Edison's Decision
By
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Chapter 1

Introduction: Evolution or Revolution?

In 1886 Thomas Edison moved a business for which he did not intend to work to a city where he did not intend to live. Around that decision pivoted the history of the little city of Schenectady, New York. The history of that little city can serve as a case study answering specific questions, and illuminating a more general one.

The general question concerns the 19th century process of the industrialization of the U.S. Was it evolution, or revolution? This book is a history of industrialization from the viewpoint of one particular little city, aimed at illuminating that larger historical question.

That term industrialization will not be defined precisely here. It means pretty much what you think it does: large establishments instead of small shops, employees instead of independent craftsmen, manufacturing instead of agriculture, railroads in place of canals, coal and iron in place of water power and wood, and then oil and steel in place of coal and iron, electricity in place of shafts, pulleys and belts, and much more.

Cities in general, and little cities in particular are worth defining. A city is a settlement with population greater than 5000 people, with at least 2500 people concentrated in an area of a square mile or less. Cities come in many sizes. Here those sizes will be designated as magnitudes. Each magnitude is about three times the population of the previous, smaller, one. There are seven such magnitudes, ranging from the smallest, or seventh magnitude, with population of 5000-17,000 people, commonly approximated at 10,000 people, on up to the first magnitude, a city larger than five million people. This commonly approximated value of 10,000,000 is about as large as a city can get before evolving into a multi-centered metropolitan area.

For the purposes of this book big cities are first, second and third magnitude. Little cities are fifth six and seventh magnitude. Into which size class you put the fourth magnitude, 300,000 person cities, a class until recently exemplified by Rochester, New York, is a matter of choice. For present purposes, it suffices to point out that the frequent complaint that Schenectady is, in the early 21st century, a second-rate city is both unkind and inaccurate. At population 60,000, it is, just barely, a fifth magnitude city.

This assigning of magnitudes is more than numerical quibbling. Cities form systems. Cities of different magnitudes occupy different places in the system, both geographically and functionally. The biggest cities typically lie where an ocean or a great lake meets a significant river. Those biggest cities typically specialize in such areas as finance, information, culture, education, politics and medicine. Little cities, by contrast, typically lie where a significant land route meets or crosses a river. They typically specialize in a particular area of manufacturing, service, or government administration. Not for nothing

do they earn such nicknames as the Collar City, the Spindle City, the Rubber City, the Carpet City, or, in the case of Schenectady the Electric City.

There are hundreds of little cities in the US, and they collectively contain a respectable fraction of the US population, perhaps a quarter or more. Yet their role is clearly subordinate to that of the large cities. It will be shown here for Schenectady, and will be conjectured here for little cities in general, that the decisions that most influence their history are almost always made in big cities. Schenectady was shaped not only by the Edison decision, made in New York City, that provides this book's title, but by a half dozen or so of other major decisions made in Albany, Philadelphia, and in New York City back when it was still called New Amsterdam.

A convincing theory explains why the dominance of big cities is even greater than their greater population would suggest. A key to economic growth is the creation of and dominance over new industries. New industries are created by, and are dominated by, the combination of people with complementary skills. The number of combinations possible grows much faster than the number of elements. So the bigger the city, the disproportionately larger is its role in the combinations of skills that fuel growth, whether invention, organization, or finance. This can be summed up in an idea from economics: cities show increasing returns to scale with population.

The US city system began as a weakly connected hub-and-spoke network of a dozen or so cities, most of them on the Atlantic Coast. New hubs formed initially on the inland rivers, then on the canals that supplemented the rivers, then at the lowland locations easily reached by railroads, and finally in relatively difficult to reach places such as Denver that offered riches worth linking with an expensive railroad. Eventually, even railroads became only one specialized part of a more general transportation network.

That system in 1800 contained only sixth and seventh magnitude cities: Philadelphia and New York at the top, at the border of fifth magnitude, most other cities in the seventh magnitude class. U.S. city population doubled roughly every 15 years in the 19th century, mainly by the creation of new cities. Since the U.S. population as a whole doubled only every 25 years, the city fraction rose from about one-tenth of the population in 1800 to something like half by 1900. In that year, the system stretched over six magnitudes. The entire twentieth century added only one more.

The biggest cities dominate not only in numbers and decisions, but qualitatively as well. By disproportionately participating in invention and industry creation, big cities tend to move up the industrial food chain: from transportation, commerce and manufacturing to finance, information, culture, medicine, law and education.

What role does this leave to the little cities? Here invoke another economic concept, comparative advantage. The very dominance of big cities, initially in manufacturing and invention as well as commerce and finance, makes their real estate more and more valuable. Activities that require large amounts of land and energy, and that produce large amounts of waste products, tend to move out to cheaper real estate.

So this process of industrial outflow is one key element in the little city story. A second is the process of industrial inflow. Inventors of entrepreneurs may begin their lives in the rural hinterland, as did Thomas Edison of Milan, Ohio. They move up the city hierarchy. They tend to do so not in one giant leap, but in small steps. This inflow, complementing industrial outflow, leads to those little city manufacturing specialties. Sometimes industrial inflow is evident within a single family: George Westinghouse, Sr.'s move from the town of Central Bridge, NY, to Schenectady, followed by George Westinghouse, Jr.'s move from Schenectady to Pittsburgh, PA.

There's a third step in the process. Overbuilding on their outflow and inflow opportunities, little cities, particularly in the U.S. northeast, grew too big to sustain. This later step, industrial overshoot, is, however, a twentieth century story.

Thus runs a theory of the influence of little cities on industrialization. Cities constitute a system, and within the system little cities provide outflow sites for big cities, and inflow sites for towns and the countryside. How about the impact of industrialization on little cities? Did they see a sudden industrial revolution, or a longer term accelerated evolution?

That revolution versus evolution question has four dimensions: economics, demographic, ethnicity and political.

In the dimension of economics, several historians have found that the Northeast US, roughly the parallelogram bounded by Boston, the eastern Great Lakes, Cincinnati and Philadelphia, underwent in the years 1820 to 1850 what has been described as an industrial, or a market, or a transportation or a Jacksonian revolution. As a result, the Northeast, before the Civil War, was launched on modern industrialization, with operatives replacing journeymen, capitalists replacing master craftsmen, finance replacing community, and economic man replacing virtuous republican. So pervasive is this view that two of the major interpretations of this 1820-1850 era employ the same phrase in their title: market revolution. (**Larson, John. 2010. The Market Revolution in America. Cambridge. Sellers, Charles. 1991. The Market Revolution. Oxford.)**

The opposing view sees a process moving in the same direction, but in a more evolutionary manner. "Industrialization took place gradually," wrote historian Steven Ross, "and at an uneven rate, affecting different workers at different times and in different ways." **Ross, Steven J. 1985. Workers on the Edge. Columbia, xvii.** This evolution took not one but three generations, stretching over the entire 19th century. This slower pace is no mere detail. Evolution brought new skills, not just deskilling; new virtues as well as new vices; and opportunities as well as problems. Rather than replacing republican stability with capitalist instability, it replaced old forms of instabilities with new ones. **Meyer, David B. 2003. The Roots of American Industrialization. Johns Hopkins, esp. p.1-7**

In the dimension of demography, one interpretation sees city demographic change as closely related to geography. In simplest terms, cities are what they are because of where they are. This is an old idea, sometimes discredited under the label geographic determinism. How can geography cause anything? It just sits there. People not places cause things. However, in its modern incarnation, geographic interpretations answer this and other objections. Of course people cause things. Geography

is not a cause but a constraint. It shapes what people can accomplish and where they can accomplish it. Distancing itself from the oversimplifications of the frontier theory and the disguised racism of Nazi geopolitics, geographic interpretations now take on the more benign forms of environmental history or ecological history. William Cronin's **Nature's Metropolis**, a history of 19th century Chicago, is the outstanding example.

The opposing interpretation centers on biography. Many, perhaps most, historians, refuse to give up so easily on the idea that it is people, not places, that make history. A city's history is more or less the collective biography of its movers and shakers. The history of Schenectady is the collective biography of five people: founder Arendt Van Curler; education pioneer Eliphalet Nott, locomotive manufacturer John Ellis; absent angel Thomas Edison; and electrical engineer Charles Steinmetz.

Considering ethnicity, the rival interpretations are disposition and situation. A pioneer in the disposition interpretation ought to be given credit for a pioneering willingness to consider ethnicity as a historical variable at all. Dixon Ryan Fox depicted the early 19th century of New York State as a blending of two ethnic flavors, Yankees and Yorkers. The interpretation of Fox and others features dispositions. Yankees are opportunistic, inventive and entrepreneurial. On New York soil, they both combined and clashed with the ethnically Dutch, who were dispositionally stolid and conservative, Yorkers.

The opposing view honors Fox's choice of the ethnic dimension while rejecting his dispositional focus. The significance of ethnicity arises from situation. The situation immigrants left, and the situation they arrive into, shape, rather than respond to their apparent and actually highly situational dispositions. Yorkers take advantage of established family networks due to longer residence, not inborn stolid disposition. Yankees are more often found in newly created jobs due to their early educational advantages and new residence, features that only look like an inborn disposition toward ingenuity.

Finally, the dimension of 19th century U.S politics can be interpreted as the politics of nothing versus the politics of something. The politics of nothing depicts a political system often full of sound and fury but signifying very little in the way of ideas. All American political parties championed what Richard Hofstadter described as the American political tradition: a patriotically expressed but poorly defined combination of liberty, democracy and capitalism: a democracy not of fraternity, but of cupidity (a synonym for selfishness).

The politics of something sees a long range meaning to US political alignment. Simplifying drastically but not, one hopes, excessively, a party of democratic tendencies, the Democratic Party, opposed a series of parties favoring the rich, well born, and able: first the Federalists, then the Whigs, and finally the Republicans. The fact that the Democrats were the party of slavery offers a challenge to this interpretation. However, the rise of slavery as an issue certainly marks a period when politics was indisputably about something.

Those are the general dimensions of that evolution versus revolution theme. They could be traced in any little city. All little cities are in most ways alike. Each is, however, in certain ways distinctive. For Schenectady, the distinctive features of its 19th century were the occupation of machinist, the disease of typhoid, and the family name prefix Van.

Little cities all had lots of the same occupations: grocers, carpenters, clerks, servants, for example. But little cities were distinct in having certain occupations of an unusually high frequency. River ports, such as Newburgh or Poughkeepsie, had more coopers than average. Cities in a position to supply a nearby big city with mass produced shoes, such as Lynn, MA or Newark, NJ, had a more than average number of shoemakers. Cities such as Troy and Albany, suppliers of stoves, had a more than average number of molders.

For Schenectady, that occupational specialty became machinists. That occupation has been defined in various ways: for example, as an operator of machine tools, or as a person who uses tools to make tools. This range of definitions covers a considerable range of skills indicated at one time or another by that occupational title. For the purposes of this book, the key attributes of a machinist will include a significant level of skill at using a machine tool such as a lathe to cut metal and make parts for other machines. 19th century industrialization depended heavily on metal parts. There were, roughly speaking, three ways of making those metal parts iron or steel: heating the metal and banging into shape, called forging and typically done by a blacksmith; melting the metal and pouring it into a sand mold, called molding, and typically done by a molder; and cutting the metal by moving it against a cutting tool made of harder metal, called machining and typically done by a machinist. All these tasks were progressively, as the century advanced, done in ways that relied more heavily on machinery, and less heavily on the strength and skill of the individual worker. This change was, however, evolutionary. Even at the 19th century's end, the skills of machinists, molders, and even blacksmiths were still very important. In addition, as will be shown, the machinist specialty had an importance in Schenectady that went beyond economics.

Cities also specialized in the areas of ill health and fatal disease. Before the twentieth century, US cities were very unhealthy places. People came there for their economic advantages, either unaware of or accepting of the likelihood of increased mortality in the city. As has been said of cities in general, the economic attraction of cities was so great that people were dying to live there.

For Schenectady, the particular unhealthiness was caused by its sandy soil and susceptibility to floods. This promoted the spread of water borne disease. A particular form of that disease prevalent in Schenectady was typhoid. Following its progress gives a way to follow the specific way this one little city dealt with a specific aspect of the pollution dangers that all cities, big or little, faced.

Finally, each little city had its particular ethnic mix. That mix had many determinants. One was the national origin of its first settlers. Others were the nature and timing of immigration waves. In the Northeast, in the 19th century, there were two main sources of original immigrants, Great Britain and the Netherlands. There were three main waves of immigrants: Yankees from New England at the turn of the century, Irish Immigrants especially after 1840, and German immigrants especially after 1850. A convenient, though inexact, way, of following this ethnic mixing is through the family names of city households.

For Schenectady, the Dutch heritage, the consequences of that original settlement from the Netherlands, is especially pervasive. This can be followed by the unusual frequency of family names

beginning with Van, a very good, but not infallible, indicator of Dutch origin. What difference did those Dutch origins make to Schenectady?

So this is a history of a little city as a case study in the validity of two opposed interpretations: revolution vs. evolution explored in four dimensions, economics, demography, ethnicity, and politics, and emphasizing three particular indicators, machinists, typhoid, and Vans. Turn now from the questions this book asks to the way it answers them.

The answers begin with a book: The Schenectady Directory and City Register for the Years 1841-42. The authors, or more accurately the compilers, were the printers J. and W.H. Riggs, members of a family that is a significant character in the story their directory begins to tell.

That directory catches Schenectady of the act of actually becoming a city, 43 years after it was officially declared one. An old joke purports to be a book review of the occupational directory's now also obsolete descendant, the telephone directory. Great characters, the review states, but not much plot.

Not so for the 1841-1842 directory. Properly followed up on, it introduces many plots. Will Isaac Riggs ever get some respect? Will the Van Eps family rise to local leadership? Will Eliphalet Nott really get away with it? (Spoiler alert: answers are no, yes, and sort of).

There are 1000 such stories in even this modest directory, the first compiled in this particular little city. The challenge is to find generalizations that identify the sorts of stories that characterize the history of the city. A first step is to admit that most of the stories, perhaps especially the most intriguing ones, are among the hardest for which to find further evidence. For example the directory reveals that exactly one of the city's forty or so grocers was a woman. Also, exactly one of the city's grocers was an African-American. Also, those two were the same person, Mary Hannah. Sadly, that is all this historian was able to learn about Mary Hannah. A challenge perhaps for a better historian.

The best that could be done here was to compile, from directories, censuses, newspapers, and the resources of the Schenectady County Historical Society, the stories with enough surviving evidence to be told. Seeking generalization, the characters in the stories were put in boxes, defined by those dimensions of economics, demography, ethnicity and politics.

Economically, what did people do for a living? In 19th century Schenectady, there were perhaps 200 different occupations described in directories. People were not distributed evenly over these jobs, however. About one-fourth of all people showing up in directories described themselves as having one of eight occupations: carpenter, clerk, farmer, laborer, machinist, operative, shoemaker, and servant.

One of the above is a composite of several described occupations. Operatives were largely unskilled or semi-skilled operators of machinery used to make textiles, clothing, brooms, clothing, or, later, electrical equipment. In the actual counting of occupations, directories must be corrected by using the more complete, but by no means perfectly complete, census records. With these corrections, one can begin the process of making boxes with eight occupations. In most of them Schenectady differed little from other little cities. But Schenectady did have its characteristic differently distributed

occupation: machinist.

Next comes ethnicity. This poorly defined term rests somewhere between nation-state of a person's birth, and ultimate ancestral origins of a family. Here it will be approximated by combining a conventional indicator, father's birthplace in census records, with an unconventional indicator: surname. Indicator surnames include the prefix Mc, indicating North British origin. For Schenectady, that meant mainly Scottish before 1840, and mainly Irish after 1840. Sch is a prefix indicator for Germans; Ko for Eastern European, mainly Polish; and Smith a generally useful sort of American or null hypothesis indicator. Not only many of those born in the US, but a surprising number of Irish, German and even Polish immigrants had or took the name Smith. A final important ethnic group, the Yankees, people born in New England, have no such convenient surname. They have to be found, individually, in census records. Finally, Schenectady has a characteristic ethnicity, Dutch, with a characteristic indicator: the prefix Van.

Relating demography with geography, Schenectady's layout can be presented in a stylized map, shown in the Fig. 1.z. Every little city has its own stylized map with its own often idiosyncratic names, and what name is more idiosyncratic that Schenectady? For all their individuality, however, the geographic layout of little cities reflects similarities in purpose and history.

Generally, little cities sit at a distinctive place along a river, on one of the naturally flat river landings that occur every ten miles or so. Schenectady's is where the Mohawk River bends first southeastward and then northeastward from its prevailing flow direction of west to east. Squeezing between the foothills of the Adirondack Mountains to the north, and the Heldebergs to the south, that bending river threw up islands in the river, flatlands on its bank, and sand hills behind those flatlands.

In stylized form, the city can be represented as a sort of nine square tic-tac toe board turned on its corner. At the top, sits the riverfront landing square. It will be called here the Stockade. It is surrounded by four other squares: two easily flooded lowland squares south of the Stockade, called here Frog Alley and the Mill Pasture; a square through which the road to Albany ran, here called Downtown; a higher square north of Downtown called here Fonda-Romeyn after what were once its principal streets; and a lower square south of Downtown here called Cowhorn, after its principal creek. Those six make up the lower, or downhill portion of the city. To their east are the three uphill squares, College Hill, Vale, and Albany Hill. More on this description later. For now the important point is: nine locations.

Finally, Schenectady had, simplifying matters, 8 significant political parties in the 19th century: the Federalists, Democratic-Republicans, Democrats, Whigs, Americans (also known as Know-Nothings) Republicans, and Workingmen.

So, 8 occupations, 6 ethnicities, 9 neighborhoods, and 8 parties. A total of more than 3000 boxes into which people can be put. For example, Peter Tempany, a laborer, an Irishman, a resident of the Fonda-Romeyn neighborhood, and a Democrat. It is the aim of this history to use the distribution of people into those boxes as a sort of framework upon which the 19th century history of industrializing Schenectady can be built. From that framework, generalizations, using simple criteria can be formed: for

example, that people of Dutch descent were likely to be shoemakers and carpenters, and later carpenters and clerks, and were likely to reside in the eastern part of the Stockade square. From putting people in boxes, and then generalizing, a larger story, it is hoped, emerges.

This is the last that will be heard explicitly of those 3000-plus boxes. Their story will be conveyed not through boxes, graphs or tables, but through the stories of individuals. This represents not an acceptance of the theory of biographical causation, but merely a literary convenience.

The illustrative characters make up a far from random sample. The rich and locally famous are overrepresented. However, the sample includes, laborers and machinists as well a lawyers and merchants, Irish and Germans as well as Yankees and Yorkers, and residents of the poorer Frog Alley and Albany Hill neighborhoods as well as of the elite's Stockade Section. The entries for five of those characters in the 1841-1842 directory form chapter headings, for reasons that it is hoped the chapters will make clear.

In summary, this is a story of Schenectady in the century of Edison's decision, aiming at more than local history, based on sources exemplified by that 1841-1842 directory, built on those 3000-plus boxes, and told using people's stories. Begin with one of those people, a contentious character of the middling sort named Jeronimus Barhydt.

Chapter 2

Barhydt, Jeronimus, revolutionary soldier, Pine: Schenectady Becomes a City.

The self-designation "revolutionary soldier" in the 1841-42 directory was a bit of an exaggeration. Jeronimus Barhydt had, however, outlived most of those who might challenge it.

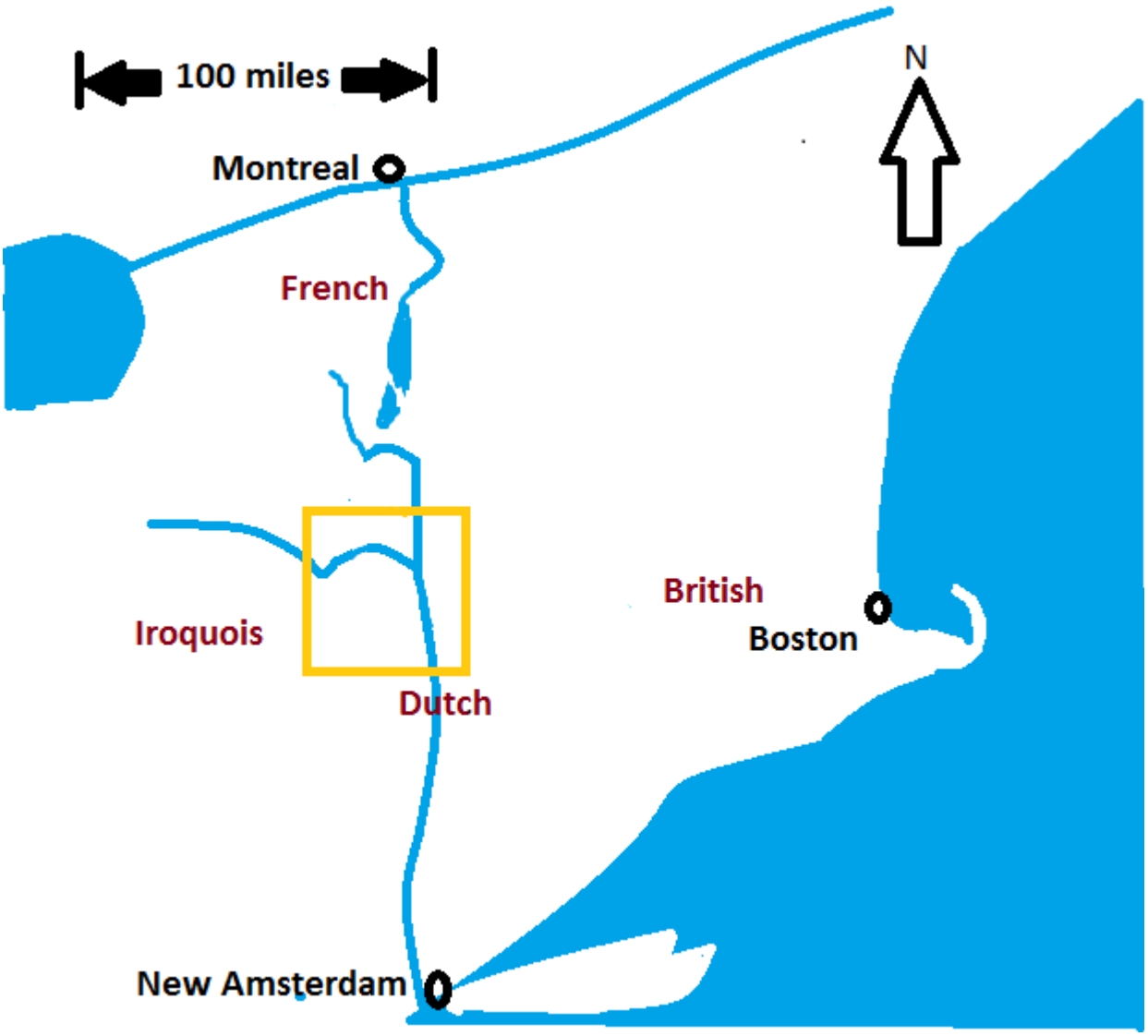
He had been only 11 years old when the American Revolution broke out. He joined the Albany County militia near the end of the war. His service consisted of a brief stint of garrison duty. His request for a military pension was initially approved, but later denied.

Schenectady's status as a city during his prime years, like Jeronimus Barhydt's military record, was somewhat exaggerated. Census records state that Schenectady was the 17th largest city in the US in 1800, with a population of over 6000. It was indeed officially designated a city by the state of New York, the fourth location, after New York City, Albany, and Hudson, to be so designated. However the area granted the city was unusually large, for peculiar political reasons. Most of the 6000 people described as city residents actually lived on farms in areas that would soon be spun off at two rural townships. Even Jeronimus Barhydt's Pine St address, though well within the city limits, was a small farm. Schenectady's designation as a city in 1798, was based more on politics and promise than on performance.

This chapter will explore the economic, demographic, ethnic and political dimensions of this sort-of-city of the first quarter of the nineteenth century. The interpretative issues will be explored, by looking at such concrete questions as: how did Schenectady become a city? How did it develop under that somewhat premature designation? To what extent was its promise fulfilled, and to what extent was its purpose reshaped?

First, however, keep in mind that in 1800, Schenectady already had 160 years of back story. That story can be read in two city histories. Here it will be summarized in three maps.

Globally, in the 1600s, Europeans had stretched out colonizing tentacles reaching six continents. The very western tip of the North American tentacle of one of those European nations, the Netherlands, reached out in the 1660s and touched Schenectady. That proposed new settlement was located right in the strategic crosshairs of the struggle for the North American continent, in the yellow square shown below



Northeastern North America ca. 1650-1700

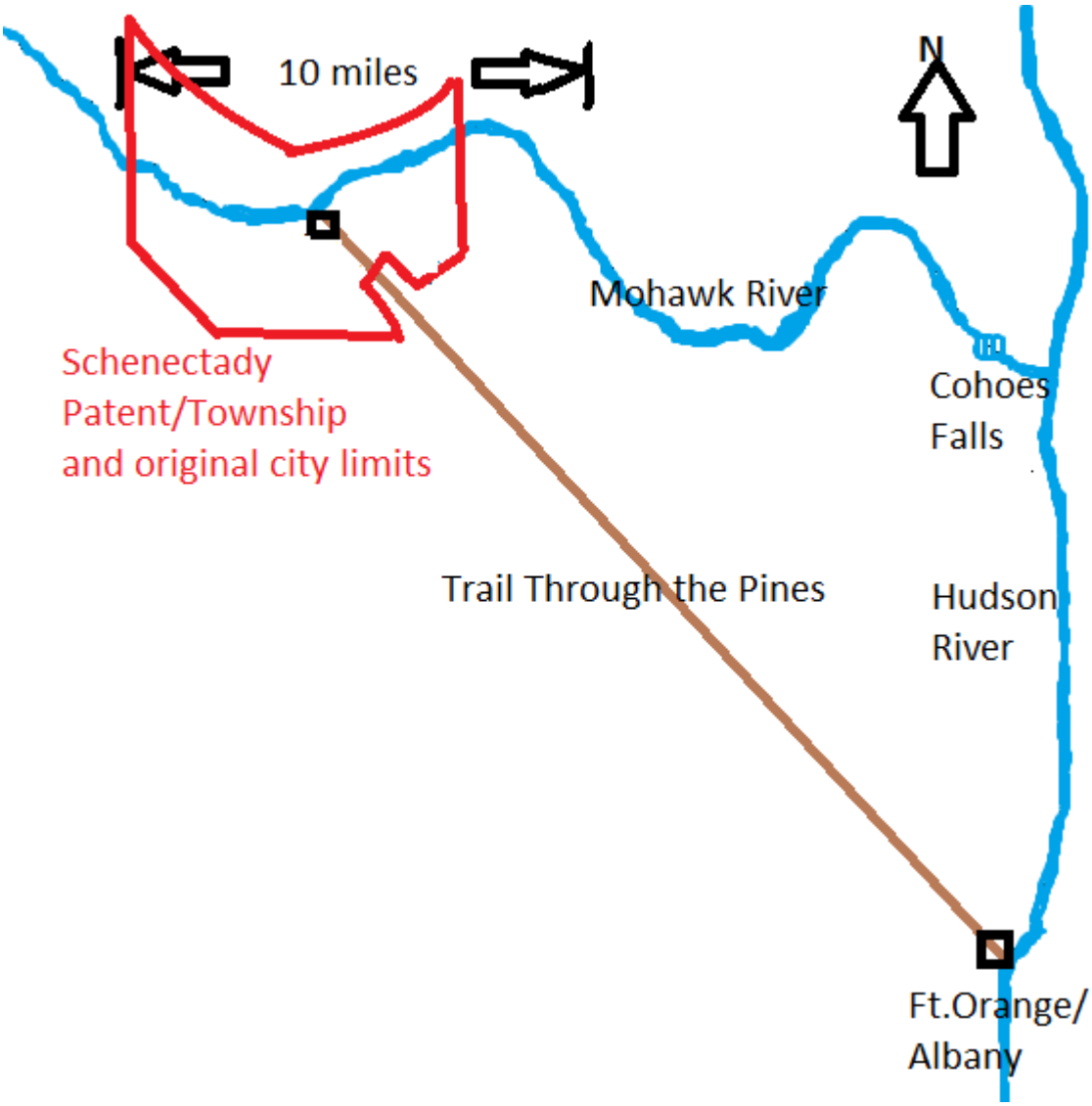
The Dutch, coming up from the South there encountered the French and their Canadian first nation allies coming down from the North, the Native American Mohawk-Iroquois already there and strongest just to the west, and the English expanding rapidly from the East. It was such strategic considerations, particularly the fear of being outflanked by the English, that led Peter Stuyvesant in the 1660s to overrule of objections from Ft. Orange (hence referred to by its later name Albany) and allow the founding of a new western frontier settlement.

Schenectady was strategic not only militarily, but economically. The Mohawk River, the best

route to the continental interior, was interrupted by a large waterfall only a few miles west of its junction with the Hudson. Native Americans bringing furs to Albany had to get out of their canoes and trek overland. The best place to do this was at the bend in the river that became Schenectady. Indeed, the most generally, though by no means universally, accepted explanation for that peculiar city name is that it was a Mohawk expression referring to that 15 mile trail through the pines to the Hudson.

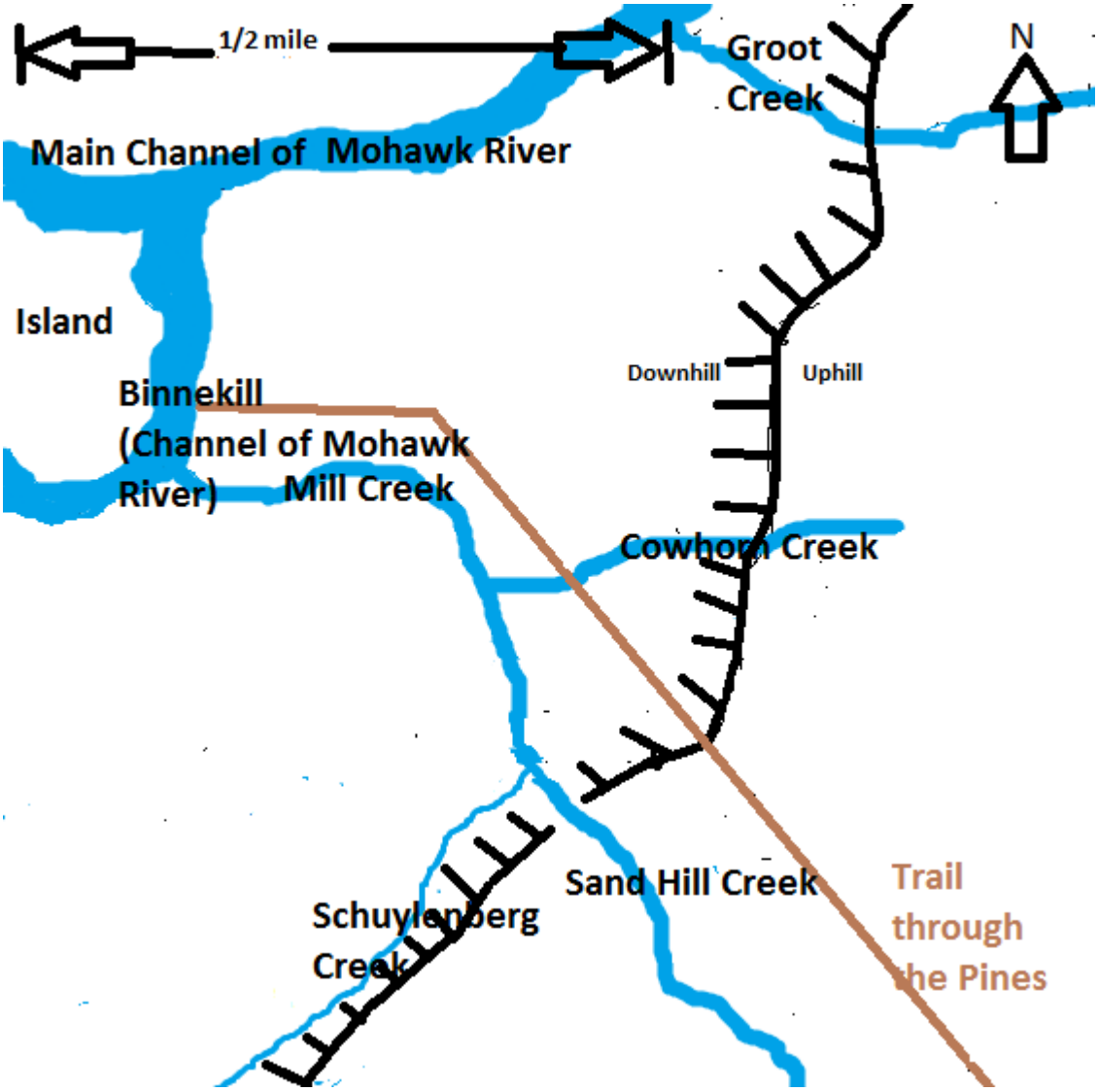
In modern terms, Schenectady was a natural transportation break: a place where goods were transferred from one form of transport to another. As the people of Albany correctly suspected even in the 1660s, however, transportation breaks tend to become marketplaces. Why simply forward the furs to Albany when you can instead buy and profit from them yourself?

The Albany Dutch were given a monopoly of that fur trade. That monopoly was immediately violated by the Schenectady settlers, in 1727 that monopoly was repealed. As part of that original official monopoly, however, Schenectady was initially designated a farming, not a trading settlement. It was given a land grant consisting not merely of the landing at the end of the trail through the pines, but of a 16 mile, 8 mile wide stretch of land on both sides of the Mohawk River. This land grant, called the Schenectady Patent, was later confirmed by the English, and survived into American times to become the artificially large boundaries that were in 1765 designated Schenectady Township and in 1798 designated the city of Schenectady.



The Hudson-Mohawk Region (the area shown within the yellow square in the previous map)

The real village, town and city, however, consisted of a much smaller settlement at the point where the trail through the pines met the Mohawk River. It had a total area of less than 4 square miles. The following map show an enlargement of the area shown within the small black square shown in the previous map, within the Schenectady Patent/Township/City.



The Site of the Initial Settlement of Schenectady (the area shown within the black square on the previous map)

This site had all the properties looked for in a transportation break settlement. The bend in the

Mohawk River had produced a flat lowland area southeast of that east bend. The surrounding hills, which were close to the river banks on both sides of the river over most of its length, were here pushed back a mile or more to the south and east. This flat area, opposite a big river island that separated the river into two channels, was the place chosen for the houses of the initial settlers. From there, they could launch boats into the more convenient channel, the Binnekill.

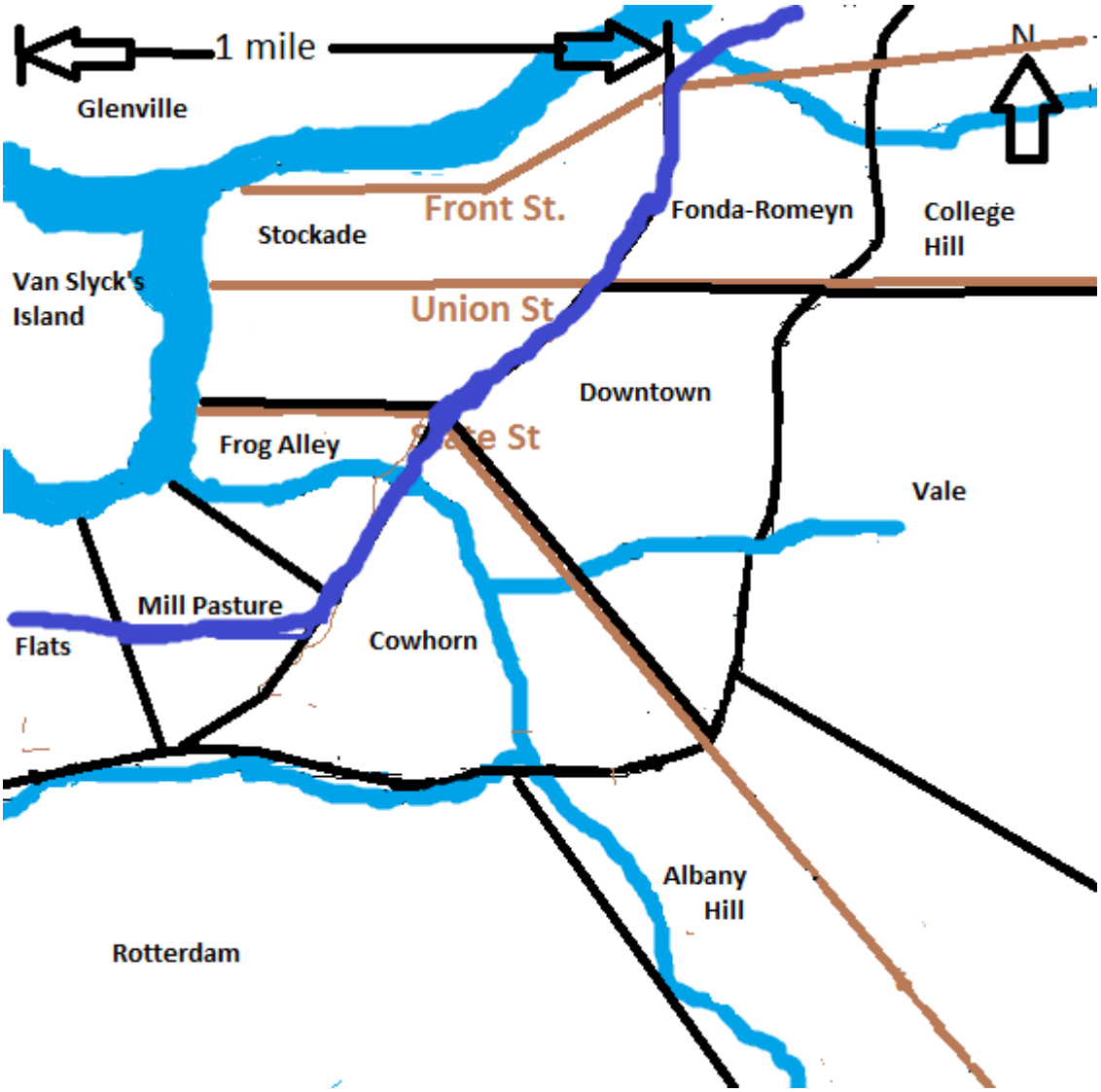
Another desirable feature of the site were the creeks that flowed down from the nearby hills to the river both east and west of that settlement. One of those, Mill Creek, carried sufficient power for a grist mill. The others were useful for saw mills. Drinking water could be drawn from those creeks, or easily reached underground by wells dug into the sandy soil.

The settlers also got farm land in the most fertile stretch of that large Patent. That fertile stretch, called the Flats, was a flood plain about five miles long, extending westward from the settled area along the south bank of the Mohawk River. The rest of the land within the 128 square mile patent, the "common lands", were not initially allocated to individual families. That common resource of woodland, pasture, and mill sites, was placed, by a patent issued by the British government in 1684, under the supervision of five designated original proprietors.

Within what would become the city proper, residents quickly recognized the differing uses of the different areas. Here they will be given names drawn from various periods of history.

Those areas are shown on the next map. They will be called squares, though none is precisely square in shape.

The stockade square, the northernmost square, held the original homes and the wooden fortification. To its southwest, the later site of a disreputable neighborhood called Frog Alley, surrounded the place where the most powerful stream entered the Mohawk. There was placed the city grain mill. The next square down, where floods were more frequent and therefore few trees grew, was designated a pasture, called the Mill Pasture. To its east, where a stream called Cowhorn Creek met other streams to form the mill creek, the square was also floodable and unhealthily soggy. It became a site for forms of natural products processing, such as tanning. The area southeast of the stockade, the future Fonda-Romeyn square, was left in woodland. The central square, high land but not on the river bank, was the obvious first area for expansion beyond the stockade. It would eventually become the Downtown, a distinction it retains in the 21st century. Finally, those three hilltop squares, later called College Hill, Vale, and Albany Hill, were initially left as common land, used for a few farms, several sawmill and gristmill sites, and for woodland.



Basic Layout of the Settled Area of Schenectady in the 19th Century (Black lines are area boundaries; dark blue line is future path of Erie Canal)

That local topography proved surprisingly predictive and persistent. As will be seen, modern uses of those areas evolved from those original topography based uses. Not so the other assumptions of early settlement. Most of those arrangements proved more trouble than they were worth, reflecting more European assumptions that American realities.

As a strategic outpost on the frontier, Schenectady proved a flop, both to the Dutch, who were

never called on to defend it, and to the English, who were. This was most obvious on a February night in 1690 when a frozen and exhausted raiding force of some 200 Frenchmen and Native Americans from Montreal arrived at that bend in the Mohawk. They found the fortifications not only weak but unmanned, due to a local political dispute. Before the night was over, the city was in flames, some 60 of its residents were dead, and 27 more were marching as captives back to Canada.

Commercially the record was more mixed. The fate of Schenectady as transportation break was determined not by Schenectady or envious Albany, but by the British Army. The carrying trade, conveying and dealing in the eastward flow of furs and the westward flow of army supplies, was controlled by Indian Agent Sir William Johnson from his estate west of Schenectady on the Mohawk, and by his designated agents, mainly army veterans and Scotsmen. Four of them, John Duncan, James Phyn, Alexander Ellice, and Daniel Campbell did settle in or near Schenectady. They and their heirs became the city's richest citizens, not merely in the seventeenth century but until the 1860s. **Canedy, Charles. 1967. An Entrepreneurial History of the New York Frontier 1739-1776. Ph.D. Diss. Western Reserve University. p 381**

Local economics also revolved around land dealings, particularly in those common lands. The proprietorship agreement proved a nightmare. It launched a convoluted legal case lasting a century and rivaling Charles Dickens' fictional case of Jarndyce vs. Jarndyce in both its complexity and futility. Both the original proprietors and their rivals felt they were unjustly deprived of the rewards they should have gotten from disposal of the common lands, which constituted about two thirds of the 128 square miles of that big Schenectady Patent.

The struggle came by the time of the American Revolution to have three sides. The interests of the five original proprietors were inherited by a very determined individual named Ryer Schermerhorn. He claimed a right to the common lands for himself. In opposition stood a group of descendants of the original settlers, perhaps as many as 500 families. These “descendants” appointed a group of trustees to push their interests. These included merchants John and Henry Glen, and trader and frontiersman Jellis Fonda. He was the individual for whom that street in the Fonda-Romeyn square was named. In the mid twentieth century, a descendant of that Fonda family, the actor Henry Fonda, played a character much like Jellis in the movie Drums Along the Mohawk. That Revolutionary War drama included a scene in which the hero confronts Tories in a Schenectady tavern.

Originally purported to represent the people, the descendant trustees ran afoul of later inhabitants. This "inhabitant" party, led by such individuals as former Yankee sailor turned merchant David Tomlinson, innkeeper Joseph Shurtliff, and brewer Charles Martin, found the claims of the descendant trustees to be as oppressive as those of proprietor Schermerhorn.

All those complications gave Schenectady's role in the American Revolution a peculiar flavor. The first liberty pole erected in Schenectady may have been a protest not against the tyranny of King George but the tyranny of the descendant trustees.

Though the city as a whole was strongly patriotic, many of the richest men in town were Tories. All of them managed, however, to make sufficiently patriotic arrangements with the local committees to

preserve their fortunes. The Ellices carried theirs back to England, where it became the nucleus of one of the great 19th century British fur trading fortunes. John Duncan proclaimed his neutrality, but lost to debt his estate ne "the Hermitage" just across the eastern boundary of the Schenectady patent. John's son Richard served in the war as an officer in the British army, but was able to return and buy up the Hermitage and live out his life there, dying in 1819. In his will he left his gold-headed cane to Schenectady's leading patriot, Joseph Yates, perhaps as an indication that there were no hard feelings. Daniel Campbell also proclaimed sufficient loyalty to keep his estate southwest of the city, and his large fortune. In the hands of his descendants, that fortune would have significant industrial impact.

The aftermath of the Revolution was, economically, ethnically and politically, a time of moderate rearrangements around the question of who would rule at home. A new top layer of traders emerged, largely either new arrivals or individuals whose early patriotism and energetic wartime service enabled them to rise above what was previously middling status. Prominent among them was Jellis Fonda, who as an energetic patriot had raised Schenectady's first company of minutemen, and led a successful attack on the home and fortress of Sir John Johnson, heir of William Johnson. Others whose status rose due to early adherence to the patriot cause and effective wartime servitude as officers included sawmill operator and farmer turned merchant Abraham Oothout, merchant Isaac De Graff, and surveyor Christoffel Yates. All had been patriot army captains and colonels. Henry Glen, a Tory who quickly saw the light, served as an American army quartermaster. A historical marker still standing in Schenectady's stockade proclaims that George Washington once visited at a Glen family house. This testifies not to a historical fact (the visit likely never occurred) but to the Glens' efforts to launder their somewhat suspect reputation. Henry succeeded, and served three terms as the area's representative to the U.S. Congress.

A family with a solider patriot reputation vaulted to the top of the city's political and social ladder. The Yates of Schenectady were initially relatively poor, derided by the upper classes for their occupations as cartmen and shoemakers. Even Christoffel Yates, that efficient and energetic Revolutionary Colonel, never made much money. However, over in Albany, the family's scion, Abraham Yates, had become a patriot leader on a national, not merely a local, scale. Perhaps because of that connection. Christoffel's son Joseph became a lawyer instead of a shoemaker or surveyor.

Schenectady's politics from the Revolution to 1798 was conventional. The elite divided up into Federalists and Democratic Republicans. The Glens and their in laws the Van Ingens led the former, the Yates and De Graffs led the latter. There was actually little difference in status, ethnicity, or ideas between these parties. When the city's important issues arose, they found ways to work together. There were two such issues: finally settling that long running trusteeship controversy, and taking advantage of Schenectady's potential new role as a gateway to the frontier.

In those post-Revolution years New York State experienced the fastest population growth rate in its history. Revolutionary veterans and other residents of increasingly crowded New England poured into the newly opened central and western parts of the state. Many of those migrants came in wagons via the trail through the pines, and transferred their goods to boats at Schenectady. A pioneering effort at free enterprise improvement of westward transportation, the Western Inland Navigation Company,

was attempting to dredge and dam the Mohawk River west of Schenectady into the best route to the U.S. interior.

So why was Schenectady designated a city in 1798? There seems to be two reasons, each of which was expressed by Schenectady residents in their petitions, and recognized by the state in its responses. One was finally to settle the trusteeship controversy. The death of Ryer Schermerhorn in 1795 reduced the number of contending factions from three to two. The two remaining groups, the descendants and the inhabitants found the opportunities of commerce outweighed differences. "Politics we have none here," wrote an associate to Henry Glen on 10 Feb 1796. "To be honest, I cannot find three together that will converse upon subjects of that nature. Schonoctady (sic) improves in point of business and property rises beyond belief."

The resulting consensus proposed moving responsibility for the common lands from the trustees to an appointed mayor and elected Common Council. Earlier designation of Schenectady as a borough in 1765 had failed to achieve this settlement. City status, officially granted 26 Mar 1798, did. In summary, it was mainly to recognize this transportation break promise and to settle the trustee controversy that the state legislature chartered Schenectady in 1798 as New York State's fourth city. A cousin wrote to Henry Glen on 26 Mar 1798 that "We are now a city. Their (sic) are three persons spoken of to be mayor, John Glen, Jos. D. Yates and Mr. Martin. I expect Mr. Glen will get in."

This expectation was incorrect. Governor John Jay's choice for mayor, then a state-appointed rather than elective post, was Joseph C. Yates. This probably was due both to Yates' somewhat neutral position between the descendants and inhabitants, as well as his strong Albany connections. It would mark the beginning of a political ascent that carried Joseph Yates to the State Supreme Court, and then, in 1822, to election as Governor of the State of New York. He would be the only Schenectady resident ever to achieve this honor.

Schenectady's gateway to the frontier status really did make it unique among upstate New York settlements. However, the unnaturally large area, and accompanying large number of rural farmers included in its population, tended to hide the fact that this status was more promise than reality.

The degree to which Schenectady's promise was immediately fulfilled differs in principal accounts of its early city era. A book, written in the 1850s by a descendant of the Glen family and local judge, depicts a boom. Residents prospered not only as traders but also as boat builders for the improved westward water route, and as teamsters bringing goods by wagon over the trail through the pines. The judge states that 300 families were supported by that goods haulage alone, and that the section of the city here identified as the poor pasture was entirely devoted to boat building.

Diarists writing in the early 1800s about their visits to Schenectady, including New York City politician De Witt Clinton, New Haven minister Timothy Dwight, and Pennsylvania traveler Christian Schutz, paint a less effusive picture. They are unanimous in declaring Schenectady not a city but a large country town. Clinton remarks on its dullness, Dwight on the immorality of its transient population. Schutz, though finding it no city, salutes the enterprise of its boat builders. Like the judge, he describes the "Schenectady boat" as a successful new version of the sail or pole-powered type of cargo carrying

river boat known as the Durham boat.

Digging into census records, and surviving legal documents, deeds, maps and images makes it possible to reconcile the apparent disparity between the descriptions of thriving river port versus dull farming town. The verdict is mainly on the side of a large country town, focused more on serving its countryside than on long distance trade. The population of the actual settlement, that tic-tac-toe board that would be the city of Schenectady in the 19th century, was only about 2500 people in 1800, too few for genuine city status. In the documents surrounding local petitions or land transactions in which the middling classes were involved, those names boat builder or teamster rarely come up, although participants are often represented by such occupational titles as farmer, yeoman, carpenter, shoemaker or blacksmith. When the city chose its official seal in 1798 it chose not a river boat, but a sheaf of wheat. The distribution of household sizes in the censuses through 1820 is tightly clustered around its mean of six people, a distribution typical of a country town. Such a distribution for a city would show a wider range, with frequent households of one or two people, indicating newly arriving young workers, and significant numbers with ten or more, indicating inns and boarding houses.

Yet the goods did flow through Schenectady, and the boats did indeed laboriously make their human-powered way up river against the current. Reconciling the two versions, booming gateway to the frontier versus sleepy country town, begins with Schutz's firsthand account. He notes that rates for overland travel were low because farmers bringing their empty wagons back from Albany markets doubled as teamsters. Building on this insight reveals that in general, commerce was a part time task of versatile multitaskers.

Legal and land records reveal that many carpenters and shoemakers were also part time farmers or commodity suppliers, exploiting both in their house plots and in the plots of woodland, mill site, or pasture they bought from the common lands. Farmers, and especially farmers' sons still living at home, were part time craftsmen, laborers and teamsters. Boat builders were likely principally general carpenters. The Schenectady and Durham boats were fairly simple flat bottomed constructions, for which ability to withstand frequent collisions with rocks were more important than streamlined elegance. River travel was often limited by low water, winter ice, competition from improved overland routes, and the only modest success of the Western Inland Navigation Company at overcoming those problems. Private capital was not fully up to financing a reliable route to the west.

Describing Schenectady's economic structure can best be done, and will be done in this book, by identifying, every 50 years, the five occupations that were the largest main occupations. About 2/5 of the people of an 1800 community can be said to have such an outside-the-household occupation; that is having a job in anything resembling the modern sense. In rough terms this meant the household head of a six person household, and just over one son and or daughter. For the years 1800-1820, in this sense, Schenectady was a country town of farmers, servants, laborers, carpenters and shoemakers.

The farmers, as opportunity offered, did a lot more than just farm, ranging from part time craftsmanship, to land speculation, to hauling goods over the trail through the pines or working on those river boats. Jeronimous Barhydt, for example, though primarily a farmer, was a small time land and

goods speculator as well. Other Barhydts were farmer-blacksmiths.

The presence of servants as the second most frequent occupational class is partly statistical, partly inferential. Slavery still existed in early 19th century New York State, though gradual emancipation was underway. Schenectady in 1800 had more than 400 slaves, and about 40 free African-Americans. That most of them were servants rather than plantation workers is indicated by the small size of slaveholdings. The slaveholding families typically had only two or three slaves at most, with double-digit slave holdings unknown.

A second set of servants is unlisted in censuses and later directories. Daughters of poorer farmers and craftsmen often went into service for more prosperous families. This was done more for room and board, resulting in one less mouth to feed, rather than for earnings. A local bank cashier noted as late as the 1850s that he could hire a servant for $1.06 a week. For reference this was about one-sixth the wage of a common laborer.

The third of the most prominent occupations, laborer, is similarly underrepresented in formal accounts. That 1841-42 directory, Schenectady's first, lists only five laborers. There had to be lots more, if only because human power was the only way to get earth moved and heavy things lifted. Laborer shows up more often than either teamster or boat builder in the self descriptions left by participants in 18th century legal matters file. Just as daughters were the main source of servants, living-at-home sons too young to inherit a farm or to establish journeyman skill in a craft most likely provided the main source of laborers.

The final major occupational classes circa 1800 were carpenters and shoemakers. Wood was the dominant construction material. Shoes frequently wore out. A list of perhaps 50 other crafts trailed close behind, beginning with blacksmith and mason, extending through hatter and wagon maker, and reaching even such arcane specialties, by the 1830s, as mantua maker or umbrella maker. In all, the general classification of "manufacturing", first counted in the 1820 census, accounted for about half of Schenectady's occupational descriptions. Agriculture accounted for about one third, with the remainder divided among the not very useful because too vague categories of commerce, inland navigation (with numbers far too small, in the tens, to support the idea of Schenectady as booming inland river port), ocean navigation (rare but not nonexistent) and the learned professions (a category somewhat inflated in the census numbers by a tendency of craftsmen and merchants whose education extended beyond mere literacy to claim this distinction).

The final and most conclusive bit of evidence arguing against Schenectady as gateway-to-the-frontier boom town is rate of population growth. Boom towns, soon to be boom cities, are easily identified by such rates. They double in population in a decade or less. The classical example, and perhaps all time long-boom champion is Chicago, which doubled in population in each of the decades of the 19th century, rising from a frontier settlement of less that 1000 people to a city of more than a million. Even such more modest booms, those of Schenectady's neighbors Troy and Utica, had their decades of population doubling.

Schenectady, by contrast, had doubling times of thirty years or more from its origins through

almost all of the 19th century, and never doubled in a single decade before 1900. This growth was especially slow from 1800 to 1830.

Ethnically Schenectady was indeed a Dutch town in the 18th century, long after English and then Americans established political sovereignty. That identity, however, was never quite what it seemed.

Begin with the fact that a surprisingly large number of original families were only Dutch by courtesy. Amsterdam, the settlers ethnic situation of origin, was the most cosmopolitan city in the world. The Glens, who actually preceded the first Dutch settlement group, were Scots. The Barhydts, early arrivers, are described at least once as "de Sweede", suggesting possible Scandanavian origin. The De Forests and the De Treux (later Truax), were French Huguenots. The Clutes may have been at least in part German.

The Yates descended from an English soldier who went native to the extent of temporarily changing the spelling of the family name to the more Dutch-sounding Yetts. By the 1820s, when Joseph Yates became the only resident of Schenectady to ascend to the governorship of New York, he was mercilessly caricatured by political rivals for his heavy Dutch accent and his allegedly dispositional Dutch stolidity, slow decision making, and conservatism.

Inferring ethnicity in the early 19th century is a tricky matter, relying mainly here on surnames, since place of birth was not entered into census records until 1840. The large number of Van prefixed surnames, plus other characteristic Dutch names as Schermerhorn and Veeder, suggest that Dutch was the principal ethnicity of about 2/5 of Schenectady's residents in 1800-1820. Behind that were the North British, mainly at this time Scots, and the New England Yankees. Each were about one sixth or less of the population. All other, south British, African-American and the rest, comprised the other one third.

Reflecting ethnicity, the Dutch Reformed Church was still the city's most important church in the early 19th century. Understanding its major economic, political, educational, and social welfare roles is crucial to understanding Schenectady's first century and a half. However, by 1800, that role, like the tradition of conducting services and delivering sermons in Dutch, was passing away. Rev. Dirk Romeyn, the strong minded and theologically orthodox Dutch Reformed leader whose initiatives included the founding of Union College, initiated the change from Dutch to English. At the time of city founding in 1798 his Sunday morning sermon was given in Dutch and the afternoon sermon in English. With Romeyn’s retirement in 1801, English became the church language. Dirk Romeyn was memorialized in the street used in this book to identify the Fonda-Romeyn square.

The Dutch Reformed Church's once extensive landholdings were also beginning to leak away. The Dutch church was by 1810 being rivaled by the Congregational (English) and Presbyterian (Scots) churches that formed a tight triangle with it in the Stockade section.

More important, Dutch identity itself was diffusing away by intermarriage or association. Characteristic 19th century Schenectady names reflect this mixture: Nott Schermerhorn, Oothout Craig, Van Eps Ingersoll. Ethnic evolution in early Schenectady was not a sequence of sudden changes, from Dutch to English then English to American, but rather a gradual blending.

Politics also emphasized consensus more than sudden transitions. Parties and factions did contend, but when important issues arose, the relatively small elite, strongly interconnected by those inter-ethnic marriages, could get together. Those important issues included the battle against the trustees, the achievement of city status, and, most important, the formation of Schenectady County in 1809.

The designation of an area as a county assumed a different meaning in the new US than it had held in colonial times. To the British, a county was a way of enlisting the few families with large landholdings to serve as a sort of amateur local government of justices of the peace. In upstate New York, before the Revolution, this resulted in almost the entire Mohawk River valley being included in just two large counties. Schenectady was in the eastern one, Albany County. The 128 square mile Schenectady patent was typical of the large land grants either endorsed or made by the British. Indeed, the vast nearby Dutch patroonship of Rensselaerwick that the British allowed the Van Rensselaer family to retain dwarfed even the large holdings of the Schenectady patent, of Indian agent Sir William Johnson, and of New York City lawyer James Duane.

In the new United States, counties became not a tool of the landed classes, but a mere administrative convenience. A county was typically an area small enough that its inhabitants could walk in less than a day to its centrally located county seat to get essential legal and financial business done. That county seat held a courthouse, a bank, and typically also an important church and an educational academy, perhaps even one aspiring to become a college.

In upstate New York, this new meaning of county meant dividing those two big colonial counties, Albany and Tyron/Montgomery, into four or more. By considerations of geometry alone, the four roughly rectangular counties of Saratoga, Albany, Montgomery, and Schoharie appeared to suffice. However, for some notables in the center where four corners meet, including members of that prominent Duane family as well as the leaders of the city of Schenectady, the walk to their designated county seat of Albany was too far. One element that may have helped the Schenectady argument for county status was the fact that every creation of a new county offered new opportunities for political patronage.

The Schenectady area petitions prevailed. A new triangular Schenectady County, still in the 21st century one of the smallest counties in New York State, was created at the point where the corners of those four rectangular counties would have otherwise met.

For the economics, ethnicity and politics of Schenectady, this demographic act of county creation was much more important than had been the earlier city designation. It greatly accelerated those processes of outflow from larger cities, and inflow from towns and farms, to which little cities owe their growth.

To illustrate those processes, consider six families. The Paiges, De Forests and Shannons illustrate inflow from the surrounding countryside. The Craigs, Riggs, and Notts illustrate outflow from more populous places.

The Reverend Winslow Paige, of Yankee origin, was after the Revolution the minister of a church in the upper Hudson valley town of Schatigcoke. Hoping that his sons would be ministers, he sent them both to Williams College. However both chose the law. In the manner of many aspiring lawyers in the early 19th century U.S., such as Henry Clay, and later Abraham Lincoln, the Paige brothers launched their legal career in a new county, where opportunities were wide open. The new county the Paiges chose was Schenectady. They arrived just after the 1809 county formation. Both apprenticed in the law offices of Schenectady's first mayor and New York State's future governor Joseph Yates.

John, the more adventurous, participated heroically in the War of 1812. He also married advantageously. His first wife was Joseph Yates' daughter. His second wife was the daughter of a mayor of Albany, a post that John Paige would himself eventually attain. He would also become the president of a highly politicized Albany bank, the Canal Bank. He would be deeply implicated in the careless processes of politically favored lending that led to that bank's highly publicized crash in the 1830s. **Cabinet 18 Dec 1857 (Obituary of J.K. Paige)**

The more scholarly brother Alonzo stayed in Schenectady. Like John he attached himself to the dominant faction of what was to become the Democrat party, the faction initially known as the Bucktails but memorialized in history as the Regency. He climbed gradually up the political ladder. By 1830, to the extent there was a Regency boss in Schenectady, Alonzo Paige was that boss.

A more typical source of inflow to a new county seat depended less on high status than did the inflow of the Paiges. The good farm land of the Hudson-Mohawk region was filling up by 1800. This was especially true because farm families found it useful to have many children, and due to the healthiness and good nutrition of farm life, many of these children survived to adulthood. It is hard to accurately follow the flow of these families because they tended to move around a lot and use a limited number of first names. However, here a try will be made for two such families, the De Forests and the Shannons.

Jacob De Forest, a successful farmer just south of the city of Schenectady in the post-revolutionary period had several sons. He turned the farm over to his namesake Jacob, leaving the others to find their own way. Two went to the new county seat. Obadiah trained as a cooper, an important trade in transportation break cities, where grain and other commodities traveled in barrels. However, Schenectady's later decline as a transportation break may have been the cause of his changing careers. By the 1830s he was an under-sheriff, raising his family in an apartment above the county jail.

His brother Martin De Forest came to the city as an agent for the rich heir of a Scots trader, Daniel D. Campbell. This young heir, whose main interest in a long 19th century life seems to have been breeding horses on his gentleman farm, was actually a nephew of the Scots trader's wife, and a member of the Dutch Schermerhorn family. However, by removing the last name Schermerhorn, he became the heir. An agent handles money matters for a wealthy landowner. Campbell was the owner of by far the largest amount of personal and real property in Schenectady County. As agent Martin De Forest was probably mainly responsible for collecting rents. But, as will be seen, when Campbell was, at a key moment in Schenectady's history, offered the opportunity to participate in a manufacturing venture, Martin De Forest likely played an important part in the decision.

The Scots immigrant Robin Shannon arrived in Albany County in about 1750. After the Revolution, at least two of his surplus sons, John and William, had found their own farms in the town of Princetown, just west of Schenectady in what would become Schenectady County. There was not enough land there for all of their sons. Two of them flowed in to Schenectady, Thomas as a grocer, and Peter as a mason. A daughter, Margaret, born in 1796, stayed in Princetown, marrying Isaiah Kittle, the Dutch-descended eldest son and inheritor of a farm of a family that originally spelled their name Ketelhuyn. She too would, as will be seen, flow into Schenectady.

Overflow from bigger cities rivaled inflow from smaller places in populating new county seats. Archibald Craig was born in 1775 to a well to do family in Monmouth, N.J., attended Princeton, and began his career in the New York City area. There he took up with "young and fashionable companions" "(the quotes are from his obituary). In this pursuit he "found his finances exhausted". A family connection, the Duanes, provided him with introductions by which he could move upstate to repair his fortunes. He had to sell his last possession, a fowling piece, to gain funds to open a store. By 1808, he was in Schenectady, operating a drug store, and known as the "industrious and economical" Dr. Craig, though without any apparent medical qualifications or practice. **Cabinet 4 Aug 1846**

Isaac Riggs had grown up on a variety of farms as his father travelled northward from New Jersey in search of opportunity. Entirely self educated, something he would be defensive about throughout his life, he took up the career of printer. He preferred the humbler title typesetter. This emphasized his mechanic sympathies and adherence to the self made image popularized by Benjamin Franklin. Like Franklin, Riggs aspired to cultural and political influence as well as financial success. At Albany, where he apprenticed, he had many models close at hand. Edwin Crosswell would become the printer for the Regency faction, the basis of the Democrat Party. Riggs' Albany friend Thurlow Weed would partner with politician William Seward to create the New York state Whig party. Riggs' mentor, Solomon Southwick would run through episodes of wealth and bankruptcy, admiration and disgrace, and eventually make at least two wildly unsuccessful runs for governor.

Perhaps finding this crowded Albany printing scene too competitive, Riggs overflowed from the state capital, ending up in the new county seat of Schenectady as the designated printer for its leading political figure, Joseph Yates.

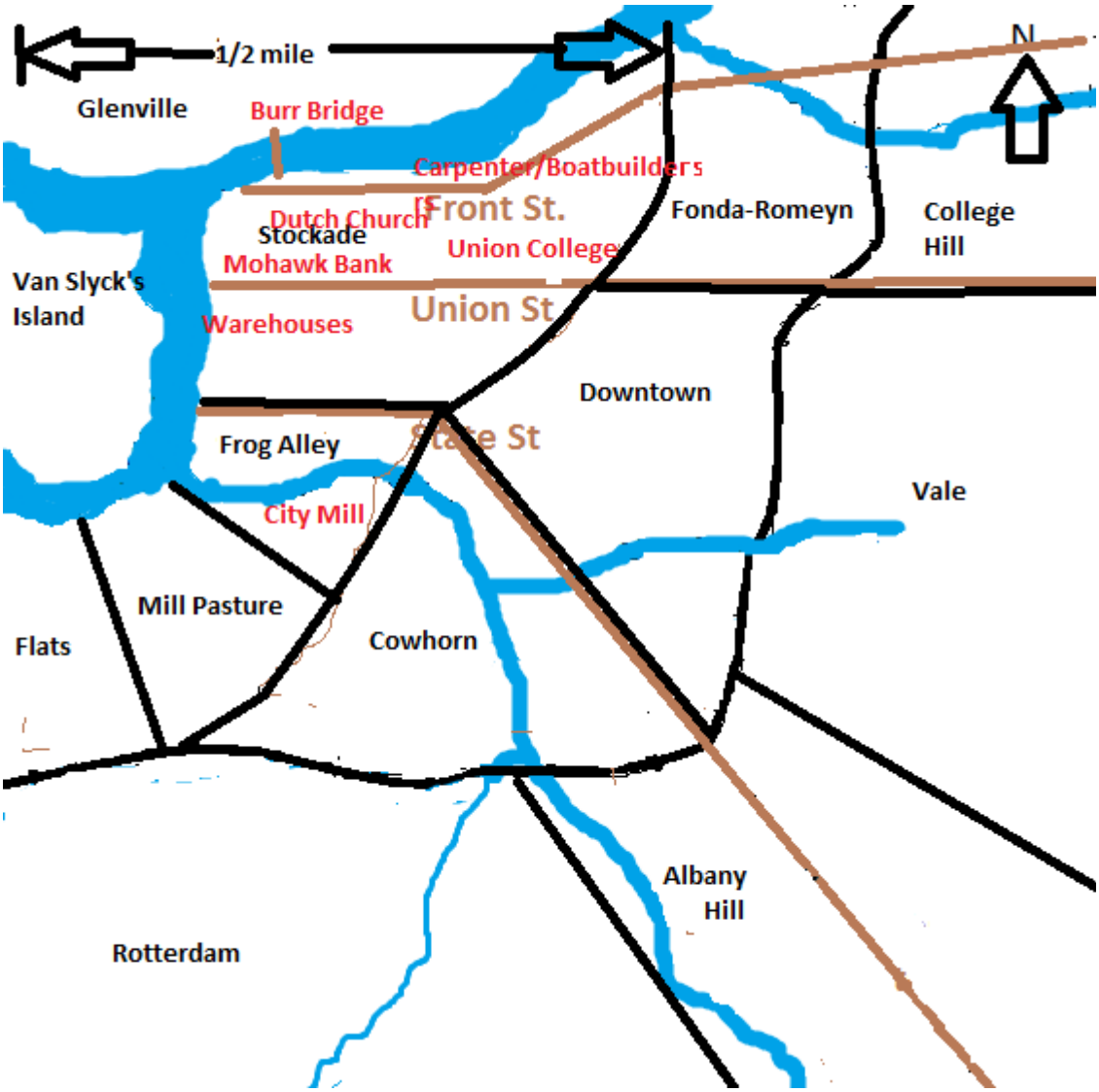
Also overflowing from Albany was a charismatic minister, Eliphalet Nott. Born on a Connecticut farm, his formal education consisted of little more than a semester in a seminary. His subsequent career included selling patent medicines and publishing a table of currency conversions. Somehow, just after 1800, he ended up as the minister of Albany's First Presbyterian Church. After Aaron Burr killed Alexander Hamilton in a duel, Nott delivered an anti-dueling sermon that, in pamphlet form, achieved the early 19th century equivalent of going viral. This helped put him in the spotlight just as an opportunity for overflow was emerging.

As mentioned, the goal of turning a local academy into a college was not unusual for a new county seat. Here Schenectady had a head start. In 1795, Schenectady's First Reformed Church, the Dutch church, led by its pastor, Dirk Romeyn, had such an aspiration. However, in an unusual initiative

perhaps aimed at getting state support, the church proposed a college jointly supported by multiple religious denominations. This indeed led to state approval, and to the name Union College, reflecting both religious cooperation and the union of the new nation. Placing such a college in a small town rather than a big city was typical of the times: Cambridge rather than Boston, for example, Princeton rather than New York City, Schenectady rather than Albany. The theory held that this would isolate scholars from big city vices.

In the emerging county seat of Schenectady, this theory had not proved too successful. The often rebellious student body brought in their own vices, or picked some up locally. " The said college," wrote a 1797 Schenectady resident writing under the name Dutchman, "has introduced a set of wild young rakes among us who do nothing but break our stoops - remove our signs- destroy our fences." Hopes of major state funding had also not been met. In its first decade Union College ran through three presidents. The fourth, Eliphalet Nott, proved to be something very different, in terms of leadership, fund raising, discipline, and above all, longevity. His tenure lasted sixty years.

So by about 1815, Schenectady seemed well launched on a prosperous career as county seat and transportation break, and well supplied with ambitious newcomers through the process of inflow and overflow. It was an important node in the northeastern US transportation network, mainly because of its location at the head of navigation of the Mohawk River, the best water route to the west. It was also tied into the road network, all the more so since by 1815 a bridge had been built across the Mohawk from the settled area. This was an impressive structure designed by a noted bridge-builder of the time, Theodore Burr (a relative of the more famous Aaron).



Schenectady in 1815

It was in 1815, however, that this not yet city-achieving growth would run into a major problem. Before taking that up, however, consider this semi-rural, pre-industrial Schenectady.

There is a tendency to paint a rosy picture of such a pre-industrial place. Certainly some aspects of that picture are true. Schenectady was a healthier place than it later would be, mainly due to lower population density and the ability to grow vegetables on city house lots. Residents were more likely to persist in the city than they would be later in the century. A sampling of every tenth person of the 1810 US Census and a search for them in the 1820 US Census indicates that about half the people present in 1810 were still there in 1820. This compares to a persistence of only about one-third for the decade 1870-1880.

A widely held view holds that such a pre-capitalist city was an economically more idyllic place

than it would become after the snake of capitalism entered the garden. While boasting few material possessions, people had less to fear from economic instability, and behaved more like virtuous cooperative republicans than cutthroat economic competitors.

In this view, the virtue and stability arose because individuals owned their capital: the farmer's land, the craftsman's tools. This enabled them to build a stable local economy on reciprocity, avoiding the later conversion of both farmer and craftsmen into landless, skill less dependent proletarians.

A look at pre-industrial Schenectady finds this model oversimplified, both in terms of the characteristics of citizens and the realities of capital. Farmers indeed owned their land, and craftsmen their tools. Both needed, however, another form of capital, working capital: the money to buy seed and feed families until the crop came in; the money to buy leather and pay journeymen until the shoes were sold. The acquisition of working capital introduced its own kind of instability.

This appears most obviously in the Legal Matters file of the Schenectady County Historical Society, a somewhat random collection of legal cases before the county court of the young county seat. The great majority of these cases concern promissory notes. These are loans between individuals, whether for working capital a farmer or craftsmen needs to bring goods to market, or for purchases of consumer goods on credit. In a busy year such as 1819 dozens of such cases are recorded in this incomplete file.

Jeronimous Barhydt was a participant in several of these cases, sometimes as creditor but more often as debtor. He appears to have experienced at least one bankruptcy. These problems were interrupted by bursts of land speculation success. One of these, apparently the last, came to and end with the announcement on 11 July 1831 by a creditor, armed with a Supreme Court writ that "I have seized and taken and shall expose to sale" the property of Jeronimus Barhydt, including 28 acres of farm land, 12 acres of meadow, and "3 or 4 other lots." Barhydt appears to have spent at least one stretch in debtor's prison.

Debtor's prison is a much misunderstood institution of the pre-capitalist economy. Its goal was not mere vengeance or punishment. Creditors recognized that a debtor could not raise money while locked up in jail. The purpose of debtor's prison was not revenge, but deterrence. The fear of jail was intended to deter debtors from hiding their assets, for fear of being caught and sent to jail. Debtors declaring bankruptcy while hiding assets was a big problem before capitalism made assets easier, rather than harder, to track. **Baker, Matthew et. al. 2009. "Debtor's Prisons in America". U. Conn. WP Series 2009 #33.**

That quarrels over money could escalate is suggested by Jeronimous Barhydt’s involvement in cases of assault and battery as well as promissory notes. In one such case, Barhydt was in a dispute with one John Shaw. When the two met Shaw was carrying $100 in small coins. Finding something Shaw said offensive, Barhydt knocked the coins from Shaw's hand, and a scuffle began. Barhydt "beat, bruised, wounded, injured and evilly taunted" me, Shaw claimed in his suit. Barhydt, in his counter-suit for slander, claimed that Shaw had started the fight and that he had only finished it. The court found for Barhydt, declaring him innocent of assault and battery, and entitled to a settlement of $24.84 for

slander.

Assault and battery seems to have been something of a specialty for the Barhydts, with John H. as well as Jeronimous significantly involved in multiple cases. In one case, the assaulted was the deputy sheriff. Perhaps the family's blacksmith brawn proved helpful to this family avocation.

The more serious point is that economic instability was ever-present in this pre-capitalist paradise. This was due in large part to the over-optimistic raising of working capital through promissory notes, and the inability to repay those notes. Farmers lost their farms, as well as craftsmen being required to declare bankruptcy, and, if convicted of doing so dishonestly, going to debtors prison. It was not only the rise of democracy but also the rise of more systematic capitalist procedures that rendered debtor's prison superfluous and aided its abolition in New York in 1831. **Balleisen, Edward. 2001. Navigating Failure. esp. pp 8-9**

In the sample of families used in this book, the Barhydts, though more physically contentious than most, are not outliers in their encounters with pre-capitalist financial instability. Archibald Craig's youthful financial troubles are what sent him upstate. Margaret Shannon Kittle's mother-in-law lost her farm to foreclosure. Martin De Forest as agent had to deal with the tangled affairs of more than 50 families that owed money to the estate of the widow Cambell when she died and left her fortune to her now Schermerhorn-shorn nephew Daniel. Joseph Yates, as executor of this estate, was charged with financial irregularities, an episode that blighted his later career. Henry Glen, quartermaster and claimed friend of George Washington, would come near bankruptcy due, he claimed, to failure of notes being paid to him by a major creditor, the United States government. Even support from Alexander Hamilton, and Glen's three terms in the House of Representatives would not enable him to gain payment. Meanwhile his brother and partner in the carrying trade experienced even worse problems. "Thin John" Glen had been a high roller who bragged that he won in a card game the land that later became the town of Glen's Falls. By 1810 he was a pauper saved from starvation by the charity of his relatives. Eliphalet Nott's lifetime of financial chicanery will be a major topic of the next chapter. Isaac Riggs though living in the style of a leading citizen, found the finances to support it ever elusive. The subscribers to his newspaper and the people for whom he did printing did not always pay their bills, a situation he testified to by frequent plaintive appeals in his newspaper. After a few years as Schenectady's pioneer publisher, he was $300 in debt.

Even the very successful iron foundry owner Peter I. Clute testified to the uncertainty of this pre-capitalist economy. "I can say I have built a great deal of bad luck and some good luck two [sic]" he wrote late in his life to a relative."Since I commenced business I have lost over $30,000 in bad debts," he wrote. At the same time he took pride in the fact that "I have allways [sic] paid my debts," and was never sued for debt.

An advertisement later placed in the Schenectady newspaper the Cabinet expresses the nature of economic instability in pre-industrial Schenectady. "I have given my time, I have bought leather and had to pay for it "wrote shoemaker Cornelius Van Saantvord, in the course of urging delinquent customers to pay their bills. "I have hired journeymen and had to pay them; and the profits arising from

the manufactory of boots and shoes, which is my living, you withhold from me" **Cabinet 18 Dec 1833**

To sum up, it is too simple to contrast a pre-industrial era of economic stability and republican virtue with an industrial era of economic instability and democratic cupidity. Instead each era had its own forms of stability and instability, republicanism and democracy, and virtue and cupidity.

Schenectady had experienced a century and a half of evolving forms of economic growth and challenge, of economic opportunity and instability, before the alleged industrial revolution began. Sources of conflict, opportunity and instability had ranged from constant disputes with Albany over farming versus fur trading; roles in the carrying trade on behalf of private enterprise, the British Army, and the new US government; the trusteeship controversy over the common lands; the part-time and volatile nature of transportation break opportunities at the gateway to the frontier; and the problems of working capital, promissory notes, and consumer credit.

Demographically, this had led to an only modest and slowly growing city population of less than 3000 in 1815, but one being mildly accelerated as county seat status stimulated processes of rural inflow and bigger-city outflow. Demographically, the geographically and topographically constrained process of shaping nine distinct neighborhoods had begun. Ethnically, Dutch dominance, always somewhat less than it seemed due to the cosmopolitan nature of the Netherlands, was even further giving way to diversity through marriage. Politically, factional politics had little ideological or ethnic basis, giving way to consensus whenever a significant issue arose. For example, uniting to petition the state successfully for a bank in Schenectady, the Democratic Republicans exempted the local Federalists from the sins of their national brethren, expressing a preference for "brotherly love and affection" on the local scene. **Western Spectator 25 Apr 1807.**

In short, evolution, not revolution: modest industrial expansion, consensus politics, slow population growth, and merging ethnicities. All this evolution was, however, suddenly interrupted. In 1815, the state of New York decided to carry out a long proposed project.

Chapter 3

Kittle, Widow, cotton factory: Looking for Export Industries

This terse item from the 1841-42 Occupational Directory needs expansion. Widow is understood. About one in every twelve households in 1841 Schenectady was headed by a woman, most of them widows. But what was the cotton factory? And who, or what, was a Kittle?

The entry refers to a person already mentioned in the previous chapter. Margaret Shannon, farm daughter of Princetown, became Mrs. Isaiah Kittle, farm wife. Then she became the Widow Kittle. As for cotton factory, even the compiler of the directory was not sure if it was an occupation or an address. He applied this descriptor to 12 people. His style was to use words beginning with small letters for occupations, and capitalized words for addresses. Cotton factory was, however, both a name and an address. The compiler showed his confusion by, midway through the directory, beginning to capitalize the C in Cotton factory, though not the f.

Schenectady made a similarly confusing and halting entry into the age of factories and industrialization. This chapter will deal with some questions about that entry. Why did Schenectady have to change its economic identity from transportation break? What new identities did it try on? How did those new identities work out? How did this economic experimentation in the first third of the 19th century, impact the areas of demography, ethnicity, and politics?

The reason why Schenectady had to change its economic identity was the Erie Canal. In 1815 New York decided to put state funding to work on a project the Federal Government had turned down. This was the building of a water route from the Hudson River across the length of New York State to Lake Erie. The idea was old. Reasons for its adoption, ranged from the obvious economic advantages through the political skill of its proponents and the lessons of the War of 1812. Here the emphasis is on its impact on Schenectady.

That impact was not good. Schenectady was reduced from a major transportation break where the trail through the pines met the Mohawk River to just one of dozens of stops along the canal. The rural farms of Schenectady County were brought into competition with the more fertile farmland of the west, first in central and western New York, then in Ohio and the rest of the new states. Schenectady County farmers could not compete in commodities such as wheat, and retreated into such specialties as dairy farming and growing broom corn.

Schenectady was not the only New York State settlement negatively impacted by the canal. Hudson River cities and towns, such as Newburgh, Poughkeepsie, Kingston, and Hudson, also saw a relative slowdown compared to the newer canal boom towns of Troy, Utica, Syracuse, Rochester and Buffalo. Because it had bet its future city status so heavily on that transportation break role, Schenectady was particularly hard hit.

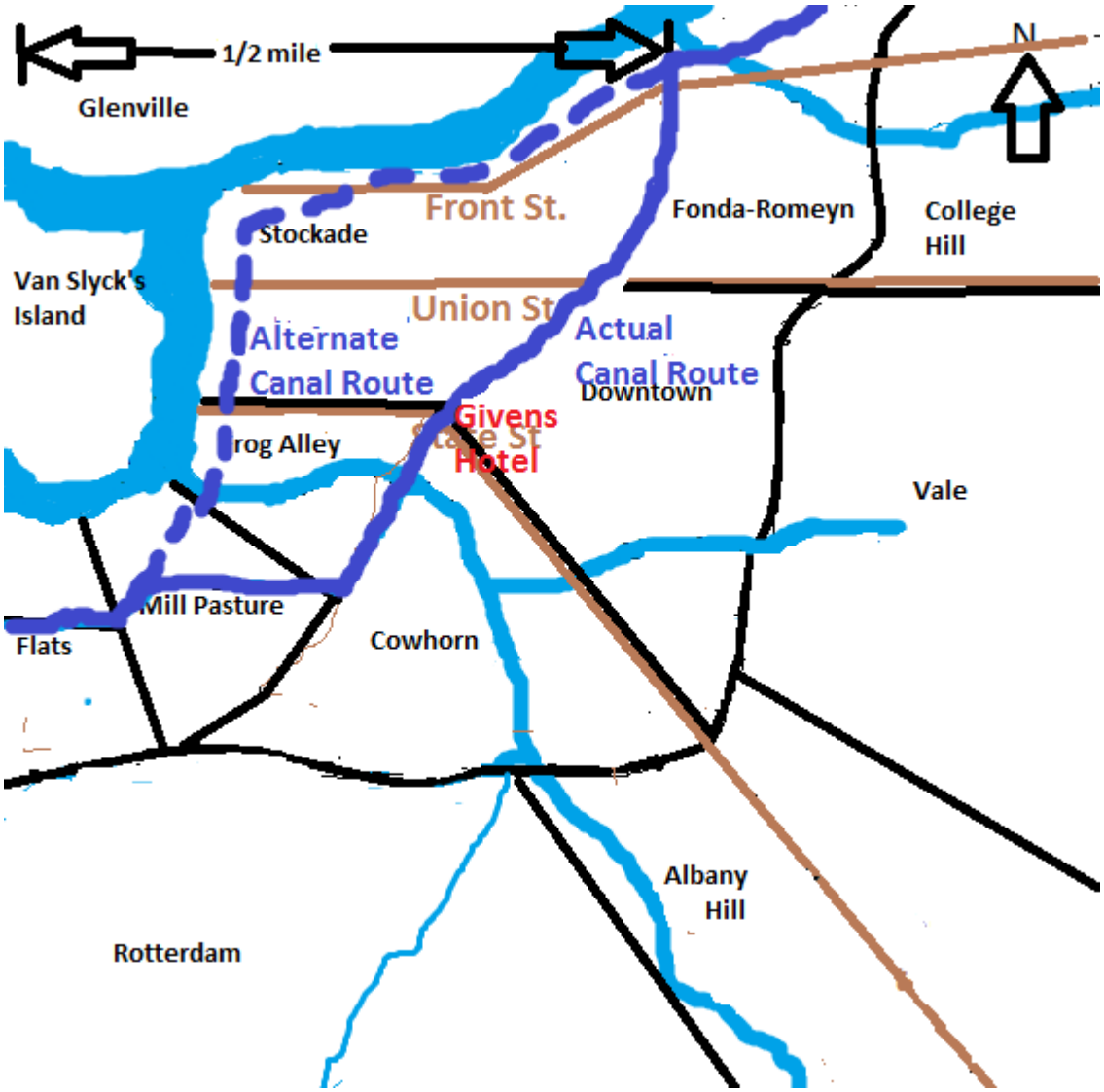
Symbolic of the change that overcame the city was its response to its Great Fire of 1819. Ignited

in a shop in the most densely populated part of the city, the fire tore along the waterfront proving especially destructive to the warehouses of merchants in the carrying trade. The part of the story less often told is that fires of this sort were common in 19th century cities. Schenectady's later key industries, such as the Locomotive Works, the Clute Machine Works and the Edison Works, would also suffer destructive fires. The owners shrugged off the damage and rebuild bigger and better. By contrast, with the Erie Canal already irrevocably under way, Schenectady did not rebuild its waterfront. Instead it converted that Stockade waterfront from a commercial hub to a residential area. What had once been called (in the18th century, and in Dutch) Merchants' Street was now residential Washington Street.

While it is unnecessary here to review the full Erie Canal story, a few aspects of it specific to Schenectady are worth noting. First is the route chosen for the Canal within the city limits.

The standard histories of the Canal, in so far as they refer to that Schenectady portion at all, draw on a single source, a memoir written long after the event by canal engineer John Jervis. This source describes two possible routes through the city, one hugging the south bank of the Mohawk River, and the other passing midway between the river and the hills, along the line that in this book's schematic map separates the Mill Pasture, Frog Alley and Stockade squares from the other six squares. According to the usual treatment based on the Jervis account, the river hugging route was the initial choice. However, a canny Yankee hotelkeeper named Resolved Givens had a different idea. He owned land near where the midtown route would cross State Street. He successfully pushed for his favored route, got the Canal Commissioners to go along, and ended up the owner of Schenectady's premier canal hotel, the Givens Hotel.

Givens indeed early bought land where the future canal would go. He and his partner Isaac Ledyard did so as early as 1806. However, the only firsthand account written while the route choice was still being decided tells a different story. Samuel W. Jones, a prominent Schenectady lawyer and politician, reviewed the route controversy in his diary in 1821, while the decision process was still underway. As he tells it, the mid-city route, not the river-hugging route, was the initial choice of the canal surveyor. Then the merchants living along Washington Avenue lobbied hard for the river hugging route. This would restore the former waterfront as a principal commercial area. However, objections to that route arose. They concerned possible damage to the canal from flooding or ice. It was at this point that the controversy became at least as much about politics as about engineering and geology. Givens goes unmentioned in the Jones account. The route that would pass his hotel did indeed, however, prevail. **Diary of Samuel Jones 31 Mar 1821.**



Route of the Erie Canal through Schenectady

Two other route possibilities are less often discussed, but more consequential. Had engineering been more advanced in 1815-1825, the canal might have used the Mohawk River as its bed, at least as far as the vicinity of Cohoes Falls. This is the route of the modern New York State Barge Canal, built just after 1900. This would have left the city free of the shallow, stagnant ditch that crossed through its center for most of the 19th century. The beautiful waterfront would have been connected with, not separated from, equally beautiful hilltops that could gradually evolve into suburbs.

Another possibility, occasionally considered in the 19th century, would have been to bypass Schenectady entirely. The canal might have left the banks of the Mohawk southwest of Schenectady, and proceeded along the hypotenuse of that Albany-Troy-Schenectady triangle, more or less paralleling the old trail through the pines. This is the route taken in the 21st Century by the New York Thruway. This, again, would have left Schenectady a beautiful riverfront town, though a bit disconnected from the main stream of commerce. This route was, however, never a political possibility in the early 19th century. Not because it would have bypassed somnolent Schenectady, but because it would have bypassed dynamic Troy, then a contender with Albany for the role of commercial hub of the Canal.

So the choice of Canal route was a political issue, extending far beyond this book's concerns. However, it the politics was complicated, the immediate consequences were simple. "The evils and embarrassments that have come upon us by the construction of the Erie Canal" were still being bewailed by a Schenectady Mayor as late as 1839. Schenectady's growth, already slow before 1820, ground almost to a halt in the next decade. The state census of 1825 found that Schenectady County had actually lost population between 1820 and 1825. The city itself gained only about 7% in population in the 1820s, a very slow growth rate for a young city. At 4248 people in 1830, it was still below genuine city status. **Freedom's Sentinel. 1 Jan 1839.**

“It is true that we have lost a great portion of the forwarding business “, wrote columnist "Peter Homebody" in the Schenectady Cabinet. He noted how Schenectady County farmers had been overly optimistic in believing that high farm prices would persist, "that wheat would remain at $2 and rye and corn at $1.25 per bushel". Those farmers had "run in debt" after their prices were undercut by western competition. He projected a positive view of the future, but one that seems based on thin hopes. The Mohawk River route might be revived and improved to supplement the canal. This was petitioned for regularly by Schenectady residents, but it was never a real possibility. The state was unlikely to subsidize a competitor to its own highly lucrative canal. **Cabinet 20 Apr 1825; 8 Nov 1825. LM 2152; 2210-2214**

All settlements need some imports. A county seat mainly serving the needs of its mainly rural county, as Schenectady was in 1820, can get by on little more than such classic import commodities of iron, salt, sugar, tobacco and millstones. Only a small fraction of the settlement's economic activities need be devoted to exports in order to meet these needs. The main fraction of activity can be devoted to economic cycles within the county: turning local lumber into boards at local water powered sawmills, for example, and turning boards into houses, furniture, wagons and boats. Or it can also be turning local hides and the bark of local trees into tanned leather and then locally produced shoes, or local grain into whiskey, or milk from local cows into butter and cheese, or wool from locally raised sheep and flax from local plants into thread spun on local farms and cloth woven on home looms.

A growing city, by contrast, typically devotes one-third or more of its economic activity to goods and services with impact beyond the county boundaries. These goods and services are sold on a national or even a world scale. This was the role of the transportation break activities, a service industry that was the intended engine of Schenectady's economic achievement of the city status that it had prematurely gained politically. In colonial days, that service was sold to the British Empire, as a fee placed on the transport of furs and military supplies. In the early US, it was similarly sold as a fee placed on frontier

expansion. Now that fee would go directly to New York State as canal tolls. If genuine city status was to be gained, other major export goods or export services had to be found.

Exploration of three such core exports was already underway by 1820. Each of them potentially met the need for an industry producing a good or a service that could be sold beyond Schenectady County, earning money that would enable city residents to increase their purchases of imported items.

The first to emerge was a service industry, and had been present since 1795. This was Union College. Its president Eliphalet Nott, had a big vision for it. He sought national, rather than merely local prominence. He envisioned Union as not just one of several dozen US small colleges, but at the top in both enrollment and academic achievement. He aimed to create a rival to Harvard, Yale, Princeton and Columbia. In terms of aesthetics, he aimed to surpass those leaders. At a time when US college campus architecture was haphazard and utilitarian, he had a vision of planned beauty.

He achieved these ambitions. By the 1830s Union passed Columbia and Princeton, and sometimes Yale, in its annual number of graduates. Its carefully planned campus, designed by a French architect, set a new standard for campus beauty.

Nor was Nott content merely to imitate educational predecessors. Instead he embraced a newer vision. He advocated the merger of engineering and science with the liberal arts, the provision of elective courses, and the exercise of social consciousness. He advanced these priorities at a time when other colleges were content to concentrate on the classics. Though remaining a notable preacher, Nott also excelled at practice. He was in the forefront of reform campaigns, from opposition to dueling to temperance to anti-slavery. His work on the science and technology of heat earned him the title "Philosopher of Caloric." Nott also educated educators. Union graduates carried his ideas as founders or presidents of colleges from Rhode Island to Michigan.

Union's graduates found places of prominence. They included a US president, Chester A. Arthur, and the secretaries of state during the Civil War of the Union, William Seward, and the Confederacy, Robert Toombs. Other graduates included 8 state governors, 7 US Senators, 7 US Officials of Cabinet or ambassador rank, 7 judges of US or State Supreme Courts, and 16 college founders or presidents. Other distinguished alumni included numerous scientists, engineers, and entrepreneurs and city fathers across the nation. As just one example, a historian of Milwaukee makes a point of the crucial early role played in building that city by half a dozen or so Union College graduates. One was appropriately named Eliphalet. Another, Edward Allis, became the founder of a major U.S corporation located in Milwaukee, Allis Chalmers. **Encyclopedia of Union College, p. 32-34. Still, Bayard. 1948. Milwaukee. State Historical Society, Madison. p. 72**

Yet when this era of collegiate reform makes it into general histories, it is the Nott acolytes who get the credit. A recent survey history of the early 19th century, for example, conveys the ideas through the words and work of Nott student and president of Brown University Francis Wayland.

There is a good reason that the credit for these educational reforms typically does not go to Nott. For the philosopher of caloric was also in many respects a Wizard of Oz. His activities behind the

curtain were not quite as wonderful as they seemed out front to the world.

The dog Toto who pulled back the curtain on the wizard was, appropriately, a 20th century Union College historian, Codman Hislop. His definitive biography of Nott revealed the Philosopher of Caloric as a bit of a humbug, a fallible human being, running around pulling levers as fast as he could to produce deceptive special effects and avoid exposure. The biography depicted an ambitious entrepreneur unable to separate his personal enrichment from that of his college.

The indictment of Nott's financial career includes secret slush funds that mixed his personal business dealings with those of the college; deceptive promises never fulfilled, indeed perhaps never intended to be fulfilled; and basing the entire enterprise on the operation and manipulation of a state-authorized lottery that the state was frozen out of in regards to regulation or even information. Nott's mastery of political influence kept him from suffering serious personal consequences from his doubtfully legal dealings. Charges ranging from unethical conduct to outright fraud dogged him throughout his 60 year tenure. Those charges never resulted in a guilty verdict. The basic truth behind the charges was, however, eventually conceded by even his most ardent defenders, such as Schenectady lawyer and politician and Union College trustee Alonzo Paige. While continuing to defend him in public, the trustees convinced him behind the curtain finally to turn over to the college a $500,000 President's Fund that he had secretly created early in his tenure, and had invested in his own name in everything from Long Island real estate to a Rhode Island coal mine.

Emphasis here will be on Nott's role in providing Schenectady with a major service industry to replace its transportation break role. This Nott to some extent achieved. Yet he also created a college separate from the city, looking down on it both literally and metaphorically from its new campus atop College Hill. Schenectady would not become a college town, on the model of Dartmouth's Hanover, NH, or Williams' Williamstown, MA it would instead be a little city with a separate college attached, or more accurately detached, in the manner of Lehigh's Bethlehem, PA, Earlham’s Richmond, IN, or even Harvard's Cambridge, MA.

To Nott, Schenectady was "the town beneath the horse's tail." To college professor and treasurer, and conscientious daily diarist, Jonathan Pierson it was a dirty city of dubious personal habits, "fit only for hogs and Dutchmen. A dirtier place never existed". Nott treated the city like he did the state of New York: as a financial asset to be milked. He did this by allying with the elite against the mass of citizens. His alliances were non-partisan. In the era of personal factions, he allied with many of those factions at once, ranging from downstate's DeWitt Clinton to the upstate Albany-Schenectady Yateses. In the era of parties, he could simultaneously ally with wealthy Albany Democrat William James (grandfather of the psychologist and the writer), with the Democratic Party’s man in Schenectady, Alonzo Paige, and also with Schenectady Whig leader Isaac Riggs and the state’s Whig party leader, Union alumnus William Seward. Pierson 29 Oct 1836, p 566

Nott's first need in building a great college was funding. He began conventionally, getting modest direct support from the state agency that chartered Union College, the Board of Regents. He became a member of the Board of Directors of the Mohawk Bank an insider's route to favorable loans.

He supplemented this funding by marrying a rich Troy widow. However these proved inadequate so he moved to more dubious methods. Lotteries for educational purposes had been found to be so corruptible and unreliable that by 1810 the state of New York had outlawed them. Nott, however, working with the Yates family and a former state comptroller, found a loophole and grandfather clause and bought up some existing educational lotteries that the law had not eliminated. This would be the principal source of the college's wealth, a stream of poorly accounted for almost uncontrolled funds that provided for, among much else, that secret President's Fund. As a secondary source of funds, Nott also fleeced the city of Schenectady.

As noted earlier, the , the thousands of acres of Schenectady common land contained in the both the original 17th century Schenectady Patent, and the 128 square mile 1798 city of Schenectady, had come under control of the Mayor and Common Council. They were forbidden from selling that land without express approval of that Common Council's Aldermen. In 1812, Nott wanted not only part of that common land for his new campus on College Hill, but also 3000 other acres scattered throughout the county that he could sell or rent to raise additional funds.

Once again, he found a loophole. The city could not easily sell the land, but it could trade it. The city needed a new city hall, and the new county seat needed a county courthouse. Union's original building, West College, located in the Stockade square, would be made educationally obsolete by the new campus. Why not trade it to the city for some of that common land? **Munsell, John and Howell 1885. History of the County of Schenectady. NY Munsell and Howell. p. 129**

Nott and his allies, college trustees Abraham Oothout, a city Federalist leader, and Henry Yates of the city's major Democratic-Republican faction, went to work on the rest of the city elite. In October, 1811, the Schenectady Common Council passed the agreement. Nott got the campus site and 3000 acres of additional land. In return, the city got that West College building, plus a promise that the "New College" would be built within the settled parts of the city, then called the first and second wards. At this time the city was divided into four wards. The third and fourth wards would soon be spun off as the towns of Rotterdam and Glenville.

Discontent from lower down the city social ladder, from people who saw this as another trustee-like land grab, was ignored. When the smoke had cleared, Union College had been traded $70,000 worth of land for an obsolete building that served only badly and temporarily as a public building. Henry Yates claimed it to be worth $54,000, but its real value was revealed a little later, in 1831, when Nott, in a burst of college expansion, bought it back for only $10,000. He would later, in 1854, sell West College again to the city for $6000, in the process using the sale to squirm out of a long range obligation of tens of thousand dollars worth of educational services to the city and free tuition to city residents that he had promised to provide as part of the out-of-court settlement of his President's Fund scandal.

Back in 1811, not satisfied with this coup, Nott went on to squeeze more from the city. In identifying the land, Nott and Yates described what they would get as mere "gores, remnants, corners and gussets", odds and ends of not much use to the city. In fact, as city representatives I.M. Schermerhorn, Isaac De Graff and John Jauncey pointed out on 23 Oct 1811, Union proceeded to lay

claim to "many hundreds of acres of woodland of great importance to the citizens." **Cabinet 23 Oct 1811** Loss of these valuable timber land and wood lots was especially painful to the city because at this time when Schenectady was suffering something of a wood shortage. This had led as early as 1795 to new laws against unauthorized cutting down of hickory, oak, maple beech or ash trees on the common land, and later, on 9 Feb and 27 Apr 1814, to rewards for the capture of wood poachers. **Mohawk Mercury, 9 Feb 1795 Cabinet 27 Apr 1814**

Meanwhile, with construction of his new campus just beginning, Nott continued to use the building he had traded to the city, West College, while failing to pay the rent he had promised to the city. This amounted to $1000 a year, a major share of city income at the time. When confronted with this fact of non-payment, Nott blandly referred questioners to the Board of Trustees, a group conveniently not in session at the moment. Schenectady Alderman John Jauncey noted on 3 Mar 1814 that he "will presume by the reply of E. Nott that he entirely evades giving a direct answer," adding that "the buildings are in a ruinous situation."

This set the stage for what would be six decades of frequent town-vs.-gown conflict. It could take modest forms, such as the tendency of students to take on debts with local merchants that they were unable to pay. This characterized the college careers not only of the humble, but of two student sons of the Yates family prosecuted for promissory notes, and of William Seward whose excessive and unpaid tailors' bills angered his father but did not reach the courts.

The conflict could reach more serious levels, even involving violence. In one episode, town constables climbed College Hill to deal with a conflict over student voting, they were driven away by students bearing clubs and throwing rocks. In 1833, as a result of another local issue, Jonathan Pierson noted on 8 July 1833 that "the townsmen are raving mad at the students, some of whom they intend to whip."

Though a strict and effective disciplinarian, Nott resisted such city interference in college matters. He operated his campus as a separate Yankee empire, isolated on the hill from those smelly hogs and Dutchmen downtown. He did so however, by allying with the elite in the town, such as Union College trustees Abraham Oothout and Henry Yates, young but rising lawyer Alonzo Paige, with Union College printer and the town's leading newspaper editor Isaac Riggs, and his fellow clergymen at the city's three prestigious churches, the Dutch Reformed, Congregational and Presbyterian.

This was most clearly illustrated in Union's clash with the distinctly downscale First Methodist Church of Schenectady in 1825. The story comes in two versions. One is presented in the Encyclopedia of Union College. In this story, Union students, out of curiosity or piety, attended services at Schenectady's First Methodist Church. One of them suddenly found himself surrounded in his pew by menacing Methodists. His fellow students attempted to extract him from the threat of attack. A scuffle ensued. The students fled toward campus, pursued by their Methodist tormentors. At the gates of the college, the pursuers were turned away by defenders led by Eliphalet Nott himself. **Somers, Wayne, ed. 2003. Encyclopedia of Union College. Union p.736**

The view presented in the history of Schenectady's First Methodist Church differs. Dozens of

Union students regularly visited the church to heckle and harass the parishioners. Wrote Methodist leader John Joyce 0n 21 Nov 1824, "We cannot assemble for the purposes of public worship without fear." On one particular November 1824 Sunday when matters reached a head, "the congregation, at the close of public worship, was attacked by 60 to 100 students armed with dirks, canes, sticks or firewood.... the sexton was assaulted, and the students rushed into the church, beating and knocking anyone who stood in their way." **Cabinet 21 Nov 1824 19 Jan 1825**

The Methodists held an open meeting to protest the repeated invasions by Union students, and presented their detailed description of the incident, as well as requests for redress, in a letter to Riggs' Schenectady Cabinet. This letter was answered, on 19 Jan 1825, by ministers and deacons of the city's five top churches, Dutch Reformed, Episcopal, First Presbyterian, Reformed Presbyterian and Baptist. **.**

This elite response did not contest the facts the Methodists presented. "We are constrained to say that we are ignorant of the facts stated". They downplayed the serious of what they described as a so-called riot. "Everyone knows," the writers continued, "that whenever there is an assemblage of youth in the number of between two and three hundred there will be occasional sallies of youthful indiscretion and impropriety." In other words, boys will be boys.

Replying on 6 Apr 1825, the Methodists noted that the sallies and impropriety had continued. One church member had been dirked, and three others had been beaten or attacked with clubs and stones. The elite group responded with satires aimed mainly at contrasting their own high status with the humbler occupations of the Methodists. Typical of these responses was a claim that the Methodist chairman used his church as a place to "sell small meats at high price", a reference to the fact that the Methodist leader, John Joyce, was no college graduate or member of the learned professions, but a butcher. The responses were so clearly in the issue-avoiding, subject-changing style of Eliphalet Nott that editor Riggs felt constrained to publish a denial that these anonymously attributed responses were written by a representative of Union College.

More generally, both financially and in terms of town-vs.-gown conflict, Union College was in, but not of, Schenectady."The college struggled to keep students a distance from the residents," Union's Encyclopedia notes. Students were told to avoid "mixing with the rabble". **Somers, Wayne, ed. 2003 Encyclopedia of Union College, p. 736**

Only about 5 Union College graduates per year came from the city. Those that did were mostly from a few elite families. Even they had their reservations. In 1834 one of them, James Fuller, was scheduled to give a graduation address on educational opportunities for women. Instead, he devoted to his remarks to the inferior treatment of city-born students compared to "immigrants". Nott stonily ignored the remarks, and made sure that nothing was heard about them in newspaper accounts of the graduation. His colleague Pierson felt that the Schenectady students were inferior, admitted only because of their place in "the aristocracy of the town," and dismissed one of them as "a dunce." **Evening Star 12 June 1877; Jones Diary; Pierson diary 13 Oct 1836, p. 565.**

In summary Nott's wizardry may have had elements of the humbug, and his treatment of the city was cavalier, but its overall effects on Schenectady were positive. This was true not only in

education, but also on one particular opportunity for an export industry in the 1820s and 1830s. This opportunity emerged, however, was in the indirect, devious, and hard to untangle manner that typically characterized the works of Eliphalet Nott.

The industry was the manufacture of coal-fired stoves. By 1825, New York State was beginning to gain access by cheap water transport to the coal fields of Eastern Pennsylvania. The coal, a hard variety called anthracite, was entering industry, and was being eyed for use in home furnaces and stoves. Anthracite was, however, difficult to ignite and potentially dangerous due to its release of explosive gases.

As a college president with a large fuel-wood bill, Nott had long been concerned with efficient heating of dormitories and classrooms. Unlike other college presidents, he took matters into his own hands. He had done stove experiments even before the arrival of Pennsylvania coal, and invented better furnaces for his dorms. By 1826 he had extended his interest to coal, and patented some of his inventions. In the 1820s he set up his sons Howard and Benjamin in the stove business. This Union Furnace produced and sold anthracite coal burning Nott stoves. **Cabinet 28 Aug 1828** Over the next decades, the Nott stove became a by-word for efficient heating, celebrated, for example, in a poem by Oliver Wendell Holmes, Sr. In a famous 1840s group portrait of American inventive benefactors called "Men Of Invention" Eliphalet Nott stands at the very center, surrounded by supporting actors named Morse, Whitney, McCormick, Colt and Goodyear. Benjamin Franklin, himself no mean stove inventor, gets only a cameo appearance in the form of a portrait on the wall.

So runs the conventional story. The facts given above are literally true, but as with most Nott matters, there was more to the story. In an alternate version, also based on verifiable facts, Nott was a pioneer not so much in commercializing coal fired stoves as in the profession of patent troll. This is a person who lays claim to industry profits based not so much on hardware and marketing as on timely, if ambiguously worded and legally manipulated, patent claims.

Nott was not the first Union College faculty member to address the stove issue. On 24 Nov 1812, a newspaper advertisement announced that Union College professor T. C. Brownell had partnered with two Schenectady craftsmen to offer city residents a "Russian stoves", brick stoves heating large indoor spaces, such as the college buildings, by steam heat. Nott continued, rather than originated, stove R&D at Union.

The patents that Nott obtained in 1826 were very generally worded. They did not cover the burning of anthracite or an improved grate for igniting that form of coal, the two hallmarks of later Nott stove success. Those patents do not appear to address home heating at all, but rather industrial applications. In 1828 Nott did indeed set up his son Howard in a stove business, the Union Furnace. It was located in Albany, already a stove-making center, not Schenectady. It was not a manufacturing concern, but more of a stove development laboratory. This is evident in the advertisements for this Union Furnace that appeared on 29 Aug 1829. They offered stoves on as "test by experiment" to a "small number" of customers. "Should the experiments thus made prove satisfactory," Nott and associate Joseph Horsfall wrote, "manufacturers generally will be allowed on the most reasonable terms

to make and vend these furnaces in their most improved forms." The only indication of experimental success was a testimonial on 31 Dec 1828 by Isaac Riggs, a Nott ally and Union college printer. No indications at all of full scale stove manufacture appeared in Schenectady papers until after 1832. By then, several advertisments had been printed for "Philadelphia stoves."

The Philadelphia reference was to, among others, a stove manufacturer of that city, Jordan Mott. He clearly had developed an anthracite burning stove and put it on a full production basis in the late 1820s, while Nott was still experimenting. So had, among others, a New York State craftsman named Wilson.

In 1832, Nott managed to get his 1826 patents amended to include claims to a grate and other features of what became known as the Nott stove. He immediately prosecuted a violator of his patents: not the highly successful and well-connected Jordan Mott, but the New York State craftsman Wilson. In the patent trial, two of the three judges deciding the case had business or political connections with Nott. Nott's amended patents were upheld. Other stove manufacturers lined up to pay patent licenses to Nott. He would tell an associate that these licenses brought him an income of $2000 a year. This was about 5 times the mean income of a Schenectady household. **Harris, Howell, 2008. Inventing the US Stove Industry. Bus. Hist Rev. 82: 701-733; Pierson Diary 19 April 1845 p. 719.**

Nott also seems to have reached an accord with Jordan Mott. The best evidence for this is visual. Mott stands beside Nott at the center of that Men of Invention picture. There is a good reason for their central position. Mott commissioned and paid for the painting.

Meanwhile, Nott suddenly lost interest in stoves. The Union Furnace had, by 1831 moved to New York City. It took on a new name, the Novelty Works, and a new focus. It was now devoted to the development of coal fired boilers for steamboats. This effort also never got much beyond the experimental prototype stage before going bankrupt in the economic depression of 1837.

In summary, Nott seems never to have himself become a major stove manufacturer, and definitely not in Schenectady. In the 1830s Albany and Troy stood alongside Philadelphia as the three major centers of stove manufacture in the US. Schenectady, despite the efforts of its most prominent citizen, was not in the stove manufacturing business at all.

So the city missed out on that brief opportunity. Stoves were, however, only one of several consumer products that were moving from craft products produced in small shops to industrial products produced in factories. Others included clocks, guns, shoes, and, most important of all, textiles. Here Schenectady did make an early entry.

When last seen, in about 1805 in Schenectady, Archibald Craig was repairing his lost fortunes as an industrious druggist. So it is at first glance surprising that in 1811 he should emerge as the proprietor of one of the most capital intensive industries in the U.S., a water-powered cotton spinning mill. The surprise becomes less when one learns that in 1805 he had married Margaret Oothout, not only "a very pretty woman" , in the words of a local diarist, but also the daughter of one of the richest men in Schenectady. **Paige Diary O-67, p 154**

By 1810, Craig had partnered with Margaret's father, the merchant and Federalist Party leader Abraham Oothout, in the firm of Craig and Oothout. In 1811, Craig became president of the state-chartered Schenectady Manufacturing Company. This was one of only a handful of business corporations in Schenectady. Others included Union College, the Mohawk Bank, the Mohawk Turnpike, the Albany-Schenectady Turnpike, and the Mohawk Bridge. The year 1811 was a particularly important one for manufacturing corporations. It marked a time when, after four years of embargoing European manufactures, American entrepreneurs were launched on import-substitution efforts, especially in textile manufacturing. It also marked passage by the New York State Legislature of an act of general incorporation for manufacturing companies. Corporations meeting specified conditions no longer needed the difficult to obtain special approval of both the Assembly and Senate.

The Schenectady Manufacturing Company first purchased the old city grain mill and converted it to an experimental spinning mill. Satisfied by the potential, the company bought a larger water power site on Albany Hill along Sand Creek, one the three tributaries that combined to form Mill Creek. There a full scale spinning mill was completed by 1814. In 1816, the company was in operation, selling from a store opposite the Dutch Church cotton yarn of excellent grade, bed ticking, sheeting, shirting, gingham, and cotton balls for batting. At this point, the company was not manufacturing cloth, but rather looking to supply weavers who would purchase the yarn and weave cloth.

In getting to that point, Craig had to meet at least three challenges: labor supply, competition, and technical support. In the first of these, labor, he had a precedent to follow. The pioneering method of getting workers, practiced in the mills established in New England since the 1790s, was to hire entire families and put as many as possible, children as well as adults, to work. The alternative method made famous at the first Lowell, MA, cotton mill, employing unmarried women, was still a few years in the future.

An intriguing hint suggests that Craig may have had a third method in mind. In 1810, just as he was beginning his manufacturing career, Archibald Craig was the largest slaveowner in Schenectady. That he held this distinction with only 7 slaves indicates the small scale of Schenectady slavery. Still, that was more servants than he needed. New York State was at the time in the midst of gradual emancipation. Perhaps Craig was considering accumulating African-American families as a low-wage work force. If so, he did not follow through. African Americans would indeed become part of the cotton factory work force, but decades later and in a more conventional manner.

Instead, in 1812, the agent of the Schenectady Manufacturing Co. advertised for cotton factory help in the city's newspaper: " wanted at said factory a number of active children of either sex, from 8 to 18 years old -- good encouragement will be given and good accommodations furnished to two or three reputable families who can furnish the greatest number of the above description." **Cabinet 13 Oct 1812.** The company had adopted the standard New England method. The accommodation offered included eight stone multi-household dwellings near the factory. They were Schenectady's first factory tenements. They were so solidly built that at least one was still at least partly standing in 1978. **Powers, Robert and Van Dyke, Linda. 1978. "Hamilton Hill" City of Schenectady Historical Resources Study.**

The initial complement of workers consisted, judging from the relevant portion of the 1820 census, of male-headed households of a mean size of between 8 and 9 people. This compares with the mean Schenectady household size of 6 people. Child labor, as indicated in the advertisement, was an important part of the labor supply. This is testified to by Jonathan Pierson, the Union College diarist who taught at the cotton factory Sabbath school. “Fifty or sixty children work there who are large enough to carry a bale of cotton up stairs," Pierson wrote." In this situation they are liable to learn anything other than virtue or good manners."

Among the adult work force, indirect evidence suggests that women substantially outnumbered men. That 1820 Census indicates one and a half times as many women age 16-40 as men in that age group lived in the cotton factory vicinity.

Over time, the family composition of the work force changed. In 1820 almost all cotton factory households had two parents By the 1830s, about one fourth of the cotton factory households were headed by a woman, almost always a widow. This compares to 1/12 of the households of the city as a whole. The history of one of those cotton factory widows, while not conclusive, at least suggests one life course of these early industrial operatives.

Margaret Shannon Kittle was last encountered as a newlywed in the early 1820s on a farm in Princetown. That decade went well. Her husband Isaiah's family, the Kittles, had sufficient land to give the young couple a farm. She gave birth to a son and three daughters, all of whom survived childhood. After a religious revival in Princetown in 1823, she and her husband became early members of Princetown's First Dutch Reformed Church. Then, in 1834, Isaiah Kittle, still in his 30s, died. The next appearance of Margaret in the public record is in the the 1835 State Census, as Widow Kittle at the cotton factory. **Margaret Shannon Kittle's biography has been assembled from that initially intriguing directory line, Census Records, the Shannon Family File and Schenectady Death Notice Records at SCHS, and the Records of the First Reformed Church of Princetown, SCHS**

She remained there for 15 years. It is not known if she actually worked in the factory herself. She headed a household that included as many as eight people, her own four children plus unrelated women and men, one of whom is listed as working in ocean navigation. Her son Aaron grew up there, and by 1850 was himself a cotton factory worker with a family of his own, as was another family with the name Shannon, possibly more of the many Princetown Shannon cousins. Margaret's departure from the cotton factory came in the early 1850s, when her daughter Rachel married yet another Shannon cousin, Cornelius, a laborer who lived in the working class and fairly disreputable Frog Alley neighborhood. Margaret went along as live-in mother-in-law.

Only a few of the cotton factory families have even this much of a trail in the historical record. However, such information that exists suggests some tentative generalizations about the occupational demography of early Schenectady manufacturing. The cotton factory was part of a very tenuous safety net of the time. The other part, located right next door to the cotton factory, was the Schenectady poor farm, where residents worked the fields to earn their room and board. It was by 1850 converted to the County Poorhouse. The cotton factory was a slightly better destination for those who lost their farms by

foreclosure, their businesses by bankruptcy, or their bread-winners by untimely death. The fall to the cotton factory was cushioned by family networks, which provided both multiple incomes and sometimes a way out.

The composition of the cotton factory work force changed over the years 1814-1850. The fraction of widows peaked in the 1840s, then declined. Immigrants, initially absent, became a significant fraction of the work force. The 1850 census included cotton factory workers Francis Brinell from Ireland, Henry Deviter from Germany, John Handolph from Holland, and Thomas Gilmore from England. The majority of workers, however, still were born in New York State. The African American Simpson family added four sons to the cotton factory work force. The father, Francis Simpson, was a farmer who owned real estate worth $250. This level of census-documented wealth was very unusual for both a cotton factory family and an African-American family in Schenectady. More usual was the fact that the Simpsons were gone by the time of the next census. While child labor persisted, by 1850 the Sabbath school at the cotton factory had been supplemented by a daily school. According to the 1850 Census, at least half of the children in the cotton factory tenements between ages 6 and 12 attended school.

The cotton mill was not immediately successful. It initially met stiff competition from the only slightly mechanized local spinning industry. This combined spinning wheels on farms with centralized machinery for such processes as fulling, located at small water power sites on the Mohawk Flats or east of the city. Initially, Craig sold his products to a local market. Those first products were based on yarn. The real money was in cloth sales, so Craig found himself having to put out the yarn to local home weavers. He found it difficult at first to compete in price, advertising his products as similar in price to those produced by hand methods "at the Flatts." Real success only came in the 1820s, when he added mechanized weaving to his spinning machines. This led finally to production for an export, as well as a local market. By 1825 the cotton factory had 1400 spindles and 30 water powered looms, and its 120 workers were annually turning 100,000 pounds of cotton into 400,000 yards of cloth. Production peaked at some 700,000 yards of cloth per year in the 1850s. By then the technology was becoming obsolete and when the mill was destroyed by a flood in the 1860s, it was not rebuilt. **Spafford, Horatio. 1924. Gazetteer of the State of New York.**

The cotton factory work force represented the first significant number of operatives in the city. That is, the first group of workers with skills relatively quickly learned, in contrast to the skills behind the more traditional crafts. However, to call these minders of spinning spindles and later weaving looms totally unskilled would be to underrate the difficulty of their task. In addition, from the very beginning, the cotton factory opened up opportunities for more skilled workers. An 1813 advertisement sought "3-4 active boys " aged 14-18 years for apprentices. This made the point that cotton factories needed new types of crafts to get started and keep running. **Cabinet 13 Jan 1813**

Principal among those crafts was that of machinist. The title covers many activities, the typical one being making metal machine parts by machine, for example by cutting metal parts on a lathe. It may be only a coincidence, but Schenectady's first known worker to call himself a machinist arrived in Schenectady in 1811, the same year the cotton mill began.

That machinist, Joseph Stillman, came from Waverly, Rhode Island. This was the state in which the mechanized cotton spinning industry began in the U.S. Stillman had obtained a patent in textile technology before he came to Schenectady, on an improvement in fulling mills. He may have been involved in transferring spinning technology to Craig's mill, or in a nearby water mill involved in the finishing of hand spun cloth.

Whatever his initial role in Schenectady, he soon opened his own machine shop in the Mill pasture section. Under the nickname "Old Honest Joe," he became known as a not particularly successful businessman and religious and political activist. As a Seventh day Baptist, he published a book on honoring the Sabbath. In politics he was at one time an anti-Mason, at another Schenectady's representative to a state mechanics convention. In business, his efforts ranged over such areas as selling his invention for sharpening razor blades, and selling scales and other measuring devices in connection with his post as Schenectady's official keeper of weights and measures. He also became a father of a large family and operator of a boarding house for Union College students. Both brought him into relationships with Eliphalet Nott. **Cabinet 22 Oct 1828**

Those relationships initially involved his four oldest sons, all apprentice-trained as machinists and more successful businessmen than their father. Alfred and Edwin became proprietors of the family machine shop. They built Schenectady's first locally-made steam engine in

Both later moved on, Edwin to Massachusetts, and Alfred to New York City where he became an inventor of boilers and boiler safety devices. At one point, Alfred undertook a mission for Eliphalet Nott to England to survey steamboat furnace and boiler technology there. Later his career ended tragically and ironically when he died in a shipboard boiler explosion. **Stillman Genealogy; Pierson Diary 9 July 1832, p. 475**

Thomas Stillman also became a machinist, eventually specializing in steam ship propulsion. He went to New York City to become superintendent of Nott's Novelty Works. He was a leader of the management group that took it over in 1837 and ran the works with great success. Rumors that his participation enabled Nott to maintain a silent financial interest in the works while avoiding his creditors were persistent but unverifiable. Thomas Stillman later became a leading official in the U.S. Coast Guard. In all his activities earned him, at least in later family accounts, the unofficial designation "father of U.S. coastal navigation."

Meanwhile, back in Schenectady, the contributions of the Stillman family, both as technical advisers and in running a boarding house for Union College students, had established a tie to Nott.

Elizabeth Maxson Stillman, Old Honest Joe's wife, was pious, industrious and a firm believer in education. According to her youngest son, it was at her insistence, over her husband's objections, that the three younger Stillman sons attended Union College. Two became physicians. One of them, Charles, served as personal physician to California railroad tycoon, governor, and college founder Leland Stanford. Charles participated in Stanford's project on the photography of horse gaits, a significant step in the prehistory of motion pictures. The third son, William James Stillman, became a minor celebrity as painter, newspaper reporter, diplomat, and associate of major celebrities ranging from

Frederick Church to Ralph Waldo Emerson. His activity in organizing a camp in the Adirondacks for Emerson and others in 1858is a landmark in the US environmental movement in its bringing together naturalists and literary men. The event is strikingly captured in William James Stillman's best painting, "The Adirondack Camp."

This remarkable family saga left no visible legacy in Schenectady. By 1850 the family headquarters and patriarch Old Honest Joe had moved to Plainfield, New Jersey. However, their initiative in the machinist occupation did take hold in Schenectady. Whatever the reasons the machinist trade came to Schenectady, it came to focus on steam engines.

Two other pioneering local machinists, one a Yankee immigrant and one local, also illustrate this evolution. James Matthews had, like Stillwell, patented an invention in textile machinery in his native Vermont. He came to Schenectady to make and sell his wool spinning machinery, and later another of his inventions, an improved plow. He was joined there by his brother, George, a mechanic. David Matthews, perhaps a relative, became chief machinist of Schenectady's first railroad machine shop, and an inventor of improvements to locomotives. **Cabinet 23 June 1826**

The Clute family, one of the early Schenectady families dating back to at least the early 1700s, became metal workers. Revolutionary war veteran Peter I. Clute partnered with a local blacksmith to create the Clute Furnace to turn imported iron into agricultural and domestic implements. A foundry man from Otsego County, Joel Bailey married into the family, bringing expertise and capital. Clute & Bailey evolved from a furnace to a machine shop. The firm began, in 1835, the manufacturing of steam engines. Their first powered Clute & Bailey's own shop. The second was sold to a maker of axes. The third order, according to an 1881 account produced "a pair of pumping engines, used at a Rhode Island coal mine owned by Dr. Nott." By then Peter I. Clute had become the first member of the family to describe himself as a machinist. Clute & Bailey was developing the company into the city's leading machinery related firm. In 1842, Clute &Bailey would list its products as "steam engines, lathes, machinery mill cranks and spindles, bark, corn and plaster mills, RR car wheels and hollow ware." Put into time sequence, that progression from corn mills through mill cranks and spindles to steam engines and railroad car wheels neatly sums up a half century's mechanical evolution. **Cabinet 15 Mar 1842**

So with hindsight one can see the future specialty of machinery and machine industries emerging out of Schenectady's role as county seat, country town, and cotton factory site. However, in 1830 that county seat and country town role continued to prevail. Entrepreneurship such as that shown by Archibald Craig was rare. Craig's efforts to broaden the role of the corporate charter of the Schenectady Manufacturing Company into wool manufacturing and banking came to nothing. He diversified his holdings into more conservative channels, such as a brief entry into grain milling and the purchase of land and a gentleman farm in nearby Niskayuna. The main holdings of the large estate he left consisted of 20 parcels of land. He had also served as mayor of Schenectady, and an executive in the railroad and banking businesses. These would be exercises of civic duty and salaried employment, not entrepreneurial ventures.

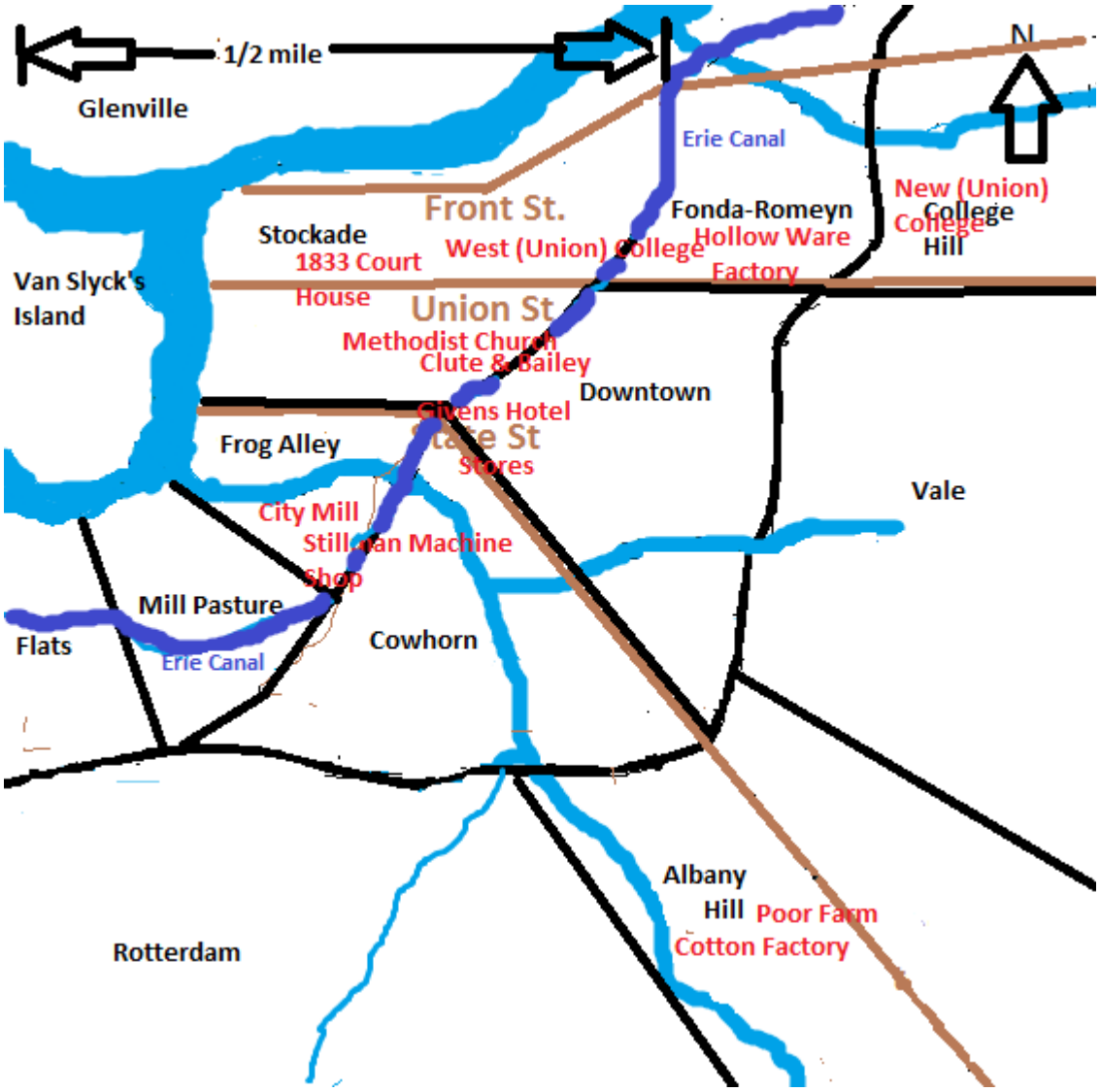
Nor did participants in the cotton factory effort become entrepreneurs. The company's first

agent, David Burt, was a Union graduate and had patented an invention. However, his will shows that he put his money into a flour and plaster mill, a tavern stand, several house lots in Schenectady, 100 acres of wood land, one of the river islands, and various other properties. The richest man in the region, carrying trade heir Daniel D. Campbell, also put his capital mainly into purchases of city lots, rather than new industries. Only near mid century would he make his first big investment in manufacturing. **Cabinet 11Aug 1830**

The demographics, economics, ethnicity, and politics of the city reflected its inability to find a new economic role in the years 1815-1830. The growth of the city was slow, increasing in size to only 4000 people in 1830. This was still below the threshold for true city size. It represented a doubling time of nearly 30 years, well below that of 15 years for an average U.S. city, much less the decade-doublings of such Erie Canal rivals as Utica, Syracuse Rochester and Buffalo. On the 1830 Census list, Schenectady's rankings had fallen to only the 64th largest city in the US and only the 7th largest in New York State. Even calling it a city at all was an exaggeration .

Such growth as there was did change the distribution of people and shops over the nine city sections. The arrival of the canal promoted the emergence of the downtown toward the city's business center. Politics and culture remained centered in the Stockade. When a new courthouse was built in 1831 it was placed in the Stockade, near the three major churches and the Mohawk Bank. The warehouses that had once lined the stockade waterfront were, however, now along Dock Street on the west bank of the canal in the Cowhorn square. There also were the manufacturing shops specializing in natural products such as tanning and cement. The canal route through Downtown and the Fonda-Romeyn square was becoming the site of metal working shops, such as hollow ware making and iron furnaces. By the 1820s, Union College was firmly implanted on its new campus on College Hill.

Meanwhile, Albany Hill had taken on its role as the place for out-of sight out of mind activities. The cotton factory and its neighbor the Poorhouse held only one part of this role. It also held descendants of the Native American Oneida tribe that had settled their after the Revolution as a poor reward for loyalty to the American side. Albany Hill had also become the principal African-American neighborhood. It was also the site of the annual Militia Inspection Day. This featured not military exercises but, in the words of Jonathan Pierson "gaming tables and tents without number" filled with "hucksters, blacklegs, gamblers, drunkards." The day ended with a costume parade down State St to the Mohawk. **Pierson Diary 29 Sept 1834, p. 396.** In mid-19th century city lore, Albany Hill was depicted as "since time immemorial" the place for public executions, military parades, and "African pinxter gambols" (Pinxter referring to an annual festival of Dutch origin) **Reflector 10 Apr 1857**



Schenectady Ca. 1830

Economically Schenectady had changed only slightly in one third of a century. The occupational mix had altered from a city of farmers, servants, laborers, carpenters and shoemakers to a city of laborers, servants, carpenters, farmers and operatives. Laborers were more numerous due to the work required to build and maintain the canal, as well as to expand and replace city housing. Shoemakers had to a large extent become shoe store owners, selling shoes brought in by canal from such mass production sites as Newark, NJ, and Rochester. The 100 or so operatives at the cotton factory had brought their occupation into the top five. Meanwhile, though machinists made the 1841 occupational list, their numbers were small, perhaps a dozen.

A curious feature of the occupational mix is suggested by the 1840 census. It lists 352 people

among the 1950 listed with an occupation, or more than one in six, as practicing one of the "learned professions." This might normally be expected to indicate principally lawyers, physicians, clergymen, and teachers. There do not seem, from the 1841 occupational directory, to have been even 100 residents who fit those four categories.

If taken literally, that 352 number would indicate a remarkably high level of learning for a place that by then barely qualified for city status. A closer look suggests some explanations. The census takers seem to have included all the Union College students, as well their professors, in the category. In addition, a sampling shows that several craftsmen, merchants and manufacturers, including a silversmith, a hatter, and the former druggist turned capitalist Dr. Craig, had claimed that learned profession status.

Ethnically, the balance had shifted only slightly among the three main groups: Dutch still dominant but relatively declining, representing perhaps one-third of the population. Yankees peaked in this era at about one-sixth. The North British share, still mainly Scots, was about one-sixth and increasing slightly as the 1830s saw the beginning of a shift within that share from Scots to Irish. Intermarriages among the three major religions, Dutch Reformed, Episcopalian, and Presbyterian continued to make the Yankee-Yorker distinction less and less meaningful.

Following from this ethnic diversity and blending was a politics of unstable personal factions. The Federalist Party had disappeared by 1820, surviving only as a label used to accuse a political opponent of dangerously aristocratic tendencies. Joseph Stillman found himself having to write two letters to the Schenectady Cabinet hotly explaining that he was not now nor ever had been a Federalist. A confusing array of Democratic-Republican factions emerged, each claiming to be the "true" republicans. Ethnicities such as Dutch, Yorker, North British and Yankee, were evenly distributed over these factions, rather than identifying a clear correlation between ethnicity and politics.

Nor did ideologies amount to much more than denouncing opponents for corruption or federalist sympathies. As in earlier eras, major issues were typically solved by informal consensus rather than political competition. The "principal men" of the city wish to "banish party spirit when deliberating on city affairs' wrote diarist Samuel Jones, one of those principal men, in 1821. **Diary of Samuel Jones, SCHS, 31 Mar 1831**

It was, in all a combination of pre-urban demography, pre-industrial economics, blending ethnicity, and a politics of mainly nothing. The blow dealt by the Erie Canal had not been overcome. The search for a new export industry has not so far succeeded. Union College, stove invention, and the cotton factory each proved successful in its own way. The College was, however, remote from the city. The stoves got made elsewhere. The cotton factory survived until the 1860s. It was not, however, replicated. It occupied the only suitable textile mill site in the city, though within a twenty mile radius a scattering of smaller factories producing such goods as carpets and cordage did emerge.

All this would change suddenly with the arrival of a new technical opportunity, immediately entangled in new economics and a new politics.

Chapter 4

Riggs, Stephen S. cashier, Mercantile Bank, 31 State: Banks and Railroads

To this directory line add the knowledge that the next line lists Stephen Riggs' father's occupation as "farmer". It looks like a standard case of urban inflow. Farmer's son leaves overcrowded countryside for emerging urban occupation. However, this expectation turns out to be far from the mark. The farmer father is an already encountered character in this book, the printer Isaac Riggs. He indeed aspired to a late career as gentlemen farmer. His son Stephen aspired to a career as city banker. Neither got his wish. Both were printers and small time political operators throughout their careers, and both died in harness.

They both did, however, embody the changes that, in their lifetimes, brought Schenectady to city status. Printing, politics, and banking were all important parts of the story. But the key was a new idea that drew occasional commentary in Isaac Riggs' newspaper the Cabinet beginning in1825: the railroad.

The key questions to be explored in this chapter are: how did the mix of railroads, banks and politics turn Schenectady into a city? How did that emerging city status further shape Schenectady's demography, economics, ethnicity, and politics? These questions were answered in ways that confounded initial expectations.

New York State's first railroad proposal came out of Schenectady County. George Featherstonhaugh lived in the Schenectady County town of Duanesburgh. He was the son-in-law of the town's founder, James Duane. He was also an Oxford graduate and well connected Englishman, with knowledge of pioneering British railroad efforts. In 1825, he proposed a Mohawk and Hudson Railroad.

His idea was attractively packaged. He gained the support of the region's richest man, Stephen Van Rensselaer. Featherstonhaugh and Van Rensselaer presented the idea so that it would not compete with the canal in freight carrying. Instead, it would revive the old trail through the pines as a passenger convenience. Because of its length and slow passage through many locks, the canal journey from Albany to Schenectady took a full day. An iron road on the trail through the pines, carrying a steam engine powered locomotive and a train of cars, could lower the time to less than 3 hours, perhaps even to an hour or less. In addition, the 15 mile railroad could serve as an experiment, testing an idea that could later be applied in New York State's regions inaccessible by canal. The arguments proved convincing to the State Senate and Assembly. Both quickly gave the railroad plan near unanimous approval.

The plan initially proved less convincing to investors. For three years, the idea languished. Featherstonhaugh moved on to other things. Van Renssellaer, though a worthy patron, was neither an

entrepreneur nor fund raiser. When the idea did re-emerge, it did so in a complicated tangle with banks and politics. Here that tangle will be unraveled only in so far as it impacts the history of Schenectady. It was a burst of railroad, bank, and political enthusiasm that, from 1830 to 1835, accelerated Schenectady to true city status. The telling here will begin earlier, and begin with politics.

The careers of Isaac Riggs, and his long time political opponent Alonzo C. Paige, illustrate how the politics that resulted in the rise of mass political parties played out on the local scene. The story begins just after 1820, and involves another ever-present Schenectady character, Eliphalet Nott. In 1822, he was facing one of the first political challenges to his secret financial empire. The investigation was conducted by the state educational body that governed Union College, the New York State Board of Regents. Having no substantive defense against the accusations of that august body, Nott changed the subject. In the process, he launched one of the most successful puns in American political history.

He claimed persecution by a body of a group of corrupt aristocrats that he labeled "the Regency." This connected the Regents of the State of New York not only with the inherently corrupt idea of royalty, but also with the scandals surrounding the particularly corrupt current royal family of Great Britain, scandals that included accusations of adultery against the Queen. This preposterous connection stuck. Forever after, the New York State political faction headed by Martin Van Buren, the faction that had appointed that particular Board of Regents, was stuck with that label Regency. A historian of the episode credits Isaac Riggs, Schenectady printer, with the lead in taking that label viral.

In reality the politics of 1822 was a politics of nothing, not a contest of "the people" against "the aristocracy". Factions were initially personal, under such leaders as Van Buren and Erie Canal "father" De Witt Clinton. Each faction depicted its rival as aristocratic federalists, corrupt monopolists, and cosmopolitan big-spenders, while depicting itself as "true republicans" (the word democrat still had a tinge of anarchism about it, and would not come into general use until the 1830s). Each side further depicted itself as the party of honest reformers, and economical champions of the "farmers, mechanics and merchants”.

Isaac Riggs used the Regency taunt to vault into political prominence. In 1822, political factions traditionally nominated candidates at caucuses. Riggs broke with precedent by nominating himself for the Schenectady County seat in the State Assembly. He won a surprising and decisive victory. This enabled him to move from the orbit of Joseph Yates to that of DeWitt Clinton, who himself was seeking to avoid a persisting aristocratic taint by labeling his faction "the People's Men." Among the causes championed to prove the People's Men's populist status was an attempt to change the selection of New York State's presidential electors from the state legislature to the vote of the people.

The Regency, then in control of the legislature, resisted. Schenectady's Joseph Yates, the regency's puppet governor in 1822-23, flip flopped so badly on the issue that he condemned himself to political obscurity.

Despite his own decisiveness on the issue, Riggs' days as a political player were also numbered. A representative of one of New York State's leading families and a Regency ally, Edward Livingston, told Riggs that he would never sit in the assembly again. He proved correct. Riggs was shouldered aside at

the next election, and the death of De Witt Clinton not long afterward removed that particular route to political success. Never again, in a political career that would span 40 years, would Riggs rise to such eminence.

Meanwhile another aspiring Schenectady politician was advancing more circumspectly. Alonzo Paige first established himself as a lawyer, and, being a Williams College graduate and of a scholarly and religious bent, as a leader of the local learned professions. He gave orations at the city's Fourth of July Celebrations, participated in religious and educational societies, became a trustee of Union College, and married into a socially prominent New York City family. Meanwhile, he moved up in the ranks of the local branch of the Regency. His tactful rise was rewarded in 1826 when he won election to that Schenectady County seat in the State Assembly. He then moved up to the State Senate.

In the Senate, he became something of an expert in banking. He was a leading member of the committee that, in 1829, wrote a new Banking Law for New York State. This law only slightly liberalized the process of bank creation. It is best known to history for its pioneering application of the idea of depositors' insurance.

Banking was one of the major issues of New York State politics in the 1820s. It was very difficult to start a bank in New York State at that time, requiring a specific charter approved by a two-thirds vote in each of the two chambers of the state legislature. This difficulty was just fine with the group that controlled both the legislature and the major banks of New York City, Albany, and much of the rest of the state: the Regency. By directing the deposit of canal funds and other tactics, the Regency used banking as an important political tool.

Schenectady's situation illustrates the issue. As earlier noted, it had gotten a bank back in 1807. The Mohawk Bank of Schenectady was something of a rarity in New York State, a non-political bank. It had been formed, like Union College, as a cooperative effort of local elite political factions, then still called Jeffersonian Republicans and Federalists. The ever present Eliphalet Nott was soon brought on board, to join the likes of Joseph Yates and Abraham Oothout. The Mohawk Bank subsequently acquired an elegant headquarters in the Stockade section, across the street from the Dutch Reformed Church.

The theory of banking at the time was that a bank would supply working capital, in the form of notes of about 40-60 days duration. That money otherwise had to be supplied by those difficult to collect personal promissory notes. With the aid of a bank the shoemaker could borrow to buy his leather, the farmer to buy his seed. The reality proved to be somewhat different. A historian of early U.S. banks has described this reality as "insider lending." Far from being a crime, this was the expected way of doing business. The directors of the bank had the inside track, directing loans to themselves and their connections. Nott, for example, borrowed to help finance his new campus.

The small time merchants, manufacturers and farmers found themselves frozen out. At least so they claimed in the numerous petitions that went forth from Schenectady, initially in 1812, and then nearly on a yearly basis from 1825 on, for a second bank in Schenectady. The petitioners posed their requests tactfully, emphasizing their respect for the probity of the Mohawk Bank. Reasonably, they

presented the argument that a county seat does not have only one merchant, one sawmill, one shoemaker, one carpenter, or one blacksmith. Why should it have only one bank?

By the late 1820s the petitioners, representing a cross section of Schenectady's merchant and manufacturing community, grew impatient. State Senator Alonzo Paige, at least as depicted in Riggs' newspaper, was dragging his feet on the Schenectady Bank issue. He was proving more loyal to the Regency than to his home city. In the 1829 election, Paige lost the city wards, returning to the Senate only with the aid of the rural vote.

Back in office, he suddenly became a champion of the bank. His change of heart, however, seems to have a source other than that rebuke from urban voters. This is indicated by a detail in the latest version of the Schenectady Bank Bill. The name proposed was changed from "Schenectady Bank" to "Rail Road Bank".

That name did not stick. But the fact that it was temporarily attached at all is a clue to an important and sudden change that came upon the New York State political scene in 1829. That railroad idea, after three quiet years, was bursting into prominence. This can partly be explained by the explosive emergence of railroads in Great Britain. It can also partly be explained by the actions of two other states, Maryland and South Carolina. They had not only chartered railroads, but were actually building them. In the hands of other states, railroads could threaten the supremacy of the Erie Canal. As a result of those rival efforts, that pioneering idea of a Hudson and Mohawk Railroad, when it finally came about, would not be the first, but the third, U.S. railroad.

For whatever reasons, the elite of New York State suddenly concluded that it was worth investing capital, both financial and political, in railroads. Being highly capital intensive, the nation's first routinely million dollar businesses, railroads, needed the support of both individual rich men, and banks. That "Rail Road Bank" name neatly captures the Regency's interest in not only getting involved in the railroad boom, but also in allowing the creation of more banks.

A Regency associate, wealthy New York City lawyer and merchant Churchill C. Cambreling, became Chairman of the Board of the Mohawk and Hudson Railroad. He brought onto the board his former mentor, America's richest man, John Jacob Astor. The railroad's charter was updated, and its coffers became full enough to finance an actual effort to lay tracks and buy locomotives. Construction of the Hudson and Mohawk Railroad is now "a certainty" wrote Isaac Riggs on 18 Feb 1829. A committee of the railroad's Board of Directors, including the sole Schenectady board member John I. DeGraff, had chosen a route. Work was expected to begin in the spring of 1829. It did not. But the mere rumor inspired a burst of new railroad petitions. Nine would be sent to New York's legislature in 1830. By 1832 that number of petitions would balloon to 49. **Cabinet 18 Feb 1829**; **9 June 1829; 26 Aug 1829.**

After some further delay, in July, 1830, ground was finally broken for the construction of the Mohawk and Hudson Railroad. The ceremony took place on the brow of a hill overlooking Schenectady. Stephen Van Rensselaer turned the first spade full of the earth. Churchill Cambreling gave a speech, predicting a bright future for railroads. They might someday rival canals, and cross the breadth of New York State. This may have seemed to his listeners to be celebratory hype. Yet most of them would live to

see those prophecies fulfilled.

More important, many listeners decided it was time to get in on the boom. By October, 1830, Riggs reported that forty shares of Mohawk and Hudson Rail Road stock were sold on the New York Stock Exchange for a profit of 150% over their original cost. Even before completion of the Mohawk and Hudson, in 1831, a second local railroad was launched. The Schenectady and Saratoga Railroad, like its predecessor, aimed for passengers, not freight. The goal here was to speed well-to-do vacationers to two rising watering places, the medicinal springs of Ballston Spa and Saratoga Springs. Schenectady may have missed becoming the first U.S. railroad destination, but it was on the way to becoming the first U.S. railroad junction.

Carried on the railroad enthusiasm was the launching of the new banks believed needed to help fund them. At least 11 new banks were approved in the spring 1830 session of the State Legislature, more than had been approved in the previous five years. Poughkeepsie, Oswego, Catskill, Cazenovia, Cooperstown, Hudson, Waterford, and Syracuse were on the list, along with three new New York City banks. Schenectady did not make the cut. Its bill was returned from the banking committee with no recommendation regarding passage.

All this deepened suspicions by Riggs and others that Paige and the Regency were delaying matters until they could secure Regency control over this source of railroad funding. These suspicions were deepened in March 1831, when the Schenectady Bank Bill passed the committee of the whole with that name change to Rail Road Bank. According to Riggs's later account, Paige demanded one more change: giving a leading role in the new bank to that Mohawk and Hudson Railroad director John DeGraff, a man highly respected by all parties in Schenectady, but who would prove to be aligned with the Regency on political matters.

In May, 1831, the Schenectady and Saratoga Railroad was chartered by the state. Its president would be Churchill Camberling, and DeGraff would again be the only Schenectady board member. Another Regency supporter, Judge Samuel W. Jones of Schenectady, reported in his diary of receiving an early opportunity to participate in the initial stock offering, and almost immediately selling his shares for a 30 percent profit.

All this at a time when only 12 miles of the Mohawk and Hudson Railroad had been completed, and when the first test of a locomotive on those tracks failed when its fuel would not ignite. However, the next try, this time with the later legendary locomotive the De Witt Clinton, did succeed. It whizzed along the route at amazing speed, completing the 12 miles in less than an hour. Completion of the road quickly followed. In August, 1831, a locomotive pulled a load of dignitaries on the first official run, teaching them first hand that riding behind a locomotive was not only thrilling, but also smoky and, due to plentifully emitted sparks, perhaps even dangerous.

Instead of fear, however, all this ignited yet more irrational enthusiasm. In Schenectady, a meeting at Veeder's Tavern in October, 1831, discussed a "contemplated Rail-Road from this city to Buffalo." At the next meeting this ambitious goal was scaled back to the more realistic Schenectady and Utica Rail-Road. That railroad, as will be seen, became, in more financially skilled hands, the real

beginning of modern practical and profitable U.S. railroad transportation.

Meanwhile, the nearby Ballston Spa Gazette took up the booster chorus. Under the title "Rail-Road Bank", the editor proclaimed: "the city of Schenectady has taken a new start, and is destined to increase in population and in wealth, the canals and Railroads passing through it will make it the great through-fare of the north west and south."

That Rail Road Bank, its name changed back to Schenectady Bank, finally passed its final hurdle in April, 1832, when the State Senate approved it 28-1. "The Schenectady Bank passed by great exertion," wrote Alonzo Paige to his father-in-law on 1 Apr 1830. "Many gentlemen who voted against every other bank voted for this, from motives of friendship. I trust it will not be said by the factious spirits of our city that their member has not done his duty."

Signature of the act by the governor launched a standard process. The state appointed a set of Bank Commissioners. The Commissioners accepted subscriptions for stock, and chose the actual recipients and quantities of shares for each. The stockholders then elected a Board of Directors and officers, and appointed a cashier and teller. All this should have been politically neutral and should have taken a few months, with the bank in operation by late summer.

Instead, Schenectady's "factious spirits," Riggs and his anti-Regency supporters, had their suspicions further confirmed. The Commissioners selected were all Regency men or sympathizers. They included Alonzo Paige, John DeGraff, Regency-appointed canal collector James Myers, and, in an apparent show of impartiality, the previously non-partisan entrepreneur Archibald Craig, who now became a follower of Regency policies. As an added indignity, Paige led a majority of Commisioners to pass a delay of stock shares until mid-November. The Regency explained this as a courtesy to farmers, allowing them to sell their crops before buying stock. In fact, few if any farmers did so. Riggs countered that Paige was delaying things because he planned to run for the US House of Representatives, and did not want to offend voters with his Regency bank takeover before the election.

Paige did not run for the House, but the delay held. When the appropriation of stock was announced, Riggs' claim was further confirmed. As the Albany Journal, another anti-Regency paper, put it, "the friends of the new bank have been egregiously deceived." Riggs noted that "suffice it to say, however, that one or two of our honorable Senators, an hon. Judge, an hon. Chancellor, a Registrar in chancery &c &c have each come off with a finger in the pie."

Two weeks later a committee of irate citizens elaborated on those charges. A par value of $150,000 in stock was distributed. Though citizens of Schenectady were "principal agents in procuring the Charter of the bank", the "merchant, mechanic, manufacturer and farmer of Schenectady" have "been forgotten." Of that $150,000 in stock, $57,000 went to the Commissioners themselves. Another $15,000 went to some Regency loyalists in the town of Florida in Montgomery County, $10,000 to a similar group in Schoharie County, and $5000 to just four individuals in Albany. One of those Albanians, who proved to be the recipient of the largest single holding of Schenectady Bank shares, was the Regency's chief banker, Thomas Olcott, president of the Albany Farmers and Mechanics Bank, a Regency stronghold.

Meanwhile, the "40 of the merchants of this city (Schenectady)" who had subscribed for a total of $80,000 in stock, got only a total of $10,000 worth. This distribution assured that when the Board of Directors was elected, the Regency would make another clean sweep. The Board included Paige, his father-in-law Benjamin Mumford, Archibald Craig, Schenectady Regency loyalists Isaac I. Yates, Harvey Davis, Stephen Clark and George McQueen, and four Regency supporters from surrounding counties. Two of them, Jay Cady from that town of Florida and Freeman Stanton of Schoharie County, are best known to subsequent history through their mutual relative, Elizabeth Cady Stanton. Of the directors, only the respected Schenectady hatter Ephraim Benedict, could be seen as being possibly clear of the Regency taint.

To add insult to injury, Schenectady residents other than a couple of Regency favorites were frozen out of control of the three railroads that met at the city. A.C. Paige, his brother John K. Paige, Archibald Craig, and Schenectady Bank teller Thomas Palmer were the only Schenectady residents to become Directors of any of the three railroads.

Riggs found the distribution of shares in the Utica and Schenectady Railroad in 1833 to be particularly outrageous. Five of Schenectady's most respected citizens General (of militia) Isaac M. Schermerhorn, and merchants David Tomlinson, William McCamus, John Ohlen, and Peter Rowe subscribed for hundreds of shares. They got a total of 5. Meanwhile, a clerk in the office of A.C. Paige subscribed for 10 shares and got 3. The great majority of shares went to Regency-dominated participants in New York City, Albany, and Utica.

In fairness to the Regency, there is another side of the story. Buying stock in the 1830s was a very different matter from buying it in the 21st century. Today, one expects to pay the full share price. In the 1830s, one paid a small fraction of the par price of $100. Then, in increments of $5-$10, over intervals of many months, stockholders were called upon via newspaper advertisement to pay in additional portions of that total par price. The success of the corporation often depended on the ability of the stockholders to pony up when called upon. The corporate insiders could plausibly claim that they wanted stockholders who were likely to answer those periodic requisitions. Often, many did not. Such Regency supporters as banker Thomas Olcott, cotton mill magnate Archibald Craig, and prosperous Florida resident Jay Cady were both more likely than others both to have the money, and more likely to pay it in on demand. Those "40 merchants of the city" (of Schenectady) were less certain to comply. Indeed, as will be seen, when they had a chance to do as stockholders of another Schenectady bank, they did not deliver.

So the full story can be debated. However, one clear conclusion can be drawn. As Schenectady entered its age of banks, railroads, and mass party politics, it was the controversy over bank and railroad shares that served as the local catalyst for creating local versions of two new political parties, the Democrats and the Whigs. In Schenectady, the Regency, plus a few who joined in later to gain some of the benefit of Bank and Railroad participation, such as Archibald Craig, Harvey Davis, Peter Rowe and Thomas Palmer, became Democrats. The merchants, manufacturers, and others who felt frozen out followed Isaac Riggs into the new party soon to be led statewide by Riggs' old typesetter friend Thurlow Weed and his partner, Union College Graduate William Seward. This successor to the earlier clumsily

named "Anti-Regency" or "True Republican" parties was named the Whig Party.

By 1834, these new party labels were in place. This represented another milepost in the evolution of New York State politics from a contest of elite factions to a contest of mass parties. These parties each had a national ideology, echoed in local papers across the county seats of the nation. The Democrats wanted to destroy the Bank of the United States, while the Whigs wanted to preserve it. The Whigs wanted a protective tariff in the interests of domestic manufacture, while the Democrats wanted a low tariff for revenue only. And so on.

Actually, at Schenectady, it was not ideological preference on these national issues that drove people into one party or the other. Before the parties emerged, the only thing that either future Schenectady Whigs or Democrats objected to about the Bank of the United States was that it had not established a branch nearby. Similarly on the tariff. A petition favoring Free Trade (low tariffs, the future Democrat position) appeared in Isaac Riggs' paper before the Schenectady Bank controversy and the railroad opportunity arose. That petition contained about an equal number of future Whigs and future Democrats. It was only after the local controversies catalyzed Regency versus anti-Regency party creation, and the parties assumed national ideologies, that the locals lined up on the "right" side of the national issues.

So ideology, while a symptom of mass parties, was not its cause, at least in Schenectady. Nor was ethnicity. A roughly equal number of old Schenectady names, the Van's, Clutes, Barhydts and so on appeared in the ranks of both parties. Nor was the new party system in Schenectady a matter of a capitalist elite of Whigs versus populist Democrats, as sometimes depicted in histories of the era. As has been shown, the Democrats had secured the inside track in acquiring capital, both railroad and bank varieties.

In so far as there was a difference in parties in Schenectady, it was occupational. The majority of the city's most prominent lawyers were Democrats, beginning with Joseph Yates, Alonzo Paige, and John DeGraff, and working down through younger members of the profession such as Paige's brother-in-law Platt Potter, James Bouck, Thomas Palmer, and Stephen Daggett. A Larger share of the merchants and manufacturers were Whigs. This included the leader of Schenectady's major foundry and machine works, Peter I. Clute, hotel keeper Resolved Givens, partner and patternmaker in the short-lived Union Stove Works Joseph Horsfall, as well as most of the "40 merchants and manufacturers of this city" frozen out of those stock distributions. There were exceptions: lawyer Archibald Linn was a leading Whig, leather merchant George McQueen was a leading Democrat. However, the overall pattern of lawyers versus merchant-manufacturers prevailed.

This party division was reflected in the creation of local corporations. There was a Democratic insurance company, the Schenectady and Saratoga, with basically the same roster of directors as the Schenectady Bank. Paige referred to it as "our insurance company." There was subsequently created a Whig insurance company, the Schenectady Mutual Insurance Company. The Schenectady Bank widened its clientele by setting up a Schenectady Savings Bank with a mission of securing the small deposits of ordinary citizens. It had essentially the same Democrat directors as the parent bank. In response, the

Whigs from set up their own bank, the Mercantile Bank, in 1839. This was the one in which Stephen S. Riggs had his brief banking career. Even in issues that seemed only partly economic the split held. When Schenectady debated building a new major street, known today as Broadway, the petitions pro and con split on strict party lines: Whigs for the new street, Democrats against.

Though this lawyer versus merchant-manufacturer split differentiated the parties, it could not decide elections. There were too few in any of those elite categories. So, like the nation as a whole, the Schenectady parties became mass parties, with artisans, laborers and farmers lining up on both sides. They did so in about equal numbers, as indicated by the closeness of most local elections in the 1830s. A major feature of the new politics shows up in the party petitions published in the newspapers. In the past, such petitions typically contained a dozen or so names of recognizable members of the local elite. In contrast, when the Whigs mounted an 1834 petition in opposition to the policies of the Jackson administration in Washington, it contained more than 500 names. On the list were some of the ordinary citizens who have been bit players in this book: Honest Joe Stillman, pioneering machinist; farmer Isaiah Kitttle, soon to die and initiate the process by which his wife became Widow, Kittle, cotton factory; the cotton factory' shoemaker and sometime factory laborer, Cornelius Finehout; and Darcy Joyce, one of those Methodist butchers scorned by the city's leading clergymen. In the new era of mass politics, the ordinary citizen's name, as well as his vote, had value.

So banks and railroads had delivered a new politics to Schenectady. Did they also deliver a path to genuine city status and the promised prosperity? The answer is, yes, but not in the way initially expected.

That early railroad boom was actually a railroad bubble. Running a railroad profitably in the long term turned out to be very different from laying some tracks and carrying carloads of dignitaries on an opening celebratory run, or enabling passengers to save those 20 hours of canal tedium from Albany to Schenectady.

This was perceived fairly quickly in Schenectady. In January 1834, a letter writer stated in the Cabinet: "It is very doubtful with me whether Railroads ever can or ever will possess the capacity of doing business sufficient to afford a revenue equivalent to capital expended in their construction and the expense of their attention "(that is, maintenance). He might have had that pioneering experiment, the Hudson and Mohawk in mind. It was both undercapitalized, and constructed in ways that put the capital in the wrong places.

Because of the undercapitalization a couple of bad decisions were made. The tracks were made as cheaply as possible, with thin bands of metal above wooden supports. These "strip rails" were quickly worn away, and could separate from their wooden base, with dangerous consequences. In addition, to shorten the railroad and keep it level, it was built from the hilltops next to Albany and Schenectady, rather than between the city centers.

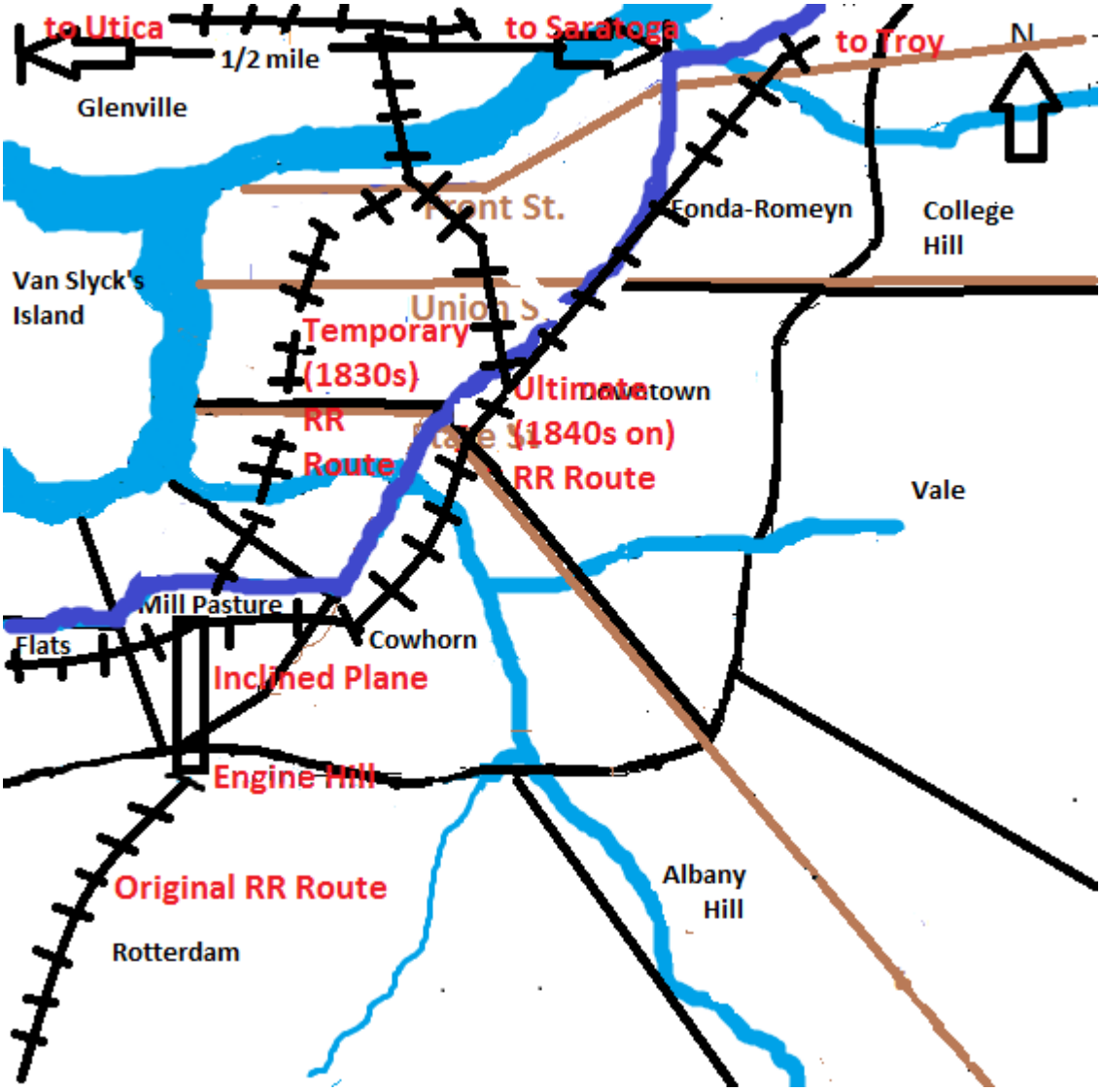
That meant at Schenectady the railroad ended atop a hill just southeast of the city, today called Mt. Pleasant, but then labeled Engine Hill. From the hilltop, an inclined plane directed, and a stationary steam engine powered, the stage of the journey between the top of Engine Hill and the banks of the

Erie Canal. This proved an expensive inconvenience. It was almost immediately apparent that the railroad would have to be lengthened to pass around the hills and then through the city. This was especially evident as soon as those two other railroads, the Saratoga and Schenectady and Utica and Schenectady, made the city a railroad junction.

This re-routing took a decade to fully achieve. As the changes were made, the response of the people of Schenectady illuminated the reception of early railroads. Elite citizens, far from taking the modern attitude of "not in my backyard", took a position that might be described as "in my backyard--please!"

For example, when, in 1832 when the Saratoga and Schenectady Railroad proposed running its tracks through a ditch passing through the stockade district between the two fanciest streets, Washington and Church, a committee led by Archibald Craig, whose house sat in the affected area wrote on 5 Jan 1832 a letter of protest. What Craig and the others were protesting was not the location of the tracks but the ditch. They petitioned for tracks running "on the upper surface of our streets." As the petition put it: "as this city is to be the termination of many of our interesting improvements, it is desirable that they should not be constructed as to avoid facilities in uniting with each other in the city, which will be prevented by the present plan of execution." In other words, put the tracks on the surface of our neighborhood's streets, and the more tracks the better. **Cabinet 35 Jan 1832**

Of course, these petitioners assumed that in drawing railroads through the city, the propulsion would be by horses, not locomotives. Surely no one would let those dangerous, smoky, spark-expelling iron horses loose within the confines of the city. To the surprise of those urban railroad advocates, that was just what the Utica and Schenectady Railroad had in mind. In 1834 it petitioned for the right to run locomotives within the city. Despite substantial opposition, that right was granted by the Common Council.



Railroad Routes Through Schenectady

As the inclined plane was abandoned, the railroad from Albany was extended to the south of Engine Hill on more level ground, and came to pass through the city mainly next to the Erie Canal. Tracks then crossed the canal into the Stockade, where they passed through a less fancy portion of that district, the modern College Street, and then crossed the river. On the north side of the Mohawk, tracks then proceeded to Saratoga and Utica.

These literal tracks also became a metaphorical dividing line between the right side and wrong side of the tracks. The right side was the Stockade, west of the tracks, housing the city's elite. The wrong side was the area just east of the tracks, holding the dirty, smoky and dangerous metal working shops,

as well as the homes of a wave of Irish immigrants. This area, the Fonda-Romeyn square, became Schenectady's first industrial district.

Besides shaping the City of Schenectady, these trial and error efforts at railroad location and construction illustrated the fact that the 1830s and 1840s were a period of learning how to operate and make money from railroads. The financial aspect of this learning process quickly became apparent. Actually running a railroad was a very hard way to make money . An easier way was to supply the railroad with materials, equipment and construction services. The easiest way of all was timely stock speculation.

These realizations eventually took control of the railroad business out of the hands of little cities such as Schenectady, Utica, Troy and Albany, and down to New York City. However, it took the big city financiers, such as Cornelius Vanderbilt, who was making plenty of money from steamboats, a while to catch on. The man who first demonstrated the modern approach to railroads was an Albany resident, Erastus Corning. He was an iron merchant to whom sturdier rails were a business opportunity, not an expense to be avoided. He became the President of the Utica and Schenectady Railroad, as well as a banker and a leader of the Democrat Party. The Utica and Schenectady, carefully planned, soundly constructed, and four times as long as its Albany and Saratoga predecessors, became the first consistent money maker in the state's railroad business. More important, it was the core from which the New York Central Railroad was created.

Here focus will be on the Schenectady implications of Corning's manipulations. They may be summed up simply. Turning those short early railroads into a main line across New York State became a battle between the two cities hoping to be the main eastern terminus, Albany and Troy. Troy launched a Troy Schenectady Railroad, funded by Troy capitalists rather than outsiders. Corning countered by using the Mohawk and Hudson as a sort of loss leader to insure that the lines he controlled would become the main line. In the process, Schenectady's Archibald Craig became president of the Mohawk and Hudson. He quickly learned that he was not a rising railroad magnate, but Corning's tool in the Albany-Troy battle. There quickly followed newspaper stories of a feud between the Mohawk and Hudson and the Schenectady and Utica, followed by the departure of Craig from the president's post.

A similar episode, in the mid 1840s involved Schenectady's Alonzo Paige. He became one of Corning's board members. A legal dispute arose about the right of the Troy Schenectady to connect with the Schenectady and Utica, a crucial element for Troy to stay competitive. Corning selected board member Paige, a respected legal mind, to deliver an opinion. To his credit, Paige found that the law was on the side of Troy. This did not stop Corning, who proceeded to defeat Troy by less legalistic, some might even say illegal, means.

In general, railroad realities put a quick damper on the earlier hopes of the richer of Schenectady's residents to leverage the location of the first U.S. railroad junction into profitable participation in a railroad boom as stockholders or bankers. Would railroads, unlike that earlier short lived Mohawk River freight forwarding business, be the route to true city status?

Railroads do indeed seem to be the reason that Schenectady briefly boomed in 1830-1835. The

city's population increased by 50 percent in those five years. This was the fastest five-year city growth rate achieved before Edison's decision. It represented a growth rate that, if continued, would have represented that decade-doubling rate of a boom city.

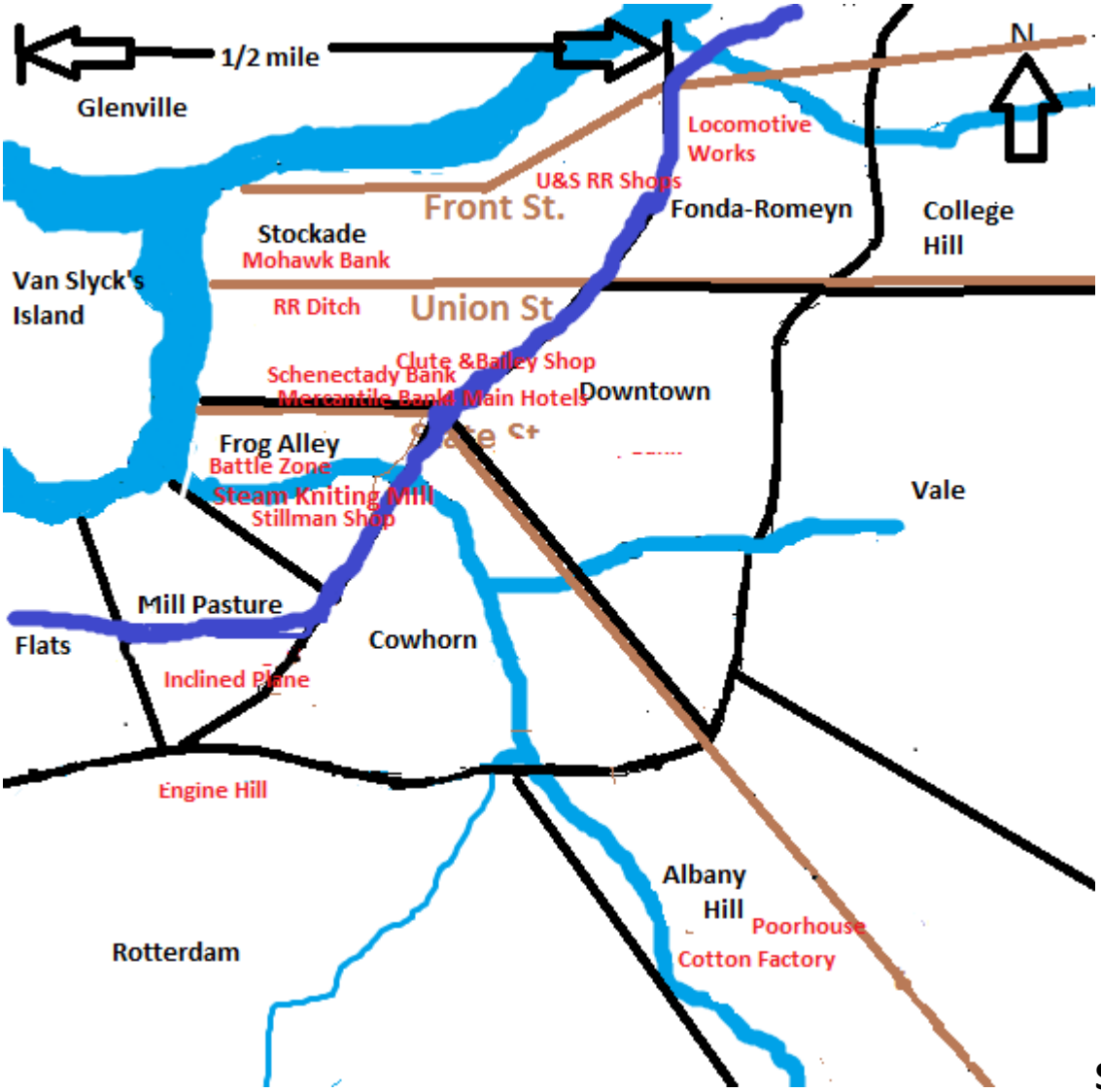
That 50% increase brought the population of Schenectady above that 5000 person mark representing true city status. The change to that status was more than mere numbers. It was also evident in more detailed demographics, as well as economics, ethnicity and politics.

Demographically all nine of the city squares were specializing in the 1830s. The Stockade square was still the home of the elite, though their names were likely to be short Yankee or South British ones such as Yates, Boyd or Paige as well as Van-prefixed or Schermerhorn , Barhydt, Clute and Veeder. Those Vans and other Dutch descendants were concentrated more on the Eastern part of the Stockade, with the Yankees in the western part closer to the river, in the elegant new houses. The Vans and were more likely than the Yankee-British to be carpenters and shoemakers, the Yankees more likely to be lawyers.

The Fonda-Romeyn square was on its way to be a working class square, one holding laborers, masons, blacksmiths and moulders. Its role as the square of Irish immigrants was just beginning. An early arrival, Irish-born blacksmith William Dormady, was sufficiently obscure to escape listing in the very comprehensive 1841 directory. His son Thomas would become a machinist and locomotive engineer, a pioneering city labor organizer and would miss by just a few votes being elected Schenectady's first Irish mayor.

College Hill now held Nott's new campus, an enclave of Yankees and the learned. Neighboring rocky and uneven Vale, still unsettled, was on the path to its eventual fate as the city cemetery. The Downtown Square, especially near where the canal and Railroad crossed it, was the site of the growing metalworking industry, such as the Clute & Bailey foundry and machine shop and, between the Canal and the tracks, the machine shop of the Utica and Schenectady Railroad. Four hotels marked the place where State Street crossed the railroad and canal . This junction of railroad, canal and State St. was becoming the new city center.

The Frog Alley square had the nickname "The Battle Ground", and a reputation as the city's notorious district for drinking, gambling and other vices. The Mill Pasture and Cowhorn Creek squares held industrial operations that needed more space, such as tanneries , livery stables and railroad car yards. Finally, Albany Hill remained the out-of-sight out-of-mind square, with its cotton factory and poorhouse.



Schenectady Ca. 1850

The catalytic impact of the railroads can be seen in 37 entries in the 1841 directory describing individuals directly involved in this new opportunity. This included engineers, mainly locomotive engineers, but also a couple of civil engineers, carmen, railroad workers, railroad collectors, operators of a new hotel the Rail Road House, and of a rail road store house, and three clerks at the railroads' storehouses and offices. This last occupation of railroad clerk was a particularly good launching pad for future success. One of the clerks, Andrew McMullen, became a local textile manufacturer and city mayor. A second, Chauncey Vibbard, became the first superintendent of the New York Central Railroad. A third, former dry goods merchant and Whig turned Democrat Peter Rowe, later became a Democrat U.S. Congressman. The new railroad-related jobs went mostly to recently arrived Yankees. By contrast, not one of the 37 railroad related occupations in the directory was held by a person with a Van prefix,

that indicator of Dutch origin.

The most important of the new or expanding job areas was machinist. Schenectady was not by any means experiencing a machinery manufacturing boom. It was, however, making a definite move into the specialty of metal machinery connected in some ways to the steam engine and railroad. The Clute and Bailey machine shop, as noted, served the needs of railroads and their contractors, as well as supplying steam engines to manufacturers. In the shop of Alfred and Thomas Stillman of this city," a 2 May 1832 newspaper report said, " the model of a steam engine on an improved plan invented by a young gentleman of this place" was on display. It was aimed at "steam boats, locomotives, and manufacturing establishments."

The most important Schenectady machine shop of the 1830s was the Utica and Schenectady Rail Road Machine Shop. Most of the dozen machinists listed in the 1841 Directory probably worked there. Its superintendent, David Matthews was perhaps a son of the earlier inventive Matthews who had come to the city from Vermont. David trained at the West Point Foundry, a pioneering American locomotive manufacturing site. At Schenectady, he patented some early railroad inventions, including a spark arrester to capture those errant sparks that had annoyed or endangered those early riders on the Mohawk and Hudson.

So Schenectady was launched, if only modestly, on its 19th century career as a city of machinery industries and machinists. However, in terms of overall employment, it was not all that different from its earlier town and country seat past. From an 1810 town of farmers, laborers, servants, carpenters and shoemakers, it had become by 1840 a city of laborers, farmers, operatives, servants and carpenters. Farming was down slightly, but the 1840 census still listed more than 300 people working at agriculture, out of a labor force of about 1600. Laborers were counted neither in the directory or the Census. There is however, good reason to infer the existence of hundreds of laborers, mainly the live-at-home sons of farmers and artisans. Canal maintenance and railroad construction demanded the services of these hundreds of temporary employees digging and lifting for their dollar a day. Live-at-home daughters were now at least as likely to be operatives at the cotton factory or at one of the smaller mills just outside the city limits as to participate in the still major employment category of servants. Finally, carpenters and especially shoemakers were down in relative terms. The term shoe-store now was now seen in numbers comparable with shoe-maker. The location of these shoe stores, along with grocers, was increasingly on Dock Street on the banks of the canal. This suggests that shoes, as well as foodstuffs, were increasingly being imported rather than produced at home.

Finally, one last rising occupation ought to be noted. It was small enough in numbers to be missed by many accounts that depict industrialization as a sudden jump from the artisan's shop to the more or less modern factory. This is the occupation of contracting.

In Schenectady and its surroundings this especially emerged in connection with the canal and railroads. These were built in sections by local residents whose bids were accepted by the canal authority or railroad company. "Proposals to be received for Utica and Schenectady Rail Road for making an embankment for the road of said company from the foot of the Inclined Plane to State Street" read

one such announcement on 25 Nov 1825. Each such proposal resulted in the employment of dozens of laborers.

Such contracting had ripple effects. Clute and Bailey Foundry directed new ads, such as one on 11 Mar 1835, "to Rail Road Contractors," directing their attention to "Clute's 6 chain plow" as well as implements ranging from road scrapers to shovels**.** A letter to the Cabinet on 27 Jan 1836 from "a number of masons" questioned the current practice of builders of new homes hiring "one man to build the cellar wall, another to do the brick work, and a third the lathing and plaster work." Instead, hire a contractor to direct the work of all the artisans. If things went wrong, "the proprietor would know who to blame."

It was in railroad contracting that the real money was to be made. Three major contracting entrepreneurs initially lived outside Schenectady but increasingly did business within the city. Jonathan Crane, a manufacturer of twine and other products, moved his capital into the more lucrative railroad contracting business and even, like the Clutes, invented a special plow for railroad building . Josiah Stanford of nearby Watervliet, NY, began as a farmer and innkeeper. He got steadily involved in more railroad contracting projects, got steadily richer, and steadily moved to houses closer to the border of Schenectady.

The most important contractor of all for the history of Schenectady, however, was a Scots immigrant named John Ellis. Little is known about his early career, which can be best followed through the Census. He married his first wife in New York City, perhaps while he was taking on a contract for part of the Croton Aqueduct, the New York City water supply. According to later stories, this job launched his major contracting career. The birth of his son John in Washington County, NY, verifies his participation in 1836 in an improvement to the Champlain Canal, a branch of the Erie Canal system. Within a year he had moved to Schenectady, where he was active on such jobs as McAdam roads. He mainly, however, built railroads, and was a major contractor for the Utica and Schenectady.

An intriguing reference suggests he may have also exerted, or been accused of exerting, political activity in behalf of that Democrat group that controlled the Schenectady and Utica. Here is the relevant claim, made by that Whig newspaper the Cabinet on 16 April 1839: " We are informed, and believe it to be true, that a loco foco contractor on the Croton Water Works, whose residence is in this city, was busy at one of the ward polls at the most recent New-York election, in command of some men (we doubt whether they were legal voters)." That term loco foco was a term for radical Democrats, one that had by 1839 had replaced Regency. If Ellis was that 1839 loco foco, he had by the 1840s become a Whig, serving at least one term as a city Alderman.

Earlier reference has been made to the small role of Schenectady residents on the Board of Directors of the Utica and Schenectady. That post was obtained in the 1830s only by Alonzo C. Paige. So it is notable that by 1843 the name of a new resident of Schenectady appeared on that railroad Board: contractor John Ellis. No explanation was given, but here is a suggestion. It was becoming common to pay major railroad contractors at least partly with stock shares, rather than cash. Such payments for his contracting services may have turned Ellis into a sufficiently important stockholder to earn a director's

position. It also may have educated him about wider opportunities in the railroad business.

Since the bubble of the early 1830s, that railroad business, like the U.S. economy had been on a roller coaster ride. Just as the problems or running a railroad were becoming apparent, in the mid 1830s, the US was hit with one of its major economic downturns, the Depression of 1837. On a local Schenectady scale, the symptoms included the failure to get off the ground of that Whig-dominated Mercantile Bank that appointed Stephen S. Riggs as cashier. This was not a conventional bank failure or bank run. The Mercantile Bank was chartered in 1839, just after New York State adopted a General Bank Law: that is, no more need for a special state charter and legislative vote to create a bank. In the depressed economic conditions of the time, it appears that the subscribing stockholders could not meet the capital assessments needed for the bank. Without that promised capital, by 1842, the Mercantile Bank had quietly faded away. Other departures included those machinist Stillman brothers, who closed up their Schenectady machine shop and departed for careers in Massachusetts and New York City.

This collapse of the railroad bubble and subsequent economic slowdown ensured that Schenectady's brief burst of boom town like growth would not persist. From 1835-1845, the city's population growth was virtually flat, staying at about 6500 people. Schenectady fell further behind the canal cities to its west, particularly Utica, Syracuse, Rochester and Buffalo.

The 1837 Depression tended to dampen the economic aspect of the earlier Whig-Democrat rivalry. When recovery was clearly underway in the mid 1840s, new business creations lacked that previous political divide. For example, the founding of Schenectady's first steam powered knitting mill, in 1846, was an effort in which members of both parties participated on about equal terms.

In late 1847, a second and similarly non-partisan venture emerged. One of the leading locomotive manufacturers in the U.S., the Norris Brothers, was located in Philadelphia. The revival of railroad building in the later 1840s, especially across New York State and in the Midwest, suggested the idea of a satellite locomotive plant closer to this action. It is not clear who got the original idea, but the Norris brothers were soon exchanging letters with some Schenectady leaders. They included Platt Potter, a lawyer, Democrat, and brother-in-law of Alonzo C. Paige, and Simon C. Groot, dry goods merchant, Whig, and descendant of one of Schenectady's original families.

The Norrises chose Schenectady over its rival Buffalo for their satellite plant. Within a year the Norris Brothers had purchased from Union College some land in the Fonda-Romeyn square, between the tracks of the Schenectady and Utica and the Schenectady and Saratoga railroads. It was an early example of that classic pattern of big-city outflow of an energy intensive and land hungry enterprise. It would be the second most important such example in Schenectady's history.

As part of the deal, the Norrises insisted on a $40,000 capital participation in Schenectady. Potter and Groot brought on board a handful of stockholders. They included the richest man in the county, Daniel D. Campbell, that lucky heir to the old Tory freight forwarding fortune, and contractor and railroad director John Ellis. He was not only an investor but also a participant, serving as agent for company President Daniel D. Campbell. Edward Norris, who moved to Schenectady, headed up the technical aspects of the venture.

Being an agent in locomotive manufacturing was not so different than Ellis's previous efforts. Locomotive manufacturing in most of the 19th century was not a factory assembly line, operated by workers punching time clocks and getting a weekly paycheck. Instead, early locomotive making was a contracting business. Agents bid on individual locomotives, just as other contractors might bid on sections of the Erie Canal. Then those agents let out "inside contracts" to foremen and supervisors, themselves virtually independent contractors. They in turn hired machinists, boilermakers, moulders, and laborers to do the work. Pay was typically piecework: not so much per day, but so much per casting or boiler. That pay was divided up in shares among team members, much like the proceeds of a whaling voyage. Like such voyages, employment was terminated upon project completion, until the next locomotive contract came in.

This is in sharp contrast to conventional historical accounts, which describe a sudden transition from artisan's shop to more-or-less modern factory. In reality, and especially in locomotive manufacturing, the route to modernity passed though that intermediate stage of internal contracting.

So while he knew little about locomotives, John Ellis had a lot to offer the new satellite company. The locomotive technology part was taken care of by the Norrises. They brought some machinists up from Philadelphia, and hired others, a large share of whom were recent immigrants from England and Scotland. After a couple of early locomotive sales, the Norrises decided on some innovative pioneering. They designed a radically new type of locomotive. Its name, "the Lightning", suggested the goal: record-breaking speed. In early tests, it exceeded 50 miles per hour.

The years 1845 to 1850 reignited Schenectady growth. City population growth, after that decade-doubling pace of 1830-1835, had been virtually flat from 1835-1845. Now. in 1845-1859 it accelerated again, though not quite back to decade-doubling. The burst would again be cut off by a depression. This new burst, however, which took population over 8000, was not a bubble. Schenectady had found a lasting place in the northeastern city system.

The best evidence was the increase in the number of machinists. That occupation's numbers grew from about a dozen in 1840 to 150 in 1850. The 1840 city of farmers, laborers, servants, operatives and carpenters had become an 1850 city of laborers (about 500) machinists, operatives, servants (about 150 in each of that category), and, in another rising category, clerks. In other words, a very typical US seventh magnitude city, plus that machinist specialty.

Then in 1850, there occurred three untimely deaths. The most prominent was that of U.S. president Zachary Taylor. Of local note was the death of Isaac Riggs, on a trip as part of his last job, as Erie Canal Collector. His best epitaph had been delivered some years earlier. It was spoken in the course of political debate, by Riggs' long time rival Alonzo C. Paige. He described Riggs thus: "a consistent Whig who has labored with great zeal and fidelity on behalf of his party, and who has never received from them any reward proportional to his services."

The third and least expected of the deaths was that of the Norris Locomotive plant in Schenectady. The locomotive "Lightning" was a failure. Its big driving wheels imposed too much wear on the tracks and its boiler was too small. The failure appears to have doomed the satellite manufacturing

experiment. Schenectady residents were probably surprised on 13 Aug 1850 to see a new legal notice in their newspaper:

"In trust for the benefit of and to secure indebtedness in the several workmen and operatives lately employed by said Norris at the Norris works in Schenectady to be sold at public auction: 2 locomotives now in progress for the Northern Railroad; two old engines now in said works to be repaired, called the Chemung and the Tioga, and all the tools and materials in said works."

Unlike Zachary Taylor and Isaac Riggs, however, locomotive manufacturing in Schenectady could be bought back to life. The Schenectady investors, Campbell, Groot, Ellis and the others, decided to purchase the company's plant and equipment at that auction, and run a locomotive plant themselves. While no direct evidence has emerged, it is plausible that the increased railroad activity connected with the imminent formation of the New York Central, which was officially chartered in 1853, may have encouraged the Schenectady parties to stay the course in the locomotive business.

Ellis was made not only agent, but now, chief executive. He did not know much about locomotives, but he knew about hiring. He found, at the nearby Albany railroad machine shops, one of the leading US locomotive designers, Walter McQueen, who was brought on board with a 1/12 share of company ownership.

McQueen was a Scot like Ellis. Like his new partner, McQueen was a determined combative individualist fitting the Scots stereotype. His education, like Ellis's, was practical not academic, including a return to Scotland to work at a state-of-the-art shipyard as well as stints at major US railroad shops.

McQueen's locomotives were not an overnight success. However, they gradually, in the 1850s, accumulated a high reputation. Unlike the Norrises, he sought not radical innovation, but economical reliability. He focused on what was becoming the standard type of US locomotive. It was called the 4-4-0 because of its four moderate sized driving wheels, and four little wheels under the front truck. By the 1870s, some three-fourths of US locomotives would be of this type. The most famous of the McQueen 4-4-0's, the Jupiter, sits in the center of the classic 1867 photograph of the driving of the golden spike that completed the Transcontinental Railroad. Hundreds more McQueen 4-4-0s worked away at more humble roles.

The McQueen 4-4-0 came to have an especially high reputation. Although McQueen did patent some inventions, such as an improved boiler, steady improvement and careful manufacturing, not invention, were his hallmarks. By 1857 the Schenectady Locomotive Works was the biggest business in Schenectady, soon to be referred to as "the big shop." Its more than 100 employees could turn out more than 20 locomotives in a good year.

Alas, the good years suddenly came to an end with another Depression, this one in 1857. Ellis's partners got nervous, for good reason. So many little cities had leaped into the locomotive making business that the industry would have suffered from overcapacity even without the depression. The reliability and long life of the 4-4-0 type of locomotive further dampened demand. This over-production problem would plague the business through the century, giving rise to continual attempts by the

smaller companies to arrive at market-sharing pacts. These efforts would not succeed until the formation of the American Locomotive Company (ALCO) in 1901.

The exact nature of the 1857 disagreement between Ellis and his investors has not been recorded. However, subsequent events indicate that Ellis wanted to push full speed ahead and achieve more production with corresponding economies of scale. The investors wanted to furl sail and ride out the Depression. At least in the later oral history version, it came down to an ultimatum from Ellis: buy me out, or I will buy you out.

How all this was resolved depended crucially on a parallel development which might be entitled "Schenectady Banks, Railroads and Politics: the Sequel.". As in the first episode, begin with the politics.

The 1854 Schenectady mayoral election was the last in the now 20 year old pattern of Democrat vs. Whig. The winner, the Democrat, was a political old-timer who neatly fit the familiar Regency pattern. Like his friend John K. Paige, he had been a War of 1812 hero, a Regency political operator and Mason, and a man whose political connections had sent him bouncing between prosperity and bankruptcy. The unique feature was that Mordecai Myers was Schenectady's first Jewish Mayor. Like his British co-religionist and contemporary Benjamin Disraeli, Myers neither denied his religion of birth, nor practiced it. Unlike a series of 19th Century Schenectady's Irish Catholic candidates for mayor, none of whom were victorious, Myers seems to have suffered no serious political consequences of religious prejudice.

The election's loser, Abel Smith, fit the traditional Whig pattern. He was a long time Schenectady resident, and a hardware merchant. However, his reaction to his narrow loss was far from conventional. He joined together with some other dissatisfied Whigs and Democrats to join a new party just rising on the US scene, the American Party, popularly known as the "Know-Nothings."

The name Know-Nothing arose from the alleged response party members gave to inquiries about the more secretive aspects of their party: I know nothing. The public face of the party was anti-immigrant, and specifically anti-Irish and anti-Catholic . "Slavery, like Papacy, is a great evil" read one version of the party platform, which went on to demand a 21-year waiting period before immigrants could vote, and to come out in favor of the Bible and sobriety.

Locally, the American party was more pragmatic. It was a merging of enough former Democrats and former Whigs to create a majority party. The local Whig party disappeared, as did its national party. Former Whig Abel Smith became the local Know Nothing party's leader. His closest partners were two former Democrats, James R. Craig, son of the cotton factory's Archibald Craig, and Norman Clute, descendant of one of Schenectady's early families, and cousin of its current machine shop pioneers.

Know Nothings swept the 1856 local elections, and Smith became Mayor. Some former Whigs did not go along. Stephen S. Riggs, who was strongly anti-slavery, became a leader of the emerging Republican party. He ran for mayor in 1858. He lost to the Know-Nothings by a margin of more than 2 to 1. Though Republicans quickly rose to the top in New York State, Schenectady would remain Know-Nothing or Democrat until well after the Civil War.

Like their Regency predecessors, the Schenectady Know-Nothings leveraged a combination of banks and politics. Craig and Smith had ascended to the Board of Directors of the staid old Mohawk Bank, becoming by the mid-1850s the bank's president and vice-president. Their rise corresponded to an episode of profit-taking. In 1853-1854, the nominal capital of the Mohawk Bank was doubled to $250,000. The shares in this new Mohawk Bank were sold to some well-to-do residents of neighboring towns, and to some recently arrived local businessmen such as leather merchant Joel Jones, and railroad builder John Ellis.

Ellis was named a director, but was at first too busy to be much involved in bank matters. Jones, also a director, did get involved. A man with financial experience, he found his first directors' meeting, presided over by Abel Smith and James Craig, to be surprisingly casual. It consisted of declaring the usual dividend, at a 5 percent annual rate, and then adjourning. Curious about more details of the bank's balance sheet, Jones was told not to worry. Later, he was told to stop making trouble.

Instead, he investigated. What his efforts ended up finding was a pair of problems. First, the Mohawk Bank had made many bad loans for a very long time. It had drifted into a position verging on illiquidity, perhaps insolvency. The actual profits made in the past were far from justifying that doubled capitalization. Far enough to raise suspicions of outright deception, and lead to at least one lawsuit against the bank.

Second, the new management had woven a web of profitable bank-politics-public utility connections. The three Know-Nothing leaders, Abel Smith, James Craig and Norman Clute, were at the center of the web. As just one example of their efforts, they used their position at the Mohawk Bank to get a large, about $20,000, loan in 1855 . They used the loan to buy control of a Schenectady gas company that had been set up New York City capitalists. They then made a gas light street lighting deal with the Schenectady city government: that is, with themselves. According to critics, that deal, and subsequent modifications, resulted in the city paying twice as much for gas lighting as it would in a competitive environment.

The activities of Abel Smith and James Craig were probably not all that different from those of Mohawk Bank predecessors in their insider lending and taking advantage of political connections. When confronted with the sad state of the bank's books they pleaded ignorance. Apparently they were know-nothing bankers as well as Know-Nothing politicians.

Their associate, city treasurer Norman Clute, however, went too far. Jones' investigations and other local discontent led to an audit by a respected Schenectady bookkeeper, John Bradt. He found, in 1859, that in the previous few years Clute had embezzled some $5000 from the city. This at a time when the city's annual budget was about $15,000. Again, the Mohawk Bank- City Government connection had been at the center. Schenectady, like most cities, made substantial borrowings from banks each year in anticipation of taxes. Clute had kept some of this borrowed money. Clumsy efforts to hide the embezzlement were revealed in part by detection of erasures in the Mohawk Bank's books.

Clute was disgraced by the episode, though Smith and Craig were not. On 22 Oct 1860 a legal battle between Joel W. Jones and Abel Smith was brought to a “satisfactory adjustment” by a notice

printed in the city newspapers that Joel W. Jones accepted Abel Smith's declaration that “he was entirely ignorant of any fraud, insolvency, or irregularity.”The state stepped in to fix the bank's problems, forcing a cutting in half of the bank's nominal capitalization.

The Mohawk Bank and city treasurer issues led to a few sharp comments. One person noted in a new city newspaper the Daily News on 18 July 1859 that while "the petty larcenies, trivial crimes and drunkenness among the poor and debased" are "magnified", by contrast "the great crimes and frauds perpetrated in our midst by the so-called 'our most respectable citizens' pass editorially unnoticed."

The more general newspaper response, however, was relief. Problems at the city's most respectable bank had been solved and could now be left behind. "The Mohawk Bank has long been proverbial for its reliability", one such comment ran on 13 May 1859 . ""There is no doubt that with its new amount of capital, and a business conducted on this basis, it will be a paying investment."

Among the relieved was Bank Director John Ellis. He had supported Jones's investigation, and remained a bank director after the departure of Smith and Craig. Now, however, in 1858 , embroiled in that dispute with his Schenectady Locomotive Manufactory partners, he needed a little more of that insider lending. His partners had chosen to let him buy them out. Exactly how much this required remains is in question, but the best estimate, based on the amount of personal property that Ellis claimed on his 1860 Census entry, was somewhere between $20,000 and $60,000.

For the Mohawk Bank, seeking to regain respectability and with its reduced capital, this might have sounded a bit too speculative. The Locomotive Manufactory had, in just ten years, already failed once, and was perhaps on the brink of a second depression-induced failure. It would sell only 2 locomotives in 1858, and only 9 in 1859. To some, risking such a large share of the recovering bank's shaky capital on this shaky venture might have seemed ill advised.

Not, however, to the directors of the Mohawk Bank, now having shed its Know Nothing directors. Ellis, one of the surviving directors, now got his loan. He used it, over the next four years, to double the capitalization of the company, and to increase his stake in the company to 50 percent. Gentleman farmer Daniel D. Campbell and merchant Simon Groot, as well as Walter McQueen and a few others, remained minority stockholders. John Ellis was now, however, in complete control of the company. He carried out his strategy of expansion. The Schenectady works remained far behind Baldwin Locomotive, which had absorbed its former Philadelphia rival, Norris. Ellis's manufactory would, however, soon become a leading competitor for second place.

For Schenectady, this meant a possibility, though in 1860 far from a certainty, of being the site of a world-class manufacturing facility. The city's export industry identity, launched by 1850, was now fully confirmed. Schenectady was a city of machinery and machinists.

To sum up, the railroad was indeed the catalyst that made Schenectady an actual, rather than a merely nominal, city. However, it did not happen in the way Schenectady's merchants, lawyers and politicians initially thought it would. It was not a politically and bank-assisted leveraging of railroad

junction location into a major financial role in a new transportation industry.

Instead, the aspects of the railroad industry were energized Schenectady were not railroad operation and banking, but contracting and machinery making. This did not merely enrich a few. It brought in laborers and operatives by the hundreds to do the hard work that fulfilled the contracts, and 150 machinists to cut the metal and make the machines. The laborers were disproportionately Irish. The machinists were disproportionately British and Scots. However, more than half of both laborers and machinists were born in New York State, and most of those in Schenectady itself. The occupation of machinist quickly became the city's signature occupation, and a sort of mobility melting pot, where the sons of immigrants and laborers met the sons of blacksmiths, printers, and shoemakers, and a few sons of some of the city's oldest families. This new generation of machinists included Charles Riggs, Stephen Riggs's son. For him, as for others, employment was precarious in this era of internal contracting and frequent depressions, but when times were good a machinist's earnings of $3 a day or more could support a family.

Without taking anything away from the individual excellence of John Ellis and Walter McQueen, Schenectady was becoming what it was because of where it was: at one end of the series of railroads that in 1853 were linked up to form the New York Central. It was the city's location that brought it first the Mohawk and Hudson Railroad, and later locomotive manufacturing. Geographical constraints also shaped the city internally. It now had an industrial center, that locomotive works in the Fonda-Romeyn square. This had by 1860 become surrounded by the main Irish neighborhood, predominantly laborer in occupation and Democrat in politics. Other smaller machine shops stretched along that belt of canal and railroad. The city now had a downtown, located also by the geography of railroad and canal. It had an out-of-sight out of mind region on Albany Hill holding the old Cotton Factory, the Poorhouse, and a new trickle, soon to be a flood, of German immigration. It had a Yankee outpost, one of the nation's leading colleges, on College Hill. It still had that old elite Stockade neighborhood. Significantly, however John Ellis chose to live first on the respectable edge of Frog Alley, and then later build a mansion downtown rather than in the Stockade.

Ethnically, Schenectady was by 1860 Dutch only by tradition and ethnic stereotype. Actual descendants of the earliest settlers, who themselves had not all been Dutch, now represented only about one-fifth of the population. They were now significantly outnumbered by those of South British descent, both Yankees and non-Dutch Yorkers. These became, and would remain, about half the city's population. Among North British, Irish had passed Scots and were on their way toward later passing Dutch. Germans trailed in 1860, but were on their way to, within three decades, passing Irish. African Americans, about one-tenth of Schenectady's population in 1800, were less than two percent of the city in 1860. They were heavily discriminated against, denied the vote, and had only recently been given a single tax supported but segregated school. Intermarriage had made the old Dutch-Yorker-Yankee distinctions increasingly irrelevant. It would not perform similar melting pot magic on Irish-, German-, and African-Americans.

Politics from 1800 to 1860 had been mainly a politics of nothing, with occasional bursts of something. Nothing fundamental separated Schenectady's 1810 Federalists from its 1810 Democratic-

Republicans, or its 1822 Regency from its 1822 People's Men. Fundamental disagreement did catalyze the local formation of two mass parties, Democrats and Whigs. But it was a fundamental disagreement over who would get bank and railroad stock, not fundamental disagreement over ideology. Ideas would only significantly enter Schenectady local politics in the 1850s with the anti-immigrant convictions of the Know-Nothings, and the anti-slavery convictions of the Republicans.

The slavery issue did not in Schenectady typically pit brother against brother. In one prominent case, however, it did pit brother-in-law against brother-in-law. Platt Potter had arrived in Schenectady in the early 1830s to open a law office, become a Democrat and stockholder in the new Schenectady Bank, and marry the sister of Alonzo Paige. In the 1850s Paige, though opposed to slavery, remained loyal to the Democrat Party. Potter, in a widely publicized statement, announced he could no longer support the policies of Southern slave owners. He became a Republican, and in 1856 challenged for Paige's seat on the State Supreme Court. Paige won in Schenectady city and county as well as in most surrounding counties. Potter, however, piled up such a large margin in heavily Republican St. Lawrence county to win the election. Paige ran once more, unsuccessfully, for Congress before he died in 1868.

Paige and Potter were already, by 1860, men of the past. The man of the future for Schenectady in 1860 was John Ellis, though his personal future would be very short indeed. While not the creator of Schenectady's new signature industry, he was the man who made it work.

The men of the past by 1860 could also be well represented by Stephen S. Riggs. He personified the age of banks and railroads that the city was about to leave behind, as well as the age of county seat and small time politics. Like his father Isaac Riggs, Stephen did a lot for his city and his party but got no respect. More educated than his father, he was caricatured not as an unlearned typesetter, but as "philosopher Riggs." Isaac Riggs had been a typesetter who aspired to political eminence and retirement to a gentleman farm. Stephen was a printer, the brother of printers, and father of a machinist. He was a would-be banker, with only a short stay in the cashier's cage. He was, in the end, a financially strapped, seriously ill publisher of a dying newspaper. Despite that, he managed to be a father of the local Republican Party. Had he lived, he might have been rewarded after Lincoln's 1860 victory with a lucrative and honored Federal patronage post. It was, however, in the post of Schenectady city clerk that he died in 1859.

Chapter 5

Ostrum, Ralph, Watchmaker: Machines and Machinists

The Ostrum, like the Barhydts, were early Schenectady settlers. They started out as farmers, included at least one Revolutionary soldier and ended up in the general occupational class called mechanics. Ralph Ostrum, born about 1800, was a watchmaker. He served the city as keeper of clocks, much as machinist Joseph Stillman had served as its keeper of weights and measures.

He also married well. His wife Caroline was a daughter of Schenectady foundryman and pioneer machine works founder Peter I. Clute. What personal benefit this connection was to Ralph Ostrum is unknown. After appearance on a volunteer fire department document, and in the 1840 census and 1841 directory, Ralph Ostrum departs from the historical record, showing up again only as a name on a gravestone in Schenectady's Vale Cemetery.

Ralph's son Spencer Ostrum, born in 1830, apprenticed at his grandfather's machine works. This choice corresponded not only to his opportunities but to his talents. Like most machinists, when his apprenticeship was up he took some wandering years, travelling to machine shops around the northeast, in particular to New York City. However, by the 1850s he was back at the family firm. He rose to foreman, then chief mechanic, on the strength of his skills more than from his family connections.

In this way, from farmer to soldier to possible millwright to watchmaker to machinist to machine works partner, did one old family make its way into the mid-19th century. This chapter will trace a step on that passage, from the Civil War toward Edison's decision. Again, the subjects will be the city's economics, demography, ethnicity and politics, and the questions: evolution or revolution? Geography or biography? Disposition or situation? Something or nothing?

The short answers are: in economics, evolution, with an industrial and occupational profile only slightly and slowly changed by 1885 compared with 1860; in demography, slow growth, as the city's geographical location enabled it to host a combination of inflow from smaller places, and outflow from bigger ones. In ethnicity, the situations encountered by successive waves of first Irish and then German immigrants, both as they left Europe and as they arrived in Schenectady, were more important than any genetic group dispositions they may have possessed; and in politics, a politics of the nothing: of invective and organization, only occasionally interrupted of the somethings of improvement, economy, workers rights and temperance. These topics corresponded only partly with the party labels Republican and Democrat.

To explore these answers further, begin with an episode that was truly revolutionary for the nation, but less so for Schenectady: the Civil War. Schenectady's Civil War was not much different from that of other little cities. Some 1000 city residents went to war. Some 70 of those soldiers died of in battle. A roughly equal number of soldiers died of disease. Those that stayed at home supported the troops through production, prayer, charitable bazaars and the raising of some $250,000 in bounties paid to the troops. That initially borrowed sum was felt in raised taxes for a long time after the war was done.

Who went? Neither Schenectady's rich or poor seemed to have much enthusiasm for the war. The city, by substantial majorities, voted Democrat before, during and after the war. Schenectady supported McClellan over Lincoln in 1864. Nevertheless, both rich and poor answered the call to arms.

Schenectady's main military units were the 134th New York and 18th New York infantry brigades. A look through the muster rolls of the 134th shows that, as expected, farmer's sons from the surrounding countryside far outnumbered city residents even in this city-centered unit. The Schenectady city enlistees were proportionately laborers and slightly more than proportionally machinists. They were disproportionately immigrants. Many were Irish but a larger share was Germans, a group whose arrival rate in the 1850s lagged well behind the Irish. To be more exact, of some 65 Schenectady residents were examined in alphabetical order in a portion of the Civil War muster rolls. About half, 33, were born in the US, almost all in Schenectady; 19 were born in Germany, 5 in Ireland, and 8 in other countries, mainly England. Of the American born, nine had Van surnames, giving that surname group a slightly but distinctly lower participation in the regiment than their proportion of the city's population. Occupationally, of the 65 sampled, 15 were laborers, 8 machinists, 7 farmers, and the other 35 spread over the general range of occupations, from painter to blacksmith to railroad agent.

The data on the 134th may underestimate the Irish contingent, as many of them went to Albany to enlist in the 18th infantry. Irish born Schenectady soldiers include the three Irish born McKinney brothers, Billy, Patrick and Dennis. More generally, the Mc surname outnumbered the Van surname among Civil War soldiers by about 4 to 1, even though the Van surname outnumbered the Mc surname in the city population in 1860 by a ratio of about 4 to 3.

The Irish recruits were mainly laborers. The Germans from a wider variety of backgrounds. Ferdinand Eisenmenger, a 42 year old machinist from Prussia was in the original roster of the 134th. He was joined in the regiment two years later by his 17 year old son Ferdinand Jr., a laborer who enlisted as a musician. Another German-born volunteer was Union college professor Frederick Peissner. He was a romantic figure as well as an intellectual. Local legends held that back in Bavaria he had been not only an 1848 revolutionist, but also the illegitimate son of Mad King Ludwig and one of the many lovers of the famous courtesan Lola Montez.

While proportionally underrepresented, some members of the older Schenectady families went. Two Barhydt blacksmiths, both named Cornelius, father and son, served, and the son died in service. Austin A. Yates, grandson of the governor, college graduate and apprentice lawyer, enlisted in the ranks, and served at Chancellorsville before moving on the judge adjutant's office in Washington. Henry P. Glen, great grandson of Glens Falls founder "thin John" Glen, served in the 134th as Sergeant. William Shannon from Princetown was among the predominant group of farmers' sons in the ranks.

As elsewhere, after a draft was begun, many who could afford it paid substitutes to serve for them. On one list of some two dozen who did so were two of the sons of John Ellis. The sons of several old Schenectady families are also on the list, with one-fourth of the list having the Van surname. Also on the substitute buying list however, were some of the more recently prosperous, such as Irish-born contractor John McEnroe, and German born grocer Jonathan Levi. Many who could have purchased a

substitute did not. The recently arrived and very successful machinery manufacturer George Westinghouse sent three sons to the war.

The experience of the 134th typified the national soldiering experience of months of boredom punctuated by moments of terror. The regiment marched off in 1862, lost nearly half the original force to desertion, most while still within New York State, spent months in training, and stood in the reserves at Chancellorsville. Then, on the first day of Gettysburg, it was one of many units flung almost sacrificially into the front line to slow the Confederate onslaught and win time for others to set up the defensive lines that would, over the next two days, win the battle. In less than half an hour on that first day, the neophytes from Schenectady were routed by more experienced and more numerous troops from South Carolina. At the end of the day, from the original contingent of some 300, only 60 could be immediately reassembled, though many more later trickled in. Some 75, however, never returned, having been killed, wounded, captured or gone missing in action. Particularly heroic on that day was Sergeant Henry P. Glen. Wounded in the initial flurry, he was quickly treated, and was able to return to the struggle. He was rallying his men when he sustained his second, and ultimately fatal, wound.

After being brought back up to strength, the 134th marched on to more than a dozen major battles. At Lookout Mountain, the 134th participated in the legendary uphill charge that took the Confederate works. Other days of particular blood and terror, now experienced by hardened veterans, occurred during the advance from Tennessee to Atlanta, at the battles of Resaca and Rocky Faced Ridge in Georgia. At Resaca former machinist Ferdinand Eisenmenger, Sr. suffered the wound from which, a month later in a Tennessee hospital, he died. His son, now known as Fred, marched on with the 134th, following Sherman across Georgia to the sea.

Where Schenectady's story differed from that of other little cities and pointed toward the future was in the role in war of a city of machine-making and machinists. The substitute purchase for the Ellis sons was in a very real sense in the national service. Rather than being sent to Union College, they had been apprenticed to management of the locomotive business that their father had taken over with the aid of the Mohawk Bank on the eve of the war.

The US Civil War was, to an unprecedented and unexpected extent, a railroad war. That new technology moved troops and their supplies with often decisive effect. Battles were waged for control of railroad junctions, such as Manassas, Va. Use of this new strategic tool required locomotives. No longer in chronic oversupply, locomotives became suddenly a scarce strategic necessity.

All this was good growing weather for the house of Ellis. The Schenectady Locomotive Works, which had produced 2 locomotives in 1858 and 9 in 1859, produced 84 locomotives in the four years of war. It was paid well for them. The histories of the firm state that the U.S. Government took over the works for its exclusive use, and doubled the price paid for each locomotive compared to the competitive 1860 price.

This success continued after the war, as the nation made up for lost time by ordering new equipment for the existing railroad network, and extending that network across the continent. The Schenectady Locomotive Works, a local newspaper reported in April, 1869 “has never been in more

prosperous condition", employing 400 men and turning out 24 locomotives per year. Future work in hand included 50 locomotives for the Union Pacific, that portion of the transcontinental railroad that had included that McQueen 4-4-0 Jupiter in the golden spike photograph.

While it would be an exaggeration to say that Schenectady locomotives saved the Union, it would be no exaggeration to say that the Union saved the Schenectady Locomotive Works. Thanks to the war, the gamble made by John Ellis and the Mohawk Bank paid off handsomely and immediately. The best solid evidence of this came in 1865. The federal government had installed a wartime income tax. In the newspaper, the incomes of the 527 Schenectady families who earned enough to pay the tax, some $600/year after deductions, were listed. This is in contrast to the more than 1000-plus households who did not earn enough to pay any tax at all. At the top of the list was the estate of John Ellis. It paid taxes on an income of $42, 365. This was more than twice the income of the second leading taxpayer, and some 100 times the mean household income for Schenectady, about $400/year. In fairness to the Ellis family, this was a wartime bonanza. Though income tax figures were not subsequently published, indirect evidence indicates that no individual Ellis ever made so much in a year again. In addition, that bonanza was ultimately put at the service of the city, later in the century, as the main endowment for the city's hospital, the Ellis Hospital.

The income is attributed to the estate because John Ellis died in 1864. He was indeed succeeded by the sons he trained. Three of them served as chief executive officers of the Schenectady Locomotive Works, running it through the rest of the 19th century.

The contributions of a second Schenectady mechanical products entrepreneur also had a major impact on the Union victory, though a less direct one. As mentioned, the war was mainly fought by farmers' sons. They, and the population they left behind, had to be fed. During the war, work in the fields was done increasingly by farmers' daughters and by machines. As the locomotive was changing warfare, the threshing machine and its many mechanical counterparts were changing agriculture.

George Westinghouse, Sr. (the exploits of his more famous son forcing this appended identifier upon him) was a Vermont Yankee who had moved about the country, training himself as a machinist while also working as a farmer, and ending up in the 1850s in Central Bridge, New York, just across the western border of Schenectady County. There he built and sold his own patented version of a threshing machine, as well as other devices using machinery to apply steam or animal power. In a typical example of urban inflow, he outgrew his original factory, and, in 1857, moved to Schenectady. He initially partnered with the Clutes, but, quickly gained complete control of his company.

His choice of a factory site was a milestone for the city. Previously, machinery manufacturing has been centered on the portion of the city paralleling the canal and railroad through the Downtown Square and on into the Fonda-Romeyn square, site of the locomotive works. The Mill Pasture square, the southwest corner of the city, was low lying and easily flooded. It was used by natural products factories, such as tanneries and a plaster mill. It blended into the agricultural flats, where broom corn was becoming the major crop.

It was there on the flats portion of the Mill Pasture that Westinghouse chose the site for his

works. It went up on the south bank of the Erie Canal, on the site of one of those old plaster factories. This was beginning of the rise of the Mill Pasture as the city's main manufacturing square.

Westinghouse was cautious and conservative in his business practices, seeking steady sales rather than sudden growth. He kept his work force, largely machinists, below 100. He rode out business depressions that caused others, including the locomotive works, into temporary shutdowns. His earnings were moderate. That income tax listing of 1865 has him making $2500 in that year, prosperous by contemporary standings, but only ranking about 50th on the Schenectady list

Like John Ellis, he trained his sons in the workplace, but also, perhaps only inadvertently, inspired in them more independence. The most religious, Albert, interrupted his training for the ministry to serve in the Union cavalry. There he met his death. The most traditional, Jay, would take over the family business. The most independent, George, Jr., enlisted in the navy as an engineer. On his return, one semester at Union College sent him back to the shop. There he invented an improved steam engine that was used at his father's works. He quickly branched out into other ideas. One of them, a device for putting railroad cars back on the tracks after a derailing, sent him to Pittsburgh in search of better metal alloys, there he also found potential backers more generous than his original Schenectady partners. Industrial inflow up the urban hierarchy struck again. The rest is a national, not a Schenectady, story.

Yet another Schenectady mechanical industry made its mark as a military equipment supplier. The Clute Foundry and Machine Works had passed from the hands of its founder, Peter I. Clute, to his three sons Cadwallader, John Baptist, and Jacob, in much the same way the locomotive works passed to the Ellis brothers. The role of master mechanic, corresponding to Walter McQueen's, was played by Peter I. Clute's grandson, machinist Spencer Ostrum. Under that leadership the firm had added to its production of steam engines to another form of prime mover. Swedish born immigrant John Ericsson had commercialized the idea of using hot air, rather than steam, as a heat engine's working fluid. This promised cheaper construction, if less power and versatility. The Clute Works had licensed Ericsson's patents and had made and sold many of these hot air engines by the time of the Civil War.

During the war, Ericsson came up with his design for the "cheesebox on a raft" ironclad known as the Monitor. The most famous of this class, and namesake, was hurriedly produced in 1862 and in that year fought the Confederate ironclad Virginia (popularly known as the Merrimack) at Hampton Roads, VA. The Monitor’s major design feature was a rotatable gun turret. At least part of the machinery of the turret of the original Monitor was built at the Clute Works, most likely under Ostrum's direction. The company went on to produce machinery for other ironclad warships of this monitor class. It also brought in an Englishman of somewhat mysterious background, one who spelled his name sometimes as Lee and sometimes as Lay, to experiment on torpedoes, torpedo boats, and even perhaps a submarine.

The results of all this experimentation remain unclear, though the firm claimed that some of its torpedoes were used in clearing the Albemarle River in Virginia during the war. Whatever the impact of those advanced products, the Clute Works had by 1865 developed a specialty in marine engineering. That emphasis on steam engines and boilers for ships carried over after the war. For his leadership, Spencer Ostrum had been brought into full partnership with his uncles.

With the return of peace, Schenectady's machinery works sailed smoothly into the task of meeting the deferred demands of the national economy. The movement of the railroads westward, the increasing use of steam power at sea and the movement of low horsepower heat engines into a wide range of applications picked up where wartime demand left off. So did the westward march of agricultural machinery across the Mississippi and onto the plains.

This success did not, however turn the demography of the city back toward decade-doubling boom town growth rates that it had briefly experienced in the early 1840s. Schenectady's population would not double in the quarter century between 1860 and Edison's 1886 decision. It went from just under 10,000 people in 1860 to about 15,000 in 1885. It remained a seventh magnitude city, the smallest class deserving the city name, while New York City was moving toward the third magnitude level of a million people.

In this respect Schenectady would be increasingly typical of New York State. The boom of Erie Canal cities, such as Albany, Troy, Utica and Syracuse, was leveling off. Those cities, which doubled every decade or less in the early part of then century, were now approaching growth rates not much greater than Schenectady's. The realm of decade-doubling boom cities was now the Midwestern belt stretching from Buffalo through Cleveland, Detroit, Milwaukee and Chicago. The railroads were eroding New York State's Erie Canal advantage. The debate within the state was switching from how to spend the canal's windfall revenues to how to modernize it to keep it competitive. The growth of the Empire State in general, and of Schenectady in particular, now rested on its manufacturing works.

That word "works", used casually by 1860 in this city of machines and machinists, deserves further comment. The common characterization of the industrial revolution as sudden jumps from shop to factory and from factory to assembly line leaves out this term entirely. Yet it denotes an important new way of working that, while temporary, proved of great importance, especially in Schenectady.

A works is a sort of community of factories and shops. The Schenectady Locomotive Works, for example, was not a big building where iron went in at one end, and locomotives came out at the other. Instead it was a community of shops: the machine shop, the boiler shop, the forge or "hammer shop", the assembly shop, the paint shop, the foundry, and on to the design shop and the main office.

Breaking down manufacture into these units corresponded well with another feature of 19th century manufacturing, the internal contract system. Each shop had its own boss, the chief foreman or supervisor. He bargained with the main office over terms of work and piecework rates. He exercised an almost dictatorial reign within his shop over who was hired, who was fired, and how a molder, machinist, patternmaker or other skilled craftsman trained and advanced.

Such mechanical manufacturing combining the works and the internal contract system can be seen as a sort of industrial feudalism. Mark Twain's Connecticut Yankee could have been a sort of "Sir Boss" even if he had stayed in Hartford instead of going back to King Arthur's Court. The combination of a works with inside contracting fit better with most of US mid-19th century mechanical manufacturing than did the more military style of hierarchical organization being adopted on the nation's railroads. The works form of organization would persist well into the twentieth century, only gradually brought into

conformity with that hierarchical organization chart form. This was not only true of the pioneering establishments, the locomotive works, the Westinghouse Works, and the Clute Works. Later at Schenectady, the Edison Machine Works evolved into the Schenectady Works of the General Electric Company, a feudal kingdom ruled by a Works Manager in feudal-like relations with the many dozen shop foremen, who in turn had nearly unregulated sway over their local situation, as long as they turned out the products. In short, for Schenectady industry, adaptive industrial evolution, not overnight shop-to-modern-corporation revolution.

The evolution in organization was adaptive in part because of the evolution of the work force. That evolution was in two directions: toward immigrant labor, and toward a melting port of machinists.

At the level of operatives and laborers, immigrants became increasingly important, although never constituting a majority even in these two classifications. In that old resident majority was laborer Cornelius Shannon, the widow Kittle's son-in law, who scraped by through combining his laboring work with other activities such as lot rental and pig raising. These activities both benefitted from and came in conflict with city political evolution. He lived in one of the three major laborer concentrations in the city, the side of Albany Hill, the principal German immigrant area. The other two areas of laborer concentration were Frog Alley, a melting pot of all the city's native and immigrant groups, and Fonda-Romeyn, home increasingly of Irish immigrants.

The equating of "Irish" and "laborer", though a cliché, was a census-data- supported reality. The Tempany family, the example who will be followed here, fit the pattern. Like many immigrants they came as a group of young relatives. Two were cousins, both named John, and two were brother and sister to one of the Johns, Peter and Bridget. They arrived in New York City in 1848, and went within a year to Schenectady, perhaps to work on the railroad. By 1850 they were settled. Bridget was a servant to the merchant John Ohlen. Peter and one John were laborers. The other John, who was, intriguingly, listed in the directory as a teacher, seems to have soon left town or died. By the 1860s, the Tempanys were established in the Fonda Romeyn square. In the 1850s John remained a laborer, and a boarder at the house of merchant William Cunningham. Peter had married, bought a house, taken in boarders, and started to participate in Democratic Party politics. Possibly via that political connection, he moved up to the job of baggage handler on the New York Central Railroad. John became a switchman for the same railroad. Members of the next generation of Tempanys would include an employee of the Locomotive Works and a locomotive engineer.

Many German immigrants were also laborers. The general German story was, however, different from that of the Irish. Before focusing on those differences, however, it is important to establish one more general part of the immigrant story. In getting immigrants in general, and laborers in particular, into history, there is a danger of too much emphasis on family stories that have survived in the records. This distorts the picture in implying more upward mobility than actually existed. As a corrective, consider ten German laborers that boarded with the grocer and liquor seller Solomon Engleman in 1850. Their names are Lewis Ardenell, Simon Ligner, Daniel Finehout, Adolph Sinsheimer, Morris Sinsheimer, Francis Bernard, Jacob Mendon, Jacob Hanf, John Fulland and John Beda. They are listed here not because they went on to inspiring life stories. They are listed because this is their only

appearance in Schenectady's record. Even in the vast archive searchable at Ancestry.com the only find is the later reappearance of Adolph Sinsheimer as a bartender in Albany. Like that earlier African-American grocer Mary Hannah, their stories, the ones most needed to fill out the picture, remain tantalizingly just beyond reach.

Perhaps half or more of Schenectady's laborers in the mid-nineteenth century were in this archivally silent majority. The canonical figure states that one-third of people found in one 19th century census are found in the next. A Union College Senior, David Cohen, verified that figure held for Schenectady. The figure, while accurate, needs two amplifications. One is that the fraction represents a decline from the early 1800s. At that time, half of the people found in one Schenectady county census were found in the next.

The other amplification is that the individual's persistence percentage depended on the number of years a person had lived in the city. A persistence rate of one-third per decade, if uniform among all citizens, would imply that nine-tenths of the people who were in the city in one year would be there in the next. This was not the case. Most of those who left were people who had just arrived. Among the new arrivals, more than half left the city in the first year, without making it their permanent residence. This has been determined by a study of directory entries. If a person stayed a year or more, that yearly persistence quickly went up well above that nine-tenths figure, and after a decade was approaching one.

Translate this into a picture of population growth in Schenectady in the 1870s, when that population was about 10,000 people. Each year about 200 people were born in the city and about 200 people died there. Each year several hundred people, perhaps 1000 arrived in the city searching for work and a possible home. Each year several hundred, perhaps just under 1000 left. Most of those who left were among the ones who had arrived in that year and decided to move on. The small margin between births and deaths, perhaps a few tens of people, and the small margin between arrivals and departures, a larger number of tens of people, added up to the added 200 people that enabled Schenectady's population to grow at about 2% a year, on the path to doubling every 35 years or so.

All this strengthens a situational view of ethnicity. Those who had, or quickly found, an ethnic network into which they could fit, whether Irish in the Fonda Romeyn square or German on Albany Hill, would be the ones likely to persist. Those who did not moved on.

One pair of German immigrant brothers quickly found such a place on Albany Hill. Matthias and Nicholas Treis travelled together from Prussia to New York City in 1850 and soon came to Schenectady, initially as laborers. Nicholas remained one all his life. Matthias, by the 1850s, was keeping a saloon on Albany Hill. Both the brothers, like the Tempanys, stayed out of the Civil War. By 1869, Matthias Treis' saloon was used for Democratic Party Ward meetings. At one of them Matthias was elected a party committeeman. He also became a founding member of Schenectady's St. Joseph's German Roman Catholic Church. Both the brothers married and started families.

In general, though laborer was the most common occupation among the Germans, a much greater fraction of them were in other jobs than was true of the Irish. Examples included Civil War veteran Fred Eisenmenger who apprenticed as a machinist at the Locomotive Works, as did his brother

John. Alexander Susholz, a Prussian army veteran, had come first to New Jersey as a clothing peddler in 1847. Arriving in Schenectady five years later , Susholz quickly partnered with another German immigrant Jonathan Levi, mentioned earlier as having risen to that substitute-buying elite. They entered the grocery as well as the clothing business, and like Matthias Treis and Solomon Engleman, acquired one the city's 100 or so liquor-selling licenses, a significant aid to immigrant upward economic mobility.

Also notable among German immigrants were intellectuals. These included Professor and Civil War fatality Frederick Peissner, and Rev. William Schwilk and Ernst Knauer, who started the city's first two German language newspapers. Amalie Schoppe, born in Germany in 1791, came to the US as a fugitive from the 1848 revolution, arrived in Schenectady in 1851, and became a close friend of Eliphalet and Urania Nott. She was an author, mainly of children's books, known in her native land for her resistance to tyranny and advocacy of human rights. **ES 10 Oct 1891**

Susholz and Levy were among the founders of Schenectady's first Jewish congregation, Temple Gates of Heaven. It was Susholz who , at least in Schenectady Jewish urban legend, helped that Jewish mayor Mordecai Myers make a deathbed reconversion to the faith of his mothers.

This religious note brings up another important difference between the Germans and Irish. The mid-century Irish immigrants were nearly all Catholics, and subject to a uniform anti-Catholic prejudice most actively promoted by the Know-Nothing party. The Irish were also, compared to the Germans, typically more likely to be from a farming background, to be less educated, and less likely to bring capital with them. The Germans, by contrast represented many religious groups, they founded in Schenectady, beside Lutheran churches and that Jewish congregation, Schenectady's Third Dutch Reformed Church, its second Catholic Church, and churches representing other varieties of Protestantism. German immigrants were also more likely to bring some capital, to be urban rather than rural, and to have some formal education. Germans quickly founded musical societies, and held a Schiller Day, complete, in 1859, with an oration by Peissner, and orchestral presentations of classical music. The victory of Germany in its 1871 war with France was celebrated not with raucous parades but with a "German Peace Day."

Politically as well the trajectory of German immigrants differed from that of the Irish. Again stereotypically, Schenectady's Irish overwhelmingly affiliated with the Democrat party. Their particular stronghold was in the Fonda-Romeyn area, where such families as the McDermotts, McEnroes, Farrells, and Cains dominated ward meetings and sent Irish aldermen to the Common Council in almost every year from the 1870s on.

The Germans, by contrast, while leaning slightly toward the Democrats, came nearer to splitting their loyalties. For example in the hotly contested 1876 presidential election, Schenectady held mass meetings both of Germans for Hayes, and Germans for Tilden. In the election, the verdict on Albany Hill, the principal German section was a virtual tie at 423 for Tilden and 406 for Hayes, compared to the strongly Democratic Tilden 397- Hayes 262 count in the Irish Fonda-Romeyn section.

All of which is not to say that German immigrants in general, and Jews in particular, escaped prejudice. "Young men , in search of adventure, enter the stores of our Jewish neighbors and amuse

themselves by a display of Young America spirit," a 25 April 1859 story of vandalism in the Daily News began. Another story, on 9 July 1859, described a disturbance at a "dance house" kept by a German immigrant, John Weld, in which a quarrel between a patron and the bartender led to a "general row" between "Germans" and "Americans" in which "blood was drawn on both sides."

Nevertheless, the evidence from occupational profiles indicated that, despite language and some religious difference, the Germans assumed an occupational profile much closer to the established Schenectady pattern than did the Irish. Unlike the name group Mc, predominantly laborers with laborer sons, the name group Sch (minus the Dutch Schermerhorn) matched almost exactly with the control name group Smith, except for having slightly a slightly smaller proportion of laborers than the Smiths.

One particular occupational specialty of German immigrants was at the operative level. Germans were disproportionately likely to be broom makers. This trade had become something of a regional specialty of the Mohawk Valley of New York State. The pioneers here had been the Shakers, who lived just east of the valley, and taught their neighbors in Schenectady the opportunities in both the agricultural and manufacturing parts of the business. By the 1830s Schenectady's farmers on the flats had begun growing the sorghum-like crop popularly known as broom corn. Small broom factories had sprung up both in the city's Frog Alley and Fonda Romeyn sections by 1840. These factories use simple but increasingly labor-saving machines to turn the straw-like fibers into the business end of brooms. Makers of machinery for these factories, and of broom sticks, added to the industrial impact.

With the machinery, a single operative could turn out more than 100 brooms in a day. Since total production in Schenectady was estimated at about 12,000, this suggests an employment in the city's broom shops of just over 100 operatives. German immigrants disproportionately made up this work force. The broom entrepreneurs were a melting pot. Examples included an 1850 German immigrant Charles Whitmyre; a descendant from a much earlier German migration, the Palatines, N.I. Schermerhorn; the son of an Irish immigrant, James Flinn; and descendants of the earliest Schenectady settlers, such as Henry DeForest and Christopher Van Slyck.

Despite the growth of broom making, Schenectady lagged in providing employment for operatives. This lag proved important because these were occupations for a second family wage earner, particularly for young women. Given the wage scale at the time, ranging from $1 a day for a laborer to $3 a day for a machinist, and the irregularity of employment in a time of internal contracting and piecework, it was difficult for a single earner to support a family of four or more. This made essential to family survival the work of children and young women in the textile, clothing and related trades.

Other cities were well ahead of Schenectady in this second-earner supply. For example, , Troy, a city with solid industrial metalworking prosperity, became known not as the iron or steel city, but as the Collar City, due to the manufacture of detachable collars, mainly by women. Other cities specialized in spinning or knitting.

In Schenectady, by contrast, only two knitting mills had been established by 1865, one high up on the Sand Hill Creek and one located at the old City Mill site. This second mill was Schenectady’s first textile mill to be powered by steam. In this regard Schenectady lagged far behind such cities as Utica,

with its dozens of steam powered knitting mills. Other employment opportunities for women, such as millinery, and schoolteaching, were insufficient to fill the gap.

So on the level of the largest occupations, laborers and operative , the intertwined trends of demography, economics and ethnicity summed up by the early 1870s to an increasing immigrant share, an increasing mosaic rather than melting pot, and an insufficient number of second-earner jobs.

In the skilled trades, here as always in this book to be exemplified by the trade of machinist, an opposite current prevailed. The original generation of machinists had been disproportionately English and Scots. The next most important groups were Yankees such as Joseph Stillman, and the Pennsylvanians who came to Schenectady with the Norris brothers.

By 1865 these pioneers had trained an increasingly Schenectady-born corps of successors. The share of English and Scots immigrants was still greater than overall population share by 1880, but less so than in 1850. Machinist became a sort of the middle class melting pot. Shoemaker Simon Glen's son became machinist Henry Clay Glen, joining such machinist sons of immigrant families as Fred and John Eisenmenger, of German descent, and William Lomansey, the son of an Irish immigrant blacksmith. His efforts would help enable another Lomansey son, Richard, to attend Union College. Charles Riggs, son of printer Stephen S. and grandson of typesetter Isaac was a machinist. Spencer Ostrum's rise at the Clute Works has already been noted. Gershon Van Voast, descendant of another of the city's founding families, took over from the departed David Matthews as chief machinist at the formerly Utica & Schenectady, now New York Central machine shop in Schenectady..

An increasing number of both laborers and machinists show up in the political life of the city, providing a final element in this interdependent braid of industrialization, ethnicity and politics . This included laborer Alfred Apps leading a group petitioning for a street light, and later being asked to serve as constable but declining because of the low pay; Peter Tempany rising in the Democrat Party from committeeman to alderman; Matthias Treis participating in not only conventional Democrat Party politics but also a sort of civil disobedience campaign to be discussed later; and in a growing role for role of machinists ranging from Henry Clay Glen's and Andrew Barhydt's steady roles in the Democrat Party's rank and file to Fred Eisenmenger's rise through those party ranks. As the above suggests, immigrants were more likely to be Democrats than Republicans, though there were many exceptions, such as Republicans Alexander Susholz, Alexander Levi and Irish immigrant and Republican Ward leader William Anthony.

There was, however, still an elite tone to the city's political economy. No one embodied that tone more completely than a recent arrival with deep local roots named Charles Stanford.

Josiah Stanford and his sons have been encountered before, as one of those entrepreneurial families taking advantage of railroad contracting opportunities in the 1830s and 1840s. As they did they moved gradually closer to Schenectady, ending up in what would become a mansion called Locust Grove, just east of the city line in the Schenectady county town of Niskayuna.

Charles, one of those sons, was born in 1819. In his early 20s he became a successful contractor

in his own right. In 1850, the California gold rush drew him west to join two brothers. At San Francisco they opened stores supplying the miners and achieved rapid and spectacular success. While Leland Stanford stayed in California to achieve fame as a railroad baron, state governor, and university founder, Charles returned to the east, to Locust Grove. There he served as the family firm's eastern supply agent, bred horses, and sought to ignite economic development in nearby Schenectady. This he did both through personal investment and politics. One of his first investments combined the two, creating the first Republican newspaper in Schenectady.

In 1863 he was elected as a Republican to the New York State Assembly. Two years later he moved up to the Senate. There he proved one of the most energetic members. The impact of the energy on the development of Schenectady will be discussed in a moment. Here focus will be on his impact on another Schenectady resident, a saddler turned government official named Robert Dorn.

Dorn had been one of the Know-Nothings of 1856, but had since become a Republican. In 1863, the same year that Charles Stanford first successfully ran for the State Assembly, Dorn was elected to the post of Canal Commissioner. In that year Stanford's paper endorsed Dorn. Stanford however soon changed his mind. He did so after being elected to the State Senate, and becoming the driving force behind an investigation of alleged corruption on the Erie Canal. That investigation, known as the Stanford Commission, quickly piled up a large volume of evidence that led to the impeachment for corruption of Robert Dorn.

The heavily Republican State Senate found Dorn innocent of all charges, The Schenectady Republican organization welcomed the vindication of one of their main leaders. It also denied Charles Stanford renomination to his Senate post. Stanford ran anyway, and in 1867 garnered enough Democrat and reform Republican votes to return to his seat. That only worked once. The next time around the Democrats made sure one of their own, rather than a Republican renegade, won. So, after a brilliant start, Charles Stanford's political rise was halted. He continued to rail against the "ring" led by Dorn and his associates, and to note regretfully that such prominent Schenectady Republicans as the Ellis brothers were supporting that ring rather than its reform rivals. This continuing crusade against the Canal ring never, however, brought Stanford back into office.

While in office he had pushed though several bills devoted to the improvement of Schenectady. This political theme of improvement had two aspects. One was improvement of the competitiveness of the city as an attractor of industry. The other was improvement of living conditions within the city. In the eyes of improvers such as Stanford the two were linked. A city with more industry could afford more internal improvements. A city that improved the amenities of life would prove more attractive to industry.

Here Stanford's legislative efforts to improve Schenectady will be illustrated by two of the issues he embraced: more railroads, and a better water supply.

Schenectady's boosters still saw the city as an important railroad junction, something like the emerging post Civil War railroad cities of Atlanta and Indianapolis. The idea began with the continuing lower cost of transport of bulk commodities by canal than by railroad. The vision went something like

this. Widen the canal to carry bigger barges laden with grain and coal. Link Schenectady with new railroads competing with the increasingly monopolistic New York Central. These railroads might include the new West Shore out of New York City, the Delaware and Hudson network out of Philadelphia and the coal lands, the new Boston based railroad drilling the Hoosac Tunnel in Western Massachusetts, and a railroad running through the Adirondacks to Montreal. Schenectady could have a future as a major distribution point, unloading western grain from the canal and distributing it by rail to Boston, New York and Philadelphia, and loading Pennsylvania coal from railroad cars onto on to barges for the journey west. The railroad competition would also lower coal and other material costs, making Schenectady's industries more competitive.

This vision had considerable attraction in Schenectady. Stanford encouraged it by leading bills to charter or survey local branches of some of those railroads. Stanford's two principal allies in the industry-attracting improvement role were George G. Maxon, who built and operated Schenectady's first modern grain elevator, and Nicholas I. Schermerhorn, who moved from being a pioneer in Schenectady's broom corn growing industry into being a coal merchant.

Schenectady's improvers were mainly Republicans. Not exclusively however. Maxon, for example, was a Democrat, as were other prominent champions of attracting new industry such as stove manufacturer John K. Paige, nephew of Alonzo, rentier Robert Furman, and broom manufacturer Henry DeForest. This bipartisan boosterism showed up after the city election of 1871, when a split in the dominant Democrat Party enabled Republicans to make gains including the Mayoralty. A bill was passed in the Common Council, and approved by the state legislature, for Schenectady to sell $100,000 in city bonds and use the proceeds to invest in the Schenectady and Susquehannah Railroad. This railroad connected Schenectady with the Delaware and Hudson and with Pennsylvania coal country. Its president was the now aging dean of Schenectady Republicans, Judge Platt Potter, encountered earlier as the victor in the judicial battle of the brothers-in-law. Both Republicans and Democrats on the Schenectady Common Council, dazzled by this prospect of transportation break revival, went along with the bond issue proposal.

Nothing much came of this vision. The Schenectady and Susquehannah went bankrupt, leaving it to Schenectady taxpayers to pay the bondholders. That first modern grain elevator was also Schenectady’s last. Defenders of the bankrupt railroad could argue that it did reduce Schenectady's coal costs, and it did eventually provide part of the railroad network that made Schenectady attractive to Edison. But these were minor and disputed benefits, compared to that $100,000 bill for railroad bonds.

The other side of Stanford and the improvers' efforts faced the problems of any growing city. They might be summed up in a half-dozen or so categories: educating children; building and paving streets; lighting the city at night; providing safety from fire and crime; cleaning up pollutants; making provision for the poor; and providing clean and abundant water. Each of these categories resulted in about a $6,000 annual expenditure by 1880. This, plus the costs of city government salaries and various miscellaneous salaries, summed to an annual budget of about $60,000. Since at that time Schenectady had about 2500 households, this meant an average cost of about $24 per household. For a laborer making $1 a day, this represented about 8% of income.

The case study to be the focus here is water supply. The main reason Schenectady adopted a city-wide water system was not for drinking water. This was easily, though with unhealthy results, obtained from wells. The main initial purpose of a water works was to provide water under pressure that the volunteer fire department could use to put out fires. Since fire could affect all citizens, water had to be paid for by all citizens, through the property tax.

In 1867 Charles Stanford presented a bill to the State Senate to raise Schenectady's legally authorized borrowing capacity enough for it to build a system for the supply of water. This effort came in the midst of a series of damaging fires at the locomotive works, the Clute works, the Westinghouse Works, and numerous smaller fires elsewhere. With most fires came an often angry discussion of whether the volunteer firemen had enough water to limit damage.

Private corporations had launched water supply efforts before 1860 in Schenectady, but those efforts were long since abandoned. Stanford's bill put the responsibility on the city. The city would appoint three water commissioners. They would commission a plan for a water supply system. The plan would be voted on by the Common Council. If approved, the bill gave Schenectady the authority to sell water bonds to pay for it, the bonds to be repaid with later water revenues. These revenues would include payment by the city for the pipes and hydrants for fire fighting, to be paid for by increases in the property tax.

One additional feature had been added to insure passage of the bill. The decision of the Common Council had to be voted on by the property owners of the city. In 1867, immediately on passage of the act in the State legislature, this mechanism went into action. The Water Commissioners were appointed and a plan was drawn up. It proposed drawing water from atop Albany Hill, from Sand Hill creek, one of the three streams that combined to form Mill Creek and empty into the Mohawk. The water would then be sent through pipes by gravity to six of the nine squares of the city, leaving College Hill, Vale, and the Mill Pasture to continue to use well water. Some 100 fire hydrants spaced around the city would fill the fire department's hoses when needed.

The plan secured the endorsement of both the city's newspapers. A meeting in favor of the proposed water system was attended by most of the city's elite, plus an enthusiastic crowd of supporters. By contrast, a meeting in opposition to the plan had few prestigious organizers and was poorly attended. Arguments against the system centered on its high cost, some $150,000, and the alleged excessive and irresponsible power given to the Water Commissioners. This contrasted to a much stronger and more specific case given by the proponents. City water plans had succeeded elsewhere, especially in the cities of New York State, from New York City to Buffalo, including some smaller ones that Schenectady aimed to emulate and compete with. The danger of fire would be greatly reduced. The system would pay for itself as more and more homes and businesses connected to the system. The enthusiasm of Stanford and leaders such as the Ellis and Westinghouse families seemed to have carried all before them.

Then, in July of 1867, the vote by property owners was held. The Water System proposal lost by a margin of more than two to one. The verdict was city wide, being essentially the same in each of the

nine squares of the city. Proponents struggled to explain this outcome. One commentator came up with a particularly implausible explanation. Because it was a vote of property owners, some women were allowed to vote. It was the alleged nearly unanimous vote of those women, said this commentator, that doomed the water system.

The reality was simpler, if less palatable to the advocates of civic improvement. Against that elite of improvers stood a silent majority of economizers. These were people for whom even $20 a year in taxes was a noticeable bite out of annual earnings of a few hundred dollars, about half of which went for food, about a quarter for lodging, and little if any was saved. Any suggestion of increasing the property tax bill set off alarm bells. About half of Schenectady's families owned property, and most of those property owners had incomes low enough to be in that tax-alarmed group.

As in the first half of the century, an attempt to understand local politics must look beyond party labels and national issues. In general, in Schenectady, the economizers outnumbered the improvers. The cost of a proposed improvement weighed heavier on the majority than did its benefits. If there was an established way to provide a service, whether policing by barely paid constables, fire protection by volunteer firemen, water from wells, or dealing with sewage by holding your nose and ignoring it, that silent majority was typically against a costly improvement. It is questionable whether any proposed improvement before 1900, and perhaps after, could have survived a secret ballot of property owners. The only other one that was tried, a sewage system proposed in the 1870s. It was voted down by the same two-to-one margin as the 1860s water system proposal.

In general, from 1860 to 1890 the best way to be elected mayor of Schenectady was to pledge to reduce the budget. The general tone of political appeals was expressed in a Republican newspaper in Jan 1869, but could have just as well been expressed in the Democrat paper:" the vital necessity of the present day is retrenchment."

To the improvers, this did not mean giving up. It meant carrying out improvements without asking the people's permission. Charles Stanford, in the immediate aftermath of the water system defeat, turned to private enterprise. Stanford organized a private water company, raised a capital of $100,000, and had a water system built.

It was indeed an improvement, but one with problems that only gradually became apparent. The problems stemmed from its limited scope, and the limited public health knowledge of its builders. The water plant was put on the bank of the Mohawk River at the north edge of the Stockade. It drew water directly from the river. That meant a more than adequate supply even if the city grew. This would not have been true of the Albany Hill source, which could have served a city of 10,000, but not one double that size. The water plant's location was near the highest concentration of population, reducing the cost of pipes compared to the city plan.

The location was also just downstream from where the Mill Creek poured the pollution of its tributary, Cowhorn Creek, into the Mohawk. Cowhorn Creek flowed out of Vale and through part of downtown before entering its square identified by its name . It had been suspected since at least 1832, when a Union College professor made a farsighted suggestion to treat city water with chlorine to fight a

cholera epidemic, that some of he most serious city diseases, typhoid as well as cholera, were water borne. The Schenectady newspapers in the 1870s and 1880s carried stories by such world experts as Rudolf Virchow of Berlin giving scientific support to this suspicion. At least one Schenectady doctor noticed and commented on that Virchow article. Furthermore, it was obvious to anyone with eyes and a nose that Cowhorn Creek was being used by nearby residents as an open sewer. Yet the seemingly obvious first law of water supply, do not put your intake downstream from your principal source of pollution, was not followed.

Stanford's water plant, despite its many faults, was a definite improvement. To the extent it caused many inhabitants to switch to the then only lightly polluted river water from heavily polluted backyard wells it undoubtedly saved lives. Those backyard wells, often dangerously close to the underground privy vaults, were the city's main source of the germs causing typhoid and other diseases. However, as the river became more polluted, and as the Stanford water plant became increasingly inadequate, the city water question persisted.

Politically, that water issue became less about health and safety, and more about scoring political points, discrediting rivals, and controlling patronage jobs. Meanwhile Schenectady suffered a rate of typhoid some three to ten times the typical U.S. city. The disease killed only some 5-40 people a year in Schenectady, with the total varying widely due to weather and river flow conditions.

This was not enough to make Schenectady's overall death rate much different from average for all US cities. Still, typhoid was a preventable toll that it took Schenectady three decades to prevent. In a modern city, hardly anyone ever dies of typhoid.

In 1872 Stanford had his unfortunately placed water plant built, and put into operation. Besides his ownership of the Water Works, his monopoly-like grip over the Schenectady game board extended further. He partnered with such individuals as George Maxon, N.I. Schermerhorn, and John McDermott to buy the local gas company from the people who had bought from the 1850s Know-Nothings. When a fire at Schenectady's Brandywine Knitting Mill led to the possibility that the company would relocate in nearby Amsterdam, NY, Stanford led a group that re-capitalized the company and kept it in Schenectady. When local merchants started building new business blocks on State Street, Stanford commissioned the biggest and best.

He was not uniformly successful in these ventures. Only the knitting mill, in which he was only indirectly involved prospered. The water company, by contrast, was almost immediately criticized for delivering often dirty water, often interrupted, and for rapidly wearing out equipment due either to poor design or poor maintenance. The gas company had similar problems. As for the Stanford Block, just before completion it collapsed, killing at least one workman. So Stanford's private efforts did not conclusively demonstrate the superiority of free enterprise. In the continuing quest for both development and economizing, attention turned back to political solutions.

Those political solutions tended to be rhetorical rather than practical. One main political theme was "reform and retrenchment". In this view, the city's elite was soaking the taxpayer to pay for poorly designed and unnecessary luxuries such as that a city water plant or sewer system, and those worthless

city railroad bonds. Another perennial theme was corruption. The city government, reformers alleged was dominated by a "ring" of contractors who fixed bids for city construction and bought votes. This version was particularly attractive to Republicans, the city's minority party. Sometimes they even caught the Democrats in the act of vote buying and other electoral offenses. Democrat Peter Tempany, for example, was convicted of tampering with the election of 1870 and had to pay a fine.

Despite these well publicized incidents, Schenectady did not develop a particularly corrupt political system. Nor did it fall under the form of "boss" rule that characterized many other cities. This was in part due to the ethnic balance of power that developed in the city. Unlike such Irish cities as Boston or Albany or such German cities as Milwaukee or Cincinnati, in Schenectady there was an even balance by 1875 among earlier arriving Irish-Americans, the German-Americans who followed later but in greater numbers, and the persisting and inflowing from the countryside Yorkers, many of Dutch descent.

Due to this ethnic stalemate, Schenectady avoided a typical US city pattern. Schenectady's mayor post did not pass to Irish immigrants, as happened stereotypically. Instead, Yorkers, and particularly those with the Van prefix, held on to the mayor's post. In the 19th century some one-fourth of Schenectady mayors had the Van prefix, while the second most frequent surname class was Smith.

Only a few Irish-American of German-American politicians became occupants of the major city wide offices. Patrick Farrell became the first Irish immigrant to be elected to a city wide office, that of assessor , in April 1875. His ascent was greeted with condescension even in the newspaper of the Democrat Party that elected him: "Our adopted citizens present but one representative on the general ticket, and on balance they never asked for a better man." James Flinn, the son of an Irish machinist who came to Schenectady with the Norris Locomotive Company, was elected to the even higher post of Recorder in 1883. However, neither Flinn nor two other men of Irish descent who rose high in Schenectady politics, John McDermott and Thomas Dormady, was successful in making the final step to election as Mayor. Each secured a Democrat nomination for that post, but each lost in the general election.

Instead of a single boss and a single dominant political club, Schenectady developed a set of what were sometimes referred to as "Ward Kings": leaders of ethnic factions within the city's wards. These included mainly Democrats, such an Irish contractor John McDermott and German barber George Holtzmann in the Fonda-Romeyn section (Third Ward), and German butcher Fred Reaber and Yorker blacksmith Ephriam Clow on Albany Hill (Fifth Ward). Occasionally a Republican boss emerged, such as Irish hotelkeeper William Anthony at the boundary of the stockade and Poor Pasture (second Ward).

Now and then a third party movement would arise. Most persistent, though not very successful, were the prohibitionists. More episodic, though occasionally significant in city outcomes, were various parties that labeled themselves Workingmen or National Labor. Least persistent, but occasionally very successful, were the occasional Civic Reform Parties, which typically fused with the Republicans and once in a while helped them defeat the Democrats.

Meanwhile the fate of the city was being shaped not by its internal politics, but by the economic

state of the nation. The years 1865-1886 were punctuated by two major national depressions, in 1873 and in 1884. Both of these had decisive impact on Schenectady, a city of machinists and machine works dependent on national prosperity for the investment that created orders for machines.

The 1873 depression brought to a sudden end the rising revenues of such companies as the Schenectady Locomotive Works, the Westinghouse Agricultural Works, and the Clute Works. George Westinghouse, Sr. had been cautious in growing his company, so needed to cut back the least in that depression year. The Ellis brothers had also been conservative in the expansion or their production, but for an aspiring locomotive works the options were grow or die. The Schenectady Locomotive Works roughly tripled its annual production between 1865 to 1873, from 20 to 60 locomotives per year, with a lower proportional increase in employment, from about 400 to about 800 men.

With the 1873 depression, locomotive orders ceased, and the plant shut down temporarily. The company was still financially sound and still maintaining its production capability, but awaiting better times. For the Clute Works, the failure of the Ericsson hot air engine to catch on meant a further specialization in marine engines and boilers. Some apparently not very successful ventures at producing torpedoes and torpedo boats for the world's navies further drained capital. While never closing down, the Clute Works shrunk in size from its end of Civil War peak, from employing perhaps 200 workers in 1866 to 100 or fewer at the time of that 1873 depression. It did, however, gain a solid reputation in its marine boiler and engine specialty, and managed to weather the depression.

Early in 1876, economic statistics were reflected in human hardship. The number of persons applying for the city's very limited support to the poor appears to have doubled, based on the expenses under that category in the city records. A special meeting called on 26 Jan 1876, by many of the city's leaders, such as the Ellis and Westinghouse families, proposed the organization of a special fund for relief of the unemployed, to which the well off would contribute, and which a committee of socially prominent women would run.

At that meeting, a prominent Democrat politician, Alex J. Thomson, remarked that the extent of destitution caused by the depression was exaggerated. The reaction was quick and angry. The next morning signs appeared around the city: " Notice is hereby given to all laboring men out of employment to meet at the Court House on Thursday evening Jan. 27 at 7:00 to take action in regard to obtaining employment. By order of the Laboring Men of Schenectady."

Who were those Laboring Men of Schenectady? The question evoked some controversy. When the meeting convened, the men in charge were predominantly Republicans. The meeting president was Solyman Hamlin, editor of Stanford's and the city's Republican newspaper. The Secretary was Madison Vedder, a Republican who led the pro-economy, anti water supply wing of the party. This led some Democrats to dismiss the meeting as "party chicanery."

However, even the city's Democrat newspaper recognized that "the problem is real." The Republican paper agreed: "There are many cases in this city of good respectable workingmen who have never been needy before, but who are now on the verge of starvation." If the occasion for the meeting was politically manufactured, the meeting took on a life of its own. The words "let us show the mayor

and Common Council that we need and must have work" were greeted with "loud applause". A committee of five, led by the superintendent of the new grain elevator, was commissioned to bring a message to the Common Council: find a way for the city to create jobs. The council gave the committee a hearing, and appointed a committee of its own to consider the matter.

Then over the next year, a genuine Workingman's party emerged. At its formal organization meeting in Union Hall on 23 Sept 1877 James Lighthall, a tinsmith was elected president. Other leaders included machinist Fed Eisenmenger, and three carpenters, Philip Fryer, Avery Sibley, and Spencer Crouch. On 26 Sept 1877 Eisenmenger was among the delegates elected to the Workingmen's State Convention. A proclamation was read stating that "we believe a large share of our miseries has its origin in a class of legislation solely in the interest of capital… the old party organizations in the county of Schenectady are in the hands of a few unscrupulous and selfish politicians, either the Democrats or the Republicans." The new party's role was defined as "protection of labor".

This role was not universally accepted. Many workingmen remained loyal to the Democrats. In response, a letter to the editor on 15 Oct 1877 from "A Toiler for Daily Bread" argued that a vote for the Workingmen would help the Republicans by taking a vote away from the real workingman's party, the Democrats.

The next few city elections gave some support to the views of both the Democrat skeptics and the Workingmen's party true believers. In both the state assembly election of 1878 and the mayoral election of 1879, the Republican indeed won in large part because of the votes the Workingmen drew away from the Democrats in the usual Democrat strongholds, Fonda-Romeyn and Frog Alley. Also in 1878 and 1879, however, Workingmen won elections as aldermen or city officials, and over the entire city the Workingmen in 1878 outpolled the Republicans, though finishing behind the Democrats city wide. Those victorious Workingmen would be the only third party candidates elected to city positions between the fall of the Know-Nothings in 1857 and the arrival of the Socialists in 1912.

By 1879, however, the Workingmen's vote city wide had fallen below that of the Republicans, and the party's one win that year was narrow and controversial. In the Poor Pasture, Workingman Adam Mellman was pitted against Democrat James McDonald. The count of votes was carefully watched by both the Workingmen's election inspector, and Democrat election inspector Peter Tempany. The count gave a one vote victory to McDonald. The Workingmen protested and demanded a recount. This second tally resulted in two fewer Democrat votes, and a one-vote victory for Mellman and the Workingmen. In vain would Peter Tempany protest, in a hearing at the next Common Council meeting, that the recount was carried out suspiciously near a narrow gap between two tables, and that the next day he had found at least two Democrat ballots under those tables. The verdict of the recount stood and Workingman Mellman was sworn into office.

Despite only modest success at the polls, the Workingmen did have an impact. The petition arising from their original meeting did result in a special committee of the Common Council, and their report led to adoption of a system of putting some of the unemployed to work on the city's streets. Mayor W. Howes Smith described the system in 1877 as "a day for coal or wood, a day for a dollar." In other words, those receiving both $1 a week and coal or wood for fuel would render 2 days service to the city's Department of Streets.

The initial set of applicants numbered 40 men, mostly out of work laborers, but also included more skilled crafts, such as two boilermakers and a brickmaker. A city newspaper on 30 Jan 1877 remarked that "the reader will be surprised at the minority of names of those of foreign birth" on the relief list. Indeed, the list did not include a single representative of the Mc or Sch name groups, while including four from the Van group. Most of the men on the list, however, had standard Yorker or Yankee names such as Smith, Johnson, Carey, Hall and Adams.

Mayor Smith was careful to point out that only the hard working poor, not the lazy, would be eligible. "I have been able to distinguish," he claimed on 13 Feb 1877 , "those who are honest and **w**illing to work from those who have been overtaken by misfortune from those who wish to use a life of absolute idleness."

With the moderating of the depression by 1880, the Workingmen's party disbanded. Its leaders resumed previous party affiliations. Daniel Morrisey and John Young , for example, returned to the Republicans, while Fred Eisenmenger and Henry Hoppman returned to the Democrats. The episode had boosted Eisenmenger's political stock, and his ambitions. Still a machine shop foreman, he started studying law at night, aided by his former Civil War comrade-in-arms, the Republican leader and ex-Judge Austin A. Yates. In 1882, while still an apprentice lawyer, Eisenmenger was named Police Court judge. In vain did one of the city's old line lawyers, Demetrius Chadsey, protest. "I very much doubt," said Chadsey, "the propriety of making the office (of Police Justice) a sort of law school." When Chadsey contested with Eisenmenger at the next Police Court Judge election, the student beat the established professional by a margin of 3-to-1.

Fred Eisenmenger went on to become an extremely effective and well-regarded judge, putting help for those who came before him ahead of politics. On occasion this extended to supplementing out of his own pocket the poor relief he supervised. On one occasion, he passed the hat in court to enable a couple who had been stranded in the city continue their train journey to their home in Detroit. Nicknamed "the Squire" he became a sort of sage, to whom ordinary people appealed not only for help but also for advice. On one occasion, in September, 1886, he had to turn down a request from an attendee at a Saturday morning open court session that he advise her on whether she should leave her husband. On the Democrat ticket, he was perennially the leading vote getter.

By 1880, Schenectady politics was back to its previous habits of concentrating on disputes over assessments for street paving, and doing very little about the issues that would shape its future, such as dealing with water supply and sewage problems, and attracting new industry. The recovery from the depression, though heartening to the well off, was so anemic among the less prosperous that some modern commentators speak of one continuous depression from 1873 to 1886.

Part of that persistent problem was the lack of those second earner jobs for the families of laborers and lower wage or intermittently employed craftsmen. Under the 1880 headline "Employment for Women" a commentator noted that "at this time the only factory labor for girls and women is at the Roy Shawl Works, the Brandywine Mill, and Truax's paper box and printing establishments". Estimating the total number of women employed, the commentator said "200 would not be far out of the way."

This was at a time when Schenectady had about 2500 families.

Fortunately private enterprise proved capable of addressing that issue. From 1878 through 1884, the city saw the arrival or local creation of a number of new manufacturing companies of widely varied purpose. Most were small in scale, with the venturers building or buying a three story brick building, putting a 50 horsepower or so steam engine in the basement, installing machines on the first and second floor run from shafting, or in at least one case, hydraulic power distribution, from that engine, processing raw materials on the third floor, hiring a work force of a few dozen, typically at least half women and children, and proclaiming a probability of growing to a work force of more than 100.

The Wiederhold brothers, for example, were German immigrants who initially ran a clothing store. In the 1870s they branched out into the production of hoop skirts. When these went out of style, John Wiederhold found a new partner, and embarked on the production of ladies' and children's undergarments. In 1879 the Wiederhold Company built a factory. It would employ more than 100 workers, mostly women, serve a national market, and last well into the 20th century.

Solomon Susholz, son of Alexander, partnered with a local jeweler to start a factory making red flannel underwear. This company also built its own factory, which was in operation in 1881, and described in detail in a 14 July 1881 article. The initial work force was thirty, supervised by six foremen or "bosses", one of whom had been hired away from the Westinghouse Co. . The production process began with the arrival of raw cotton, which was initially picked and carded. It was then spun into yarn using machines called mules, knitted into cloth on knitting machines, and formed into special segments on specialty machines such as a cuff machine, the single most expensive machine in the plant. Power was supplied by a single 60 horsepower steam engine. In the final step in the process, the largest group of workers, a force of women running sewing machines, turned out 75 dozen units of underwear every day.

These manufactories were typical of any little US city in the second half of the nineteenth century. More specific to Schenectady were jobs drawing on its growing specialization in machinery and technology. These new ventures drew on the themes of larger city outflow, rural town inflow, and the increasing degreed of local financing that Charles Stanford and his colleagues N.I. Schermerhorn and G.G. Maxon had earlier initiated.

For example, in 1879 Schenectady was able to bring to the city from nearby West Troy a works that built cars for the recently introduced horse-drawn street railways. The proprietor, Willam A. Jones, intended to expand into railway cars. He built a works on the Mill Pasture, just beyond the Westinghouse Works, further identifying that portion of the city as the rising manufacturing district. By 1882 Jones employed more than 150 workers, and was producing his first railroad parlor cars and sleeping cars. Both to attract Jones to Schenectady, and to finance his expansion, a new Schenectady bank, the City Bank, was created under the leadership of Schenectady dry goods merchant T.W. McCamus. Its large investment in the Jones Car Works mirrored the way the Mohawk Bank had backed John Ellis in 1857.

A second venture identified a way to boost both agriculture and manufacturing in the Mohawk

Valley. Sugar beets came into prominence around the world in the mid nineteenth century as rival raw materials to the sugar cane industry. That industry had been tightly controlled by a few major producers, with corresponding political influence, high tariffs, and high prices. In France and Germany sugar beets became the basis of a new sugar supply. The US followed, with US plants in California, Maine and Delaware, in operation by 1880.

This was just when broom corn growing and broom manufacture was starting to move to Illinois and other states to Schenectady's west. At least one farmer on the flats switched planting on his broom corn acres to sugar beets. Local stockholders organized the Mohawk Valley Sugar Manufacturing company, and a factory was planned for a spot in the Mill Pasture between the Jones Car Works and the Westinghouse Works. .

Another venture was the result of industrial inflow. Augustus Kilmer of Howe's Cave, NY, in nearby Schoharie County was a farmer-mechanic in the mold of George Westinghouse, Sr. He had noticed a new opportunity for mechanization: making the wires that held hay bales together. He earned twelve patents on machines for taking wire imported from Belgium, coating it, heat treating it, drawing it, cutting it, and applying fasteners to produce a superior product at a competitive price. As demand outgrew the capacity of his Howe's cave plant, he looked up and down the Hudson River and as far away as New Jersey for a new location. He chose Schenectady. His plant site in the Mill Pasture next to the Westinghouse Works further confirmed this section of town as the rising manufacturing section.

A further venture involved more pioneering. Indeed, it was advertised as the only manufacturing works of its kind in the world. This was the Coralline works. Coralline, a biological term describing marine organisms such as corals, was in 1880 being used to describe a new invention in the field that later would be called plastics. After the Civil War, an effort was underway to replace ivory and other expensive natural products with chemically produced synthetics. The leader in the field was John Wesley Hyatt of New Jersey, who had invented a material called Celluloid. It was promising, ultimately successful, and today regarded as a pioneering plastic. Being, however, made of gun cotton, it could be explosive both in manufacture and in use.

A Schenectady dentist, Dr. Volney Smith, had gone West with the gold rush, returned east via Newark, NJ, home of celluloid, and set up again in Schenectady. Along the way he investigated material for the base of a dental plate. In a handful of patents, he claimed he had invented a material related to but distinct from celluloid. Coralline, the name he gave his invention, could be produced from similar ingredients to celluloid's, but allegedly without the danger of explosion. He decided to build his first manufacturing plant in Schenectady. This also resulted in a second new industry, as Smith also had built a factory for making products such as jewelry, mirror backings and combs out of coralline.

All these efforts revived Schenectady enthusiasm. Newspapers rang with expressions of boosterism. Into this reviving economy, in 1882, stepped two well established leaders who seemed to have experienced a late life crisis, or at least a late life urge to have one more try at the big time. They were Charles Stanford and Walter Mc Queen. Each was Schenectady's leader in an important category, Stanford being its leading entrepreneur, and McQueen its leading technologist. Each had also, in the

early 1880s, experienced a recent disappointment.

Stanford's setback was in politics. In 1882, the State Senator serving Schenectady County and its neighboring counties died in an accident. The district seemed safely Republican, so when Stanford secured the Republican nomination to fill the vacated post, he seemed on his way back to Albany. Many of the district's Republicans, however, remembered his treachery toward Robert Dorn in the 1860s. The district's Democrats adopted an anti-monopoly platform and portrayed Charles Stanford as a millionaire monopolist. If the district residents confused him with his more famous brother, the notorious California millionaire railroad monopolist Leland, so much the better. The result of was a decisive defeat that finally ended Charles Stanford's political ambitions. A serious illness he suffered at this time also may have reminded him of the limited time he had left to make his mark on the world.

Walter McQueen had gradually receded from his dominance over the design and production of locomotives in Schenectady. He had been replaced as superintendent of the works in 1875. As it became evident that the days of the 4-4-0 locomotive were numbered, it became clear that his days as chief designer were numbered also. It may also have irked him that while Schenectady's product was colloquially known as a McQueen locomotive, the name of the place where they were made was typically referred to as the Ellis works. The last straw came in 1882 when the Ellises named a new chief designer, a highly regarded expert who had been trained at the Baldwin Works, A.J. Pitkin. This also signaled a move away from the McQueen designs to new ones featuring larger size and more power.

McQueen and Stanford seem to have been talking business even before Pitkin's arrival. The newspapers reported in 1881 on rumors of the likely formation of a second locomotive company in Schenectady. The site for the works was identified. Again, it was in the Mill Pasture, beside the beet sugar works, in the space between the Jones Car Works and the Westinghouse Works. The capital declared for the new firm was $300,000, matching that of the Schenectady Locomotive Works, and three times that of any other Schenectady business proposed so far.

In March of 1882 the McQueen Locomotive Works was officially launched. The investors were a city who's who: in addition to Stanford and McQueen they included Stanford's longtime associates G.G. Maxon and N.I. Schermerhorn, lawyer John DeRemer, dry goods merchant and bank president T.W, McCamus, Walter A. Jones of the car works, and John D. Campbell, son of trading heir D.D. Campbell.

All this was a bit illusory. That $300,000 capital figure did not mean that a sum of $300,000 rested in the bank account of the McQueen Locomotive Works. It meant that the stockholders had taken their shares on the promise of putting up a small fraction of that amount now, and more later in response to assessments by the management. It is doubtful that the Schenectady investors, other than possibly Stanford, had a total of $300,000 to invest. Instead they probably were acting like many who got in on the ground floor of an initial product offering. That is, they intended to see the stock rapidly skyrocket in value, then sell out to others with deeper pockets, earning for themselves a quick and healthy profit. Within a year or so most of the actual investment in the new company, other than Stanford's, was coming from stockholders in New York City, not from Schenectady.

In retrospect, the McQueen Locomotive Works can be seen as the result of irrational

exuberance. The backers of the company proclaimed with most of the US needing more railroad connections, and with a world to come after that, there would be almost endless new railroad mileage, therefore many more locomotives, and therefore the need for many more locomotive manufacturing companies. Further, there were all those obsolescing 4-4-0's that needed replacement.

In reality, the US railroad network was reaching the stage of being fully built, even overbuilt. The world market would develop only slowly, erratically, and with many overseas competitors. The number of new locomotives would not be as large as anticipated, in part because those new ones would be more powerful, so each would pull more cars. As locomotive manufacturing became more efficient, the existing 18 or so major US locomotive works would be more than sufficient. So much more, in fact, that their challenge from 1884 on would be sharing a limited amount of business, not meeting an ever-expanding demand. This would result in consolidation, not expansion. Two more wars, in 1914 and 1939, would extend the life of US locomotive manufacturing companies. Unfortunately for the McQueen Locomotive Works however, neither of those wars came along in 1884, in time to save it as the Civil War had saved John Ellis's venture.

So the apparently bright prospects for industrialization of the early 1880s had to be put into perspective. Schenectady was still a seventh magnitude city. It was an ugly one, a conclusion generally reached by those who happened to get off at the city's ramshackle railroad station, stay in one of its shabby hotels, or walk around downtown. Only those who visited the Union College campus had kind words about Schenectady's appearance.

Schenectady was also, by modern standards, a dirty city, though no dirtier than its urban contemporaries. When, on 20 Sept 1877 Cornelius Shannon was called before the city courts in 1880 for raising pigs in a particularly crowded section of Albany Hill, it was not pigs in the city that were the issue. It was the "offensive condition" of Shannon's particular operation. The city physician declared it particularly "provocative of fevers, cholera and infantum." The jury found the complaint "well founded." Shannon was fined, and given 24 hours to clean up his act. He was, however, allowed to keep his pigs. Pig raising in the city remained, legal into the 1890s.

Pigs were far from the smelliest or most dangerous nuisance. On 3 Aug, 1881, city resident Solomon Abrams led organized a campaign the New York State government for " redress for the condition of Cowhorn Creek and other obnoxious open sewers." In response the state Board of Health visited and declared that " a vast amount of sickness, suffering and mortality already results from the negligence of those things in that city". The Board also "found the city authorities too indifferent to take the action which seemed necessary." Those city authorities had responded to the Cowhorn Creek problem with an ordinance requiring property owners adjoining the creek to clean out obstructions. When those property owners refused to comply and were fined, they protested so vigorously that the ordinance was repealed. No significant city action was taken to clean up Cowhorn Creek for the next 15 years.

Schenectady was also a hard drinking city, though again, not exceptionally so. For the nation as whole alcohol consumption, though declining due to the increased consumption of beer in place of

whiskey, was far above modern levels. Temperance ranked alongside workingmen's rights as a political issue. A candidate who was strong on one or both of these issues had a considerable advantage, especially if he had rarely or never run for office and so was not tarred with the general disdain accorded politicians.

For example, in 1883, the Republicans, still seeking to overcome their general numerical inferiority, found an ideal candidate. John Young was foreman of the brass foundry at the locomotive works. He had been an organizer of the Workingmen's Party. He was a leader of the local temperance movement. He had run for office only once before, losing narrowly. He neither sought the nomination, nor made a speech during the campaign. Facing one of the city's Democrat leaders in the mayoral election, Young won decisively.

Though inexperience, prohibitionist views, and a workingman identity were electoral assets, they did not help much in governing. Young tried to apply his anti-liquor principles by raising the price of liquor licenses, and cutting in half the number of licenses allowed. When Matthias Treis, the German born Albany Hill saloon keeper, came before the excise board to renew his license he was told that "the board does not feel disposed to grant a license in your district."

"Well, I do not see why not," Treis replied. " I have kept a good place for twenty years." His subsequent arguments did not sway the board, and, rejected, Treis "turned sorrowfully away."

The reaction of Treis and the other disappointed license seekers quickly turned, however, from sorrow to action. They each contributed $20 to a common fund, for the purpose of paying the fines of any rejected saloonkeepers who defied the excise board and kept their saloons open. They also acquired the legal services of Austin A. Yates, grandson of the governor, Republican lawyer, Civil War veteran, and ex-judge. Then they proceeded to sell liquor without licenses, using their war chest to pay any fines that resulted. Arrests were made. In court, however, Yates so skillfully discredited the chief police witness that most of the accused were found innocent, while the few convicted paid their fines from the fund.

Meanwhile, pro drinking forces drove through the state legislature a bill to make the excise board in Schenectady elective rather than appointed. In the first election, the pro-saloon ticket of the Democrat party won overwhelmingly. Treis, and most of the others initially turned down, were back in business, though the higher fees remained. Meanwhile the local temperance organization split between its extreme prohibitionist and pragmatic temperance wings, and never regained its political clout.

In part because it was a dirty and hard drinking city, Schenectady was also a dangerous city, No more so, again, than U.S. cities in general. As elsewhere, the many parallel railroad tracks running through the city led to frequent accidents, sometimes with fatal results. There was a railroad accident at least once a month in the city or its immediate surroundings, and about half of those accidents led to serious injury or a death. The main victims were the railroad workers, subjected to what would today be regarded as appallingly dangerous working conditions. In addition, however, a surprising number of pedestrians were run down by locomotives when crossing the street-level tracks.

In a typical accident, on 14 Oct 1878 Lewis C. Barhydt, retired proprietor of the Barhydt and Greenhalgh spring works was run over by a railroad train near the State St. crossing. He was somewhat deaf, it was dark, and the coming of the train was hidden by another on a parallel track. Barhydt was described as a modest unassuming courteous member of the Methodist church whose industrial efforts had led to the employment of many skilled workers. “This harrowing accident” the paper concluded, brings home to residents the “constant menace” of railroad tracks through “the heart of the city.” It would not be until the 20th century that these tracks would be elevated above street level.

Schenectady was a dangerous city for other workers and other citizens as well. The dangers, again, were typical of 19th century US cities. High levels of infant and child mortality resulted from poorly understood germ based diseases grouped in city reports under such general labels as "cholera infantum." The leading cause of death in all cities among adults under 40 was tuberculosis. Schenectady was average on tuberculosis, but well above average in the occurrence of typhoid fever and other water borne diseases.

To get a distinctly Schenectady slant on these general city problems, consider first statistics, then three characteristic stories. As for statistics, until 1882, Schenectady residents did not know how bad things were. It was it that year, for the first time, that the city's Board of Health was required to compile statistics of births deaths and marriages. The first compilation, for the year 1882, showed that some 396 people had died, 309 babies were born, and 120 marriages had taken place. The leading cause of death was "consumption" (tuberculosis) with 69, but typhoid was alarmingly high, in third place, with 44.

Many of the city's dangers were ordinary ones, persisting from previously simpler times, not new products of unchecked capitalism. However, growing population density now made those previously ordinary perils far more deadly. Population density was, for example, the main cause of tuberculosis deaths. The more closely spaced people were, the more likely were , germs carried through the air on tiny water droplets from the already infected to reach new victims. Adding to the tuberculosis problem, the prevalence of alcoholism, the exhaustion resulting from 10 or more hour working days, and the poor diets resulting from lack of refrigeration and living on $1 a day, weakened individual resistance to this endemic disease. Its steady toll on relatively young adults was taken for granted, Laborer Billy McKinney, for example, was a Civil War hero who had lost his arm in battle while trying to save the life of a comrade, Cornelius Barhydt. While this and his subsequent career as a railroad employee and minor political figure got much space in his obituary, the fact that in 1879 a 40 year old man could die of "weakness of the lungs" was treated as an ordinary occurrence.

Finally although the railroad toll was new, such mundane sources of accidents as unattended children falling into the canal, other falls or horse drawn vehicle accidents due to alcoholism, and accidents due to product defects, led to perhaps 30 deaths per year.

The toll of other types of ordinary accidents can only occasionally be glimpsed in surviving documents. One such episode, in the life of Matthias Treis’ nephew. Nicholas, can stand for many. One of the first generation born in America, Nicholas had begun his working life as a laborer. In 1882 things

were looking up. He had married, fathered a child, and secured a better job as branch tender, a sort of switch operator, for the railroad. One day he borrowed a shotgun from his father-in-law and went hunting on the flats. The gun blew up, and he lost a hand.

Nicolas Treis is next encountered in the city records in March, 1885, as a "one-armed German" occupying the lower portion of a house on Paige St. on the border of cotton Factory Hollow. He had gone to the police after a neighbor, William Hutchinson "had threatened to knock a very warm place out of him and his wife as well." Hutchinson was a widower with 4 young children who boarded with the Treis family and paid Mrs. Treis to watch the children during the day. The trouble arose over money matters. Hutchinson was found not drunk enough to arrest, so the police advised the parties to settle their difficulty amicably.

The mixture of upward and downward mobility, of good and bad luck, was typical of immigrant families. Peter Tempany, as noted, had risen from laborer to baggage handler. One of his daughters, Margaret, had married Richard Lomansey, an Irish blacksmith's son who attended Union college and become a lawyer and significant local political figure. Another daughter, Mary, however, had been declared insane and sent off to the State Asylum at Utica. His nephew Peter Tempany had risen from laborer to employee of the Locomotive Works. There in June, 1886, he suffered "quite a severe accident" when a casting fell on his right foot.

Another characteristic story occurred further up the social scale. It illustrates the possible entanglement of industrialization and water supply issues, as well as the ordinary riskiness of life in the 1880s. Of the four descendents of Peter I. Clute who shared responsibility for running the Clute Works, grandson Spencer Ostrum was generally recognized as the most mechanically astute and dynamic. Contemporary records attribute the success of the company in the Civil War era to his leadership. As his uncles retired in the 1880s, more responsibility was piled on his shoulders

On Sept 1 , 1881, Schenectady citizens were shocked to learn that 51 year old Spencer Ostrum, apparently in his technical and business prime, had died of typhoid fever. Until that date, the Clute Works had been regarded as a sound and prosperous business, though not a growing one. From that date, a different picture emerged. Battles over who would assume leadership, some in court, paralyzed the firm. No new orders were taken.

Almost as suddenly as Ostrum had sickened and died, the Clute Works fell into the hands of a receiver. This bankruptcy, was announced on 27 Jan 1882. The causes of the collapse remain mysterious. It would be hasty to blame it on Ostrum's sudden death alone. Nor is it certain that Ostrum's cause of death was typhoid. Medical diagnosis was far from infallible in 1882, two years before the exact microorganism that causes typhoid was identified by German researchers. Nevertheless, the circumstantial evidence remains strong that water borne diseases were stalking the world cities in general, and Schenectady in particular.

Nor was it certain that Ostrum's disease came from drinking tainted water. That remains, however, the most likely explanation. In any event, the deaths of the man and the company certainly suggest that industrialization and water supply were not separate topics, but were closely connected

with potential causation running in both directions.

Typhoid, even when not fatal, had serious effects on both ends of the social scale. When George Westinghouse, Sr., died in Dec, 1884, at the age of 75, his obituary noted that "about three years ago the deceased suffered from a severe attack of typhoid fever, and his health never was good afterward."

At the other end of the scale, 17 year old domestic servant Minnie Stoddard attempted, on New Year's Day, 1886, to throw herself under the wheels of a moving freight train. She was pulled from the tracks, badly bruised but alive. Explaining her behavior, her employer Dr. McDonald, stated that she had been suffered from "melancholia produced by typhoid fever." While the case was unusual, the disease was not. " Typhoid fever (is) prevailing in the county to an alarming extent," the same newspaper noted on 4 Jan 1886.

Not only the dangers of tainted water but also the dangers of industrial accident stalked the apparent prosperity of Schenectady's 1880s. An example here is a mysterious event that happened in Schenectady on 17 July 1882. Again, it is cited not because the episode was uniquely deadly, but because it was characteristic of the times.

It was early evening and Coralline Works foreman Isaac Reagles had just finished his shift in the mixing room. He sent the four teenaged boys who worked for him up to the scrap room to start preparing material for the next day's work. He then went to wash up. At precisely six o'clock, marked by a loud whistle from the locomotive works next door, he was buttoning on his suspenders. That was when the first explosion occurred. Moments later, it was followed by second explosion.

"I saw the boys fall with the debris," Reagles told a coroner's jury a week later." Their landing a few feet from him was followed almost immediately by a third explosion. "I was lifted up forcibly and thrown over the wall above the door into an adjoining field. I observed two of the boys, Welsh and McDermott, come whirling toward me, having been ejected from the building by the force of the concussion."

Reagles, Welsh and McDermott were injured but survived. The boys sent flying by the first explosion, Peter Farry and Edward Ketchum, died of fractured skulls and were badly burned, Ketchum almost beyond recognition.

In the days that followed, though some facts trickled out, questions piled up even faster. Why were untrained teenagers working in a dangerous area? The danger was made clear by the fact that the mixing room had 19 inch walls, a sign that coralline like celluloid, was made from guncotton and therefore had to be mixed in a room that could contain explosions.

Far from explaining the presence of the boys, Reagles sought to shift blame and plead ignorance. "Their ages I do not recollect. I have heard about the employment of boys in the New England states. I am aware that their parents came here to solicit work for their boys, but I had nothing to do with that branch of the business."

Not only was the work dangerous, it was also experimental. Other witnesses testified that a

visitor from Newark, NJ, home of celluloid, was conducting experiments at the time of the explosions. Beyond being vaguely identified as a German, and as having left Schenectady immediately after the blast, no effort was made to bring him back to testify

Instead after hearing Union College chemistry professor Maurice Perkins testify that Reagles "was very careful" and that he "impressed all the hands that they must not bring fire into the rooms, etc." the coroner's jury quickly concluded its work. It inquired no further into the situation of the boys and the experiments carried out by the mysterious and now vanished German. A verdict was pronounced. The deaths were caused by "falling walls on the 17th of June last, at the time that said building was destroyed by an explosion, the cause of which is not known and cannot be given. The jury also finds from the testimony that the utmost caution has constantly been exercised by the proprietors and employees of said coralline works."

This verdict, ignoring both the possibility that any compensation was due to the families of the victims, or any culpability should be attributed to the company, seems to have ended both any further public investigation, and shielded the company from any liability connected with the deaths and injuries. Despite some rumors that the explosions would put an end to coralline manufacturing in Schenectady, the damage was repaired during a two month shutdown. The company not only continued producing , but even had its capital increased to a nominal $300,000.

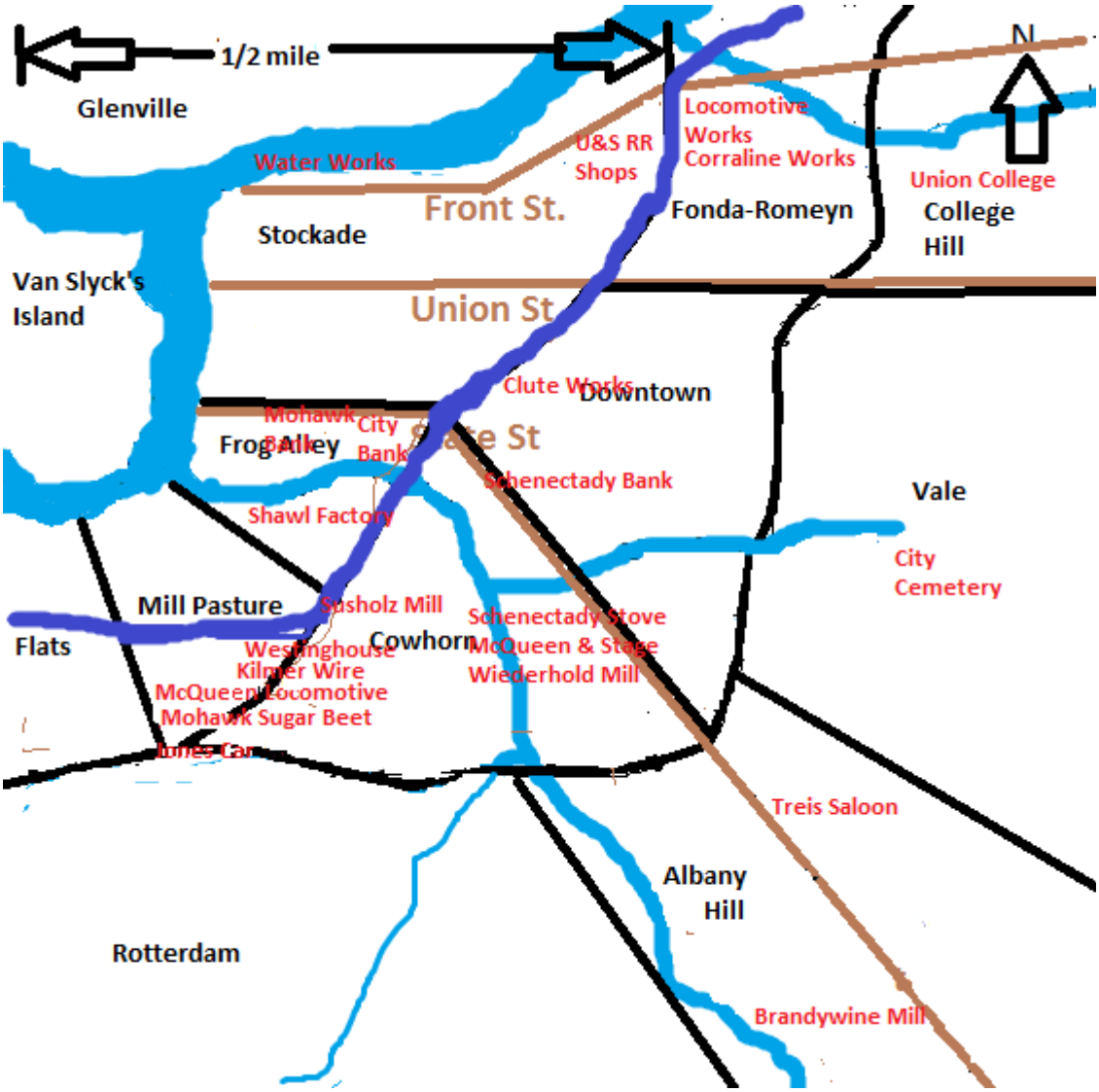
This incident was highlighted not because it was remarkable in its fatalities or its industrial significance. Deaths involving poorly trained employees were common. Coralline was a footnote in the history of plastics development. The coralline catastrophe was highlighted because, like the death of Spencer Ostrum, it tied together so many themes of late 19th century industrialization. In this case those themes include casual attitudes toward child labor, the carrying out of dangerous process in a crowded urban area, and permissive attitudes shown by the legal system toward corporate liability.

From a modern perspective, 1883 Schenectady was a fairly prosperous but also pretty appalling place. Compared to other cities its dirt, smells, alcoholism and danger were no worse than most, and better than some. Its death rate of 25-30 people per thousand was usually below nearby Albany, and typically about average for New York State's cities, though above the 20 per thousand in small towns and the countryside, not to mention the less than 10 per thousand of today.

By 1883, Schenectady had, for better or worse, evolved into an industrial city. Outflow from larger cities such as Philadelphia had brought it industries. So had inflow from smaller places such as Central Bridge and Howe's Cave, New York. Schenectady's transportation connections, the canal and the half dozen railroads, had finally paid off in manufacturing industries that could export products based on advanced technology to the world. In the Fonday-Romeyn square, the Schenectady Locomotive Works seemed headed for 1000 or more employees and the Coralline Works toward hundreds more. Surrounding subsidiary industries such as small foundries that supplied specialized parts for locomotives, and that factory that turned coralline into combs, added more jobs, both operative and highly skilled. Over on the Mill Pasture, which not long ago seemed suited for nothing more than the growing of broom corn, stood the Jones Car Works, with its soon to be 1000 employees, the future site

of the McQueen Locomotive Works, another potential 1000 man works, plus the potentially hundreds-of-men-each establishments of Mohawk Sugar Beet, Kilmer Wire, and Westinghouse agricultural machinery. To further support families, at least a dozen smaller and less technically advanced operations hiring many women and children were scattered from Albany Hill to Cowhorn Creek to Frog Alley, making products ranging from brooms and broom machinery to shawls and red flannel underwear.

Schenectady 1880-1885 saw its future, as a diversified manufacturing city centered around the central theme of machines and machinists. "Schenectady had never before enjoyed similar prosperity," a news paper article proclaimed on 10 Jan 1882. The wealth being brought in by those industries should now be put to work to provide a sewer system, a comprehensive system of improved roadways, a line of horse cars, electric lights at railroad crossings and "possibly elsewhere," and a new railroad depot.



Schenectady Ca. 1880

Schenectady had evolved over eight decades from a transportation break to a city of machines and machinists. It had become what it was because of where it was, a railroad junction where locomotives could be conveniently made, and other industries added to the core that the locomotive works provided. Ethnically, the earlier arriving Dutch, Yankees and generically American had melted together while the later arrivals, the predominately laboring Irish and more diversely employed Germans remained clustered. The newer immigrants were concentrated in particular mosaic squares, squares, Fonda-Romeyn for the Irish, and Albany Hill for the Germans. Politics remained mostly a politics of nothing, of opposition to costly local improvements and advocacy of "retrenchment". Occasional bursts of activity by reformers, workingmen and temperance advocates sent the city lurching toward of assumption of its responsibilities regarding safety, education, and cleanliness.

Schenectady by the early 1880s had, it seemed, found its role, and could see what its future would look like. Or could it?

Chapter 6

Van Eps, Jacob G. 19 Rotterdam: Decision and Beyond

Jan Dirkse Van Eps was one of the five proprietors appointed to supervise Schenectady's 1684 British Patent. He was one of four of those proprietors killed in the 1690 massacre. His son Jan Baptiste Van Eps was carried off to Canada in that raid. The three years Jan Baptiste spent there made him fluent in Native American languages, a skill he made use of after his escape and return to Schenectady three years later. As a translator, emissary and trader he accumulated substantial property, including several lots in the town, a corn mill on Cowhorn Creek, and a farm on the flats. As a result, three of the Van Eps families listed in the 1841 directory, including the family of Jacob G. Van Eps, were sufficiently well to do to from rents to require no occupational listing in the 1841 directory. The Van Eps were, however, no local aristocracy. Other Van Eps families were headed by a cabinet maker and two grocers. The family's prosperity and social standing made it possible for two Van Eps widows to live independently without relegation to the Cotton Factory or Poorhouse. That prosperity and standing also made Van Eps daughters targets for advantageous marriage. Two such Van Eps marriages will be the focus of this chapter.

Elizabeth Eva Van Eps, daughter of rentier Jacob, married Hiram Ingersoll in 1846. Hiram exemplified Yankee urban upward mobility. He arrived in Schenectady County in 1835 as one of three young children of a recently widowed farm wife from Lee, Massachusetts, come to remarry an elderly farmer and distant relative. Hiram left school early to become a drug store clerk. He then rode the transportation evolution: from conductor on a canal packet to railroad conductor, to supervisor of the New York Central railroad station at Niagara Falls, and ultimately back to Schenectady as local chief of the New York Central's private police. He acquired substantial property, and turned down the post of Schenectady's first police chief because the salary offered was too low, though later accepting the post of County sheriff. In 1870 he built what is still one of the most attractive houses in the Stockade section.

His son, George, born in 1847, was educated in Schenectady's new common school. He completed a machinist's apprenticeship at the Locomotive Works, then spent the usual machinist's wandering years, going as far west as Chicago. He returned to Schenectady in 1870 to serve as his father's undersheriff. George then returned to the Locomotive Works, rising to the post of machine shop foreman. Though an occasional Democrat committeeman, his most noticed local role was as builder of a steam yacht for pleasure cruises on the Mohawk. The yacht was named the Hettie Yates

after a great grand-daughter of the governor. If that reflected infatuation, George recovered, remaining a lifetime bachelor.

Henry DeForest, also born in 1847, became a sort of distant cousin-by-marriage of George Ingersoll when he married Elizabeth Van Eps, daughter of hotel keeper and canal toll collector Harman Van Eps. Henry's father has already been met in this book as part of the inflow of original Schenectady rural residents after creation of the county in 1809. Obadiah DeForest had been a city under-sheriff, a leader of the 1850s American Party Know-Nothings, and a Democrat after 1860. Several DeForests, including Henry's uncle Martin, agent for the county's wealthiest man, and Henry's grandfather Jacob, a well-to do farmer, were also Democrat leaders. Henry followed in this family tradition.

Henry was an early graduate of the city schools, but turned not machinist but to that other middle class melting pot profession, clerk. After studying business methods at a business college in Poughkeepsie, he came back to Schenectady to become bookkeeper at the Van Slyck broom making works, soon rising to partner. He also purchased land in the flats where he grew broom corn. Recognizing, by 1880, the competitive advantage of the Midwest in both broom corn growing and broom making, it was Henry de Forest who promoted the move to sugar beet agriculture and industry. He grew a crop of sugar beets on his own farm, and led the meeting that organized the Schenectady Sugar Beet Company.

So it is as machine shop foreman and broom manufacturer turning entrepreneur that these two Van Eps cousins enter this story. They will provide guides to Schenectady as it moved toward Edison's decision. Two questions will be the focus.

First, how and why did Schenectady become the target of Edison's decision? Why Edison, and why Schenectady? Second, what difference did the decision make to the city? How did Schenectady meet the rapidly growing demands placed on it?

Schenectady in 1881 was riding a short economic upturn that had followed the national economic recovery that had been underway since 1878. In 1882, however, the national economy peaked and turned downward. By 1883, two bright hopes of economic upturn had faded away. After shipping his harvested beet sugar to a processing plant in Delaware in 1881, Henry De Forest warned that if local investors did not quickly provide the capital to construct a factory it would not be profitable to grow sugar beets on the Schenectady flats. Instead of construction beginning in Schenectady, the US plants in Delaware and Maine shut down. A combination of cost and production problems, and the

political power of the US cane sugar industry, relegated beet sugar to a momentary fad in the US, rather than a major competitor. The Schenectady Company quickly vanished. In 1883 De Forest abandoned sugar beets on his farm, and planted his 500 acres in wheat, rye and broom corn. He turned his entrepreneurship to local real estate and attracting new industry, rather than personal participation in manufacturing.

The Coralline Works was the next to vanish. Despite its optimistic re-capitalization after that 1882 explosion, it never regained its momentum. It briefly began manufacturing again, but quickly closed down for good. These two disappearances, though damaging, were not too surprising.

The next setback, however, was both surprising and serious. It happened in an industry where local success seemed well established. This setback was the bankruptcy, in 1884, of the Jones Car Works. It had seemed, right up to the moment of failure, to be making a successful expansion from building horse cars for urban street railways to the manufacture of passenger and sleeping cars for railroads. However, it was producing for a railroad industry in which equipment manufacturing capacity had expanded even faster than railroad mileage. When the economy turned down, the weaker companies went to the wall.

Like the Mohawk Bank and Schenectady Locomotive Works a generation earlier, a local bank had bet its future on this one big venture. The City Bank of Schenectady's founder and president, dry goods merchant T. W McCamus had loaned the Jones Car Works more than $100,000. On the morning after the car works failure, customers lined up at the City Bank to withdraw their money. Prominent customers, such as City Bank trustee Charles Ellis, arrived and made big deposits. This briefly stopped Schenectady's first major bank run. When, however, a call for added capital went unheeded by the bank's stockholders, that bank run resumed. It led, in the spring of 1884, to Schenectady's first major bank failure.

This had both direct and indirect effects. Holding a bad check from the city bank, the Brandywine Knitting Mill could not pay its bills, and itself barely remained afloat. The local operations of the West Shore Railroad had trouble paying workers. Other smaller businesses felt the indirect effects of a tightening of credit. From 1884 through 1886 Schenectady echoed with a drum beat of small business failures: a stove and hollow ware works, a broom manufacturer, a foundry that had supplied castings to the car works, a crockery dealer, a jeweler, and two dry goods merchants. Some of the failures, though small had significant effects on the city elite. For example, Daniel McQueen, machinist former state

assemblyman, and son of Walter McQueen, saw his dry goods business fail. This in turn dragged down the machine shop he had founded with another prominent city machinist, David L. Stage, the best friend and advisor to Charles Stanford. The failure of the two Daniel McQueen ventures also left Walter McQueen holding $10,000 in bad loans to his son's businesses.

What of the city's main hope for renewed prosperity, the McQueen Locomotive Works? Defying the downturn, the company began in 1883 constructing two manufacturing buildings at the edge of the Mill Pasture, between the Westinghouse Works and the Car Works. The buildings were both large and state-of-the art by 1880s standards. They were of the type known architecturally as "cathedral shops", due to their great length and raised upper portion designed to let in plenty of light. They were built well enough, both functionally and structurally, to serve large scale manufacturing for a century.

The financial structure of the company proved less solid. Charles Stanford remained the principal stockholder, but the other main investors were New York City financiers. In 1884, Stanford made an additional assessment on his stockholders. When they did not pay up, he went down to New York City and purchased $156,000 of their stock. Back in Schenectady, his associate N.I. Schermerhorn made a personal deposit of $6000 in the company's bank account to still any suspicions that the company could not pay his bills. Naturally, all this caused further skepticism. Still, in contrast its proposed neighbor the sugar beet factory, the McQueen Locomotive works was at least, in 1884, embodied in bricks and mortar.

Even the financially sound Schenectady Locomotive Works had shut down in October, 1883, allegedly for only a few weeks of repairs. In January, 1884, however, the locomotive works remained closed, "The tall smoke chimney stands as a monument to the dead," reported a local newspaper. "The fires are out." The works would only begin production again in March, and then with only half its previous labor force. Through the winter the city was filled with idled locomotive works and car works employees. Only the conservatively operated Westinghouse Works, which had resisted expansion in times of prosperity, continued to operate at a normal level. The depression continued well into 1884. "Already there are, it is said, one thousand men in the city who are out of work," the Evening Star reported on 21 July 1884. "A large percent of these are skilled mechanics with families."

Depressions were always most seriously felt in the winter. In January, 1884, a "throng" of men, women and children crowded Judge Eisenmenger's Police Court Saturday sessions dedicated to the distribution of vouchers for food and fuel. Applicants included a poorly but neatly dressed widow with

two children, whose respectable appearance had caused her name to be taken off the relief rolls before friends intervened. An old man "with furrowed cheeks and whitened locks" said his coal allotment had run out, but was not granted a supplement. Albert Barton, a welfare recipient and resident of the cotton factory tenements was not present, He had died during the previous week, and his last city payment would go to bury him.

Meanwhile, as Charles Stanford tried to bring his new locomotive works to life, he was engaged in heated negotiations with the city about his water plant. Choices made to save money in its construction had not only resulted in that intake below the sewage outflow, but also inadequate pumps and piping. Variations in the depth and rate of flow in the river often left the city with dirty water, or no water at all. The water company had to make substantial investments in its first decade to even approach adequate operation. When, in 1882, it came time to renew the company's contract with the city for supplying water for fire fighting, Stanford sought to recoup his investment by doubling the price, from $5000 a year to $10,000 a year. The Common Council at first refused. The Aldermen quickly recognized, however, that Stanford had the city at his mercy. Schenectady needed his water to avoid being defenseless against fire. He insisted on that $10,000 price, and got it. As they capitulated, ten aldermen issued a statement proclaiming that they had accepted the Stanford price "totally against our will". The aldermen said that "we are in the hands of the water company" because in the time it would take for the city to build its own water plant, so “in the contingency of fire we would be without water protection."

The episode served to revive calls for the city not only to run its own water plant, but also to add a sewer system flushed by pumped river water. Bills authorizing these two projects came before the Council, as well as at the state level where laws were needed to grant Schenectady the required borrowing authority. All this came to a head in 1883, when Henry DeForest was readying his first run for Mayor. As a leading advocate of attracting industry via civic improvement, and as a leader of the opposition to Stanford's price gouging, one might have expected DeForest to make city water and city sewers planks in his campaign. To expect this, however, would be to ignore the realities of city politics. As they had in the 1860s and the 1870s, a substantial majority of Schenectady's voters opposed being taxed for either water or sewers. This probably explains DeForest's vote in 1883 against sewers, and what proved to be over the next two years his series of flip flops on the water issue. Instead, he based his campaign on promises to spend less money than his predecessors. De Forest, his backers proclaimed "has opposed all rings and all plans to take money from the city treasury."

In 1883, this attempt to woo support from economy-minded taxpayers failed. He lost to a relative political newcomer, the previously mentioned temperance advocate and Locomotive Works Foreman John Young. DeForest attributed his loss, somewhat disingenuously, to what he described as the voter's misconception that he was against sewers. Actually, he explained, he was only against the particular sewer plan that had been proposed.

He then proceeded, after his defeat, to come out in favor of solving the water problem by the city buying the Stanford Water Company for $125,000. When Mayor Young said he would veto such an exorbitant price, DeForest described that threat as an insult to the city. All this illustrated a main theme of Schenectady politics in the 1880s. Rather than consistent positions on water and sewers, increasingly being recognized as matters of life and death, all the city's politicians practiced a form of vagueness and personal factionalism intended to gain the support of voters opposed to paying for the sort of improvements that the city needed.

If both democracy and private enterprise had failed to meet city needs, it was time to go to the third option: using the political influence of the city's elite at the state level to make an end run around voter preferences. This led in 1883 to passage of two bills in the state legislature authorizing city borrowing for both water and sewer purposes. These bills contained a significant difference from their 1860s and 1870s predecessors. This time the city property owners did not have to vote on the improvements.

This raised indignation among anti-city-spending forces. Their counterarguments included the remarkable claim that sewers not only did not prevent, but actually caused typhoid. Their evidence was the untimely death of Prince Albert of England, allegedly caused by typhoid due to inhaling sewer gases. Twenty first century British historians not only give no credence to this far-fetched theory, but even have expressed doubts about the long accepted claim that the cause of Albert's death was typhoid.

In a 13 Mar 1882 petition, the "taxpayers of the 4thWard" put forth their objections to a sewer system. The "threatened danger from impure water in the wells" was exaggerated. The real force behind the program was the Schenectady Water Company, seeking by charging for flushing the sewers, to bilk more money from the city. Finally, and most important, if the city was to decide on such an improvement, then the citizens should vote on it.

These and other sewer opponents were not able to get the voting requirement put into the sewer bill, which passed both houses of the State legislature in 1882. Sewer opponents did, however,

succeed in getting the ear of Republican Governor Alonzo Cornell in mid-1882. His party, dominated by the financial and manufacturing elite, was trying to widen its support among the middle and working classes of the state. As a small part of this strategy, the Governor stood up for popular democracy and refused to sign either of the Schenectady bills because of their lack of a property owners' vote.

Here, however, a counteracting political current intervened. The state Democrats were simultaneously trying to move their image up scale, to widen their appeal among the upper middle classes and elite, and to shed their image of a mob dominated by Tammany Hall. In this effort, they seized on a Buffalo lawyer who, as that city's mayor, had gained a reputation for honesty and championship of civic improvements, such as a sewer system. This new look Democrat, Grover Cleveland won the governorship in November, 1882. Before he continued his rapid ascent to the presidency in 1884, he executed the Democrats' new strategy of respectability and appeals to the elite. In the midst of vetoing several populist bills in 1883, he signed into law Schenectady's sewer and water bills, both still shorn of that need for voter approval.

The sewer bill got immediate action. Chastened by his defeat, De Forest became in 1884 a notable champion of the sewer project. Among the arguments for its adoption was one first put forward by the Workingmen's Party five years earlier. A time of economic downturn was an ideal time for a public works project. It could give employment to out of work laborers who otherwise would burden the city's poverty assistance rolls. Also, materials would be cheap.

Union College civil engineering professor Cady Staley was put in charge. He adopted the most modern sewer plan, one developed in Memphis, TN. The project was carried out in 1884-1885. It indeed served as a sort of local fiscal stimulus. The sewer system was built by a local contractor hiring local labor, and was brought in on time and under budget. That use of local labor on public works project in time of depression, a belated response to the suggestions of the Workingmen's Party of the 1870s, may account at least in part for the fact that Schenectady's expenses on poor relief were actually lower at the depth of the depression, in l884 and 1885, than in the more prosperous year of 1882.

The sewer project was not a panacea. It did not cover the entire city, being concentrated in the well to do Stockade and Downtown regions, bypassing Fonda-Romeyn, Frog Alley and Albany Hill, and leaving the Cowhorn square to be drained by its often blocked open sewer, Cowhorn Creek. Still, the sewer system was a definite step forward. Its presence cannot be given all the credit for subsequent improved health of the community. However, the circumstantial case is strong that the sewer system

played a key role from turning Schenectady's mortality around. As noted, the first city statistics, for 1882, found that deaths in the city that year outnumbered births. Over the next nine years, the Board of Health would report on 6 Nov 1891, there would be 3,887 births as compared to 3,640 deaths,

Back in 1884 he aldermen next came to a reluctant consensus that the city had to control its own water system. The state bill had reinstated the idea of a three person Water Commission to carry this out. The time was ripe for decisive action. By 1884 scientists had identified the microorganism carrying typhoid, thereby confirming its water-borne nature. The error of the current location of the water intake was beginning to be understood.

Political infighting continued to block action. Again, Henry DeForest provides a convenient weathervane. Again seeking again the mayor's post, he again championed city purchase of the Stanford Water Company, poorly placed intake and all. He initially suggested a price of $90,000, but later raised that to $100,000, twice what his opponents on the Council wanted to pay, but in line with Stanford's selling price. The opponents accused him with being in the pay of Stanford. This charge did not prevent DeForest's election as Mayor in 1885. The charges against him escalated. He was further accused first of being one of four city officials accepting bribes from an Ilion, NY, company that successfully won the contract to light Schenectady's streets with electric arc lamps . Then he was accused of personally pocketing a few hundred dollars that he had collected in city fees. Each time he demanded an investigation, and each time he was found innocent of the charges.

In the noise created by these political disputes, the substantive aspects of the water problem got lost. They would remain lost for nearly a decade. Meanwhile, discussion focused not on how to get clean and safe water, but how much to pay for the Stanford Water plant. DeForest continued to call for a $100,000 payment. A committee of councilmen instead negotiated a price of $90,000. One might think that Mayor DeForest, long a champion of economical city government, would applaud this saving of $10,000. Instead, when the Common Council ratified the water plant purchase, DeForest vetoed the bill. The price tag, he now proclaimed was too high. He did not explain how this new position was consistent with his previous advocacy of paying $100,000 or more for the water plant. Instead, he produced a one page letter from Union College expert Cady Staley that a new water plant could be built for only $65,000. One wonders how Staley, a highly regarded authority, soon to accept the post of President of Cleveland's Case School of Applied Science, could have signed his name to such an unrealistically low estimate. The Common Council rejected both the estimate and DeForest's arguments. They easily

overrode the veto, and the city purchased the Stanford water plant for $90,000 in 1885

This story has been told in some detail because it illustrates so well how the process of reluctant consensus worked. To paraphrase a quote often attributed to Winston Churchill, urban democracy would eventually do the right thing about water supply, but only after exhausting all other alternatives. For Schenectady this messy democratic process converted the water issue into a political football, rather than a public health issue. As politicians argued about the Stanford plant and its alternatives, sticking so long to contaminated water likely cost the city of Schenectady more lives than the Civil War. As will be seen, after declining due to the new sewer system and other improvements, the rate of typhoid began to climb again after 1888 as increased economic activity and growing population dumped more contaminants into the Mohawk.

Selling the water plant in mid-1885 was the last act of that remarkable Schenectady political and business leader, Charles Stanford. Just two days after the sale, he died suddenly at his Locust Grove estate.

His passing signaled a generational change. It was followed in the next few years by the deaths of two of his partners in Schenectady industrial development. George G. Maxon had built Schenectady's grain elevator, and served on the boards of many Stanford projects. So had Nicholas I. Schermerhorn, who had also been a local pioneer in the broom straw industry, and the city's leading coal dealer.

Leadership of industrial development passed to trio from the next generation. Democrat Mayor Henry DeForest made attracting industry a major theme of his 1885-1886 mayoralty. Willis T. Hanson, a relative newcomer to town, opened in 1884 the town's fanciest drug store, beginning a rise to patent medicine king, banker, and leader of the city's Board of Trade. John DeRemer, a Union college graduate and math professor turned lawyer and Republican stalwart, combined political astuteness and economic ability. He twice served as Schenectady postmaster, that most powerful of local patronage positions. He also specialized in being a receiver for bankrupt companies.

In early 1886, one major Schenectady Company called on his services. The death of Charles Stanford in 1885 confirmed what many in Schenectady had come to expect. The McQueen Locomotive Works would never occupy those two new cathedral shops in the Mill Pasture. Walter McQueen had returned to the Schenectady Locomotive Works and an honorary vice presidency. Charles Stanford, Jr. and Welton Stanford, heirs of their father’s holdings, now began to entertain offers for those two brand new factory buildings.

Finding a new manufacturer for that Mill Pasture site was only one of a number of initiatives launched by Schenectady's new generation of developers. As Mayor, Henry De Forest created a new City Council Committee to promote new industries. He explored putting an advertisement about Schenectady in the New York Daily Sun. He proposed that the city create a $100,000 fund for investing in companies that would move to Schenectady. He got involved personally, putting Schenectady forward as a competitor for a new government ordnance plant. This bid was lost, the nearby Watervliet Arsenal remaining the area's leading ordnance contractor. Undiscouraged De Forest moved on to other promotions.

Some smaller ones were successful. John Keyes Paige, Jr., nephew of Alonzo and a Democrat postmaster, revived a local stove works. Augustus Kilmer, Schenectady baling wire manufacturer, patented inventions aimed at enabling his works to enter the rapidly growing field of telegraph and telephone wire. The Wilson Wagon Company opened a plant in Schenectady.

By 1885-1886, the game of industrial musical chairs was well established in the Northeast manufacturing belt. Cities competed at offering themselves to growing manufacturing companies by trumpeting their virtues regarding transportation and skilled as well as cheap labor, and sometimes including offers of locally generated investment or tax breaks. Companies in turn were learning how to play these cities off against one another, as the Norris Locomotive works had played off Schenectady and Buffalo to get a $40,000 in local investment in 1848.

Two examples of the mid 1880s game of industrial musical chairs in Schenectady illustrate this process. Henry DeForest focused his 1886 efforts on the Keystone Hard Rubber Company of Morrisville, PA. That company was frank in its demands. It would move to any city that would put up a $50,000 investment. The money was not forthcoming in Schenectady, and the company moved elsewhere. DeForest's focus on this opportunity perhaps caused him to take his eye off the major city project: finding new tenants for those buildings on the Mill Pasture left empty by the bankrupt Jones Car Works and the never started McQueen Locomotive Works.

Those two locations had gone into play even before Charles Stanford's death. The potential buyer was a manufacturer of railroad cars, Dr. Seward Webb, son in law of William Vanderbilt, the president of the New York Central Railroad. Webb had previously, in early 1885 when Charles Stanford was still alive, made a bit for the McQueen Locomotive Works. He offered $30,000. Stanford said he would take nothing less than $90,000. The gap proved too wide for further bargaining.

After Stanford's death, in 1885, the McQueen Locomotive Works stockholders reopened negotiations. Edward Ellis went back to Dr. Webb, and told him that the property was available for a price within Webb's range. Webb told Ellis that he would have taken the offer had it been made earlier. Now, however, he was committed to locating his new works in Batavia, N.Y.

In May, 1886, the McQueen Locomotive Works terminated its corporate existence. John A. DeRemer was appointed receiver of the company. He was given the task of selling the two buildings and the eight acres of property they stood on. Several of the company's stockholders said they would be happy to get 50 cents on the dollar for their investment.

The word seems to have gotten out that both the Jones Car Works and McQueen Works properties were now available at a bargain price. On 16 Mar 1886, a New York City financier named Edward Crane came with associates to view the site. They were not impressed. “I and my engineer could easily see, this morning, as we drove past, that a flood could do great damage here," Crane noted. Further investigation showed them that the property was low-lying and such floods were fairly common. Just a month earlier, one such flood had made it necessary to evacuate the nearby Westinghouse Works by rowboat. It was fortunate for Schenectady that future viewers of the site came in drier months, were in more urgent need of a property, and did less due diligence.

So by May, 1886, the McQueen Locomotive Works was in play as a valuable property. More generally, the attraction of new industries was high on Schenectady's political agenda. So it was no big surprise for Schenectady residents to read, on 25 May 1886, the top local news story in the Schenectady Evening Star. A new and rapidly growing electric company was setting up operations in Schenectady.

The new arrival was the Westinghouse Illuminating Company. It would light homes, mainly of the well-to-do, with the new incandescent light, powered by the even newer alternating current. The champion of this new technology was local boy George Westinghouse, Jr., now of Pittsburgh. Running the Schenectady Company would be his brother John.

The same day, a much shorter article had been below the fold of that same newspaper. Short enough, in fact, in fact, to be quotable in full. "Charles Stanford [Jr.], one of the owners of the McQueen Locomotive Works, said this morning that there is hardly a doubt that the works would be sold shortly in such a way that the owners and the city would both be benefitted. He added that George Place of New York City was here yesterday, and made an offer for the works which could not then be accepted. Mr. Place came to this city as the representative of New York capitalists."

George Place ran a New York City company that sold machinery. The New York City capitalists he was representing owned one of his major machinery customers. It had been in existence for four years. Its name was the Edison Machine Works. Place's brother-in-law Harry Livor was on its board of directors. Place served as its machinery supplier and helped market some of its products.

By 1886 the namesake of that Machine Works, Thomas Edison, was a national celebrity. He was best known for his invention in 1876 of the phonograph, and in 1878 of the first practical incandescent electric lamp. These were just the most prominent of the hundreds of inventions made at Edison's Menlo Park, NJ, "invention factory." In the 1880s, Edison was turning those inventions into products. In the process, he had turned Menlo Park's machine shop into a company, incorporated in 1882 under that name Edison Machine Works. Before the end of May, 1886, it was common knowledge in Schenectady that Place was bidding for the property on behalf of that Edison works.

Thomas Edison himself seems to have little if any personal involvement in the deal. The years 1885 and 1886 were very busy ones for him. Overcoming many technical difficulties, he developed the revolutionary idea of providing electric light and power to entire cities from central power stations rather than putting individual steam engines and dynamos in individual buildings. He faced continual cash flow problems, and battled with investors for control of his companies. He also faced serious competition from rivals such as Westinghouse, who followed him into this new "central station" business. Those rivals offered a radically different technical approach: distributing alternating electric current (AC) rather than Edison's choice, direct current (DC).

On the personal side, Edison experienced the death of his first wife, and met and married a second one. He dealt with serious illness. He purchased a mansion in New Jersey, and commenced the acquisition of Florida land for a summer home. He planned a new laboratory that would enable him to get beyond the problems of the electrical business and pioneer other new technologies. Immersed in all these activities, he delegated the management of such matters as industrial real estate to his associates, especially the manager of the Edison Machine Works, Charles Batchelor.

One of a handful of trusted Edison insiders, Batchelor had been Edison's right hand man in the invention of that incandescent lamp in 1878, and in the creation of the electric utility and manufacturing businesses that followed. The Edison Machine Works was the Edison Company that built mechanical systems. Its principal product was the Edison dynamo, the device that converted mechanical energy into electrical energy (or vice versa). That works was, however, also involved in many other branches of

manufacturing, some extending far beyond electricity. It was located in a building on Goerck St. in New York City. As the demands for Edison dynamos exploded, that building had become too small. In about December, 1885, Batchelor had purchased a large property in Brooklyn. In early 1886, the process of moving the machine works to Brooklyn had begun.

Why then, in May, 1886, this interest in the Schenectady property? Understanding this requires understanding not only Schenectady and the Edison Machine Works, but also the year 1886.

That year was one of a half dozen or so when the US appeared, in the eyes of many of its citizens, on the brink of social revolution. Such years included 1877, 1892, 1912, 1936, 1946 and 1968. The fears always proved vastly exaggerated compared to the years of actual revolution, 1775 and 1861. But at the time, in each of the other years the nation seemed to be approaching the edge of chaos.

At the centre of the apparent 1886 uprising were an explosively growing labor organization, the Knights of Labor, and a major workplace issue, the eight hour day. In the background was a fear on the part of the upper and middle classes that this movement and issue would be captured by radicals, variously labeled anarchists, socialists, or communists.

Though far from communist in ideology, the Knights of Labor could well have adopted a local version of the Marxist slogan: "workers of the US unite." In contrast to previous craft unions the Knights of Labor sought to enroll all productive members of society, shopkeepers, small manufacturers, and farmers as well as workers on all skill levels. In 1885- 1886, this nationwide labor organization claimed a membership measured in the hundreds of thousands. It scored some notable victories, for example forcing some Western railroads to come to terms.

The Knights of Labor was also widely present in the industrial northeast, including in Schenectady. It had come first in 1885-86 to the city's knitting mills, such as the McLachlan Conde, and Susholz Brothers mills. It then organized some broom making factories. Its strikes at these factories gained broad local support, from the middle class as well as from other workers. For example, when the German-Jewish entrepreneur George Susholz went out to talk to the Knights of Labor picketers at his garment factory, he found marching with them his co-religionist, the cigar manufacturer Louis Cohen, who was the head of the Schenectady chapter of the Knights of Labor.

Meanwhile the Knights of Labor had also organized Schenectady’s Kilmer Wire Works. Unlike the knitting mill operators, Augustus Kilmer refused to negotiate. He brought in Hungarian immigrants

as strike breakers. However, when a Hungarian-speaking member of the Knights explained the situation, many of the strike breakers joined the walkout. Kilmer eventually won the strike. But he also began to look further afield. By 1887, he had accepted an offer from the city of Newburgh and had moved there.

The Westinghouse Works and Schenectady Locomotive Works remained free of Knights of Labor activity. The Knights denied the rumor that they were even going to try to organize the latter works. Indeed, they took an incremental, conservative, non-confrontational approach to organization that gained them a significant degree of acceptance in the city. A charitable event for the Knights gained contributions from such notables as the leading dry goods merchant, H.S, Barney and police court judge Fred Eisenmenger. Republicans praised the Knights for offering workingmen an alternative to the saloon. Far from condemning local Knights of Labor organizer Louis Cohen as a radical, the Republicans ran him on their April 1886 ticket for the post of Police Commissioner. He lost, but ran about as well as any other Republican.

On Sunday, April 19, 1886, Rev. Peter E. Kip, pastor of Schenectady's 2nd (Dutch) Reformed Church, told a packed church with "many workingmen present," that “the Savior was the heaven born founder of the knights of labor." Though the 2nd Reformed was far less prestigious than the 200 year old 1st Dutch Reformed, and the reporter did not put the same capital letters on knights or labor that he put on Savior, this was nevertheless a strong implicit endorsement of that rapidly growing labor organization.

So Schenectady was very familiar with, and well disposed toward, the Knights of Labor. Its calm, favorable and evolutionary acceptance of labor organization was not, however, duplicated everywhere. Turmoil was especially prevalent in the biggest cities. In New York City, there was a succession of significant and often violent strikes in industries ranging from printing to street railways. By mid year, threats were being made of a general strike that would take out 100,000 New York City workers. Similar turmoil, eventuating in violence in 1886, struck other major manufacturing cities, such as Cincinnati and Milwaukee.

In Chicago, things were even hotter. The nation's new second city was a reputed hotbed of American communists and anarchists. Talk of dynamite bomb throwing anarchists was common, though not yet accompanied by actual explosions. The masses on the streets of Chicago were not, however, mainly anarchists. They were workers of all persuasions, united in an Eight-Hour-Day Movement. At the end of April, they had already been subjected to deadly fire from policemen. On May 1, the biggest

demonstration yet was mounted. "May 1 will be a day that will live in history," Schenectady's local newspaper reported. This proved prophetic of the later emergence of May Day as a worldwide workers' holiday.

On May 4, at a continuation of the demonstrations, another prophecy was fulfilled. As thousands of demonstrators faced hundreds of policemen a dynamite bomb was indeed thrown. It exploded amid a line of police and killed five of them. "Death dealt out," proclaimed the Schenectady Evening Star the next day. "Chicago police slain with deadly bombshells.... Blood flows like water"

Back at the Edison Machine Works, that literally explosive big city labor situation helped ignite a suspicion that moving to Brooklyn might not be far enough. The general suspicion became locally specific for the Edison works in early May. Shortly after that Chicago bomb blast, the New York City workers of the Edison Machine Works were organized by the Knights of Labor.

The workers' demands ranged over many aspects of wages, hours and working conditions. Two demands were especially important. The workers demanded recognition of their right to organize, and an end to the contract system. Charles Batchelor compromised with the workers on some of their demands, for example reducing the work day from 10 to 9 hours and raising wages. He refused, however, to meet the key demands of Knights of Labor, recognition and an end to the contract labor system. In response, in that explosive month of May 1886, the Edison Machine Works workers went on strike. Within three weeks management broke the strike. That strike left behind a determination on the part of Edison and his associates to, in Edison's later words, "get away from the embarrassment of the strikes and the communists." All this further fueled suspicion on the part of Batchelor and other company leaders that a move further than to Brooklyn was needed.

Enter George Place and Harry Livor, and their knowledge of those vacant buildings. Place was well known in Schenectady. He had been there in 1884, as a bidder for the equipment of the defunct Clute Works. He knew about both the McQueen Locomotive Works, and Batchelor's problem. Here was a location suitable for immediate occupancy, just a few hours by train north of New York City. This was close enough to keep the works under control from the headquarters of the Edison empire, yet far enough away to avoid the dangerous brew of politics and labor organization of the nation's biggest cities.

By the time that notice appeared in the Schenectady papers, on 27 May 1886, the deal was almost done. Place and DeRemer were negotiating in a narrow price range, between $35,000 and

$45,000. "This is a decided bargain," wrote Charles Batchelor in his diary on May 22. On May 25 he noted "at a meeting of the Edison Machine Works board today it was decided to give George Place the right to negotiate for the Schenectady locomotive works at a price not to exceed (including all commissions) $42,500."

Instead of making it known that the deal was almost done, however, another rumor emerged. The Stanford brothers would accept nothing less than $45,000. Edison would pay $37,500 for the McQueen Works, and not a penny more. This rumor is directly contradicted by the Edison Machine Works Board's willingness to pay a price of $42,500, but that price did not become common knowledge. Perhaps the difference between the two figures is contained in that phrase "including all commissions". It perhaps indicates a desire by the Edison forces to have someone else pay the $5000 commission to George Place.

The impasse over a relatively small difference in price seemed implausible to a Schenectady reporter. He noted on 31 May 1886, "It may seem strange that a large manufacturing concern, who says they will start with 400 men and will increase their force to 1000 in a year should hesitate at such a sum as $7500." An Edison source explained to the reporter that Schenectady had urban competition. The city of Worcester, Mass. was offering free land and buildings. Other than this statement, however, there is little evidence that a significant competition occurred. Every indication is that Batchelor, after deciding Brooklyn would not do, never seriously considered any other place than Schenectady.

The apparent stalemate appears to have panicked Schenectady leaders into action. They were determined not to let this major opportunity get away. They were led by Col. Robert Furman (the military rank was recognition of his role in raising a Civil War regiment that he did not accompany into battle) and lawyer Alonzo P. Strong, son of the former agent of Archibald Craig's cotton factory. After visiting the Stanford brothers and failing to get them to reduce their price, they solicited contributions to Schenectady businessmen for a fund to make up the $7500 difference. The campaign was an immediate success. Contributions rolled in from dozens of local merchants. These ranged from the $1000 contributions of Furman, leading dry goods merchant H.S. Barney, and coppersmith Levi Case, down to $20 contributions from owners of local grocery stores and livery stables. Within a week the $7500 had been raised. With that contribution in hand, the deal went through.

The closing occurred on 26 June 1886. John DeRemer, in his role as receiver for the defunct McQueen Locomotive Works, received a check for $37,500 from the Edison Company, and deposited it

in the Mohawk Bank. DeRemer then transferred the McQueen Locomotive Works buildings and property to George and Imphegenia Place of New York. Those two then transferred the property to the Edison Machine Works for a consideration of $45,000.

The Schenectady civic contribution of $7500 went unmentioned in the story. Presumably it was a side payment to the McQueen Locomotive Company stockholders to get them to accept the deal. That payment did not buy the Schenectady contributors any stake in the Edison Machine Works. They did not even get an explicit promise from the Edison company of any specific employment level or duration of stay. This transaction contrasts with the earlier local contribution of Schenectady residents to the 1848 arrival of the Locomotive Works, which was an actual investment in company stock.

The interpretation taken as most plausible here is that Harry Livor and George Place had, in May 1885, found for hard-pressed Charles Batchelor not only a solution to his problems, but a remarkable bargain. George and Imphegenia Place, and perhaps Harry Livor and John DeRemer as well, were most likely well rewarded for making the deal happen.

It is hard to find Thomas Edison's personal involvement anywhere in this transaction. He indeed was on hand in New York City on 24 June 1885, to describe the deal to reporters. Charles Batchelor, however, did most of the talking. "It is believed that labor will be cheaper there," Batchelor said, referring to Schenectady. He had done his homework on this subject, noting in his diary on 13 June 1886 that the wages of "mechanics" in Schenectady ranged from $1.45- $2.25 a day, significantly below their pay in New York City. Batchelor also emphasized, however, that wages were not the only issue." The class of men we hire will not be so susceptible to labor agitators," he told the reporters. "Country laboring men are good hard workers and they do not read the newspapers and discuss the labor problem so much as do city workers. I think we shall never have another strike."

For the record, the first strike at the Edison Machine Works in Schenectady occurred in 1887. It was, however, a small strike and quickly settled. In a larger sense, Batchelor had achieved his goal. Schenectady saw only slowly evolving labor organization, and generally industry-friendly politics. All this, however, had more to do with national trends than the specific choice of Schenectady.

The principal national trend was the sudden decline of the Knights of Labor. As quickly as it had risen, and as mysteriously, the Knights faded away. The union lost a big strike on the Western railroads. In the Schenectady region, the strike against the knitting mills, a small part of a much bigger job action against knitting mills in Troy, Cohoes, and Amsterdam, wore on for about three months, and came to an

inconclusive end. Some of the mills, such as Schenectady's Brandywine Mill, took the Knights workers back. Others, such as the McLachlan-Conde Mill and the Susholz mill did not. That long strike for little reward had exhausted the Knights' treasury and discredited its leaders. The organization never recovered in upstate New York, as it never recovered elsewhere in the nation.

The threat of anarchists, communists and more dynamite bombs, always vastly overstated, also faded. The next labor offensive, rather than a general attempt to unite all workers, was a specific focus on craft unions. The American Federation of Labor, an alliance of those craft unions, was formed in 1886. Even before that in northeast industrial cities such as Schenectady, cautious craft union based organizing methods had long been under way. These slowly but steadily gained momentum.

At the forefront were the railroad workers. They were among the most skilled and better paid of the crafts, and acquired considerable local prestige. For example, Thomas Dormady had organized the Schenectady chapter of the Locomotive Engineers union long before the events of 1886. He would run for mayor of Schenectady in 1889, losing by only 10 votes. His loss had less to do with his union role than with the fact that he was Irish and Catholic. Henry Hoppman, organizer of the local Locomotive Fireman's Union became one of the local Democratic Party's most powerful ward leaders.

Dormady and Hoppman were no radicals. They were loyal New York Central employees, best known for setting a speed record for the trip between Albany and Schenectady in their locomotive the “Alonzo C. Paige". Nor were the other craft union leaders very radical. By the 1890s the Schenectady Trades Union Council included some 12 craft unions, from the painters, where a key organizer was Martin Treis, Jr., son of the saloonkeeper, to the "Dorpian Lodge" of the International Association of Machinists. The Schenectady Trades Union Council claimed a total membership of 3000, about one quarter of the city's labor force.

In May, 1893, Schenectady would welcome to the city the leader of that American Federation of Labor, Samuel Gompers, as keynote speaker at the city's first "grand labor demonstration." Schenectady's Republican mayor Joseph Clute would greet Gompers with the phrases "in union there is strength....united we stand, divided we fall... labor conquers all", though advising against "force and violence." Gompers would reply that "as a man and an officer he was opposed to strikes."

So the growth of labor organization encountered by the Edison companies in Schenectady happened at an evolutionary pace. That pace was, however, set more by national trends than any particular labor passivity in Schenectady.

Schenectady, if it did not get any equity in the Edison companies, got what it wanted. This was location in their city of what would ultimately become one of the biggest, most technologically versatile, and industrially significant works in US history. For the price of $7500 the people of Schenectady got a century of industrial inflow, and growth, though ultimately followed by overflow and eventual decline.

To conclude this story of Edison's decision, first of all it was not Edison's. Charles Batchelor was the Edison Machine Works decision maker. The decision happened because of a coincidence. An apparently dangerously radical labor movement happened to coincide with the immediate availability of an ideal location, connected in all directions by railroads and a canal, complete with occupation-ready buildings, and land suitable for almost indefinite expansion. That land was unoccupied because it was damp, unhealthy and easily flooded, characteristics its previous occupants had not minded, and into which the Place-Edison buyers, unlike some of their more conscientious predecessors, did not inquire.

All this existed because Schenectady, originally a transportation break, had become a railroad junction, and as a consequence of that a locomotive manufacturing center, and as a consequence of that the location for the carrying out of the ambitions of Charles Stanford and Walter McQueen, and finally, because that embryonic locomotive works had become a casualty of the Depression of 1884. In short, Schenectady became what it was because of where it was.

On 20 August 1886, Thomas Edison made his first visit to Schenectady. The Schenectady Star commented on the wizard's graying hair. The Daily Union described him as a "short, thick set man with an expression of extreme content", leisurely puffing on a cigar. Far from being a sort of state visit as depicted in Schenectady urban legend, this first visit was unscheduled and informal. Edison was on his way back to New York City after a western trip. He decided on an impromptu stop to determine, in his words "what kind of a ranche the Edison Company has here anyway."

By the time of that Edison visit, men and machinery were already arriving from New York City. In sharp contrast to the McQueen Locomotive Works, the Edison Machine works wasted no time in getting up and running. By early October, 1886, production was beginning at Schenectady.

What was that new Edison ranche? First of all, it was a works. That is, it was a collection of factories. The first thing the Edison team did with its new works was to seek a mortgage on the two McQueen Locomotive Works buildings to raise money to help pay for the equipment soon to be installed in them. Then they built more buildings. By the end of 1886, work inside those buildings was in full swing.

By 1888 there were about a dozen shops at the Edison Machine Works in Schenectady, as well as several smaller buildings for storage or administration. The main role of these shops was to produce varied types of equipment that made up the Edison electric power system. The buildings centered on the two McQueen Locomotive Works cathedral shops, the No. 1 Shop, devoted to dynamo assembly, and the No. 2 shop, the first of several machine shops. In addition there was a wire and cable shop, an insulating shop for making the coatings that kept the electricity inside the wires and cables, and a tube shop for enclosing those insulated wires and cables in tubes that could be buried underground. Edison doubted that in crowded cities people would tolerate dangerous overhead electrical wires. The tube shop, especially hot, dangerous and susceptible to fire, was of the first of the shops to be mainly manned by Polish immigrants, about 50 of them, each making $.50 per day.

In the winding shops, insulated wire was wound to make the electromagnets that are essential for converting mechanical to electric power, and vice versa. The use of direct current in Edison's electrical machines also led to a major shop for dealing with mica. This natural insulating material, sliced thin and pasted to metal, was a key to the commutator, the device that kept that direct current always flowing in the same direction. Further, though electricity's ultimate role was to replace the shafts and pulleys that transmitted power from steam engines to machines, even the Edison Machine Works was not there yet. So a large factory at the works served the Edison Shafting Co., the mechanical equipment firm connected with George Place. Other shops at the works included an iron foundry, a brass foundry, a tinsmith shop, a fabrication and assembly shop, a pattern shop, a rod and truck shop, a paint shop, and a tank shop.

So many specialty shops were present that perhaps it would be easier to list the components of the Edison system that were not built in Schenectady. The principal one was Edison's incandescent lamp. This iconic form of electric light was not then, or ever, produced in this city that lights and hauls the world. However, one early arrival at the machine works was the Bergmann Co., maker of lighting fixtures.

Finally, like the Westinghouse Works and the Clute Works, the Edison Machine Works took on projects beyond the main product line. For example, at the time of the move to Schenectady, the Edison Machine Works, like the Civil War era Clute Works, was developing torpedoes for the U.S. Government.

Who led the Edison Machine Works? Again, not Thomas Edison. Charles Batchelor, Treasurer of the Edison Electric Light Co, was the initial general manager of the Edison Machine Works. He stayed in

New York City. John Kruesi did move to Schenectady, and quickly succeeded Batchelor as general manager of the Machine Works. Samuel Insull became by 1888 president of the Edison Machine Works, with an office in New York City. William "Pop" Turner served as general foreman of the machine works.

Batchelor and Kruesi were Edison's closest collaborators. Their fame rests today on their achievements before 1886, especially at Menlo Park, the first, and perhaps still the greatest of the world's invention factories. Batchelor, an English born mechanic, helped in 1878 to develop the carbon filament, the key to the Edison Incandescent lamp. Kruesi, who grew up in a Swiss orphanage and came to the US as a machinist, turned Edison's 1876 sketches into the world's first phonograph. The English born Insull, the youngest of the team, had made a rapid ascent from Edison's personal secretary to the executive suite. His dynamism and ambition made him unpopular among longer-time Edison loyalists. Turner was the one who dealt directly with the work force. His effectiveness in this role helped maintain a general labor peace.

Beneath these four were a growing corps of foremen, one or two per building. More or less on a parallel level with the foremen in the works hierarchy were members of the technical staff. This included both college trained engineers, and a supporting staff of draughtsmen and calculators.

The Edison Machine Works was not, however, the Edison empire’s technological center. That role was played by Thomas Edison's West Orange Laboratory, run by the wizard himself. To the frustration of his Schenectady subordinates, Edison diverged into new fields, rather than focusing his laboratory on the problems of the electrical industry. Just as the Edison Machine Works moved to Schenectady, technological leadership was shifting from Edison to his rivals. These included George Westinghouse and a Philadelphia inventor now located in Lynn, Massachusetts, Elihu Thomson. Unlike Edison, they embraced the idea of alternating current, as well as the rapidly growing business of electric street railways, which Edison had handed off to a former associate and now temporary rival, Frank Sprague.

Insull chafed at Edison's slow technological response to the AC and street railway opportunities, but respected the technical division of labor. When an associate recommended a young man he described as a "marvel of mechanical genius" for employment at the Schenectady works, Insull replied:

"It does not strike me that a 'marvel of mechanical genius' is the class of lad to enter a machine shop. I should think that he would be better suited for employment in the Edison Laboratory. We don't want marvels of genius in a manufacturing establishment. All we want are young men who have the

ability to do as they are told. 'Marvels of mechanical genius' in such a position are usually troublesome and chafe under discipline."

The Edison Machine works circa 1890 indeed did not have anyone subsequently recognized as a genius. It did however have a technical staff that was highly capable. Many of them were university trained, and a few were former professors. Ernest Kolben, for example, the chief technologist of the works, was a former professor of physics. Other members of the engineering staff went on to outstanding careers for GE. Especially notable later among the early Edison Machine Works engineers was Oscar Junggren, who would become one of the world's greatest designers of steam turbines.

However, these future leaders were not given a free hand to innovate. The Edison Machine Works was busy full time turning out conventional Edison DC equipment. The two young men retroactively recognized as geniuses of the next phase of the electrical revolution, Nikola Tesla and Charles Proteus Steinmetz, both made their greatest contributions while independent or associated with smaller firms. Each then allied with an Edison competitor. Tesla, briefly an Edison employee, made his greatest inventions while an independent, and then sold his patents to George Westinghouse. Steinmetz went to Thomson Houston when the company he worked for was purchased by that Edison rival. The Schenectady urban legend that Thomson Houston purchased that company in order to acquire Steinmetz is, however, untrue. The company, Eickmeyer and Osterheld, owned valuable patents related to industrial uses of electric power such as street railways and elevators.

As Insull had noted, Schenectady was a manufacturing site, not a center of innovation. The major technical element was skilled craftsmen, principally machinists but also a wide range of other crafts such as patternmaking, tool making, and molding. A newspaper story claimed that the machine works held 2000 of these specialized machine-related craftsmen, but census figures suggest that is an overestimate, with a more likely figure being more like 1000. Again, however, this is enough to suggest that the idea that an industrial revolution universally replaced craftsmen with operatives is exaggerated. Industrial evolution both gave and took away. It gave opportunities for machinists and toolmakers; it took away opportunities for shoemakers and blacksmiths.

By the late 19th century the machinist craft, whether at the Edison Machine Works or elsewhere, was an ethnic melting pot. Descendants of early inhabitants such as the Glens met Yorkers, Englishmen and Scots, and an increasing number of children of the mid-19th century Irish and German immigrants. On the initial Edison Machine Works machinist force were, for example, William Madigan,

son of a Schenectady immigrant Irish laborer. As a foreman, he would become a key contributor to GE's steam turbine development. Machinist Henry Geisenhoner, a German immigrant and another early Edison employee at Schenectady, would become both a foreman and one of the most prolific inventors at the works.

Those highly skilled workers, making $2 a day or more, were, however a minority of the work force. The majority was mainly operatives. It is the operatives whose origins, activities and fate are particularly hard to trace.

Fortunately, a remarkable piece of evidence has survived. Credit GE and the Museum of Invention and Science and Invention (MiSci) in Schenectady with preserving it. It is an employee log of the Edison Machine Works for 1891-1892. It includes a tabular listing of more than 1000 employees, giving the date they started, their names, addresses, specific occupation, pay rate, previous occupation and date of termination, often with the reason for termination. It might most plausibly be looked on as a large sample, though probably not a complete list, of the operatives at the works.

What did operatives do at the Edison Machine Works? There were three main categories. Some wound coils for electrical machines. Some split, manipulated or pasted mica. Some were in the recently coined category of "shop laborer", a sort of miscellaneous category for the other types of less skilled operative tasks.

About one third were women. Both women and men were mainly in the age range 15-30 years. About one in seven, however, was listed at the lowest listed age, 14 years. It is reasonable to guess that some of these were younger. A bill before the New York State Assembly at the time put 14 as the generally, though not yet legally, recognized minimum age for work in factories. Only about 1 in 10 of the workers were over 30. The oldest was 52. Among the women, only about 1 in 10 were married, as indicated by the prefix Mrs.

The average wage was about that canonical dollar a day that laborers earned throughout the century. However, that average was within a doubly peaked distribution. The women and 14 and 15 year old boys essentially all made $.50-$.70 a day. The men almost all made $1.00 to $1.35 a day. A significant exception was the category of about a dozen or so men given the occupational description "student." They made $.50 a day. Some of them were simply there to earn tuition money. For others however, including one from the Massachusetts Institute of Technology, a stint on the shop floor added practical experience to their classroom learning. As Pop Turner pointed out, these students came from

as far away as Japan. Late in the 1890s this experience was formalized into a sort of in-house postgraduate engineering course called the Test Program.

The great majority of workers, however, came to the works in another way. The most common previous occupation was "home work", followed by farming and school. These are trailed by a long list of other previous occupations: broom maker, knitting mill operative, printer, plumber, blacksmith, grocery clerk, barber and many more.

The ethnic origins of the workers are not listed, but can be inferred from their names. Like Schenectady as a whole, the majority were Yorkers: people whose names indicated family residence in the US for three generations. The Van surname, indicating descent from original Dutch settlers of the region, was underrepresented. The Mc surname, indicating Irish, and especially the Sch, indicating German, were overrepresented. The surnames with a Di or Ko prefix, or a final vowel, indicating Eastern European or Italian, were present, but, in 1891, in small numbers. The predominance of these immigrants as works operatives would be a 20th century phenomenon.

Unlike the locomotive workers, who were heavily concentrated in the Fonda-Romeyn square, the Machine Works operatives come from all over the city and its immediately surrounding neighborhoods, with one significant exception. Very few come from the Stockade square.

Finally, more than two thirds of the workers were listed as departing employment by 1895. So many are in this category as to raise the suspicion that this might be a selective list. It is more likely, however, that it simply expresses a known fact about industrial operative employment in the US at the time: extremely high turnover. Most of the departures are listed as "quit". A smaller number indicate a transfer to another job at the machine works. A similarly small number indicate firing for such deficiencies as "incompetence" or "absenteeism." Only a few are listed as "laid off."

To give faces to these generalizations, consider 27 individuals who lived on a single street, Kruesi Avenue, just outside the works. Only about half of them made even a single appearance in the city directories or the census. This, however, indicates less an itinerant working class than the large number of single women who married soon enough to disappear from the records under the current surname. For the half with other traces, the records found ranged from a single census or directory line to an obituary.

The sample indicates no dramatic subsequent rags-to-riches stories. The closest is that of

Andrew Geisemer, a 14 year old mica paster in this sample. His grandfather was a German born saloon keeper on Albany Hill, and his father worked at the Locomotive Works. After just two years at the Edison Machine Works, Andrew left his operative job to become a carpenter, and went on to a career as a building contractor.

At the other extreme is one example echoing the experience of the widow Kittle of the cotton factory. Mrs. Frances Tiffany went from wife to widow to taking in boarders, and then, at age 52, to earning $.50 a day as a coil winder.

Most of the stories are somewhere in between upward mobility and last stop. Many of the children and single women were second earners, often children of other Edison workers. For example, 20 year old mica splitter Laura Dey was not only the daughter of an Edison Works employee, but also a cousin of a fellow mica splitter, 19 year old Celia Mereness.

Some had deep roots in Schenectady County. The family of 22 year old winder Martin Scrafford dated back at least the Revolutionary War. His grandfather had been a farmer. HIs father was a machinist. Martin left his operative job for a brief stint as a self-employed photographer. He then returned to the company, by then General Electric, for a career as a machinist.

Some came from outside Schenectady County. The brothers Herman and John Hauprich came from Albany as laborers. After two years as laborers at the Edison Works, they went back to the Albany as, respectively, a printer and a laborer. Other immigrants stayed. Louis LeSage came from Canada, became an oil house worker at the Edison Works, and spent the rest of his working life, as did his son Leo. Laborer Robert Keilman, who came to Schenectady from a chemical works in Idaho at age 42, also stayed on as a lifetime employee.

All these ordinary life stories have been presented as an alternative to the standard industrial revolution narrative. In that narrative, the operatives of the new factories are depicted either as deskilled craftsmen or recent immigrants. Some Edison Machine Works operatives did fit those categories. The evidence here presents mostly alternatives to that standard narrative: jobs for young women other than the previous alternatives of textile mill operative, domestic servant or milliner; jobs for young men other than laborer; or a first taste of industry along the way to a more permanent post as clerk, machinist or even engineer.

All this is not to glamorize the life of the Edison Works operative. The hours were long, the

wages low, and the work deadeningly repetitive. The foremen were often dictatorial. Potentially deadly hazards ranged from the flammable material in the tube shop that resulted in one major fire in 1893, to the simple danger of crossing those six railroad tracks in the early morning or evening darkness. Then add in the prevalence of alcohol, and the health dangers of contaminated air and water.

As the Coralline works explosion characterizes the dangers of work in pre-Edison Schenectady, an 1891 incident characterizes the dangers of work in the emerging electric city. In the die stamping shop of the Edison Works, one of the regular stamping machine operators was accustomed to smuggling beer into the shop. On 13 Dec 1891, Foreman August Weber caught him drinking on the job, and told him no more beer. "The man said if he couldn't have his beer he wouldn't work." He and a co-worker, the die setter, promptly quit.

Carl Sillman, a German immigrant, had recently come to works in the shop as part of "a big party of Germans and Swedes." Despite a total lack of experience in this skilled task, Sillman was put to work as a replacement for the departed machine operator. "Probably from not being thoroughly familiar with the work", said a reporter, Sillman reached beneath a disc to take measurements at the wrong time. The machine came down and crushed off both his arms.

Immediately after this "frightful accident", he refused an ambulance and walked to the works hospital. Foreman Webber "gave directions that everything should be done" and announced that "the Edison General Electric will see that he is well looked after for the rest of his life." This claim is impossible to verify, as the name Carl Sillman never appears again in searchable directory or census records.

Such incidents were an important part of the picture of the Edison Machine Works in its early years. This is not to imply that it was more dangerous than previous industries in Schenectady or elsewhere. If anything it was probably slightly less so. Nevertheless, all industries of the late 19th century were very dangerous places, unforgivably so by modern standards.

The rise of the Edison Machine Works to the city's dominant industry was rapid. From zero in 1886, it reached 3000 employees by 1893. This was twice the employment reached by the Locomotive Works in 45 years. How did this explosive rise of a new industry impact Schenectady?

From 1886 on population growth accelerated, reaching that decade-doubling boom town pace before 1900. Schenectady's population reached 22,384 in 1892. This was nearly a doubling since 1880. It

sufficed only, however, to make Schenectady the 13th largest city in New York State. Schenectady had long since dropped out of the top 100 cities in the US. The growth spurred by the arrival of the Edison Machine Works would, however, make it one of the few cities in the US ever to return to the top 100 after previously departing, making that brief re-entry at 77th place in 1910. That was quickly followed by a second exit from that top 100 by 1930.

This growth placed increasing pressure on those city functions that, even in a slowly growing city were only being barely met. These included creating and paving streets, providing public safety, fighting fires, educating children, preventing or disposing of pollution, and the example that again will be followed here, water supply, with emphasis on that local disease specialty, typhoid.

The new Edison Machine Works elite quickly became heavily involved in community real estate and infrastructure. Harry Livor offered to invest $4000 to help fund a new hotel. The Edison Hotel was soon built on the site of the former Givens Hotel. It included a special room reserved for the wizard, though rarely occupied by him. Batchelor, Insull, Kruesi and Turner also invested in local real estate.

Though he still spent most of his time in New York City, Insull soon took the lead in reorganizing Schenectady public utilities. He and other Edison Machine Works managers became leading stockholders in companies that took over the gas and electric utilities, eliminating that embarrassing Westinghouse name. They also took over the recently created street railway, now converted from horse to electric power.

Edison Machine Works leaders also became politically active, in both parties. Pop Turner was, briefly, a committeeman among the Democrats. William E. Gilmore, assistant general manager of the works, became a Republican Alderman. John Kruesi addressed a Republican rally on the benefits to workingmen of a high tariff. GE leaders also were free with advice to the city. John Kruesi pointed out the inadequacies of the fire department after a particularly destructive fire at the works. Samuel Insull told a dinner meeting of Schenectady leaders in 1891 that every house in Schenectady should be connected to the sewer and water systems. He was seconded in this opinion by Henry DeForest, though the current Schenectady mayor, Republican Everitt Smith, answered Insull by blaming the city's health problem on the recent arrival of ignorant and dirty foreigners.

Insull did not offer to pay for the improvements he recommended. Indeed, the Edison Machine Works did not pay a share of taxes corresponding to the increased strain it put on the city. The Edison Machine Works was located outside the city line in the town of Rotterdam. Rotterdam taxes were only

about one third that of the city's, and went mainly to meet county rather than city needs. In addition, the County supervisors admitted that the Edison Works was under-assessed even by Rotterdam standards. The Edison Company also used its local clout to get a bargain in the amount it paid for city water. Its water bill was later computed to be only half the level paid by industries of comparable size in other cities.

While getting bargains from the city and county on taxes and the water bill, the Edison Machine Works was also able to exert pressure on the city, county and state to solve the flooding problems that periodically revisited the Mill Pasture and Flats. Thanks to the efforts of local State Assemblymen of both political parties, the state financed the construction of a long and stone reinforced "berm bank" on the east bank of the Erie Canal in the vicinity of the works. This reduced the seriousness of flooding. An even more effective remedy occurred when the Erie Canal was replaced by the Mohawk River as the local part of the Erie Barge Canal in the first decade of the 20th century.

Though putting a strain on public finances, the arrival of the Edison Machine Works led to a boom in private real estate business. Henry De Forest switched his efforts to real estate sales and the asphalt street paving business. A centerpiece of his efforts was to gain control of the land just to the southeast of the triangle shaped Edison Machine Works property. This had formerly been the site of the beginning of a plank road between Schenectady and the county town of Duanesburg. He now renamed his portion of that old road Kruesi Avenue. “It being a broad level and straight thoroughfare,” said De Forest on 30 Sept 1889. “It may be made one of our finest avenues and worthy of the name of the general manager of one of our largest industries.” He added that it was his intention to give to the mechanics employed at the Edison Works an opportunity to enjoy 365 warm dinners at the family table.

Other regions were similarly upgraded, at least in name. The old Engine Hill, at the top of the inclined plane, became Mt. Pleasant. On 10 Aug 1889, Realtor Charles E. Scott announced that he had purchased portions of Cotton Factory Hollow, “the scene of many pitched battles, robberies and even a murder”. This area, a reporter predicted, “will soon be no more the home of disreputable drunkards and abandoned women” Scott proposed to put in a beautiful park and drives with several lakes "OWN YOUR OWN HOME, HIGH AND DRY, NO WET LAND, NO SWAMP NO MALARIA" proclaimed Scott’s advertisements.

At this time a new characteristic dwelling type gained predominance. The "Schenectady flat" was a wooden two family house, about 20 feet wide and 60 feet deep. Most of the city, especially south

of State Street, would come to hold this characteristic form. Though brick houses still predominated in the stockade and Poor Pasture squares, the rest of the city, especially Albany Hill, and the emerging suburbs as well, was mainly filled by Schenectady flats. Sold at a cost of $1000 or less, they could be purchased with a small down payment and mortgage by a worker, who could then rent out the top floor to another family to earn the monthly mortgage payment. Despite the efforts of DeForest, Scott and other realtors, supply of housing could not keep up with demand. "A dearth of dwellings," proclaimed the Evening Star in Aug, 1890.

Henry De Forest's Kruesi Avenue development did not in fact become the home of the Edison Works elite. John Kruesi, for example, bought a house in the Stockade instead of on the street named for him. Typical residents of Kruesi Avenue were, instead, those 27 Machine Works operatives earlier described. Kruesi Avenue became a working class street, and, in the eyes of the local newspapers a hotbed of liquor and sin. "Crazy Avenue" and "the Bowery" were its politer nicknames. Newspaper stories described how "objectionable houses" had moved to Kruesi Avenue from their previous location in the Frog Alley, with a "nondescript ranche" called the Tin Horn being given special notoriety.

Prostitution did indeed become a more visible aspect of this industrializing city. This is not to suggest that it was non-existent before. Back in Feb 1869, for example, the police made a "descent on a bagnio on Albany Hill," followed by a house on Amanda St in Frog Alley allegedly frequented by "some of our most respectable citizens" and run by a Miss Coleman, who was labeled "the wickedest woman in Schenectady." In that earlier time, however, such stories were relatively rare.

Newspaper attention to this aspect of urban life became much greater after 1886. Typical of the new coverage was the 1894 case of the "Robin's Nest" which came before Judge Eisenmenger's Police Court. One of the Robin's Nest's workers was sent to the Albany Penitentiary, while a second was put in the custody of her mother, "who promised with tears in her eyes to take care of her in the future." The proprietor of the Robin's Nest was sent on to District Court. There she explained that "she had tried to make a living by keeping a boarding house, but her efforts were in vain." Having been deserted by her husband, she had raised four children who were now "living decent lives." The judge declared what was described as a "light" penalty of 60 days in jail or a fine of $60. After being paid the $60, the judge warned that this leniency should not be taken as a precedent.

Despite such sensational stories, there is little evidence that crime was actually getting worse in Schenectady. The official report of the Schenectady Police Department on 3 July 1892 reported an

increase in arrests of about 60% percent from 840 arrests in 1881 to 1226 arrests in 1891. This was precisely in line with the increase in population. Nearly half the arrests were for drunkenness. This represented less than a doubling from 1881. Nearly one third of the arrests were for "other misdemeanors" or violation of city ordinances. This left only 68 examples of burglary and larceny and 94 of breach of peace. Major felonies and murders were apparently not frequent enough to require a separate tabulation.

It had only required a 50 percent increase in the number of policemen, from 11 to 15, to meet city needs. The police did assert, however, that their workload was much greater in 1891 because the number of saloons had doubled in that ten year period. This was a significantly higher rate of growth than the population. That figure got attention from visiting revivalists. Rev. Charles W. Chapin, for example, claimed on 4 April 1892 that Schenectady had one saloon for every 150 inhabitants, a higher rate than the 1 in 200 of "the wicked city of Chicago." Some of those saloons, he added, "were already importing young girls to entice in and help ruin young men."

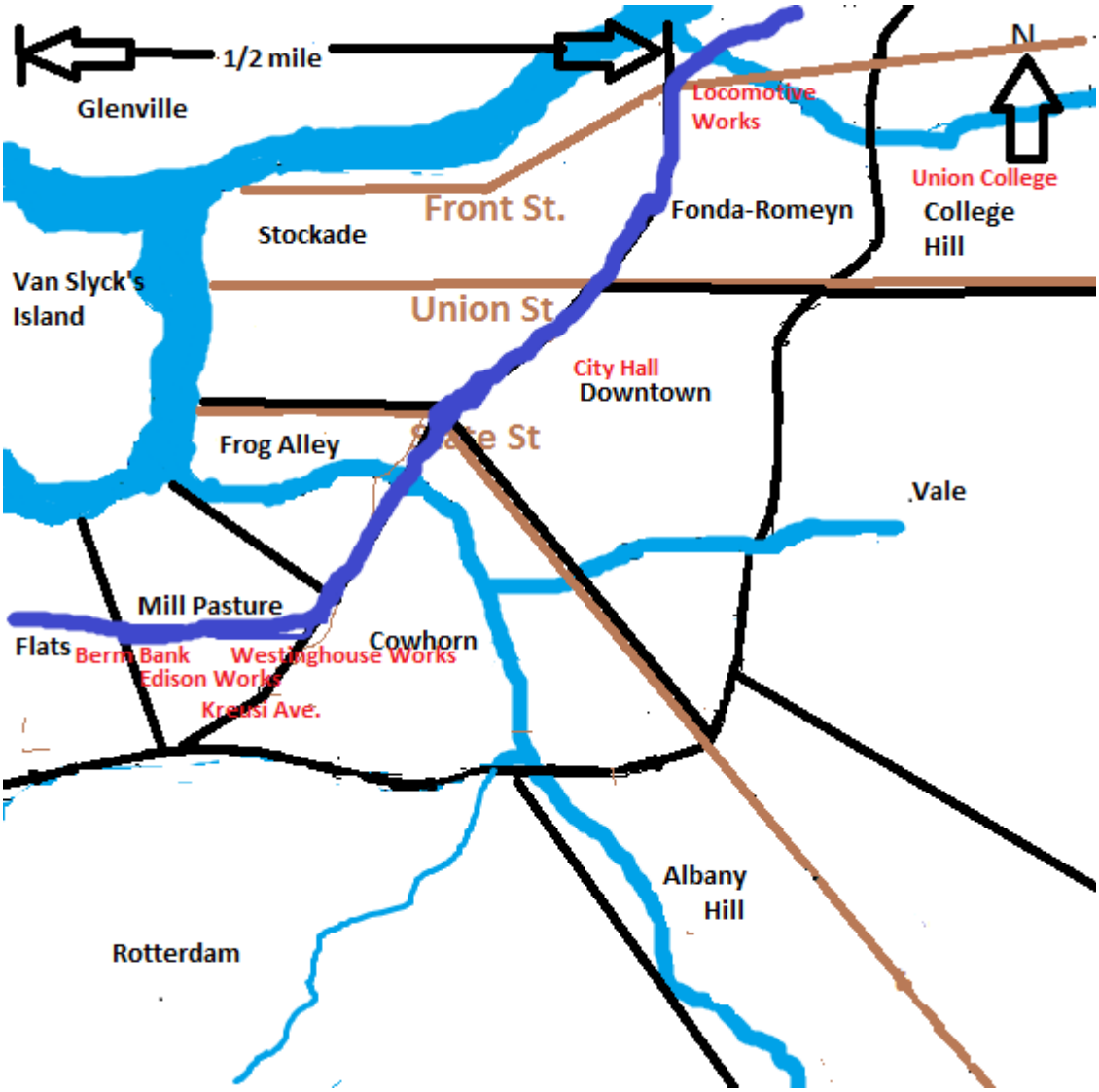
This alarm over growing vice did not, however, seem to show up as strongly in Judge Eisenmenger's Police Court. For example, on 15 May 1893, the Evening Star reported on a raid on three gambling houses on Albany Hill, and the next day's appearance in Police Court. "Judge Eisenmenger maintained his usual dignity," the report read, "but there was a twinkle in his eye, and chances are big that his grave demeanor concealed a smile," as he fined the arrested "players" only nominal amounts for "being disorderly persons."

Another issue getting more visibility was typhoid. The 1884 sewer system construction and 1885 purchase of the Stanford water plant had helped prevent a rise in the death rate, but had not solved the city’s problems with "zymotic diseases" such as typhoid.

In 1886, the city's health officer declared that "the cause of so much sickness", especially typhoid, was "no doubt local", arising from the city's "dirty streets, filth in the back yards, impure water." He studied 24 cases of typhoid, and found that in 15 of them the family drank only well water. He concluded that almost every case of typhoid in the resulted from well water.

In August, 1890, he again reported "quite a large number of typhoid fever cases", though describing the death toll as "moderate." By April, 1891, that conclusion became questionable. More people died of typhoid (7 people) in that month) than the usual main cause of adult death, consumption (6 people).

Typhoid, though striking city wide, was especially prevalent of what might be called the wrong side of the tracks. Before Edison's decision, the metaphorical tracks dividing the right side from the wrong side had been literal tracks: the tracks of the New York Central and other railroads, which hugged the east bank of the Erie Canal in their passage through Schenectady. Those tracks separated the elite Stockade and the middle class homes of the Vans from the principal manufacturing district, the Fonda-Romeyn square with its Locomotive Works, metal processing factories, and predominance of Irish laborers.



Schenectady in the 1890s

In the 1880s, in a trend vastly accelerated by Edison's decision, that boundary between the right side and the wrong side of the metaphorical tracks became State Street. The Mill Pasture, located south of State Street, had become the main manufacturing district. The portion of the city including the Stockade, Downtown, the now more respectable Poor Pasture, and College Hill were to the north, on the "right" side of State Street. There the houses were typically of brick and often one family, the streets were lit by electricity, the sewer system served most houses, and the water plant in the Stockade provided adequate pressure both for serving homes and fighting fires. On the south or "wrong" side, in

the Mill Pasture, Frog Alley, Cowhorn Creek and Albany Hill squares, the houses were almost universally wood frame two family Schenectady flats, the streets were unlit or lit by oil lamps, many households still disposed of their waste in underground vaults despite the greatly increased housing density, and many drew their water from backyard wells. The wrong side was lower lying than the right side, and therefore easily flooded and naturally boggy. This made it easy for microorganisms to diffuse from underground waste vaults to household wells. The division was partly man made. The South Side of State Street, located far from the Stockade Water Plant, was less completely served by either the water system or the sewer system. It was the south of State St. that housed the earlier wave of German immigration. It would after 1890 house the main wave of what was typically called Polish immigration, but also included Hungarians, Czechs, Russians and other Eastern Europeans. Polish was a description at the time, not a nationality. That once and future nation-state was until the end of World War I, divided between Germany, Austria and Russia.

This division between the moderately elevated uplands north of State St. and the lowlands or hilltops south of it would persist in Schenectady down to the 21st century. Only the inhabitants would change. When African Americans returned to Schenectady in the mid 20th century, it was south of State Street, on the old Albany Hill, now called Hamilton Hill, where they mainly settled.

Even back in the 1890s, when the main immigrant inhabitants of Albany Hill, Cowhorn, and Frog Alley were of German descent, these groups were in much more danger, both occupationally and epidemiologically, than their northern Van, Yorker, and now long settled Irish neighbors. A notable, but not extraordinary, family story bringing out these dangers was that of the Horstmann family. Two members of this German immigrant family, the family patriarch and his nephew, had risen from day labor, broom corn harvesting, day labor and broom making to jobs as railroad engineers on the New York Central. In January of 1891 56 year old Friederich Horstmann died of typhoid. In January, 1899, his nephew, 36 year old Henry Horstmann died in a railroad accident.

Statistics backed up Schenectady's general increase in mortality, and the particular danger of both of these causes of mortality, typhoid and accidents, to those in the prime of life. The city's death rate rose from 20 per 1000 in 1885 to 31 per 1000 in 1891, second worst of the 13 cities in the Hudson Mohawk region, and not far from the state's worst urban rate of 36 per 1000. It did not stay at that high level, fluctuating widely in the range from 20-31 deaths per thousand. Typhoid cases rose to 48 in 1891. By the 1890s, the prevalence of typhoid became the subject of increasingly scientific research by a new generation of researchers trained in the scientific medicine of germ theory.

In an article published in the journal The Sanitarian in 1891, Dr. Joseph D. Craig of Albany Medical College presented his results on “Epidemic Intestinal Diseases in Albany and Vicinity". Typhoid was at the head of the list of this class of diseases. The list also included malarial fever, diarrhea, and grippe. These diseases had reached epidemic proportions in the Hudson-Mohawk region in the winter of 1891. "It has been suggested," he wrote, "that Schenectady is the fountain and origin of the epidemic." His survey of cases reported by 59 local doctors bore out this suggestion. Towns upstream of Schenectady were virtually free of the diseases. Going in the other direction, Schenectady had 44 cases of severe diarrhea, compared to 17 in Albany, and 3 in Cohoes. Craig went on to report in detail on the illnesses suffered by three Edison Machine Works employees, Fred D., William D. and Ralph S. Each of them contracted severe illnesses that could be traced to drinking river water. In addition, he noted, people in the southern part of the city still depended on backyard wells that were "fearfully contaminated with sewage."

Meanwhile there had emerged a new approach to water supply. "How would it do to test the plan of supplying the city with driven wells upon the sand plain south of the city?" an anonymous letter writer had asked on 9 June 1886 in the Evening Star. This approach had already been carried out in Brooklyn, and was being tested in Albany. In modern terms, this meant tapping aquifers: that is, large bodies of underground water, recharged from rainfall or a nearby river. That river water would be naturally filtered through thick layers of sand that removed contaminants.

This was, in retrospect, the right answer. It was championed by the Water Commissioners. Yet it could easily be confused with the digging of smaller wells to serve individual houses or neighborhoods, by far the most unsafe way of providing water. This confusion, plus city property owners' continued resistance to tax increases, delayed even the testing of this new idea. The Water Commissioners were replaced, and the new commissioners returned to the old idea of river water.

So despite signs of danger, and emergence of a promising new approach, the water issue remained deadlocked by politics for nearly a decade after 1886. The Water Commissioners barely escaped having their positions eliminated on the grounds of economy. In 1888, seeking to energize a search for a clean water supply, they had appointed a new Superintendent of the Water works, the foreman of the Locomotive Works Machine Shop, George Ingersoll. The appointment was, however, quickly overruled by the Common Council.

That rebuke was led by the city's Democrat Aldermen, seeking to wrest control of the water

plant away from the Water Commissioners. The Republicans offered no more receptiveness. An 1891 proposal to spend $4000 on experiments with driven wells was vetoed by Republican mayor Everitt Smith on the grounds of economy. The three Water Commissioner positions were mainly valued for their patronage opportunities, and were fiercely fought over. One contest within the Common Council for a water commission post went thought 37 ballots before a choice was made.

The water commissioners elected after that long deadlock were able, in May, 1890, to bring George Ingersoll back in as Water Works Superintendent. He then took on, at first on his own initiative, a new role. He became a sort of water wildcatter. He began in 1891 drilling wells to test the driven wells idea. The first effort, in retrospect, was a near miss. He drilled near a pond in the southern suburb of Rotterdam, but failed to strike abundant water. Then, on the advice of consultants from Cincinnati he tried the north bank of the Mohawk. Failure again. A third try was at a pond on the north bank, Collins Lake. Here the water level went down at a rate suggesting that the supply was inadequate.

Ingersoll was not ready to give up. He moved on to the islands in the river. There, in late 1891, he struck a water supply that did not diminish with pumping. The answer, it seemed, had been found.

Unfortunately, the current city government was not interested. It proclaimed that for a growing city such as Schenectady there was only one adequate source: the Mohawk River. The Water Commissioners posts underwent another political shift. "The commissioners have dismissed the driven well project of the old board," reported the Evening Star in July, 1892. This set of Water Commissioners believed that only the river would give an adequate supply. They did belatedly recognize the need to move the intake, placing it two miles west of the city, well upstream of Cowhorn Creek. They also commissioned a chemical analysis of the river water at that point. The chemist chosen, Maurice Perkins of Union College, found no chemical problems with the water.

Here arose two unlikely political heroes, neither a scientist, one a Democrat and the other a Republican. Democrat Alderman James G. Barhydt, a machinist, pointed out that a chemical analysis alone was inadequate. In light of recent scientific findings, a bacteriological analysis was needed. This was carried out in 1893 by Union College biologist James Stoller. He found, in contrast to his chemist colleague, that the levels of bacteria in the vicinity of the new intake did indeed reach dangerous levels. The 18,000 bacteria per cubic centimeter measured at the site of the proposed new intake were not much fewer than measurements made at the current intake

The Common Council and Water Commissioners, however, proceeded to ignore this finding. The

Council voted to carry out the Mohawk River project. Here the mayor stepped in. Republican Mayor Joseph W. Clute was a lawyer who would leave the world under a cloud. In 1905 he would commit suicide by gunshot as the police were on the way to arrest him for defrauding a client. His election as Mayor back in 1893 was an accident. With the Democrats in a large majority, a list of prominent Republicans refused the nomination. However, the Democrats split. The Democrat leader of the Fonda-Romeyn square, Irish-born contractor John McDermott, won the nomination, His party rival Henry De Forest led a large scale defection. A Good Citizens Group was created by a number of prominent citizens, nominally non-partisan but effectively throwing support to the Republicans. All this led to Clute's election.

He was faced with a Common Council resolution to build a new water works with an intake in the Mohawk River two miles west of the city, well above Cowhorn Creek. Armed with the bacteriological report, Clute vetoed the resolution. The Mohawk River, he said, "contains germs of disease as shown by analysis." He went on to detail how sewage was poured into the Mohawk by the upstream towns and cities of Rome, Utica, Ilion, Herkimer, Little Falls, St. Johnsville, Canojoharie, Fort Plain, Fonda, Johnstown, Gloversville and Amsterdam. "The Mohawk River is becoming more and more objectionable as a source of water supply" being "soon appropriated as a natural sewer." He concluded that "It is extremely necessary that speedy and energetic measures be taken in the direction of supplying our city with clean and wholesome water."

This veto was sustained by the Common Council. Then, armed with a petition from the town's leading citizens, the Water Commissioners endorsed a return to the driven wells idea. "We believe a full supply", they proclaimed, "was available from driven wells near the shore of the Mohawk River." A test well was needed for confirmation. If successful, a new pure and abundant water supply costing $150,000 to bring to the city was available.

The Common Council proceeded in September, 1893, to authorize, by a vote of 14-1, the spending of $4000 on an experimental well to test George Ingersoll's program for developing the aquifer. Winter weather slowed the drilling. In Feb, 1894, however, water was struck at a depth of 31 feet. In succeeding weeks, the supply showed no signs of falling off with increasing pumping. During a visit to the wells by the entire Common Council on 2 Mar 1894, Superintendent George Ingersoll served to each Alderman a drink of Schenectady's new clean and abundant water.

Experiments proved that this aquifer not only underlay the river islands, but expanded far

beneath the south bank of the river. It would be a source of water adequate onto only for the 1890s, but well into the 21st century and perhaps beyond.

It took until 1897 to get the aquifer based water supply into operation. The results were instant and dramatic. Revisiting the issue of "Typhoid Fever in the Hudson Valley" in an 1899 issue of Albany Medical Annals (XX, 492), Frederick J. Mann found that after the aquifer water supply had gone into full operation, death from typhoid in Schenectady fell to less than one fourth of its pre aquifer level. The death rate from typhoid had been 1.04 per 1000 people in 1892-1896. It was .26 per 1000 in 1897, and continued to fall.

Machinist George Ingersoll became a leading water supply expert. Schenectady went from the typhoid hot spot of the late 19th century to a model of pure water supply in the 20th century. Typhoid incidence declined from one of the city's top causes of death to virtual non- existence. Occasional typhoid cases did occur, but only in noticeable clusters when breaks in the new water system let in water from the old river plant, which was still being used to flush the sewers. This provided sad confirmation of the wisdom of switching from river to aquifer water.

The water supply story, from Stanford's 1860s initiative to that 1890s triumph, illustrates the way a little city stumbled its way into modernity. Similar stories could be told about the other responsibilities of a city, from schools and street railways, to a professional police force (dating from 1880) and a professional fire department (established in 1900) to intermittent and inadequate but improving efforts to deal with the poor, to the lighting and cleaning of the streets, and finally, just at the turn of the century, to turning Cowhorn Creek from a deadly open sewer into an enclosed and unobstructed underground sewer.

As the city was stumbling toward assumption of modern responsibilities, the Edison Machine Works was also evolving toward the form it would take in the 20th century. This evolution had two dimensions, technological and organizational.

In technology, the busy and prosperous Schenectady Edison Machine Works was threatened by 1892 with technological obsolescence. During its first five years, the direct current systems it produced held their own against the rival alternating current systems. That first generation of alternating current systems had little if any advantage over DC. While somewhat more flexible in making use of water power, those early AC systems were more complicated and more expensive. Much has been written about the way the Edison forces carried out an unethical publicity campaign featuring capital

punishment by AC (failing however to change the verb from "to electrocute" to "to westinghouse").These accounts do not, however, always mention the fact that Edison was correct: DC was inherently safer than AC.

In the early 1890s a new second generation of AC systems was emerging. These systems had two solid advantages that DC was not able to match for a century. First, these new systems could achieve transmission distances not of merely a few miles, but of tens or even hundreds of miles. This was first demonstrated in Germany in 1891 by a 90 mile high voltage transmission line between the cities of Frankfurt and Lauffen. Second, the new type of AC systems could be used to build much more powerful and versatile electric motors than either first generation AC or first generation DC. This was demonstrated by a handful of simultaneous inventions of a technology called polyphase power. Especially important was the demonstration of polyphase by Nikola Tesla.

In the US, George Westinghouse, Jr. was the leader in putting these high voltage and polyphase AC technologies to work. Closely following at his heels was the Thomson-Houston Company. This Lynn, MA, firm was known by envious rivals as the "cowbird of the industry", hatching the eggs in nests laid by others. In fact, being this sort of fast follower would prove to be perhaps the most successful corporate strategy of the twentieth century, for companies ranging from General Motors to Microsoft. Back in 1892, Edison's companies were slow followers. They lagged far behind the leaders in accepting, much less implementing, and the second phase of the AC revolution.

Financially, however, the Edison companies did take an early part in another main trend: consolidation. In 1888, German-born financier Henry Villard, on the rebound from a failure in railroad consolidation, brought together the technologically lagging Edison companies with some more technically progressive companies, the Sprague Electric Motor and Traction Company, a leader in street railways, and the Siemens Company of Germany, an electrical pioneer more receptive than Edison to the new type of AC. The new company was called Edison General Electric. With its formation, Thomas Edison completed his personal exit from the electrical industry.

As the parent company consolidated, its Schenectady works spun off, in 1890-1892, a series of ventures. Under the leadership of Insull and Kruesi the US. Wire and Cable Company was created in Schenectady. In Dec, 1892, Pop Turner resigned from the machine works, and purchased its shafting, hanger and coupling business. He planned to exploit his own patents on oil bearings at a new works in the suburb of Bellevue, just southwest of the Edison Machine Works. Henry De Forest took the lead in

raising a fund of $2000 to purchase the property Turner wanted and present it to him. The mica department of the works also spun off, as the Mica Insulator Company, occupying the building of the departed Kilmer Wire Works.

For a moment, in the early 1890s, it appeared that the Mill Pasture of Schenectady was becoming a sort of Tech Valley, an electromechanical precursor of the sort of electronic or computer innovation center that would be epitomized in the next century by California's Silicon Valley. This momentary efflorescence was, however, brought to a screaming halt by the events of 1892 and 1893.

The consolidation that formed Edison General Electric had been seen even before 1890s as only the first step in the merger process. The adoption of the Sherman Anti-Trust Act in 1888 had, surprisingly, promoted rather than prevented the further formation of the giant merged companies called trusts or monopolies. The Act was interpreted by the courts not to apply to manufacturing companies. Manufacturing industries ranging from leather, tobacco and sugar to steel, locomotives and electricity seized on consolidation as a cure for what was perceived as ruinous competition due to over-capacity.

A leader of this consolidation movement was New York City banker, and Edison General Electric backer, J.P. Morgan. He had been an early Edison investor, with his house the first one Edison lit with electricity. More generally, he had led efforts to consolidate railroads, and was now expanding that effort to electricity. Reluctant to become involved at first, Morgan by 1892 had taken over the role as central facilitator of a great electrical merger aimed at uniting all the major companies. Negotiations took about five years, and were only partially successful. George Westinghouse, Jr., who had taken the lead in the second AC revolution, felt strong enough to stay out of the consolidation. However, most of the other major US players were brought in. These included, most prominently, Thomson Houston and Edison General Electric. By Feb, 1892, the merger terms had been arrived at. On April 15 it was made official. On 28 April 1891 it made the Schenectady headlines as "An Electric Trust.... One of the greatest Trusts Ever Formed in This Country. "

What did this mean to Schenectady? Citizens were assured that it meant further growth for the local works. Reverend Sewall of the First Reformed Church endorsed it. "He believed in consolidation," he sermonized," and other things being equal, the more capital invested in an enterprise the more economically it be administered." Big business, he assured his parishioners, could be "Christianized

business,"

Legally as well as theologically, consolidation brought advantages to Schenectady. As part of a deal with the state of New York under which General Electric would incorporate in that state, instead of such rival corporate havens as Delaware or New Jersey, the state authorized the company to declare its legal location as Schenectady, and hold its stockholders meetings there. This enabled the new company to avoid New York City taxes.

Nobody was fooled by this technicality, however. The new company had its true headquarters in New York City, where president Charles A. Coffin had his office. More threatening to Schenectady, the company had its technology headquarters in Lynn, MA. Thomson Houston executives based in Lynn got all the top positions in General Electric. This included the new company's chief technologist Edwin A. Rice. Underlining Edison General Electric's second class status in the merger, its stock was valued at only $14 million versus the $18 million valuation of Thomson Houston. Capitalizing expected future growth, the value of the new company was put at $50 million.

At first glance, this meant little change for Schenectady from its previous role. The General Electric machine works would take its technological cues from Lynn, as its predecessor had depended on Thomas Edison's West Orange Laboratory. Such innovation as occurred in Schenectady would be via spin off companies, such as the wire and cable, mica, and the Turner works.

This reasonable expectation was suddenly and decisively reversed. The immediate cause was the US economic depression of 1893. The ultimate cause of Schenectady's surprising new role was more basic: the geography of location. Consider each of these in turn.

The depression hit the new General Electric Company at a very vulnerable stage. Its predecessor companies had accepted as revenues the stocks of the local electric companies that had bought electrical equipment. In this 1893 depression, those stocks became temporarily unsalable. Within a very short time the new company could not pay its bills. Its stock fell in the summer of 1893 from $63 per share to $25 per share. When, on 16 Aug, 1893, Schenectady reporters went out to the General Electric Machine Works to ask John Kruesi about rumors that the new company was bankrupt, they received from him the not very comforting answer that "I have heard nothing."

In that tension filled month of August, 1893, General Electric president Coffin made a trip to JP Morgan's summer home in Maine, begging for a bailout. Morgan agreed to head up a syndicate that

would loan General Electric the money it needed, in exchange for the right to buy those utility stocks at a bargain basement price after the economy recovered. As a casualty of that depression the General Electric capitalization of $50 million had to be cut in half by the end of the decade, with the principal losers being the preferred stockholders. In the long run, however, that $50 million estimate was not wrong, only premature. General Electric went on to be worth hundreds of millions, and eventually hundreds of billions.

As part of the Morgan bailout, General Electric and its titular president Charles Coffin were placed under the control, from 1892 to 1900, of two "Morgan men", valued subordinates of the great banker. Charles Coster took charge in New York City, while Joseph P. Ord went to Schenectady. It was Ord, a man most Schenectadians have never heard of, who made the last and most important of the city's crucial 19th century decisions. He decreed that the General Electric Company would centralize its technical, bookkeeping, publicity and new manufacturing initiatives in Schenectady. Titular president Coffin announced at the April, 1894, stockholders meeting that "the business management of the company has been concentrated at the principal office in Schenectady." There "selling, accounting, manufacturing, (and) engineering" would be located.

The reasons for this centralization went beyond the immediate needs for economy occasioned by that 1893 depression. To overcome the temporary lead of its much smaller rival Westinghouse, General Electric would have to expand rapidly into the new AC technologies. This meant switching from a focus on machines to a focus on systems. Part of this second AC revolution was the need for vastly bigger power sources, whether it was falling water such as the great project or Niagara Falls, or the new steam turbine technology being pioneered in England. That in turn meant not only bigger generators and corresponding bigger versions of all apparatus, but more scientifically based connection of these components into systems.

All this had two implications. To achieve the system integration needed, the technologists and the manufacturing plants had to be in the same place. The separation of engineers in Lynn from manufacturing in Schenectady would only duplicate the inefficiency of Edison's separation of Schenectady and West Orange. In addition, the new heavy machinery had to be produced in even larger versions those one story cathedral shops, with electric cranes carrying the giant components from end to end. That meant much more manufacturing area.

Where should this new integrated plant be put? The answer was obvious. Lynn, an old

manufacturing city where shoemaking had preceded electricity, was too crowded. Schenectady had wide open spaces in the Mill Pasture and out onto the flats. It also had weak local politics, a calm local labor scene, and low taxes. General Electric President Charles Coffin, leader of the Lynn, MA, contingent, declared on 27 Jan 1894 that the works at Schenectady were "far superior to those at Lynn, " He noted that while Lynn was already full to capacity with some 2500 workers, 5000 men could be put to work in Schenectady "without being crowded in the least." He concluded that "the Schenectady Works could be operated more cheaply, and that land could be purchased by the acre here for the price of a square foot at Lynn."

The move to Schenectady began in 1894. It would include not only the centralization of manufacturing and technology, but also the centralization of other corporate functions such as accounting and publicity. Additions to the works would include not only more cathedral shops, but also a large office building, the largest in Schenectady. Expansion of the works would spread outward from that original triangle shaped property between Kruesi Avenue and the canal. This would soon include closing down that relatively new Kruesi Avenue, with the city buying out the property owners using the same kind of contributions from local businessman that had been so quickly forthcoming to lure Edison in 1886. To allow expansion out onto the flats, Schenectady County's state legislators secured $35,000 funding in Jan 1894 to further reinforce that long stone "berm bank" to limit the effects of future floods. To further aid expansion, those briefly independent new ventures, the wire and cable and mica plants, and the Turner Works, were absorbed into that rapidly expanding General Electric Works.

What emerged would be a new kind of works: not merely a machine works, or even an electrical works, but an industrial works. It would include one of the landmark industrial research laboratories in world history, a laboratory where Nobel Prizes were won. It would include innovations not only in electrical machinery, but in fields ranging from appliances to radio to television to X-rays. It would be as significant in terms of corporate organization and labor response as it was in technology.

It would encounter a city stumbling into modernity, completing centuries of evolution from Dutch village to company city. The State Census of 1895 would find Schenectady to be a city of population of 22,615. Slightly more than half that population, nearly 14,000 people, now lived in the Downtown, Albany Hill, Cowhorn, Mill Pasture, and Frog Alley squares. The Stockade, which had been essentially the entire settled city in 1800, now held less than one-tenth of the population.

The rate of increase for the decade 1885-1895 barely missed that decade-doubling boom town

rate, and the miss was only due to the 1893 slowdown. The next decade, 1895-1905 would see that long awaited decadal doubling, identifying Schenectady as a boom city at last.

As population accelerated, individual lives changed. Henry De Forest had evolved from broom corn grower and broom manufacturer to the city's leading real estate dealer, and owner of an asphalt paving firm that was part of an "asphalt ring" that would be Schenectady's particular target for progressive reform. He also symbolized a new state of Schenectady politics. In 1896 he officially switched from the Democrat to the Republican Party. Schenectady politics had finally polarized around an economic axis, with the Republicans as the party of the rich, the socially prominent and the managers and close allies of General Electric, and the Democrats the party of all others.

George Ingersoll had evolved from machinist to water wildcatter to nationally renowned water expert. Through his determined and ultimately successful quest for the aquifer, he became perhaps the greatest individual benefactor to Schenectady in its 19th century. Schenectady's twentieth century would still be a century of Vans and machinists. It would not, however, be another century of typhoid.

In a longer range perspective, their extended family, the Van Eps, give a more than two century perspective on Schenectady. They were not only first settlers but part of that first settlers' elite group, sometimes called "patricians". Members of the Van Eps group served in among the five proprietors, with power over distribution of the common lands. The received large properties, and significant special opportunities, such as mill rights and operation of a ferry. Yet they did not become a permanent elite. By 1841 they were still somewhat more likely than most to earn their living from their property owners. By 1894, however they had melted into the city's general profile. The 27 Van Eps families listed in the 1894 directory represented the entire range of occupations, from physician, superintendant of streets and engineer through bank cashier, machinist, bookkeeper, draftsman, fireman, and molder, to Edison Works employee, apprentice, dressmaker, peddler, laborer, and to one resident of the almshouse. Only two males listed without occupations might be rentiers. Only one of those 27 Van Eps households was of sufficient prominence to be listed in the directory in bold face, the mark of elite or at least significant businessman status. That 1 in 27 was about average for the directory as a whole. So despite the Van Eps' in particular , and Vans' in general, modest differences from other name groups in occupational and residential profile, the Van name group, as typified by the Van Eps, had not, in the long term, become an upper class.

With that recognition of absorption of an initial Dutch elite into the ethnically and

occupationally varied population of an evolving industrial city, Schenectady's 19th century, the century of Edison's decision, will, for the purposes of this book, be declared at an end. That end will be specified to occur, slightly prematurely, on 22 Jan 1894. On that day, Schenectady newspapers noted the arrival in that city of the top engineers from General Electric's Lynn, MA, work force. The list included such eminent names as Walter H. Knight, Henry G. Reist, Frederick Fish, F.G. Stockwell, and James Cahoon.

One name was however, from a 21st century perspective, conspicuous by its absence from that newspaper list. Accompanying those prominent engineers to Schenectady in Jan 1894 was a short, twisted, bearded, cigar smoking German immigrant. His original designation in the Lynn engineering force was "calculator", a position he held because he was one of the few people in the world who had mastered the mathematics that underlay the second AC revolution. He had also, after arriving in the US, changed his first and middle names: from Karl August to Charles Proteus Steinmetz.

Schenectady's twentieth century would be Charles Proteus Steinmetz's, and General Electric's, century.

Chapter 7

Conclusion: Industrial evolution from the middle out.

The 1886 decision that was the key event in Schenectady's 19th century was not Edison's. The industry that the decision sent to Schenectady, however, was his.

So it is altogether fitting that in the 21st century a statue on the spot where Schenectady's Ferry St. used to meet the Erie Canal depicts Edison reaching out his hands, perhaps passing the electrical spark, to Charles Proteus Steinmetz. It is the local version of a similar theme depicted on the ceiling of the Sistine Chapel, only here with Steinmetz in the role of Adam, and Edison as God.

Thanks to this 21st century addition, Edison and Steinmetz now make up two fifths of all the people honored by statues in Schenectady. The other three are President Chester A. Arthur, a Mohawk named Lawrence who came to the aid of Schenectady at the time of the 1690 massacre, and an unknown soldier of the Spanish American War.

If Edison was the ultimate cause of Schenectady's most important episode of industrialization, he was not, however, the immediate cause. The symbolic passing of the spark was just one step in a long evolution. It was not an unanticipated and sudden industrial revolution.

So evolution, not revolution, is the answer to the main general question posed in this book. Schenectady evolved in a way in many respects typical of US little cities. Key concepts for understanding that evolution are city systems and geography. Trying to tell a city's story from the inside is misleading, and this is especially so for little cities. Every city is part of a system. That system encompasses many magnitudes. City roles emerge according to places within that system. Little cities in particular become subordinate to bigger cities in such areas as politics and finance. The decisions that shape little cities are mainly made in big cities. The “Edison decision” made by Charles Batchelor is typical. Schenectady's key decisions were made in New York City, in Albany, and in Philadelphia, and (in the case of its 1690 massacre) in Montreal.

At the same time, however, those little cities benefit from the outflow from the big cities of space hungry and energy hungry manufacturing industries. So a little city's place within the city system is more determinative of its fate than are the biographies of its internal leaders.

A key to a city's place in a city system is its geography. To a large extent, cities are what they are because of where they are. Schenectady's transportation break geography made it a city. The Erie Canal took that transportation break role away. The railroad brought it back, as Schenectady became the first US railroad junction. This helped make it a city of railroad contracting, then a city of locomotive manufacturing and of machinists, then a city with just the right buildings on just the right unoccupied plain at just the right time. In this way, the natural geography of the bends and waterfall of the Mohawk River evolved into the social and economic geography of the Electric City.

That evolution, driven by the nature of city systems and by social and economic geography, had

consequences for demography, economics, ethnicity, and politics.

Demographically, Schenectady did not become a true city at all until nearly half way into its 19th century. It passed the lower limit of a seventh magnitude city in about 1840, and only moved up into sixth magnitude only with the turn of the 20th century. With a total population increase from about 2500 people in 1800 to 22,615 in 1895, it was a slow jogger in the US city marathon. It was passed by more than a hundred other US cities in the 19th century. In that century US urban population grew twice as fast as the nation's population as a whole, doubling every 15 years. Boom cities doubled in population every 10 years. Before 1895, Schenectady's doubling times were 25 years or more. Only as its 19th century was ending did Schenectady reach that pace of boom city growth.

Schenectady moved slowly, and with several false starts, toward industrial specialization. Schenectady did not become a college town, or stove city or cotton factory city, or railroad junction city. It did become a locomotive city, though lagging far behind the Baldwin Works of Philadelphia in that industry. Finally, however, Schenectady took its place alongside the Collar City, the Spindle City, the Rubber City, the Carpet City, and the Steel City as the Electric City.

The evolution toward that place was in part a process of industrial outflow. The locomotive industry flowed out of Philadelphia to Schenectady long before the electrical industry flowed out of New York City. Individuals also flowed out of those larger centers, from future cotton factory entrepreneur Archibald Craig just before 1800 to Charles Proteus Steinmetz just before 1900.

Complementing this outflow was industrial inflow. Participants in its relatively short range version ranged from Widow Kittle of the cotton factory to city economic, political and cultural leaders Alonzo Paige, Isaac Riggs, and Charles Stanford, the latter achieving his inflow from nearby Niskayuna, but by way of California. In the case of the two George Westinghouses, what flowed in, from nearby Central Bridge, NY, in one generation flowed out, to Pittsburgh, PA, in the next.

In the dimension of economics, one looks in vain, before the Civil War, for that almost instantaneous proletarianization of farmers and craftsmen that replacement of virtuous republicans by economic man described as the traditionally understood American industrial revolution. Instead, the economic insecurity experienced by the likes of ex-Revolutionary soldier Jeronimus Barhydt and the widow Kittle of Princetown farm and cotton factory gave way to the different but not necessarily worse economic insecurity of saloonkeeper Matthias Treis and his laborer brother Nicholas, and laborers John and Peter Tempany. This evolution took not one but three generations, stretching over the entire 19th century.

This slower pace was no mere detail. Evolution brought new skills, not just deskilling; new virtues as well as new vices; and opportunities as well as problems. Rather than replacing republican stability with capitalist instability, it replaced old forms of instabilities with new ones.

A town of farmers, laborers, servants, carpenters and shoemakers in 1798 became a city of laborers, servants, operatives, machinists, carpenters and clerks in 1850, and a city of machinists, operatives, laborers, clerks and carpenters in 1894. The one third or more of the work force engaged in

export industries went from transportation break support in 1798 to college, cotton factory, and small machine works by 1830, to Locomotive Works in 1875, to the industrial works consequence of Charles Batchelor and Joseph Ord's decisions by 1886 and 1893.

The dimension of ethnicity poses the question of disposition versus situation. This book concluded in favor of situation. The educational, economic and religious background of those who arrived, and the timing of their arrival, mattered more than any inborn ethnic disposition. Sometimes the situation encouraged blending, in the timeworn but still meaningful melting pot. Thus Dutch blended with Scots and Yankees, and both with other American born arrivers. The result was the more general ethnic blend of Yorker. The Van Eps cousins, the De Forests and the Ingersolls exemplify this process.

Distinct characteristics remained. The Dutch Vans were, for example, throughout the century more likely to live at the edge of the Stockade, to be initially carpenters and shoemakers and later clerks, than other groups, and less likely to become machinists, or employees of the Locomotive Works or Edison Machine Works.

Mosaic patterns were present from the beginning. For African Americans, Their slavery system lasted in New York well into the 19th century. After freedom, most left. The city's African American fraction fell over the century from more than 1 in 10 to less than 3 in 100. Those who stayed were located first in Fonda-Romeyn, where Mary Hannah had her grocery, then on Albany Hill, where Francis Simpson had his farm.

Irish immigrants became laborers and occupied Fonda-Romeyn, Germans moved into a broader occupational distribution and occupied Albany Hill. College Hill was a Yankee square. The city's ultimate pattern might best be characterized as a mosaic with some melted squares, such as Frog Alley and Downtown.

Finally in terms of the standard characteristics of politics, where "something" was ideology, ethnicity or economics, Schenectady's 19th century was a politics of nothing with occasional bursts of something. The political issues that mattered most to voters in city elections were retrenchment, reform, and development, applied on a local, specific and personal scale. The bursts of something included the 1830s politics of banks and railroads, the 1850s rise and fall of the Know Nothings, the sorting out of parties of the slavery issue, the intermittent efforts of Temperance and Workingman parties, and finally, a century-ending realignment that saw the Republicans at last become the party of the rich, of the well-born, and of General Electric.

In all those characteristics, Schenectady was a city with an industrial evolution, a geography-driven demographics, an ethnicity of disposition, and a politics of nothing with occasional bursts of something. In these respects Schenectady resembled many other little cities. What of its particular signatures, Vans, typhoid and machinists?

Schenectady remained a city of Vans through the 19th century, and, indeed through the 20th. As late as 2000, in the telephone directory for the Capital Region Smiths only barely outnumbered Vans, six

pages to five. As indicated above, that prefix proved a useful marker. It indicated the tendency of the earliest settlers neither to become a local aristocracy, or to diffuse away. Instead they persisted, first as carpenters and shoemakers, later as clerks. They were less likely than later arrivers to become machinists or laborers, less likely to work for the city's largest industries, and more likely to live in the Stockade, though mainly at its eastern edge, and more likely than others to become the city's mayor.

Schenectady gradually became a typhoid hot spot as the 19th century went on. This was the consequence of more people settling more densely on wet land, and relying on the easiest and least expensive methods of obtaining water and disposing of wastes. Typhoid and the ways of combating it, sewers and clean water, serve as a useful indicator of the ways the people of a little city addressed, or failed to address, civic responsibilities. What would later be regarded as progressive urban reform had its own evolution, more tangled and halting than industrial evolution. Problems could be ignored, exploited for short run political advantage, or denied. In the long run, however, as the water supply story indicates, it proved at least possible to stumble to a solution.

Finally, that local specialty of machinist has provided the story with several main protagonists. Attempts are often made to tell history for the bottom up, rather than from the top down. Here an alternative emerges: history from the middle out.

The machinist occupation was a sort of middle class melting pot. The city's first machinist was a Yankee, Honest Joe Stillman. In that specialty descendants of the city's original families, such as the Clutes and Glens, met first Scots, English and Yankee immigrants, as well as the Pennsylvanians who came with the Norris Works. To these were added Irish and then German immigrants. Later would come Poles and Italians. Missing from this machinists' melting pot, however, was one of the city's earliest ethnic groups, African Americans. Their return in large numbers, in the 20th century, would come so late as to largely miss this machinist opportunity.

Machinists stand out for more than the inventions they may have made, though two of them, both named George Westinghouse, reached the top rank as inventors. So did Walter McQueen as a technologist. Machinists, however, also made individual contributions to the broader life of the city. The sequence started with Honest Joe Stillman, for his political and religious interests and remarkable family story more than for his modest technical abilities. It continued through Spencer Ostrom, guiding hand of the Clute Works.

That machinist identity got its signature embodiment in two remarkable city stories. Fred Eisenmenger, son of a German immigrant went from laborer to military musician to soldier to machinist to law student and Police Court Judge. Living into the 20th century, he would become in 1902, Schenectady's first mayor of German descent. George Ingersoll went from machinist to machine shop foreman to water works superintendent to water wildcatter. No doubt the aquifer, one of the city and county’s greatest assets, would have been discovered and exploited without him. But it was through him that it happened.

This machinist stamp on Schenectady would continue into the twentieth century. Leadership roles taken by machinists would range from becoming the backbone of the city's 1911 Socialist

government to twice organizing and gaining recognition for unions, in 1915 and 1937, at the General Electric Works. Indeed, the machinist tradition, though much attenuated, survives into the 21st century, with machining steam turbines still being the main thing GE does in Schenectady.

Much of the 19th century Schenectady that this book surveys has vanished. The long lasting cotton factory tenements were finally torn down in the 1980s. Sand Hill Creek, which powered the cotton factory, now lies invisibly beneath I-897, a spur of the New York Thruway. Cowhorn Creek lies similarly and safely underground. No traces of the Clute Works or the Givens Hotel can be found, or even of the Erie Canal that gave them their advantageous downtown location. The old canal itself lies beneath a boulevard, while the modern barge canal uses the Mohawk River as its route through Schenectady. Even the once mighty Schenectady Locomotive Works is no more. It was absorbed into the consolidation called the American Locomotive Works just after 1900. That company went out of business in the 1960s. The last locomotive works buildings are about to fall in 2016 to make room for the construction of Schenectady's first gambling casino.

Some sites of the 19th century story do, however, survive. For example, the Mohawk Bank, after subsequent incarnations as the home of the first superintendant of the New York Central Railroad Chauncey Vibbard, the home of clothing manufacturer Jonathan Levi, and the home of Schenectady's elite men's club, the Mohawk Club founded in 1885, survives in the 21st century as the Stockade Inn.

Union College not only still survives but still embodies the original plan developed by Jacques Ramee for Eliphalet Nott. In 2015 it was rated the 12th most beautiful campus in the US by the Princeton Review. Its educational policies continue to emphasize Nott’s pioneering ideas, with an unusually strong combination for a small college of liberal arts, science, and engineering. Union’s civic role has changed however, under late 20th century and 21st century leadership. No more does it look down haughtily on hogs and Dutchmen, Instead, it has adopted policies of neighborhood improvement and participation in urban educational and social efforts showing a much more direct concern for its city.

The Edison Machine Works of 1886-1894 is in 2016 just one of dozens of GE manufacturing plants, scattered around the globe. That Schenectady plant has about the same number of people in its GE work force in 2016 as General Electric had there in 1894, about 2500 workers. Its area has grown from the original 8 acres to 639 acres, about a square mile. That space, now largely empty, was once needed for a work force that grew to 40,000 in 1950. That growth and subsequent decline are a twentieth century story. The two McQueen Locomotive cathedral shops that spawned the works survived until the 1970s. In a large nearby building, machining still goes on. Machinist remains a signature occupation of this plant and its city.

For a last stop in this brief tour of 19th century survivals, step just across the modern city of Schenectady's eastern boundary. Here one site captures centuries of history.

On that site, in the 18th century, wealthy Scots fur trader John Duncan built his country estate "the Hermitage". The Tory Duncans, despite the Revolution, survived at the Hermitage until 1819. A few decades later, the site found a new occupier, a participant in the 1840s railroad boom, contractor Josiah

Stanford. When his son Charles returned from California, he turned it into a gentleman horse farm called Locust Grove. There Charles met with the buyers of his water works and his partners in many civic ventures. There his sons met with bidders for the two cathedral shops, and made the sale to New York City machinery salesman George Place.

Locust Grove passed on to other hands. Early in the 20th century, an aging George Ingersoll was looking for an appropriate place to put his estate to work for Schenectady. In 1913 an associate of Ingersoll wrote to his aunt: "Did you know Geo. Ingersoll left $50,000 to found a home for aged men? I am so glad he did that. I always liked him."

To fulfill this bequest, the Ingersoll Trust purchased Locust Grove. It served as the Ingersoll Home for Aged Men for most of the 20th century. Then progress turned its environs into the extension of a local shopping mall. The building was slated for destruction. Historical memories, however, awakened. Rather than being destroyed, the building was repurposed, into a branch of the Berkshire Bank.

So it stands today as a combined memorial to representatives of three very different Schenectady eras and initiatives: to fur trader, freight forwarder and Tory John Duncan, representing Schenectady's transportation break origins; to gentleman farmer, politician, and entrepreneur Charles Stanford, representing its industrial evolution; and to machinist, foreman, and water wildcatter George Ingersoll, representing its response to industrialization. There, perhaps, from time to time, a customer or teller takes a sip from a drinking fountain of George Ingersoll's plentiful and pure aquifer water, and gives a thought to what is past, and passing, and to come.