fraser Public Library, Fraser MI (10/2019-present)
- Presentation and development of all library programming. Trains and manages programming assistants. Acts as the primary librarian in charge of youth services including weeding, purchasing and reference for the youth and YA collection.

STEM & Outreach Coordinator, Midland Center for the Arts, Midland MI (5/2017-10/2019)
- Presentation and development of STEM and outreach programming adhering to current Michigan curriculum standards. Development and presentation of Digitarium planetarium shows, hands-on-workshops and activities for schools, libraries and other venues. Oversees and operates the Smithsonian Spark!Lab space. Trains and manages education staff in the space. Utilizes collections management skills and object handling knowledge on as needed basis by museum staff. High level of communication, teaching, public speaking, organizational skills, and customer service skills required for a large range of ages.

- Responsible for customer service at the Whiting Forest Visitor Center. Tasks included ticket sales, and rental facilitation. Responsibilities also included tours of the Pines house (historic house museum), cataloging in the archive, research projects for Dow Gardens staff, and ongoing preservation projects. Detailed knowledge of current museum best practices utilized. High level of communication, research skills, public speaking and organizational skills required.

- Presentation and development of museum programming, including historical and scientific information. Researched, organized and taught summer camps including Geocaching camp and Wizards Academy camp. Extensive communication and teaching skills utilized to convey information to a wide variety of age groups. High level of communication, teaching and customer service skills required.
Youth Coordinator, Mahaska County YMCA, Oskaloosa IA (2/2014-12/2014)

- Organized, planned and directed 21st CCLC afterschool program for up to 100 students. Organized, planned and directed summer camp program for up to 50 students. Extensive communication skills and creativity utilized in planning and organizing programming. Marketing of programs included creating pamphlets, newsletters and flyers, as well as maintaining social media sites. Oversaw and managed up to 15 employees, including hiring and training of employees. High level of detailed organization and multitasking required.

Outdoor Education Coordinator, Flat Rock River YMCA Camp, St. Paul IN (3/2013-11/2013)

- Organized and facilitated school groups coming to camp for outdoor education classes. Extensive communication and cooperation with schools and teachers in planning and organization of schedules. Marketing of program included presentations and talks to schools, teachers and parents about the outdoor education program; as well as creating pamphlets and maintaining social media sites. Oversaw and managed up to 10 employees, including hiring and training of employees. High level of detailed organization and multitasking required.