Spindles & Shuttles, Stones & Sifters, Saws & Stills: Industrial Development in the Empire State of the South, to 1940

An Industrial Context Statement for Georgia

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CHAPTER I

INTRODUCTION

This study was conducted to fulfill the National Parks Service's mandate that each state preservation office prepare context statements dealing with the major themes of their state's history. Such context studies then provide a background or framework for evaluating national register nominations, for assessing the significance of properties falling within that theme, for reviewing the impact government-sponsored actions on historic properties, and for determining the eligibility of possible tax incentive projects.

This particular study has another provenance. During the 1980s, Eric Deloney, who served both as chief architect and as head of the Historic American Engineering Record (HAER), urged Elizabeth Lyon, then head of the Georgia State Historic Preservation Office, to join HAER in publishing, in book-form, the drawings, histories, and photographs produced by the Georgia three HAER projects: (1) the Savannah railroad shops, (2) the Augusta canal and its associated industries, and (3) the riverfront dams and industries in Columbus. This work would have also included the results of one additional, projected HAER study, an examination of the Tallulah hydro-electric dam project.

While Lyon might have desired a publication dealing with Georgia's industry, she felt Deloney's suggestion was premature and probably not inclusive enough. Lyon posed several questions: whether a study of these four major sites was sufficient. Were there other major industries that needed to documented? Were these major

industrial/engineering sites, three of which (those HAER studied) were designated as National Landmarks as a result of Deloney's efforts, all that needed to be included in such a publication? Lyon felt the need for a more extended study dealing with Georgia industry as a whole, and asked me to write an industrial context statement for Georgia with those questions in mind.

From his national perspective, Deloney was looking for National Landmark nominations; Lyon was more concerned with state or local significance, with documenting all of Georgia's industry. This investigation has not revealed any hidden National Landmark status industries; instead, it tries to outline the history of and define the architecture of , the built environment created by, Georgia's textile, grist, flour, saw, cotton seed oil mills, turpentine stills, etc. And to pose questions about whether Georgia's historic industries are accurately represented on the National Register of Historic Places?

Industry in this study is defined as manufacturing, as businesses engaged in fabricating or processing by machines, usually on a large scale. It does not focus on commerce or trade and thus excludes activities such as railroads, which would fall under transportation, or the selling of goods which would be seen as commerce. For the most part, this work follows the categories used by the U.S. Census over the years. It also ignores mining, which comes under another thematic study.

Making distinctions about what is industrial (manufacturing) can be difficult and making decisions about how much material to include about each industry can be subjective. More emphasis was placed on the major, traditional 19th century

industries: textiles, grist & flour mills, and lumber & naval stores. On the other hand, food processing in the 20th century, which appeared in censuses as a major operation, was not treated very extensively, in part because it included a wide diversity of small-scale operations and, more important for this report, those factories did not leave a distinctive footprint upon the built environment of the state.

Soft drink bottling illustrates the problem. Did all those Coca-Cola bottling plants manufacture drinks and, therefore, should be treated as industrial operations and included in this study? Or did they merely bottle syrup manufactured somewhere else and, therefore, were commercial operations? For purposes of this report they were treated as the latter, even though their buildings, spread throughout medium- and large- sized cities across Georgia, were very distinctive and were often the only example of modern architecture from the 1920s or 1930s in the town. Some type of thematic study or National Register nomination needs to be made on this class of building.[1] But that was viewed beyond the scope of this work.

Since industrial is defined here as manufacturing, as fabricating a product by machines, the tourist "industry" (as opposed to the tourist business) and other such recent, trendy "industries" will not be treated here, even though it might be interesting to study the architecture of tourist homes. Did they all have neon tubing signs and were they always multi-storied buildings? Did they all smell the same?

Engineering as such is also not covered in this study, even thought much of what

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[1]Besides, John S. Pemberton, the creator of Coca-Cola, has been overly historicized in both Columbus and Atlanta, even though the two cities will not recognize the view of the other.

is discussed relates to that topic. The term engineering also includes bridges, military forts, and the general actions of engineers which are beyond the scope of this work. For an introduction to this subject, see James E. Brittain, *A Brief History of Engineering in Georgia and Guide to 76 Historic Engineering Sites* (Georgia Institute of Technology, 1976).

The period covered by this study is basically a century from about 1840 until 1940. Even though some small mills and activities from the earlier period are discussed here, Georgia had little industry prior to 1840. The harnessing of the waterpowers of Augusta and Columbus represented the beginnings of large-scale industrialization in the state. The other end of the study was determined by the 50-year period for historic properties but also by World War II. That conflict had a profound effect of the South and Georgia, in the migration of families from rural areas, in the growth of military bases, in the creation of new industries (airplanes and ship building), and in the infusion of federal funds. Old industrial buildings were modernized, new one were built in new configurations and new materials. A detailed discussion of the changes wrought by that war needs to be a separate study.

DEFINING CONTEXT

Context, for the purpose of this study, is defined in two ways. The first is the historical and geographical context of Georgia industry: where and why did various industries develop, flourish, or fail when they did? This part of the study is a history of specific industries which have been significant within the state. Such a study helps preservation planners and other researchers appreciate the significance of a particular mill in terms other than it occupies a particular piece of real estate within their

county, town, or city. But this account is very narrow history. It does not attempt to treat in any detail the human context, the world of the workers or of the entrepreneurs beyond the structures built by the latter, where the former worked or lived.

The second way to define context is in architectural terms: what architectural characteristics define Georgia's various types of industrial structures and what physical features did the various types of mills exhibit that gave them uniformity as a group? Can they be recognize as a specific type of industry merely by their appearance? How much of their fabric should remain for them to be nominated to the National Register as representing that particular type of industry?

The National Park Service (NPS), which administers the National Register of Historic Places, views the concept of historic context as being essential for assessing the significance of a particular property and for determining its eligibility for being listed on the register. According to their *National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation*, "resources, properties, or happening in history do not occur in a vacuum but rather are part of larger trends or patterns."[2]

Context is essential in attempting to establish the significance of a particular

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[2]Lisa Diane Vogel has made a context study of Georgia's most significant industry, textiles, and much of the following discussion of context closely follows her work. "Southern Textile Mills and the National Register of Historic Places: A Framework for Evaluation," M.A. Thesis (Historic Preservation), UGA, 1993. A much briefer study of the same subject is Linda Chesnut and Carson Pease, *Textile Mills in Georgia: A Cultural Assessment* (Atlanta: Georgia State University Preservation Program, 1985). National Park Service, *National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation* (Washington, DC: Department of the Interior, 1991), 7.

property. The National Register defines significance at three levels: national, state, and local. National significance indicates the property or those associated with it had an impact on the history of the nation. Only a small proportion of Georgia's industrial properties, beyond those already delineated as National Landmarks, will have national significance. State significance does not require that the property type, mills in this case, be spread across the entire state, rather that the activities or events associated with this property must have affected the history of the state. At the lowest end of the spectrum, under local significance nearly every historic textile mill could be eligible for inclusion, because of their impact on the local economy. Other smaller mills—grist, flour, saw. cotton seed oil, syrup—as well as turpentine stills, foundries, etc. would have less local impact and their eligibility might be more dependent on their integrity as historic properties.

For example, the site of Georgia's first textile mill (circa 1810) on the Little River between Monticello and Madison, if it could be located and had some archaeological fabric, would be eligible for the National Register. On the other hand, the site of a cotton seed oil mill, even if it were the first in the state, would probably never be eligible for inclusion. But a relatively intact cotton seed oil mill would be. Never as ornamented as the Sibley Mill in Augusta or other New South textile mills, most small Georgia mills would be considered vernacular architecture.

In discussing the assessment of mills as vernacular buildings, Lisa Vogel wrote: "Therefore, like vernacular houses, a measure of their significance is their uniformity as a group, rather than the unique features that usually define architectural

significance. As a result, a typology detaining the consistent and defining physical features of this type of resource is as important as a context (and actually an implicit feature of the context construct). The typology attempts to provide an adequate description of the qualifying characteristics of eligible properties to aid in evaluation."[3]

Vogel constructed a typology for textiles; this study will cover some of the same ground about textile mills and will also attempt to fabricate typologies for the various other industries that have shaped Georgia's built-environment. According the Office of Historic Preservation for the state of Georgia, three things are needed to evaluate a property's significance:

1. Information about the property;
2. criteria to measure with; and
3. a historic context to provide perspective.[4]

In addition to significance, a property, to be eligible for the National Register, must possess integrity. The NPS guidelines define seven aspects of integrity: location, design, setting, materials, workmanship, feeling, and association. The typologies drawn by this study will aid in determining integrity. What should have been the setting, design, and materials of these mills, and what changes occurred in

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[3]Vogel, "Southern Textile Mills," 4.

[4]Georgia Historic Preservation Section, *A Vision for the Future: The Georgia Historic Preservation Plan*, Department of National Resources, State of Georgia, 1989, 3. Vogel included a very detailed discussion of applying National Register criteria and that material will not be repeated in this study. For more information about this topic, see especially her Chapter 5: "A Framework for Evaluating Southern Cotton Mills" in "Southern Textile Mills," 84-105.

them over time which were normal and should not exclude them from the National Register?

SOURCES

No history of Georgia industry exists. No overall study of the state's industry, nor even the somewhat standard account of antebellum textile mills—available for other southern states—have been produced for Georgia. The standard state history, Kenneth Coleman et al., *A History of Georgia*, treats manufacturing as a secondary study.[5] The topic is not considered a central theme of Georgia history.

Probably the most comprehensive treatment of any aspect of Georgia industry is an unpublished Ph.D. dissertation, John Richard DeTreville's "The Little New South: Origins of Industry in Georgia's Fall-Line Cities, 1840-1865," (University of North Carolina, Chapel Hill, 1986). He combed every newspaper, every manuscript collection, and local sources in the three cities he covered, Augusta, Macon, and Columbus from the antebellum into the Reconstruction period. Parallelling that work is Mary A. DeCredico's *Patriotism for Profit: Georgia's Urban Entrepreneurs and the Confederate War* (University of North Carolina Press, 1990). DeCredico's primary source was the R.G. Dun & Company records about the business owners. While her account is well-written, it's focus does not coincide with the themes of this study. Several other theses, not surprisingly dealing with Athens, also provided

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[5]Judging by the length of the index entries, the following topics are given more attention that manufacturing (arranged in descending order): blacks, legislature, whites, Savannah, politics, Atlanta, Augusta, agriculture, government, Indians, United States, and Democratic Party. Cotton farming, Great Britain, and South Carolina, are given the same amount of attention as manufacturing.

information. The Historic American Engineering Record studies of industry in Augusta and Columbus also provided some significant information[6]. But this study, which tries to be somewhat comprehensive in time, space, and type of industry, cannot simply be written by summarizing existing secondary sources.

All of those works deal with large population centers; to view industrial development across the state it is necessary to come to terms with many small towns and 159 counties. Antebellum compilations of information and data about the counties, such as Adiel Sherwood's *Gazetteer of the State of Georgia* (1828, 1837, & 1839) and George White, *Statistics of the State of Georgia* (1849). *Georgia Historical and Industrial by the Department of Agriculture* (1901) supplied similar insights and statistics for a later period, which served to show change over time.

A very important source, despite its numerous errors, was the decennial Manufacturing Reports of the U.S. Census. It provides the best overview of Georgia's industrial past. The only manuscript manufacturing census for Georgia, which lists individual companies, deals with 1880. For most southern states they also exist for 1860, but not for Georgia. All of the statements and data based on census reports should be treated as proximate, rather than absolute[7]. Even so, it is essential in showing trends, for defining changes in the number, size, location, and types of

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[6]These HAER reports have been ignored by historians. Neither deTreville nor DeCredico used them. Nor, even more surprising, DeCredico did not use deTreville's dissertation.

[7]Comparing the manuscript and published censuses for 1880 shows many omissions in the printed one.

mills operating over time in the Peach State. Unfortunately, after 1890, the Census Bureau stopped defining the types of industry within each county and began only listing the total industrial product for each county and only enumerated specific industries in larger cities, which excluded Columbus in several years. (Census data by counties and by products in the various forms available is included in Appendix I of this study.

Another important source for this study was a sample, prepared by Margaret Zachery, of Sanborn Insurance Maps for 20 Georgia towns: Marietta, Bowdon, Baxley, Coolidge, Glover, Demorest, Abbeville, Griffen, Elberton, Dublin, Arlington, Cario, Hazelhurst, Dallad, Jesup, Lumpkin, Lavonia, LaGrange, Cochran, and Cartersville. The sample was drawn alphabetically and it produced 10 towns or cities above the fall-line and 10 below. Zachery photocopied from microfilm all of the industrial structures in these towns. From these, it was possible to analyze what types of industries existed and when in these towns (very important since the census did not provide this data after 1890) and their geographical distribution (marble works in the Northeast & turpentine stills along the coast) and to determine the size and configuration of these mills.

Finally as noted above, Lisa Vogel's study of "Southern Textile Mills and The National Register of Historic Places" was important in providing a framework for moving this study beyond a mere historical tract into a preservation context.

ORGANIZATION OF THIS STUDY

This study moves from the general to the particular. Chapter II treats industrialization in Georgia as a whole, and by comparisons defines it within a southern context. It attempts to periodize industrialization within the state. It also includes a section which explains the importance of waterpower in defining the shape of Georgia industry prior to 1880, a fact which many historians ignore.

Chapter III attempts to define the shared architectural or physical characteristic of Georgia's industries by focusing on the types of power sources used by mills, the considerations involved in siting a factory, the problems of transmitting power within a factory, and discussions about the facades or ornamentations of the structures.

The remaining chapters attempt to define individual industries by explaining their history and significance within Georgia history, their architecture, and their profile and foot-print within the state's built-environment.[8] Textiles are omitted at this point, because of Vogel's work. For all of these industries an effort is made to delineate what of their fabric should remain in order for them to retain National Register eligibility.

This document is seen by the authors as being organic, that is it will continue to growth, to expand over time. New materials will be added as better examples for various categories are identified by the authors or preservation planners. Thus, every chapter is numbered separately so that new information can be added one

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[8]The grist and flour mill chapter includes a discussion of water power technology which could relate to other industries.

chapter at a time.

CHAPTER II

HISTORY & GEOGRAPHY OF GEORGIA INDUSTRY, AN OVERVIEW

"The day is not far distant when Georgia will assure the high rank nature designed for her to hold in the confederacy—that day will have dawned when her resources shall begin to be fully developed—when an improved agriculture shall have resurrected her fields—an invigorated commerce bear her productions to every clime, and the mechanic arts, from innumerable workshops, roll out upon her people, the uncounted streams of wealth—when out dormant mineral wealth shall be exhumed, and a new industry be imparted to our rusting labor—when the gorges of our mountains shall be made luminous with forges, and the sylvan solitudes that now encompass our waterfalls, be filled with the music of machinery." Such was the view of the Committee on Manufactures of the Georgia Legislature in 1847.

On the second day of the Battle of Gettysburg, General Paul J. Semmes led his troops across the peach orchard and the wheat field toward the base of Big & Little Roundtop. He died of wounds received on that day. This Georgia general, who was a cousin of the captain of the Confederate raider, *Alabama,* was also President of the Coweta Falls Mill. His position at the textile mill was not just an honorary one, as they would become for Confederate generals after the war. Someone who had business dealing with Semmes called him the "veriest shylock" he had every known.

In 1882, the U.S. Senate's Committee on Education and Labor began a broad investigation into "the relations between labor and capital, the wages and hours of labor, the condition of the laboring classes in the United States . . . ." Their inquiry—the first by a federal agency to analyze the problems creating by rapid industrialization—began their task by collecting testimony in New York; Boston; Manchester, New Hampshire; and Fall River, Massachusetts. Then, the Senators headed South to learn about southern industrialization. They visited Birmingham, Columbus, Atlanta, and Augusta[1]. In 1882, Georgia was perceived as the southern place to view industry and talk to its promoters and workers.

An 1901 publication by the Georgia Department of Agriculture introduced the chapter on manufacturing as follows: "Georgia stands in the front rank of the Southern States in the variety, extent and value of her manufacturing establishments, without considering the question of her leadership in any one particular line. Long before the Civil War the prominence of the State in railroad construction and manufactures gained for her the proud title which she still worthily bears, 'Empire State of the South.'"[2]

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[1]See U.S. Congress, Senate, Committee of Education and Labor, *Report of the Committee of the Senate Upon the Relations between Labor and Capital, and Testimony Taken by the Committee* (Washington: GPO, 1885, IV. The fourth volume of this series contains the detailed testimony collected by the committee in Georgia.

[2]O.B. Stevens & R.F. Wright, *Georgia Historical and Industrial by the Department of Agriculture*, (Atlanta: George W. Harrison, State Printer, 1901, 331.

These vignettes conflict with several traditional views of southern industry: 1) that no industry existed in the antebellum South because the elite (like Semmes) actively opposed industrialization and 2) that southern mills were not built before 1880. These two ideas/myths might be associated, for the purpose of creating straw-men, with Eugene Genovese and Broadus Mitchell.

Genovese[3] starting from a Marxist perspective sees the South as a pre-capitalist society dominated by the planters. In order to maintain class solidarity they effectively opposed industrialization in the South. Despite the fact that most of Genovese's has been in the plantation records of large planters along the coast, rather than in the records of the existing industries, his opinion have carried great weight among historians. Ironically, his ideas are in agreement with the Old South myths held by many laymen, which sees the antebellum South as only being interested in agrarian pursuits, as being dominated by cotton because somehow that rather than slavery started the war. Both Genovese and the Old South mythology would have industry retarded in the region because of social rather than economic factors.

Non-economic factors or some inherent social antipathy to mills in the South was not the primary reason for the slow growth of Georgia's industrialization. Certainly, industrial growth was retarded in the South, but from economic reasons: investment in a staple crop economy and slaves did slow industrial development. In the case of Georgia, settlement started a full century after New England. Georgia and

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[3]See his *The Political Economy of Slavery, Studies in the Political Economy of Slavery, Studies in the Economy and Society or the Slave South* (N.Y., 1961) and others.

the South did not have the problems of over-population linked with poor soil and a poor climate that plagued (or blessed) New England and forced them to develop non-agricultural economic activities. The major story in American industrialization is the rapidity with which the New England manufacturing economy grew[4].

The earliest historians to discuss southern industrialization, starting in the 1920s, reinforcing the image of the antebellum South without any mills. The most important was Broadus Mitchell, who dated the beginnings of southern industry to the 1880s in his *The Rise of the Cotton Mills in the South* (1921). Later in the decade he prepared a biography of William Gregg, where he made Gregg the lone pioneer of southern mills. Mitchell ignored the fact that both Augusta and Columbus launched much more elaborate waterpower projects prior to Gregg.

Mitchell's ideas reinforced the myth that political reconstruction devastated the South. According to Mitchell and his disciples, Southerners were so ravaged by the war, so shocked by their defeat, so dedicated to agricultural pursuits, and so preoccupied with the politics of Reconstruction that for fifteen years they made no attempts to build factories. Then in the 1880s with the impetus from the Atlanta Exposition (1881) and the New South rhetoric of Henry Grady, the region almost instantaneously launched the "cotton mill crusade."[5]

Such an interpretation does not explain Georgia's industrialization. The 1880s

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[4]For example, the South (or the Confederacy) ranked 6th in the world in textile production, ahead of Germany, Austria-Hungary, and Russia in 1860.

[5]See the more extended discussion in Chapter on textile mills which explains why these two factors had limited impact on influencing would-be investors to put their money in textile mills.

interpretation came from viewing southern history through the experience of the Carolinas, even though, by citing the Atlanta Exposition and Henry Grady, Georgia seems to play an important role in the cotton mill crusade. Textile mills did come to the Carolina Piedmont in large numbers initially in the 1880s, and they eventually surpassed in quantity and capacity those of Georgia. But the foundation of Georgia's textile industry had been established by 1860. It led the South by that year and its textile production had expanded by 70% in the previous decade, while N.C. increased by only 6% & S.C. declined by 15%.

Georgia ranked as the leading textile and as the second industrial producer in the South by 1860 because of two factors: excellent waterpower sites and the economic impetus of urban centers. Newspaper editors in Georgia cities—especially the ones along the fall-line—argued for industrial growth in boosteristic terms beginning in the 1840s. Augusta and Columbus vied for the title Lowell of the State and many proclaimed Georgia as "The Empire State of the South."

John deTreville combed the newspapers of Augusta, Macon, and Columbus published between the 1830s and the 1870s. In those pages, "I could find no antipathy [to industry]. Instead I found almost universal support, the only significant opposition arose from apathy."[6] In Augusta and Columbus, those editors knew that their towns bordered some of the nation's leading waterpower sites. That fact encouraged their advocacy of manufacturing.

Significance of Waterpower

Many historians in assessing southern or American industrialization in general

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[6]John deTreville, "Little New South,"1.

have failed to recognize the significance of waterpower in determining the geography of manufacturing. Many authors probably assume that after the industrial revolution began, steam engines powered most factories. This assumption was valid for England in the first half of the 19th century, but in the U.S. falling water rather than steam drove most factories, especially textile ones. As Louis Hunter showed in his seminal work, *A History of Industrial Power in the United States, 1780-1930,* Volume I: *Waterpower in the Century of the Steam Engine*, waterpower formed the basis of most American industrial centers until mid-century and beyond.

In comparison with New England, the distribution of waterpower sites in the South presented the southern manufacturer with a distinct disadvantage. The topography of New England clustered a multitude of water falls near the coast, adjacent to urban centers which provided capital, technical expertise, a market, and, eventually, laborers. The broad coastal plain in the South, which played such a determining role in the development of a plantation economy, also retarded industry, since no major waterpower sites existed between the coast and the fall-line.

In the same year that Samuel Slater launched his yarn mill in Pawtucket, less than five miles from Providence, Rhode Island, a group of South Carolinians attempted to establish a similar operation with a spinning jenny at Stateburg in the Sumter District in the middle of the state and on the fringe of the frontier. A wagon road which traversed the Santee Swamp and River linked this site to Charleston, almost 100 miles away. The Stateburg mill failed, and no waterpower facilities existed any closer to Charleston. By 1809, within 31 miles of Providence falling

water turned 41 spinning mills.[7]

Charlestonians even tried to harness the tide. In 1808, the South Carolina Homespun Company erected a mill powered by a tidal pool, but it also failed[8]. The mighty Ashley and Cooper Rivers might have the power to form the Atlantic Ocean (even if only in the mind of Charlestonians), but the rivers's slight gradient of descent precluded them from powering turbines to turn spindles and looms.

In Georgia in 1810, presumably because of Embargo and the general interruption of trade with Britain, Jacob Gregg, William's uncle, started Georgia's first textile mill on the Little River near the boundary of present day Jasper & Morgan counties. It operated successfully for six years, but failed after the War of 1812 when the U.S. was flooded by cheaper English yarn and cloth.[9] Had this mill and the two S.C. operations been in the same proximity, they might have reinforced each other and enabled them to survive.

In New England, the industrial sites along the Merrimack River (Lawrence and Lowell, Mass.; Nashua, Manchester, and Concord, N.H.), all located within a 50 mile radius of Boston, reinforced one another and fostered technological interchange.

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[7]Ernest McPherson Lander, Jr., *The Textile Industry in Antebellum South Carolina* (Baton Rouge: Louisiana State University Press, 1969); Albert Gallatin, "Manufacturers," *American State Papers, Finance,* II (1809), 433. The distances were measured using [William Winterbotham], *The American Atlas . . .* (N.Y.: J. Reid, 1796).

[8]Lander, *Textile Industry in Antebellum S.C.*, 4-6.

[9]Richard W. Griffin, "The Origins of the Industrial Revolution in Georgia: Cotton Textiles, 1810-1865," *Georgia Historical Quarterly*, 42 (1958), 356.

In the South, significant waterpower sites existed on the fall line of major rivers at sites separated by 100 or so miles (i.e., Cheraw, Columbia, Augusta, Macon, and Columbus).

In 1845, a Milledgeville ruminated about the problems associated with manufacturing in Athens. He noted, "the want of sufficient water power is her great hinderance and puts a limit to her operations. The scattering establishments in other parts of the State, are . . . placed on streams too small to allow of a great business, and will therefore languish, ... No mistake is more fatal than that which locates a manufactory alone. It may for a time flourish, but can never sustain the competition which great communities of manufactories will bring forth."[10]

Note the problem was a reliance on waterpower, and by the time the universal use of steam power was feasible, the South was behind, as was the most of the nation. Since 1870, five Northeastern states have produced almost 50% of the nation's industrial output. "As other regions have developed, the share of the total production of these five states has declined moderately."[11]

Proportionally by 1860 Georgia's industries were having a limited impact on the state, even though Georgia was a leading southern state in industrial production. (See chart below.) Given Georgia's population, urban growth, and waterpower

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[10]Milledgeville, *Federal Union*, April 1, 1845. reprinted in U.B. Phillips, *Plantation & Frontier Documents: 1649-1863, Illustrative of Industrial History in the Colonial and Antebellum South* (Cleveland, 1909), II, 302.

[11]Edward D. Beechert, "Industrialization," *The Encyclopedia of Southern History*, 625-30.

potential the state should have had more mills. The state then had more urban centers than most of its neighbors. Georgia's cities counted for 38% of its industrial production in 1860.

The real story in Georgia's antebellum industrialization—and one that

Value of Mfg for Southern States, 1860
Arranged in Order of Value of Mfg Product

	Pop.	Est's	Val. of Mfg Prod.	Val. / Est.	Val. / Capita
Virginia	1,219,630	5,385	50,652,124	9,406	42
Georgia	1,057,286	1,890	16,925,564	8,955	16
North Carolina	992,622	3,689	16,678,698	4,521	17
Louisiana	708,002	1,744	15,587,473	8,938	22
Alabama	964,201	1,459	10,588,566	7,257	11
Tennessee	1,109,801	2,572	9,416,514	3,661	8
South Carolina	703,708	1,230	8,615,195	7,004	12
Mississippi	791,305	976	6,590,687	6,753	8
Texas	604,215	983	3,367,372	3,426	6
Florida	140,424	185	2,447,969	13,232	17

Drawn from 1860 Census.

contradicts the Genovese view—was the development of the waterpowers of Augusta and Columbus during the 1840s. The City of Augusta invested approximately $100,000 to divert some of the water from the Savannah River into a seven mile long canal. From the first level, water fell through three level, thus, allowing two sets of industry to be powered by the same water. The model for this enterprise was the

canal system of Lowell, Mass., and the developed waterpowers at Petersburg, Va. By 1860, the canal powered two, five-storied brick factories of the Augusta Manufacturing Company, four merchant (flour) mills (Granite Flour, Paragon, Cunningham's Flour, & Cheely's), two foundries or iron works (Augusta Machine Works and Hight & MacMurphy), and the city water works pumping station.

On the other side of the state, Columbus, almost a century younger and not even settled for two decades, adopted a more expedient manner of developing its waterpower. The city council sold the waterpower rights to private individuals. Given its potential, it development floundered, as did Augusta to a certain extent. But by 1860, three brick, five-storied textile factories (Coweta Falls, Howard, & Eagle), the Variety Works (a lumber planning mill), and Palace (flour) Mills drew water from a two-block long headrace. Another mill, the Carter Factory, stood empty. It owner, Farish Carter, one of the richest men in the state, who is always identified as a Milledgeville planter[12], built the mill when cotton prices were low. His plan was to move slaves from the field to the mill, where he could get more return on his investment. When the price of cotton climbed (and when the Columbus water development did not live up to expectations), he kept his slaves in the field. Such

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[12]He should be known as an investor or entrepreneur. In addition to his activities in Columbus where earlier he had been one of the primary stockholders in Coweta Falls Factory, he speculated in land in eight states in the South and Old Northwest, in grist mills, marble quarries, a woolen (probably fulling) mill, cigar factory staffed with slave labor, toll bridges and ferries, steamboats in Georgia and on the Mississippi, banks, railroads, gold mines, etc. John S. Lupold, "Farish Carter," *Dictionary of Georgia Biography,* I, 176-77.

actions do not fit the stereotype of the antebellum planter.[13]

These developments occurred without much opposition from the cities' residents other than the normal level of resistance to investments requiring tax dollars. The main complaints about both project were that it took too long for them to be functioning and that they were inadequately designed or implemented. Few questioned the wisdom of developing these waterpower. Visitors to both cities were always impressed, and sometimes astounded, to find these industrial establishments in the deep South.

Other Georgia cities also had mills, usually powered by steam engines.

Six Leading Urban Georgia Industrial Centers, 1860

City	Est's	Value of Product[14]
Savannah	38	$1,917,357
Columbus	19	1,409,711
Augusta	47	1,362,642
Marietta	16	676,609
Atlanta	15	414,336
Athens	36	398,838

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[13]Hunter in a chapter labelled "The First Industrial Cities," discusses waterpower developments in Lowell, Manchester, Lawrence, and Holyoke in New England; Minneapolis-St. Paul in the Mid-West; and then Augusta and Columbus. The fact that the last two were southern cities did not warrant any special notice. Viewed from a waterpower perspective, especially when the view was filtered through the 1880 Census Report on Waterpowers—Hunter's primary source for this chapter—these southern cities do not appear as anomalies but as significant national sites. Hunter, *Waterpower*, 242-46.

[14]The 1860 census reported Taylor County with 88 establishments and a product value of 533,433. These inflated figured result from counting the value of ginned county as an industrial product. Most of those establishments were cotton gins. Once you realize this anomaly exists, it is interesting to see the maps of southern industrialization that blacken in this area of rural Georgia.

Savannah, without any waterpower, led Georgia in manufacturing in 1860. Much of its industrial establishments consisted of small shops fabricating products for a local or regional market. The same was probably true of Augusta and Athens. The impact of waterpower and textiles can be seen in Columbus and probably in Marietta (Cobb County) and Atlanta (Fulton). The statistics for the latter two do not exactly reflect urban developments, since they included Roswell and other mills along the Chattahoochee.

Viewed in terms of the typical manufacturing establishment, or what the census classified as manufacturing, most Georgia factories in 1860 were small and they processed an agricultural or forest product or a raw material. (See chart of 1860 products on the next page.) They added very little to the value of the product and employed only a few workers and had a limited impact on the state's economy. Most of them were probably pre-industrial and employed few machines in their processes.

Perhaps, the most telling fact about the evolution, is that the state's products would not have changed substantially nine decades later. Only the scale of the mills would change. The 1849 sample of small manufacturing in Georgia shows how widespread the small grist and flour mills were throughout the state. In most counties (except for the pine barren Wayne County where apparently not much happened) the numbers for each of these mills exceeded the number of post offices in the county, an indication of the rural location of these operations. The presence or absence of waterpower also did not seem to affect whether a county had grist and saw mills, since these appeared in the coastal plain as well as in the Piedmont and Mountains.

GEORGIA'S LEADING INDUSTRIAL PRODUCTS, 1860

ARRANGED ACCORDING VALUE OF PRODUCT

Product	Est's		Hands	Raw Materials	Labor Cost	Product	Value Added	Val. / Worker	Val. / Est.
Flour & meal	378	1,599,515	620	3,876,596	158,668	4,550,007	514,743	830	1,362
Lumber, sawed	410	1,639,217	1,871	1,210,807	438,588	2,412,996	763,601	408	1,862
Cotton goods	33	2,126,103	2,813	1,466,375	415,332	2,126,103	244,396	87	7,406
Rice flour	1	115,000	96	648,200	16,560	772,200	107,440	1,119	107,440
Steam engines	22	1,213,400	661	294,858	242,004	735,053	198,191	300	9,009
Carriages	118	370,035	691	163,106	225,636	595,331	206,589	299	1,751
Woolen goods	11	242,500	383	260,475	63,348	464,420	140,597	367	12,782
Leather	137	329,048	337	212,621	80,808	422,451	129,022	383	942
Boots & shoes	125	168,331	423	194,000	118,224	406,557	94,333	223	755
Furniture, cabinet	41	158,616	307	75,301	103,968	328,421	149,152	486	3,638

SAMPLE OF SMALL SCALE MFG IN GEORGIA COUNTIES, 1849

(Data Drawn from Geo. White, *Statistics of Georgia*, 1840)

COUNTY	GRIST MILLS	FLOUR MILLS	SAW MILLS	COTTON MILLS	POST OFFICES	JUG FACT'Y	DISTIL-LERIES	RIFLE FACT'Y	WOOL CARD.
MOUNTAIN / UPPER PIEDMONT COUNTIES									
Chatooga	6	4	8	1	8				
Gilmer	22		9		5	1	4	1	
Franklin	31		15		10		Numerous		
LOWER PIEDMONT COUNTIES									
Heard	17	3	13	1	6				
Gwinnett	26	3	9		10		7		2
Oglethorpe*	10	4	14		8				
COASTAL PLAIN COUNTIES									
Randolph	18	1	12		8				
Thomas	21		11		4				1
Wayne	few**				1				

*Oglethorpe County also had one "steam saw, grist, & flour mill in progress." A harbinger of progress which would supersede these small water-powered grist & saw mills.

**White noted that most corn in the county is ground by hand mills.

The scale probably varied from region to region, but certainly most of these operations only served a small community or even just a few families.

Thus, Georgia's antebellum industry was small-scale, rural and primarily served to grind the farmers' corn and wheat and saw their timber for houses and barns. The urban centers, especially the water-powered ones, made Georgia slightly more industrialized than most other southern states. Their retardation was a product of economic factors, not of an societal antipathy to grimy factories.

The Civil War changed the industrial profile of the state, but most of it only for the duration of the conflict. Existing companies expanded their production. Merchants, cotton factors, and others, with no manufacturing experience, launched new enterprises fabricating a variety of products, often behind boarded-up store front which returned to retail space after the war. Such factors meant that the built-environment associated with the Civil War did not survive. The Confederacy also opened large-scale operations, producing weapons, ammunition, shoes, uniforms, etc. in the major cities.[15]

As a result of the Civil War, the industrial complexes of Atlanta and Columbus were destroyed. In the case of Columbus, industrial reconstruction began

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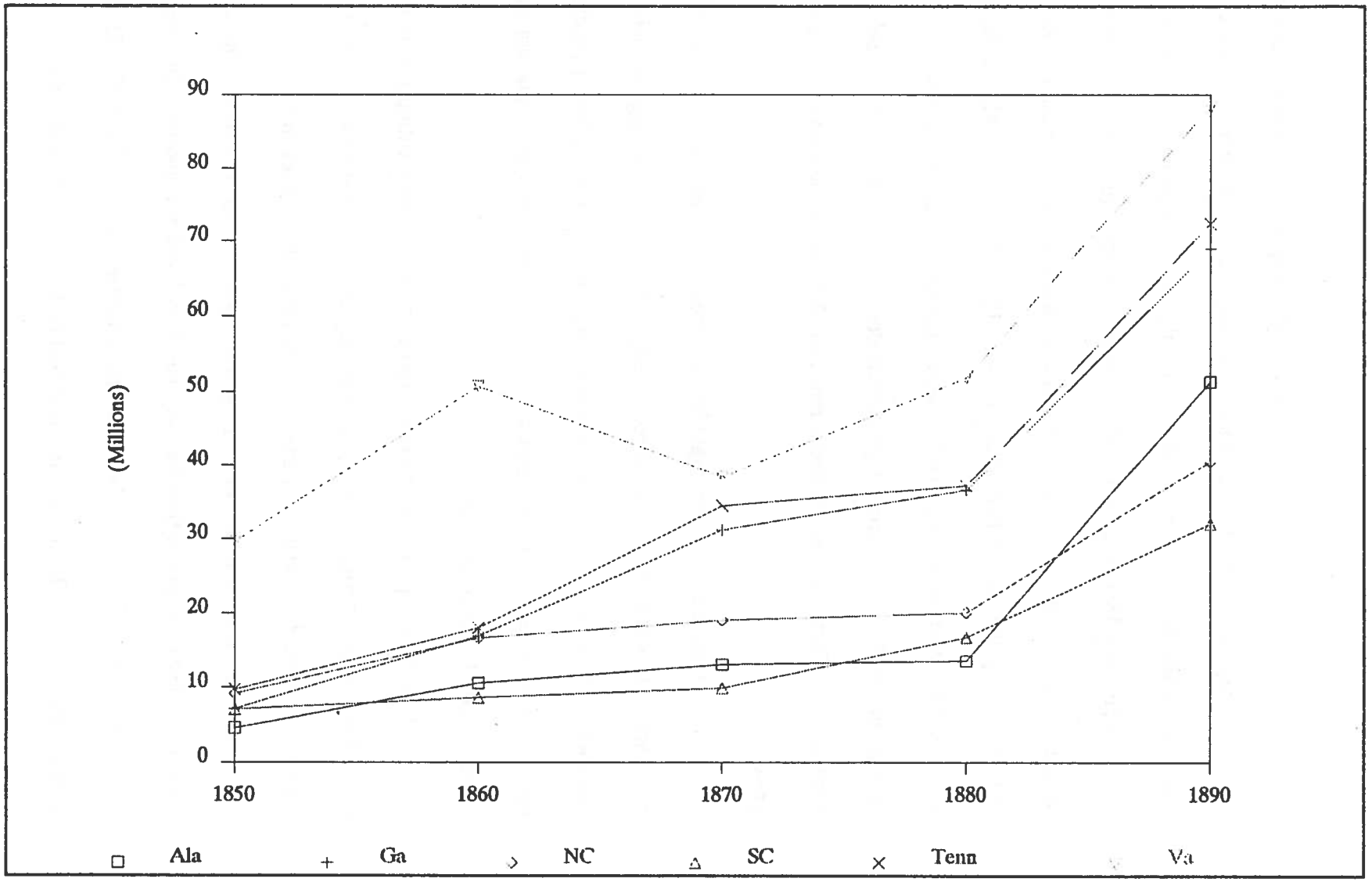
[15]Numerous works deal with the arms and supplies produced during the Civil War in Georgia. For material about Civil War manufacturing in Augusta and Columbus start with the following works: Florence Fleming Corley, *Confederate City,. Augusta, Georgia, 1860-1865* (Columbia: University of South Carolina, 1960); Maxine T. Turner, *Navy Gray:* A *Story of the Confederate Navy on the Chattahoochee and Apalachicola Rivers* (University: University of Alabama Press, 1987), contains considerable information about Columbus industries; and Diffee William Standard, *Columbus, Georgia in the Confederacy: The Social and Industrial Life of the Chattahoochee River Port* (N.Y.: William Frederick Press, 1954).

almost immediately. General James Wilson's cavalry troopers burned all the Columbus industries, except the grist mills, in April of 1865. By the end of August, the stockholders for the Columbus Iron Works had met, doubled the company's capitalization, and had the firm back in operation. The Columbus *Daily Sun*, on October 28, 1965 reported: "Never has the business of Columbus been more active . . . . Never were the prospects of the city more bright and hopeful. Do not listen to croakers. There's a better day coming, and what we daily see—the numerous wagons on the streets, the absence of idle negroes and the general life and industry in every department of trade are not illusions, but facts—the beginning of a happy and permanent prosperity."

The most important Columbus development was the Eagle & Phenix. Starting with a modern mill (1868) and equipped with spinning frames and looms from England, this mill expanding into two new structures and quadrupled its capacity in about a decade. The war had only destroyed its physical plant, it still had its skilled entrepreneur, William H. Young, its labor, its market, and, of course, the magnificent waterpower of the Falls of the Chattahoochee. It expanded faster than any other mill in the South in this period and was the region's largest in 1880. The value of its product in that year, $1.5 million, exceeded all but a handful of Georgia and southern counties. The experience of the Eagle & Phenix and Columbus, on a very much smaller scale, seemed to parallel that of Germany and Japan after World War II.



Value of Manufacturing Product for Six Southern States, 1860-1890

Perhaps the Eagle & Phenix's success helps to explain why Georgia's industrial production did not fall, but apparently increased as did the number of factories between 1860 and 1870. The instinctive perception of most southerners would be that the impact of the Civil War and Reconstruction would have devastate industry during the second half of that decade (1865-1870), especially in the state devastated by William T. Sherman's troops. Industrial growth was not uniform throughout the South. Virginia's production declined the most in that decade. The growth in the Carolinas and Alabama remained flat, while Georgia and Tennessee grew.

The Georgia experience might be explained somewhat by monetary inflation, but other factors need to be considered. Despite the physical damage to their factories, skilled, large-scaled industrialists should have been in a better position than planters or farmers to convert depreciated Confederate money or bonds into tangible assets before the collapse in 1865.

At the small end of the industrial spectrum, many little entrepreneurs who entered the market during the war, made money prior to 1864 or 1865, and even if their plants were destroyed, they tried to re-establish themselves in that field. These small manufacturers, who profited during the super-inflated economy of the war, faced two substantial peace-time factors, one short-lived and another that lasted at least through World War II. The immediate problem was the Crash of 1873 and the ensuing depression. The other was the arrival of the national market and

geographical specialization in the South, brought by the an integrated rail net. Its development had been hastened by the Civil War. Every region of the nation, not just the South, produced goods that was favored by its geography or what they had already perfected as small companies moved to dominate a national market. The small Georgia tin smith or cast iron molder could not compete with larger-scale competitors shipping from Cincinnati or Cleveland or Pittsburgh. So, the small producers, especially in the South, folded. The number of establishments in Georgia declined between 1870 and 1880

The only geographic advantage enjoyed by the South was inexpensive, tractable labor, the single most important factor in the growth of the textile industry. Few new products were manufactured in Georgia after the 1870s, not because of the stupidity or lack of creativity on the part of Southerners, but because of the rural poverty of the South (rooted in the uncompensated abolition of slaves and the lack of currency because of the national banking system) and because of the forces of the national economy. Neither did diversified industries emerge in Wyoming, Oregon, Arizona, or many other rural states in this era.

After 1880, textiles came to mean industrialization in the South, unless one was in Birmingham. The Cotton Mill Crusade, the boom in textile mills in Georgia, affected Georgia, even though it was not the beginning of such mills in the state. During the 1880s, Augusta added to two major plants along its canal, the magnificent Sibley and the massive John P. King. Fuller Callaway shifted some of his mercantile

SAMPLE OF SMALL SCALE MFG IN GEORGIA COUNTIES, 1901

(Data Drawn from Dept. of Ga. Agric., *Georgia Historical & Industrial,*1901.)

COUNTY	FLOUR & GRIST MILLS	SAW MILLS	COTTON MILLS	COTTON OIL MILLS	OTHERS
MOUNTAIN / UPPER PIEDMONT COUNTIES					
Chatooga	5 (W)	6 (S)			
Gilmer	6 (W)*	1 (W)			Wagon fact'y & 2 Tanneries
Franklin**	1 (S)	1 (5)	1	1	Brick fact'y & 4 Fertilizer establishments
LOWER PIEDMONT COUNTIES					
Heard	Several (W)				
Gwinnett			1		4 Tanneries; & 4 Harness factories
Oglethorpe	20 (W)			1	Oil mill & Guano factory***
COASTAL PLAIN COUNTIES					
Randolph	7 (W)	3	1		Carriage fact., Machine works, & Wood work'g fact'y
Thomas****	3 grist-gins (W)				2 Sash & blind; 10 Shoe makers; & 12 Turp. stills
Wayne		Many			Many sawmills & turpentine stills.

*Gilmer County also had several portable saw mills.

**The Franklin mills at Lavonia were large scale. See the description in the text.

***At Smithsonia.

****At Cairo, they were intending to establish a first class sugar refinery.

profits into LaGrange's first textile. Several other medium-sized towns moved in the same direction. Small mill towns appeared at the edge of existing towns and in a few villages created for that purpose.

Beyond textiles the primary industries involved resource-processing, corn and wheat milling, sawing lumber, extracting pitch and turpentine from pine trees. The naval stores industry, concentrated on the coast, grew at the turn of the century. One new industry, the cotton seed oil mill, began in the 1880s and provided an additional source of revenue from the cotton plant. Unlike grist and saw mills in the antebellum period, these cotton oil mills did not appear at every crossroads. Improvements in transportation and reliance on railroads meant a concentration of agricultural-processing mills in towns and small cities. The differences between the 1849 and 1901 small-scale manufacturing samples illustrate the decline in numbers of grist and saw mills.

If a town did not have a significant rail connection, like Lavonia, it would not have a textile mill or cotton seed mill. Many communities which built the latter facilities in the last two decades of the 19th century were railroad towns, with circular limits, created during that period. While often created by local initiative and local capital, these buildings, in terms of architecture, were standardized structures, being built across the nation.

The cycles of industrial growth and contractions also parallelled those of the nation. The expansion starting in the 1880s ended with the depression of 1893. By

1898, industrial production in Georgia and the nation began to expand again. World War I spurred industrial activities; some mills expanded their capacity with profits made during the war. But then the 1920s the southern economy lagged, especially agriculture and the textile industry. Not until 1939 did Georgia industrial output reached the 1919 levels. Cotton textiles were in a national recession. Georgia banks have invested heavily in Florida real estate and when the bottom fell out of that boom in 1926, some Georgia banks failed, which created another drag on the economy. The major crash, of course, came in the fall of 1929 with the crash of the stock market.

The New Deal had little impact on the architecture of southern mills, but the NRA markedly change the life of textile operative by promising $12 for a 44 hour week and 8 hour days. The policies emanating from Washington in the Roosevelt's era eventually changed Georgia's agriculture and industry, and these trends were hastened even more by World War II. Georgians leaving the farm and moving to cities, expanded military bases, airplane manufacturing, the accelerated growth of Atlanta, all heralded the beginning of a markedly different age. But a year before Pearl Harbor, Georgia's mill products looked amazing like their products a century earlier: textiles and agricultural processing.

Georgia's 10 Leading Industrial Products, 1940
Measured by Value of their Product

INDUSTRY	NO ESTS	WORKERS	WAGES	MATS COST	PROD VALUE	VAL. ADDED
Cotton goods	137	55,868	35,346,064	129,798,117	212,851,829	47,707,648
Lumber and timber prods	1158	15,454	8,911,692	11,974,737	31,180,191	10,293,762
Fertilizers	125	2,809	1,723,624	20,388,516	29,252,800	7,140,660
Oil, cake, meal--cottonseed	61	1,519	912,410	20,336,431	24,894,917	3,646,076
Knit goods	44	6,018	3,632,232	10,578,512	19,377,923	5,167,179
Car, general shop constr (steam RR)	31	6,782	9,138,693	8,354,244	19,124,942	1,632,005
Shortenings and veg cooking oils	4	346	283,208	17,173,801	18,939,923	1,482,914
Turpentine and rosin	662	19,912	7,415,084	5,046,183	18,076,499	5,615,232
Planing-mill prods	161	2,788	2,170,421	9,295,507	15,067,699	3,601,771
Printing, newspaper and periodical	184	1,416	2,382,718	3,017,448	14,656,932	9,256,766

CHAPTER III

MILL DESIGN: SITES, PLANS, LINE-SHAFTING, & FACADES

Rather than discussing the evolution of various aspects of mill architecture—power sources and transmission, fenestration, illumination, building materials, etc.—for each type of Georgia industry, this chapter attempts to define some universal characteristics of factories and explain how they have changed over time. Historically, mill entrepreneurs and their builders/architects considered two broad sets of considerations, one involved the specific site of the mill and the other involved the size, height, and footprint of the structure.

General site considerations included proximity to a power source, to the transportation net, to raw materials, and to a labor force. Through the 1870s for most Georgia industries (especially textile, grist, saw, and rice mills) a location next to a power source, falling water, was the single most important consideration. By the 1880s and increasingly after that decade, steam power and later electricity freed mill owners from building next to a waterway.

Given the high proportion of Georgia industry involved in resource processing, closeness to raw materials was a characteristic of Georgia's mills, but not for textile mills. Despite the image of bringing the cotton mills to the cotton fields, the siting of these larger mills was not governed by proximity to raw cotton but by nearness to their labor force, impoverished white tenant farmers who made tractable mill operatives. They were concentrated in the Piedmont and, after the development of

steam power, the mills came to them.

In the earlier period, access to transportation probably played very little role in siting mills, but after the expansion of railroads, rail connections represented an important consideration. Probably after 1880, and certainly after 1900, every industrial operation required a railside location. But the prime consideration of Georgia's earliest mills was access to waterpower.

Waterpowered Industries

Falling water powered the first generation of Georgia's grist, saw, and flour mills. Some understanding of the various devices used to convert falling water to energy is needed in order to assess these mills. Flowing water alone does not create a water power site; falling water caused by a natural waterfall or by a dam is needed to provide a head of water. Both the volume of the stream flow and the head, the height of the fall, are important in determining the horsepower of a particular site.

Water was diverted from the river, stream, or pond through a head gate into a head race that delivered the water to the wheels. Most head gates had a trash grate, a set of vertical bars that prevented limbs, logs, or other trash from entering the head race and damaging the wheels. Head races are also known as raceways, flumes, or penstocks, if enclosed in a large pipe.

The length of head races varied greatly. Long head races allowed mills to be built farther from dams or falls thereby increasing the fall. This configuration might be found on small mountain streams or in the coastal plain where the gradual fall of the land necessitated a long distance to create an adequate head to turn an overshot

wheel.[1]

Very short head races transported water from a pond or power canal (such as in Augusta or Columbus until the 1890s) to the wheel or wheels. At many sites, a tail race carried the water back to the stream. The distance between the head and tail race is the height of the head. Between those tow races various types of devices were used to transfer the kinetic energy of falling water into rotary motion for turning mill machinery or electric dynamos.

Five types of water wheels were used in Georgia's industrial operations: 1) the tub mill, 2) the undershot mill, 3) the breast mill, 4) the overshot mill, & 5) the turbine. All of these technologies originated in Europe and were transferred to the U.S., all before 1776 except for the turbine. They are listed in the order of increasing efficiency with the turbine being the most effective, but their use was dependent upon the economic resources of the owner and on the nature of the stream, both its rate of flow and its head.[2]

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[1]For example, see the picture of the Abbeville grist mill with a very elevated small, penstock feeding an overshot wheel. Mary Lou McDonald & Samuel J. Lawson, III, *The Passing of the Pines: A History of Wilcox County, Georgia* (Roswell: WH Wolfe Associate, 1984), 67.

[2]This division into five types of water wheels follows the outline of Donald Gregory, Jeane, "The Culture History of Grist Milling on Northwest Georgia," Ph.D. Dissertation, Geography & Anthropology, Louisiana State University, 1974, 27-33. Robert D. Newman (*Archaeological Investigations at Seven Mill Sites,* Russell Papers, 1984,5-12) groups these devices in a slightly different manner, seeing only two types of wheels: undershot and overshot, with the breast, pitchback, and flutter being variations of these two. (Much of the following discussion in the text relies on Jeane and Newman.) For more detailed discussions of these water wheels and their evolution, see Evans for a contemporary view and Hunter for a detailed historical account. Oliver Evans, *The Young Millwright and Miller's Guide* (Philadelphia: Lea & Blanehard, 1972; reprinted N.Y. Arno Press, 1972) and Louis C. Hunter, *A*

The tub mill, the simplest of these devices, was inexpensive and fairly easy to construct. It was employed primarily in grist, saw, and very small textile mills. Its horizontal water wheel consisted of a shaft from which boards radiated like spokes but lacked an outer wheel. Instead it fit inside a wooden hoop. Water in a flume or chute or spout was directed against the blades of the wheel. These operations, by comparison to more sophisticated operation, had fewer or no secondary shafts, gearings, or belts to transmit power.

For example, in some grist mills the wheel and the grinding stone were directly attached to the same shaft; the speed of the wheel was regulated by controlling the flow of water. Sometimes called a peasant wheel, it was usually found in frontier areas and in small, seasonal operations. A variety of this simple device was the flutter wheel, a tub wheel operating without the surrounding hoop.

The vertical undershot wheel required more construction or engineering skills to erect than the horizontal tub wheel, and the undershot was not associated with frontier conditions. Water from the raceway hit its paddles or floats in the bottom quadrant on the upstream side of the wheel and turned the wheel in the same direction as the stream flow (see diagram on the following page). While its maximum efficiency (about 22%) was less than an overshot wheel, the undershot had a specific use: in streams with little fall but with great quantities of water. Thus, it was widely used in Georgia below the fall-line where the gradient of descent of streams was not

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History of Industrial Power in the United States, 1780-1930, Volume I: *Waterpower* (Charlottesville: University of Virginia Press, 1979).

very steep.

Undershot wheels usually drove tide mills. Water was impounded at high tide in a reservoir behind some type of dam, and then at low tide water flowed from the reservoir through a raceway to the undershot wheel. This provided two periods every 24 hour period when the mill could operate. Both the saw mill at the bluff in Darien and the rice-threshing mill, to the south on Butler's Island, were initially tide-powered and later driven by steam engines.

Breast wheels, named because of where the water struck them, provided more efficiency (exceeding 50%) than either the tub or undershot wheel. If the water struck above the axle it was a high-breast wheel, if below, a low-breast wheel. Breast wheels could operate with a lower fall than an overshot wheels. The speed of a breast wheel could be regulated more easily than an overshot one. Also in situations where backwater problems—high water in the tailrace that interferes with the turning of the wheel—exist, the breast wheel was more effective than an overshot, since the breast wheel revolved in the same direction as the water was flowing.

The overshot wheel, theoretically the most efficient (greater than 60%), is what most American visualize when they think of a grist mill, of a large wheel slowly turning on the side of a wooden building in a picturesque setting. Water strikes the floats or paddles of this wheel on the downstream side causing the wheel to turn. The term "overshot" derived from water striking the wheel tangentially to its circumference. Large versions of this wheel could operate with vary small amounts

A unique use of the overshot wheel was at the Stafford Brothers Mill in Tarboro, Camden County, in the Southeast corner of the state. There, water from artisan wells drove overshot wheels. Originally a rice mill, it later became a grist mill.[3]

A variation of the overshot wheel was the pitchback. The water strikes it on the upstream side of the upper quadrant, higher than a breast wheel. Its advantage, like the breast wheel, was that it rotated in the same direction as the water flowed so it was less affected by backwater problems.

While most Americans and Georgians viewed an overshot or maybe a pitchback wheel as an essential ingredient for an old mill, the choice of Georgia mill owners was for turbines after the 1840s. In 1981, The Society for the Preservation of Old Mills conducted a survey of "Old Mills in Georgia."[4] They identified approximately 235 mill buildings or former sites and the type of wheel used could be established for about 150. Of those about 100 used turbines and half that number had overshot wheels.

The turbine, developed in France and the U.S. from 1820s to 1840s, in respect to size, cost, efficiency, and operating characteristics was a significant improvement

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[3]Alderman, Werner, & Webb, "Old Mills in Georgia," 1981.

[4]For a fuller discussion of this list, see the chapter on grist & flour milling and Appendix III of this report. The romantic image of overshot wheels on grist mills can produce some misconceptions. According to Dean Wood, while trying to recreate a picture of the Ellbeck Mill, which once stood at a site in Fort Benning. Informants talked about the wheel turning on the side of the wheel, even though Sanborn Maps reveal that a turbine had powered the mill during the entire lifetime of the informant.

over all existing types of wheels. Many inventors contributed to this development and many differences of design emerged. At an overly simplistic level, a turbine—a wheel, horizontal at first, surrounded by an iron case—was submerged in a penstock, surrounded with water. The only way water could escape from the penstock was to enter the sides of the turbine and then flow down through the wheel, exiting beneath it. The wooden penstock, on the floor of which the turbine was mounted, was built above the tailwater.

Iron guides around the edge of turbine force water in a spiral motion into the center of the horizontal wheel which was mounted to a vertical shaft. The wheel consisted of a series of curved runners or buckets which the water turned. With an overshot and other vertical wheels only a portion of the buckets or paddles were being acted upon at any time. "In the turbine all the working surfaces were simultaneously subject to the pressure of the column of water passing through the wheel.[5]" (See the pictures of turbines on the following page.)

Water pressure as well as the weight of the water turned a turbine. Turbines had the advantage of reducing the problem of backwater and allowing more power at

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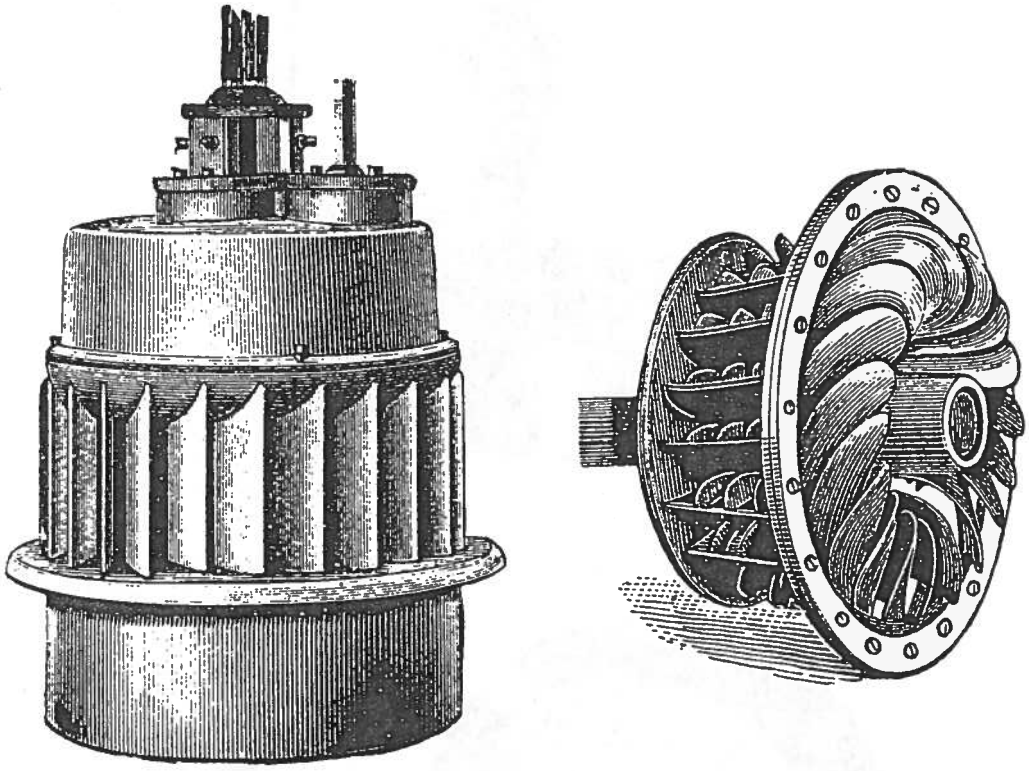
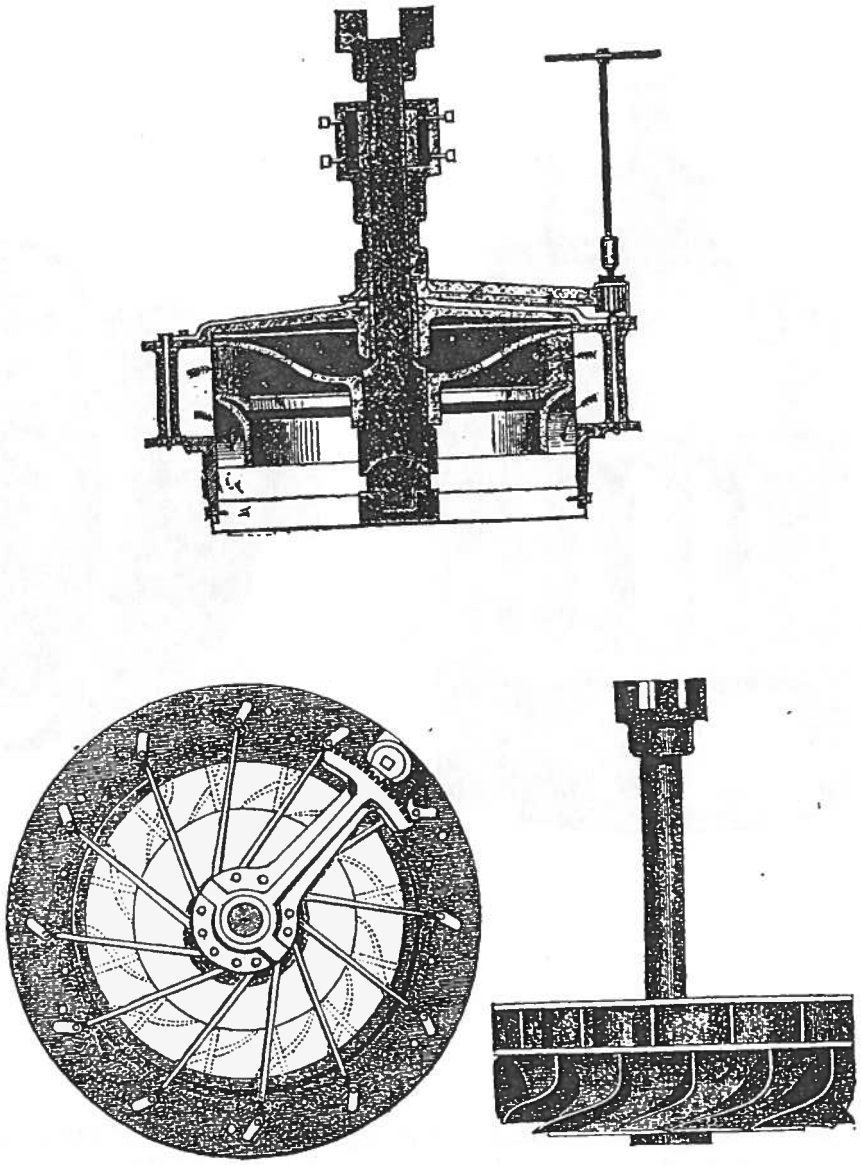
[5]For a detailed treatment of the evolution of turbine technology see Louis C. Hunter, *A History of Industrial Power in the United States, 1780-1930,* Volume I: *Waterpower in the Century of the Steam Engine,* (Charlottesville: University of Virginia Press, 1979), 292-415; quote on 321



Hercules turbine, similar to four in the upper powerhouse of the Eagle & Phenix. Installed in 1899, they ware still operating. Image from Hunter, *Waterpower.*



Leffel's double turbine waterwheel. Eight similar devices are siting in the river amidst the ruins of the Columbus Railroad Company powerhouse at the City Mills dam in Columbus. Image from Hunter, *Waterpower.*

a site with a low head. The placement of turbines at the mill was similar to that of water wheels, either under or at the end of the building on the downstream or tailrace side of the structure. In some cases multiple turbines were placed under the building at different locations, probably because of additions but also maybe because handling a several small stream of water reduced construction problems. (See the site plan of the Curtright Factory, on the following page) for an example of the multiple turbines.)

By the 1840s, American manufacturers began mass-producing turbines, and they were rapidly introduced to American industries. For example, City Mills, a merchant grist and flour operation on the Chattahoochee River at Columbus, installed turbines during the 1840s. As late as 1882, an enumeration of 52 Georgia textile mills, showed 41 factories driven by turbines and only 11 by steam engines[6]. At major waterpower sites, turbines would continue to function long past the 1880s, and larger-scale turbines later drove generator at hydro-electric dams.

Considerations about transferring the energy of falling water to mechanical rotary power often dictated the location of factories. Small mills tended to be sited with their linear axis parallel to the stream or mill pond. Larger mills, where they shared power, on larger rivers tended to be sited with their linear axis perpendicular to water way.

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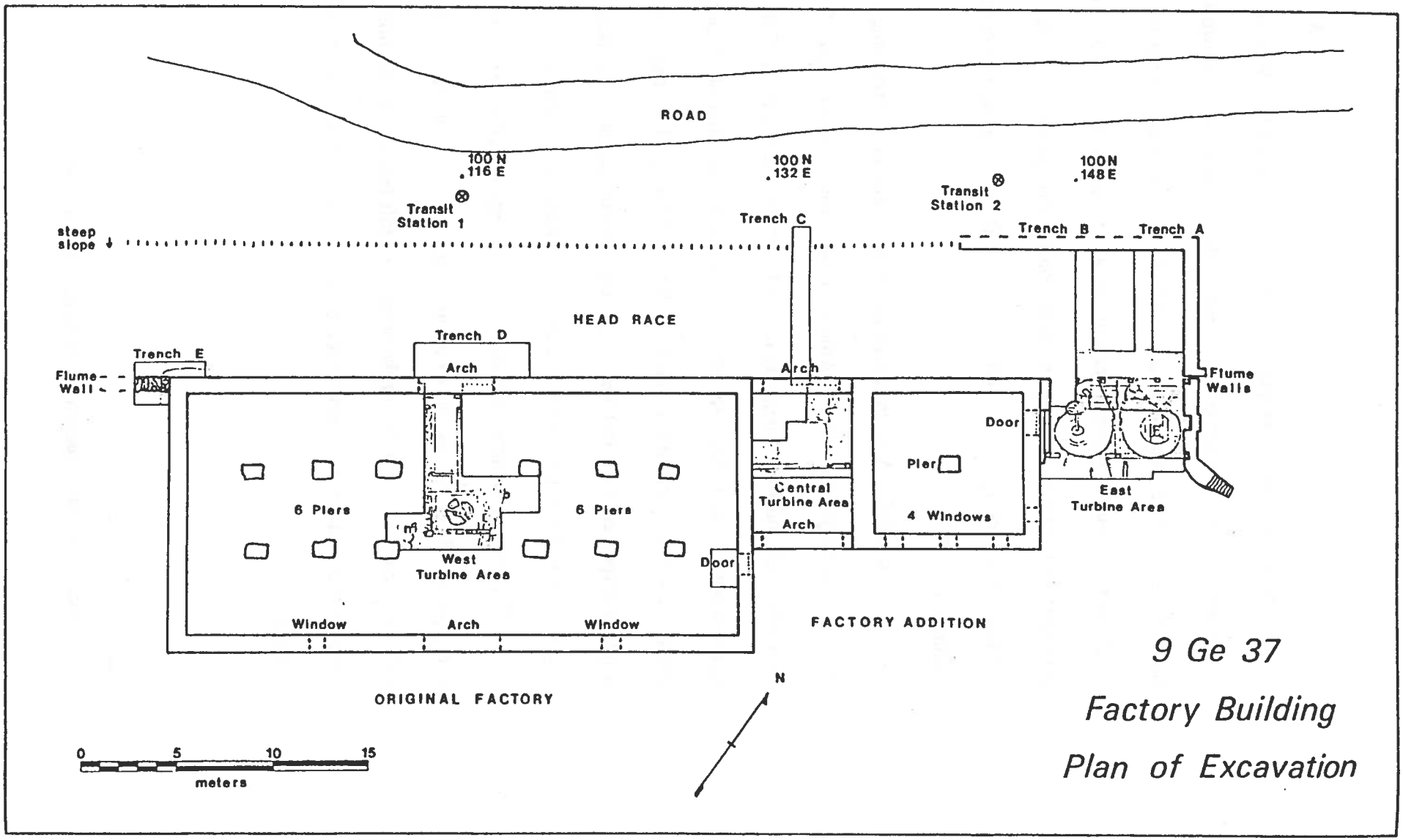
[6]*Baltimore Manufacturers' Record*, 2 (1882), 465.


ROAD
100 N
.116 E
100 N
.132 E
100N
.148E
Transit
Station 1
Transit
Station 2
steep
slope
Trench C
Trench B
Trench A
HEAD RACE
Trench D
Trench E
Arch
Arch
Flume
Wall
Flume
Walls
Door
Pier
Central
Turbine Area
Arch
East
Turbine Area
4 Windows
6 Piers
6 Piers
West
Turbine Area
Door
Window
Arch
Window
FACTORY ADDITION
ORIGINAL FACTORY
N
0
5
10
15
meters
9 Ge 37
Factory Building
Plan of Excavation

Steam & Electric Power

The introduction of steam engines freed mills from the banks of waterways, allowing them to be built in almost any site. The shift from one to the other was not immediate[7]. Initially, only large companies could afford a steam engine, and reliable portable ones were not available until after the Civil War. However, the introduction of steam did not change the internal configuration of mills, since the steam engine simply replaced the water wheel or turbine as the single source of power for the mill. The same was true of electricity initially.

The progression of the introduction of electricity into mills went from lights, to large engines which powered rope drives turning all the line-shafting in the mills, to motors on each floor that still drove line, to individual motors on the equipment. The latter would not occur until the 20th century. It finally produced the truly flexible factory and rendered obsolete the internal transmission considerations discussed in the following section.

Internal Power Transmission

In the earliest mills, the delivery of energy to the machinery would be a prime design criteria. Power coming from the wheel or turbine or stationary steam engine or even an early electric motor was transferred to shafting running the length of the operation, usually parallel to the longest axis of the factory. Belts running around pulleys on the line-shafting connected to pulleys on the machinery.

In smaller mills, the main shaft from the overshot (pitchback, breast, or

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[7]See brief discussion of the introduction of steam engines and electricity into Georgia factories in the previous chapter.

undershot) wheel usually did not drive the grinding wheels or saws or spindles directly. Instead, it was belted to a counter-shaft. This allowed for an increase in RPMs (delivering circular power from a larger to a smaller pulley) and served as a clutch mechanism and allowed for devices to stop the motion of the machinery short of having to stop the wheel, not necessarily an easy task.

In the case of turbines, a large crown gear on the shaft coming from the turbine(s) meshed with a smaller gear on a horizontal shaft that then transferred power to other devices. Often the gears or more precisely the gear teeth (mounted in a cast iron frame) on one of these interfaces would be wooden, so that any improper meshing, a fairly common problem with waterpower, would only break a wooden tooth and not a more expensive iron gear. Thus, the presence of a wooden gear or teeth does not necessarily date a site or equipment as being particularly old; such devices being common in the 20th century.

Textile mills constructed as late as the turn of the century still had multiple-sheaved pulleys driving long continuous ropes which made several winds around both the driving and driven pulleys. While it might sound archaic, rope drives were more efficient that belt drives for long distances and large amounts of torque.

Such rope drives operated many floors of equipment in multiple-storied factories. Prior to the introduction of electric motors for individual sections of plants or for individual pieces of machinery, a 2-, 3-, 4-, or even 5-storied mill was necessary, depending on the scale of the operation. The horizontal distance which line shafting could carry power was limited. So, in large plants, separate rope drives

delivered power to one or two floors where another large sheaved pulley drove the line shafting. Line-shafting remained in use in some Georgia mills until the middle of the 20th century and beyond.[8]

In terms of reading mill structures in 1990s, an observer might be able to recognize rope-ways or belt-ways in Georgia textile mills from the exterior. Because these are open, multi-storied spaces without any flooring, surrounded by substantial, usually brick, walls, they could not be recycled to another use after the factory shifted to individual electric motors. Because they were not in use, these area were not air-conditioned and their original windows tend to still be in place, so they appear very different from the long walls of bricked or covered windows.

In terms of architectural integrity, line shafting when re-hung as decoration in adaptively used buildings should be oriented in same the direction as it originally ran, usually with the long axis of a building.

Internal Design Considerations

The following architectural considerations applied to most industrial building:

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[8]For example, the Columbus Plant of Bibb Company started (1900) as a typical 300 foot mill with all its power supplied by rope drives, one on the exterior from the power house to the mill and then another rope way within the mill which took power to the floors. The mill grew linearly with a 200 foot addition (1915-16) and then another 500 feet (1920), both of these areas were powered by electricity. Portions of the original mill continued to be driven by the rope drive (apparently because someone on the board of directors liked the device) until the shaft between the drives broke in 1953. The mill engineers, who had urged it be replaced earlier, then had to scramble to find and install motors to replace it. The adjacent mill, Columbus Manufacturing (by then a West Point Pepperell operation), still had carding machines run by line-shafting in 1978, a fact they would not allow Historic American Engineering Record (HAER) photographers document.

a substantial-enough armature or frame to maintain the structure's integrity when all the machinery is operating, adequate floor space for the machinery, an arrangement that facilitates the delivery of motive power to the machinery and an efficient manufacturing processes, and sufficient illumination for machine operators. All of these objectives, whether accomplished almost without thinking by a folk builder of a vernacular grist mill or by an architect who analyzes every detail of a high-style New South textile mill or by a contractor who simply follows a plan built ps of times across the nation, must be meet for every mill or foundry or machine shop. Improvements made over time, especially in types of power and illumination, would make some of these objectives easier to accomplish. A very secondary consideration, especially for the folk builder, is exterior ornamentation that bespeaks the proud intentions of the entrepreneur or emphasizes the scale of the operation.

As discussed in the previous section, considerations about power transmission were primary early and declined in significance with the introduction of electricity. Other design aspects obviously changed over time with the introduction of different materials and with the growth in scale of factories.

Wood formed the heavy framework for every early Georgia mill. Massive hand-hewn beams with mortise-and-tenon joints absorbed the vibrations of machinery and supported the floors holding the equipment. This style of construction lasted longer for mills than it did for housing. A balloon-framed building simply could not support a large grist or textile mill. It was not by chance that Horace King, the famous African-American bridge builder, constructed a large grist mill (City) and a

medium-size textile mill (Clapp's Factory) along the Chattahoochee in the 1860s. The same techniques used in bridges were needed for mill buildings.

At the same time, downstream a short piece, a national construction company built a larger textile mill (Number 1 of the Eagle & Phenix). By 1890, the grist mill hired a national firm (Richmond City Mills of Indiana) to construct a new brick flour mill. Over time, most Georgia mills followed the same pattern of moving from local builders to standardized national forms.

Even at the national level, wood framing remained the rule, even in large scale mill, into the 20th century. Cast iron pillars did not immediately replace wood in factories, because of cast-iron's tendency to melt during fires. This problem was realized, after tragedy fires, in England as early the 18th century. In order to prevent fire, builders employed the techniques known as slow-burn mill architecture.

It employed fewer large wooden elements as opposed to numerous small ones which could ignite more easily. Rather using that joists (numerous small boards), floors were laid on a fewer number of massive transverse beams supported by the walls and internal beams. Cast iron "capitals" or sleeves tied the wooden posts to two beams. The corners of all these wooden elements were chamfered to prevent fires from starting on frayed edges. Many of these columns on each floor would have fire buckets shaped like a cone. According to tradition they were shaped in this manner so operatives would not steal them to use at home. If someone tried to set it on the ground all its contents would spill out.

The flooring on top of the beams was multi-layered, either two or three boards

thick, running at intersecting angles, with, ideally, a layer of asbestos or asphalt paper between the wood. In a textile mill the planks were joined together to form a continuous surface and the top layer tended to be maple because of its durability.

The floors were built snug enough so that they were both water- and fire-tight, thereby, allowing a fire to be contained to one floor. Sprinklers systems were first developed for factories[9]. John Hill, who engineered the construction of both Eagle & Phenix #3 in Columbus and the John King Mill in Augusta invented an early version of a sprinkler head[10]. Water towers, usually associated with many types of factories, provided the head of water needed to operate the earlier sprinklers systems.

Adequate internal illumination remained a long term problem for mill builders. Early the need for massive timbers in multi-storied mills meant that window openings were initially small and tall. Southern textile mills resembled those of New England, with narrow window slits adding to the vertical feel of these early factories. As internal framing became smaller, windows sizes opened up. Also large windows came as plants became one-storied as a result of power coming from electricity. This would be particular true of metal fabricating plants or machine shop operations.

Time lapse photographs of a chronological series of textile mills where light is

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[9]For a more detailed description of slow-burn construction, based on D.A. Tompkin's ideas, see Vogel, "Southern Textile Mills," 64-71.

[10]Hill probably should be more recognized in Georgia's engineering history. Unfortunately, particularly in terms of this study, the building associated with his work on sprinklers was destroyed along with Gas Works in Columbus in the early 1990s. His inventions and his business interest in sprinklers were absorbed by the Grinnell Company.

emanating from the interior of the mill would gradually go from little light to bright lights and then would be suddenly extinguished. The latter represented the bricking-in or covering over the mill windows that came with air-conditioning, usually in the 1960s. That process could also raise questions about the architectural integrity of the building, but such points are minor considering how much it improved the lives and, specifically, the lungs of the operatives.

Fenestration also represented an important point of ornamentation on mill buildings. Most Georgia mills, as utilitarian structures have only have minor decoration. For example, probably the most elaborate antebellum southern mill building, Bennett's Rice Mill, could have been built in Savannah in terms of its function. Governor Thomas Bennett built (1844) an Italian Renaissance "palace" in order to mill rice. Its rusticated lower level, large Palladian windows on the front and sides, and the Greek and Roman details on the fenestration were all copied from various Italian palaces. It elaborate surface contrasted starkly with the plain, massive timbers which supported it. The interior and exterior bays did not even correspond, and some of the rows of inside columns ended in window opening. Such an exuberant facade might have been an inappropriate screen for a steam engine and milling equipment, and it might have been emblematic of Charleston's hostility toward industry, but its grand style was an appropriate reflection of the monetary importance of rice to the city's economy.

Savannah or Georgia produced no similar high-style industrial building in the antebellum period. Georgia's architectural gem was the "New South" Sibley Mill in

Augusta (1880), probably the South's most imposing factory facade. Because of its crenelated parapet and decorative stair towers and pavilions topped with finials, some historian have speculated that it was modelled after the British House of Parliament, but it probably was intended to imitate, and thereby, memorialize, the Confederate Power Works which had earlier stood on the site. At the same time, its exuberance appeared to have been inspired by the optimism of the New South creed.[11]

Most industrial buildings in Georgia, the South, the U.S., and the world did not have the architectural details of either of those structures. Most mill design reflected the period as well as its purpose. Early textile mills resembled New England churches, since the same builders erected both. Grist mills look like barns. Twentieth century industrial complexes usually have some feature that will speak of the particular embellishments being used in that decade.

Many Georgia mills were starkly utilitarian and their function could immediately be read. Some operations, like saw mills and turpentine stills, might have lacked a facade to ornament. Their roof and minimal sides were directly attached to frame supporting the machine. To most workers, the exterior of the mill probably had little meaning. Simply the existence of the mill, the paycheck it represented, and, for many Georgians, the alternative, albeit a paternalistic one, to the grinding rural poverty of share-cropping and tenant farming.

Even thought most Georgia industries developed because of the climate or

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[11]The previous two paragraphs follow very closely the text of John Lupold, "Industrial 19th-Century Architecture," *Encyclopedia of Southern Culture* (1989), 80-82.

geography of the state, most industrial buildings were not uniquely Georgian. Mills, turpentine stills, foundries were not, in the manner of a house, adapted for a particular climate. Industrial structures, instead, are shaped by their function which creates a uniformity that transcends state or regional factors. Also by the second half of the 19th century, some construction companies began specializing in specific types of industrial buildings. These conditions meant that their history, rather than their architecture made them Georgian.

CHAPTER IV

FLOUR & GRIST MILLING

Probably the most ubiquitous industrial element amidst Georgia's rural landscape was the small grist mill. Not overwhelming in length as the pilastered brick walls of textile factories or in height as the stacks of a steam plant or in visual impressions as the flaring furnaces and filthy walls of foundries, grist mills in terms of numbers were Georgia's number one industry during the 19th century. Geographically, their presence in terms of buildings or ruins or dam sites can be found in more counties and with more substantial remains than the small-scale saws which eclipsed them in sheer numbers at the turn of the century.

As noted in Chapter III, The Society for the Preservation of Old Mills conducted a survey of "Old Mills in Georgia" in 1981.[1] They identified approximately 167 mill buildings and 68 ruins or sites or buildings with adaptive uses. Only 28 of these mills did or could still operate. Only 12 of them appear to be listed on the National Register of Historic Places. Considering their long-term presence and their broad geographic distribution within the state, more grist mills should be represented on the National Register, especially since stream beds harboring

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[1]While this list has some omissions and probably some errors, it is a very useful tool in drawing some generalizations about how these mills have survived, the types of water wheels they used, and how well they are represented on the National Register. For those reasons and others, this list is replicated as Appendix III of this report.

former grist mill sites can yield excellent archaeological evidence about the early hydro-technologies.[2]

Grist milling first began in Georgia with the Germans at Ebenezer in 1740. Construction on the first mill began about 1735 & was completed by December 29, 1740. The earliest maps of Savannah-Ebenezer area show only saw mills; grist mills were probably more numerous and, thus, taken for granted and not even listed.[3]

By the 1740s a mill existed in the Augusta area and was followed by others there, and on the Ogeechee. In the 1760s, petitions to erect mills came nearly every year.[4] Mills followed settlers into frontier areas.

The first operations were simple tub mills[5] which usually ground corn rather than wheat. Grist mill tended to mean only corn, while merchant mill—one that sold its product rather than must grinding for a share—denoted flour production. The structures surrounding the pioneer, corn mill would be small. Inside was one run (or pair) of stones, a stationary lower stone and upper stone probably attached directly to as the tub wheel. ,A wooden hopper, above the grinding surfaces, stored the corn.

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[2]For an extended discussion of how to find waterpower sites while conducting an impact survey of an area which might include such historic features, see the works of two of Louis DeVorsey's students: Roy Doyon, "A Locational Strategy for Discovering Abandoned Small-Scale Waterpowered Activities in Georgia's Piedmont Counties," M.A. Thesis, Geography, UGA, 1983; and Jimmy Paul Hunke, Fluvial Morphometry as a Tool in Rediscovering Historical Waterpower Sites: A Case Study on the Georgia Piedmont," M.A. Thesis, Geography, UGA, 1983.

[3]Jeane, "Culture History of Grist Milling," vii & 24.

[4]Drawn from Allen D. Candler, *The Colonial Records of Georgia* (Atlanta, 1907) and cited by Jeane.

[5]See discussion of types of wheels in Chapter II.

From there it was fed to a opening in the center of the top stone. The corn moved outward by the "lands" and "furrows" of the stones was ground and exited as corn meal around the circumference.

According to Jeane, an enterprising farmer could construct a small mill building "and, with the help of an itinerant millwright, hang a wheel, gear the operation, and open quickly for business. Itinerant millwrights were, in all likelihood, far more common than settled professionals."[6] Such a mill most probably served a limited number of people. Farmer could not afford the time to travel all day to have his corn ground. A small mill might serve three to seven families, on the average. The miller was paid with the product.

One of the ideas, according to Jeane, a myth associated with grist mills was that they were usually the first development within what became a later settlement. His evidence drawn from Northwest Georgia did not substantiate "that grist mills served as magnets for settlers or that mill frequently formed the nuclei of later towns." Furthermore, "mills in Northwest Georgia showed no tendency to necessarily associate with fords, ferries, or bridges on major roads. Mill location was dependent on a sufficient head for power, other landscape factors were secondary."[7]

What Jeane found and it appears valid for the entire state is that grist mills or their waterpower facility over time tended to power other types of small industrial

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[6]Jeane, "Culture History of Grist Milling," 42.

[7]Jeane, "Culture History of Grist Milling," viii. For the opposite view see M.T. Thompson, "The Grist Mill in Georgia," *The Georgia Review*, 7:3 (1953), 1-15.

operations. The single mill, if it transcended the mere tub mill, tended to become a grist-saw mill, and then a grist-flour-saw mill, which was very typical in Northwest Georgia, or a grist-flour-saw mill & cotton gin in areas that produced the staple, and finally an integrated mill complex offering a wide range of services other than just milling.[8] (See Jeane's geographic model of a mill complex on the following page.) By the end of the 19th century such integrated agricultural/forest processing facilities would move into towns.

Grist/flour mills in towns were usually classified as merchant mills, since they marketed rather eat or bartered all of their product. All larger towns or cities, especially above the fall line, had one in or near the town, initially powered by water and then by steam. Augusta became a major interior milling center, probably drawing both its raw materials and customers from Georgia and South Carolina. Four large operations, the Granite Flour Mill, Paragon Mill, Cunningham's Flour Mill, & Cheely's Mill drew waterpower from the Augusta Canal by the beginning of the Civil War.

While all early mills of any size were multi-storied because of power transmission considerations[9], merchant mills affected that configuration because of their processing needs. Corn or wheat would have passed from floor to floor in cup

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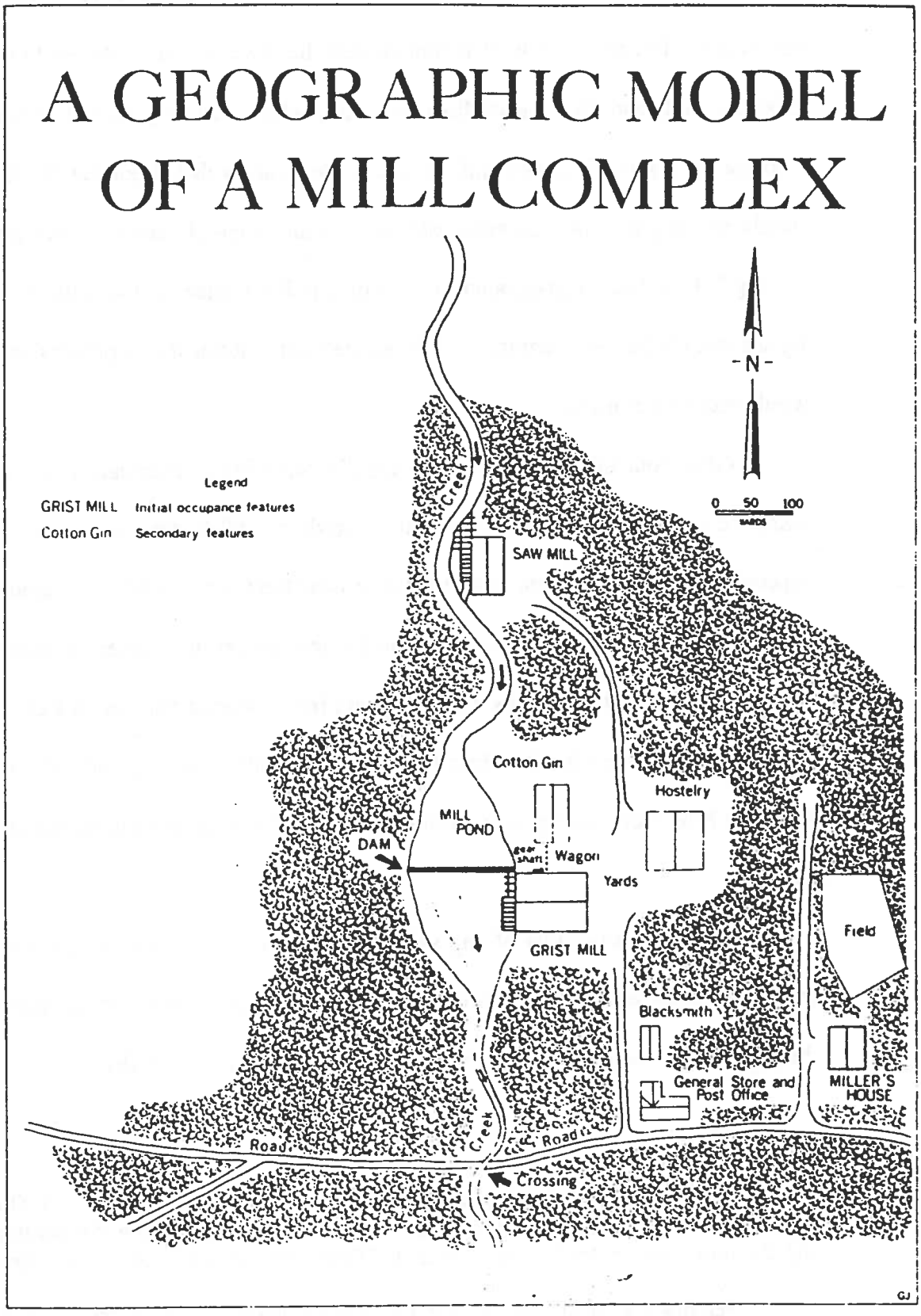
[8]For example, of the four mills examined in the Wallace Reservoir Study on the Oconee River, one was simply a grist mill, two were grist-saw-gin complexes, and the fourth was a textile mill. Wood, "Four Mill Sites on the Oconee River."

[9]See discussion of waterpower and internal transmission of power in mills in Chapter III.



Drawn by Jeane, from his "Culture History of Grist Milling."

pulley. A miller might even move the wheat up the elevator several times in order to remove some of the chaff. Auger shafts moved products horizontally. The un-ground kernels were stored on the top floor, cleaned on the floor below, milled on a still lower floor, returned to an upper floor to be sifted, and then to next floor down to be bagged.

Simplistic Model of Floors in a Merchant Mill

[Based on the Flour Mill at City Mills, Cols., 1890,
Built by Richmond City Mill Works,[10]
Richmond City, Indiana]

Shortage bins for unprocessed grains
Sifters / Shakers (clean the unprocessed grain)
Baggers
Stones / Roller mills (flour)
Steam engine———Power shaft
[or] |
Turbines

These urban mills, while often wooden in construction in their first generation configurations[11], tended to become brick clad in the late 19th century. Their pilastered sides and corbelled parapets framed their names and advertisements for their products. Their commercial flour operations often failed to meet the

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[10]This company probably operated on a national basis. One of its ads, probably for a steam engine, still appears today on a contemporary formica pattern made from cuts of old newspaper ads. See Wendy's which have not been remodelled recently.

[11]This was true of Cheely's Mill in Augusta and City Mill in Columbus. They both acquired brick building at a later date. The Granite Mill (Augusta Canal) was, as its name implies, stone from its initial construction in 1848.

expectations announced in their facades. Georgian and any Southern or even Northeast mills represent excellent examples of the impact of geographical specialization brought by the national rail net. Many of them modernized their flour production because of the development new roller mills (two grooved metal cylinders which ground the wheat). Eastern flour mills could not match the economies of scale wrought by the upper mid-Western factories. Local mills could not compete with flour arriving by railroads. Georgia mills returned to local products—corn meal, grits, and animal feeds. The unused spaces, once designated for flour production, became feed mills. Corn, cotton seed hulls, peanut hulls, molasses were ground, mixed, and sometimes formed into pellets. New uses for old Georgia products, but this industrial process would not energize or revolutionize Georgia's economy.

In evaluating textile mills for National Register consideration, the small wooden mill, usually 2-1/2 stories with power shafting in an open basement, is easily recognized and its exterior integrity is easy to evaluate. In terms of interior integrity, some of the power shafting or equipment should remain if the building is to qualify as a grist mill. In the case of re-use projects, the preservation of existing line-shafting, grinding stones and their bed, and other small pieces of equipment should be required in order to receive tax credits. Finally, environmental impact studies involving waterways need to search carefully for historic milling sites. The remains of tub wheels and turbines covered perhaps with a century of mud can reveal more than any written records about the early history of waterpower technologies.[12]

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[12]For research techniques, see the work of Doyon & Hunke discussed in footnote 2 of this chapter.

CHAPTER V

SAW MILLS & NAVAL STORES

For more than a century, saw mills were as plentiful as grist mills in Georgia, but they did leave the same remains of the state's built-environment or leave the same imprint in Georgians' collective mind. The tree, even if unrecognized, always shared the economic stage in Georgia, with rice and indigo, with cotton, with flour and cotton seed oil.

"The saw mills in this county and all middle Georgia mostly itinerate from neighborhood to neighborhood and saw on shares from private forests; for half if logs are furnished and for fourth if they do their own logging, sawing from 1 to 200,000 feet in a place for local use. Very little lumber is sawed for use elsewhere." So wrote enumerator Cyrus B. Barrow on the 1880 Morgan County census sheet for saw mills. It speaks volumes about Georgia's lumber industry in the 19th century.

While the amounts listed in the censuses for lumber, sawed appeared large, much of it consisted of boards "saw[n] on shares from private forests" for a farmer or landowner and did not put money in someone's pocket. Thus, much of Georgia's lumber was not used in a secondary industry—i.e., furniture—where more wages could have been generated. Also, since saw mills "itinerate[d] from neighborhood to neighborhood" the physical remains of small scale, historic ones are scare and not much of factor in considering National Register properties.

Saw Mills

Georgia led the South in timber production during the antebellum period and

Savannah was one of the nation's leading timber exporter. Augusta probably had Georgia's first saw mill powered by steam (1802) belonged to William Longstreet, who probably invented the engine.[1] Chatham Mill was probably the first steam saw mill in Savannah (1817) and was soon followed by the Hermitage Steam Saw Mill & Cast Iron Factory and by the Savannah Steam Saw Mill. These operations, like those powered by flutter wheels, initially drove vertical gang saws, not circular saws until the 1830s. Savannah's largest's saw mill, the Royal Vale Mill (1848), was located between the River and Musgrove Creek (1848) and had three steam engines driving three gangs of sash saws and four circular saws. Lumber for these mills was floated to the coast as it would continue to be for at least a century and a half.

By the 1830s, some large-scale mills moved into the interior and began, rather than floating logs to the coast, shipping sawn boards to Savannah and other ports for export. The New York and Georgia, Land and Lumber Company, capitalized at $250,000 established several mills in the interior of Georgia in the 1830s. Some large plantation owners built mills which reached commercial proportions. They existed side-by-side by small mills that "intinerated" from place to place and sawed on the shares. This split would continue through World War II.

Very late in the 19th century the national timber industry moved to the South after it had denuded the upper Mid-West. Large operations, with large amounts of capital, bought massive amounts of the pine-barrens and worn-out cotton land from

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[1]Longstreet was an important early Georgia inventor. Ronald H. Ridgley, "William Longstreet," *Dictionary of Georgia Biography*, II, 635-36; John Hebron Moore, *Andrew Brown and Cypress Lumbering in the Old Southwest* (Baton Rouge: LSU Press, 1967).

which they harvested their timber. Some of these, including Georgia-Pacific, evolved into national firms. This boom made Brunswick a very significant shipper of lumber. Even as those changes were occurring those little mill operators who continued to "itinerate" from place to place, wishing to become an owner of a big mill. Most of them did not make the transition.

Naval Stores

As the national timber business moved into the South at the end of the 19th century, another old Georgia industry also boomed, naval stores which was also based on exploiting pine trees. The harvesting of pine resin for tar (removed by burning pine wood in a tar kiln), pitch (obtained from distilling tar, boiling it & then burning the residue), and turpentine (produced by distilling resin) began in the colonial period.[2]

This industry continued, and boomed after the Civil War, first in the Carolinas and then moved southward and westward. By 1900, it was already centered in Alabama. The naval stores frontier move because of the manner of harvested the resin depleted the longleaf pine[3]. "Boxes," square indentations were cut into the

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[2]G. Melvin Herndon, "Naval Stores in Colonial Georgia," *Georgia Historical Quarterly*, (December 1968); his "Timber Products of Colonial Georgia," *Georgia Historical Quarterly*, (Spring 1973); and his "Forest Products of Colonial Georgia," *Journal of Forest History* (July 1979). Another naval timber industry was live oaking or searching for appropriately shaped live oaks and then harvesting them, but again this activity left no surviving imprint on the built environment, except perhaps the ship, *The Constitution*. Virginia Steele Wood, *Live Oaking, Southern Timber for Tall Ships* (Boston: Northeastern University Press, 1981).

[3]Thomas Gamble, editor, *Naval Stores: History, Production, Distribution and Consumption* (Savannah, 1921).

bases of the trees; they eventually weaken and killed the trees. A Georgia chemist, Charles Herty, would change this process and go on to revolutionize the Georgia timber industry.

Educated at the Johns Hopkins and later in Germany, Herty taught at Georgia and coached its first football team, but left Athens apparently because of a conflict with his department head. He held various positions including ones with the U.S. Forest Service and served as President of the American Chemical Society. Herty revolutionized the naval stores industry by inventing a small, fired-clay cup (1900-05) that could be attached to pine trees. Above the Herty cup several small cuts into the tree produced a flow of sap, more than the old method produced, and did not harm the tree.[4]

Two decades later Herty turned his attention to removing the pitch or tar from pine pulp so that it could be used for newsprint, an objective that most paper makers felt was impossible. Herty succeeded, and Southland, the first southern newsprint mill opened in 1937[5]. Herty's work vastly increased the value of pine forests, and the land which grew them. This impact would be felt after World War II. While most of the mill structures associated with saw mills and turpentine stills have disappeared, some physical site associated with Herty needs to be recognized in the same manner

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[4]T.H. Whitehead, "Charles Holmes Herty," *Dictionary of Georgia Biography*, I, 444-45; Gerry Reed, "Saving the Naval Stores Industry: Charles Holmes Herty's Cup-and-Gutter Experiments, 1900-1905," *Journal of Forest History* 26:4 (October 1982), 168-75.

[5]Jack P. Oden, "Charles Holmes Herty and the Birth of the Southern Newsprint Paper Industry, 1927-1940," *Journal of Forest History*, 21:2 (April 1977), 77-89.

that the site of Catharine Greene's Plantation was for the work of Eli Whitney.

CHAPTER VI

COTTON GINS & PRESSES

Invention of the Cotton Gin

Because Eli Whitney, after graduating from Yale, traveled South to find employment, Georgia is known as the birthplace of the cotton gin. The story is well-known: Whitney's plans to tutor on a South Carolina plantation never materialized, and he joined his fellow Yale graduate, Phineas Miller, at Mulberry Grove, the plantation of General Nathanael Greene's widow, Catharene. Georgia had granted the General this estate near Savannah as a reward for his Revolutionary War service.

At the suggestion of Catharine, Whitney turned his considerable mechanical abilities to devising an "engine" to separate the seeds from the fibers of up-land, green seed cotton. Working for about six months, Whitney adapted a Sea Island cotton roller gin into a machine to remove the clingier seeds of the short staple cotton.[1] While Whitney was an important inventor, his significant is often overstated. In textbooks and summary accounts, Whitney is portrayed as if he alone created the southern cotton culture and the growth of slavery, leading to sectionalism, secession, and war.[2]

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[1]Kenneth Coleman, "Eli Whitney," *Dictionary of Georgia Biography*, II, 1063-65.

[2]See, for example, Arnold Whitridge, "Eli Whitney, Nemesis of the South," *American Heritage,* 6:3 (1955), 4-11. Whitridge also asserts: "It is one of the ironies of history that the man who inadvertently contributed to the downfall of the South by this invention of the cotton gin should also have blazed the trail leading to the technological supremacy of the North." The latter refers to Whitney's invention of interchangeable part, which, in actuality, was inadvertently a product of his fulfilling a government contract to furnish a large number of muskets. Whitney's actual motive in producing both those weapons and the cotton gin was to make money.

In fact, Whitney was not a lone genius who dramatically changed the history of the world; he operated within a larger context of invention in which a series of Englishmen had already mechanized the spinning and weaving of cotton: John Kay's flying shuttle (1733), James Hargreaves's spinning jenny (1765), Richard Arkwright's water frame (1779), Samuel Cromton's mule (1779), and Edmund Cartwright's power loom (1787) all preceded Whitney's gin. These English machines spun and wove long staple cotton. Its smooth seeds did not cling to the fibers and could be removed by simply passing the seed cotton through a pair of rollers. Production of this cotton, however, was limited to a small strip of the Georgia and South Carolina coast.[3]

The increased demand for cotton, created by the new spinning and weaving technology, spurred Southerners to grow up-land, green seed cotton, which could be cultivated extensively throughout the lower South. Compared to Sea Island cotton, the up-land specie has a much wider growing range, but a shorter staple and seeds which cling to the fibers. According to tradition, one person, using hand labor, could only clean one pound of green seed cotton per day. Hence, an effective gin made the expansion of both the textile industry and the southern cotton culture possible.

Greene, Miller, and Whitney were not alone in realizing the potential of such

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[3]Various inventors devised and modified roller gins during the 18th century, including M Dubreill in Louisiana (1742), Mr. Krebs in Pascagoula (1772), Kinsey Burden in South Carolina (1777), and Joseph Eve in Augusta (1790). Improvements continued to be made to these gins and they continued to used on Sea Island cotton along the Georgia coast and around Valdosta at the turn of the century, if historic makers can be believed. As late as 1940, Georgia's 14 roller gins processed 2,400 bales or 53% of the 4,491 sea island bales produced in that year. Charles A. Bennett, *Roller Cotton Ginning Developments* (Dallas: The Cotton Ginners' Journalism, n.d.), 1-7, & 62-63.

an "'gin'". Some legends make Catharene or a slave craftsman as the inventor. One documented account shows Hodgen Holmes of Fairfield County, S.C. parallelling the efforts of Whitney. Holmes supposedly received a Caveat of Invention from the War Office in 1789 for a saw toothed gin. It protected his right to a patent for five years and expired on March 4, 1794, the date a patent was granted for Whitney's spike or needle-toothed gin.

Holmes's design, rather than Whitney's, became the accepted one. Whitney stuck needles or spikes or tines, placed in rows, around a wooden cylinder. The spikes pulled the cotton fibers through slits formed by a series of metal ribs arranged so that the openings between them were too small to allow the seeds to pass. Holmes, who received a patent in 1796, utilized narrow circular saws rather than needles. The simplicity of Holmes's device allowed plantation mechanics to replicate it, and saws remain the heart of gins today. Their capacity is still indicated by the number of saws they run.[4]

While Whitney has received the credit, neither his gin nor his specific design were widely used, because he attempted to monopolize the ginning of cotton. By 1794, he had fabricated six gins in New Haven and brought them back to Georgia. Rather than selling gins to plantation owners, Whitney & Miller formed a partnership to operate gins. They attempted to collect an exorbitant fee of two-fifths (or 40%) of

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[4]Charles A. Bennett, *Saw and Toothed Cotton Ginning Developments* (Dallas: The Cotton Ginners' Journalism, n.d.), 1-22.

the ginned cotton.[5] Other mechanics within Georgia and other southern states simply built their own gins, and most employed Holmes's saws rather than Whitney's tines.

Whitney's northern background and his actions—inventing in the South but fabricating his machines in the North—reinforces generalizations about the superiority of northern engineers or mechanics. Judging from antebellum southern newspaper ads seeking experienced northern mechanics, this idea was accepted by southerners in the period. By extension, some historians have also assumed that no cotton gins were manufactured in the South. Many gins in the antebellum era were built in the South; after 1900 nearly all gins were produced in the South, primarily Georgia, Alabama, and Texas.

Manufacture of Cotton Gins in Georgia

By 1860, at least 9 firms probably manufactured cotton gins in Georgia. In addition to the three fall-line cities—Macon, Columbus, & Augusta with two—Jones, Talbot, Taliaferro, Warren, and Troup counties each contained one of these shops[6]. The most historically significant and largest with 73 employees belonged to another

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[5]Coleman, "Eli Whitney," *DGB*, II, 1064.

[6]The 1860 census also listed producers of cotton gins in Spaulding (5 workers), Hancock (1 worker), and Newton (2 workers). The scale of these operations in terms of workers, capital, and value of product would seem to indicate that they were cotton gins rather than manufacturers of gins. Distinguishing between these two seemed to be a problem for those who collected and compiled the censuses. One glaring census error involving ginning appeared in 1860: Taylor County was listed with 51 cotton gin with 160 workers and a product value of $347,410. With this inflated data included in its manufacturing statistics, Taylor County allegedly ranked sixth in the state in industrial capacity in 1860. Including this information on statewide graphs produces a very false impression. See the 1860 maps in McWhorter S. Cooley, "Manufacturing in Georgia During the Civil War Period, 1860-1870 (M.S. [Commerce] Thesis, U.Ga., 1929).

inventive New Englander. Samuel Griswold moved from Connecticut to Clinton in Jones County about 1815. According to legend, he examined the first gin brought into the county and immediately began fabricating them. From the start he conceived of having a large scale operation. By the mid-1820s, he was probably the leading producer of saw gins in Georgia and perhaps one of the largest in the nation. By 1840, the value of his product reached $60,000. He imported sheet steel from England, employed selling agents, opened a branch plant in Rome which either did not survive or was not listed in 1860.

Because Clinton lacked a railroad, Griswold created his own community, Griswoldville, about nine miles east of Macon, on the Central of Georgia. In addition to the gin factory, it contained a grist and saw mill, a wagon factory, and houses for himself, at least 73 workers, and over a hundred slaves. Such an industrial settlement was unique for antebellum Georgia, but it would not survive the Civil War. After the conflict started, he produced about 3600 revolvers for the Confederacy. In November of 1864, General James Kilpatrick's troops, known as the most destructive in Sherman's army, reached Griswoldville and according to Kilpatrick's report: "We have destroyed a pistol factory and a soap and candle factory, both large and valuable." Griswold died three later.[7]

Through the men he attracted and trained, Griswold's influence reached far beyond Griswoldville in space and time. Daniel Pratt, another New England

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[7]William Lamar Cawthon, Jr., "Samuel Griswold," *Dictionary of Georgia Biography*, I, 369-71.

mechanics, moved from New Hampshire to Georgia, where he designed and built federal-style houses in Milledgeville from 1821 to 1831. Then, he joined Griswold and learned to build gins. Two years later, he left Clinton with his wife, two slaves, and the parts for 50 gins. In 1838, he founded Prattville, Alabama, an industrial town not unlike Griswoldville, where Pratt's first factory produced gins.[8]

Griswold also brought Dwight and Israel F. Brown, both skilled mechanics from Connecticut. Israel later became a partner in W.G. Clemons, Brown, and Company in Columbus, the state's largest producer of gins in 1860 with products valued at $100,000. In 1861, Brown received a patent on a gin using one single brush and two horizontal saw cylinders working together in single roll box; Campbell called it a double duplex gin.[9]

After the 1860 enumeration, the census no longer listed cotton gin manufacturers in Georgia. Probably most of them like Griswold shifted to other products during the war, but certainly all of them did not meet Kilpatrick's cavalry and death by 1870. By that time, apparently, gins were not unique enough to list separately and were simply shown as agricultural implements or machinery or some other category. Thus, determining the actual location of post-bellum gin manufacturers, especially small ones, is difficult.

In April of 1865, General James Wilson's Union cavalry burned the plant of

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[8]William Nathaniel Banks, "Daniel Pratt," *Dictionary of Georgia Biography*, II, 810-11.

[9]Campbell, *Saw and Toothed Cotton Ginning Developments*, 30-31.

W.G. Clemons, Brown, and Company in Columbus. By April of 1866, it was once again selling Brown 's gins. Three years later, F.M. Lummus, another native of Connecticut, acquired a shop in Columbus, moved to the city, and began producing gins, described as successor to the Taylor Gin. Lummus, according to family tradition, believed Columbus to be an evil city or that any city was evil and moved his operation to a rural location at Juniper Springs east of the city.[10] The next generation of Lummuses brought the factory back to Columbus (1899), where it became a large-scale operation.

Other Georgia gin manufacturers also resumed after the Civil War. The 1880 manuscript census for Taliaferro County showed J.L. & N.J. Hammack as manufacturers of cotton gins, operating with $2,500 capital. The census compiler noted this information as being listed under the machinery section. At the other end of the scale, several machine shops in larger cities were probably fabricating gins. For example, in Atlanta the Winship Machine Company, which began in 1853, was producing a complete ginning system by the turn of the century. (See illustration at the end of this chapter.)

As industrial structures, plants for manufacturing gins were not architecturally distinctive and can not be identified by simply examining their remains. They would have resembled any other type of machine shop of the same era. The early shops could have simply been wooden buildings, similar to large blacksmith shops. Gin

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[10]Lummus's rural factory, a wooden building, existed as a vacant structure until the 1980s, but failed to survive the breaching of the dam at this site during that decade.

factories would not have had furnaces or large foundry operations; they acquired their pulleys and shaft from foundries and purchased the sheet metal or steel out of which saw blades were cut.[11]

By the late 19th century the structures housing the larger firms probably resembled large machine shop operations. Lummus, the state's most significant 20th century plant, which is listed on the National Register as part of the Columbus Multi-Resource Nomination, is a good example of this style of industrial architecture.

Adjacent to a rail line, in an industrial/commercial section on the edge of the original city, Lummus's physical plant evolved over almost a century. The first three-story, brick, rectangular factory (1899) displays a little corbelled detail atop the stepped gable along its short side. The long side is pierced by segmental-arched windows, 21 on each story, and at the top three rows of corbelled bricks form a cornice, minor ornamentation when compared to slightly earlier textile mills.

Within this building a steam engine drove pulleys that turned belts powering line shafts running the length of every floor and belts from them worked a variety of saws, lathes, presses for working wood and metals as well as elevators for moving goods and people. Steam power made a three story building necessary; the shift to centrally-supplied electricity, probably not until the 1910s in this case, made multi-stories buildings obsolete.[12]

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[11]Griswold supposedly imported sheet steel from the Naylors in England. Cawthon, "Samuel Griswold," *DGB*, I, 370.

[12]The somewhat late date for the shift to electricity is based on a knowledge of Columbus utility companies and their problems in providing power for industrial customers. See George J. Baldwin Papers, Southern Historical Collection, University

Two buildings erected in the electric era, probably in the 1920s, were only 1 1/2 stories. With electricity, placement of equipment was no longer dependent on line shafting and could be arranged in a non-linear manner. Light became the prime consideration: the first floor walls held large jalousie windows separated by narrow pilasters and the upper story was a clerestory monitor with big windows. Because such factories tended not to install air purifiers or air-conditioning in older structures, their original fenestration has survived and indicates a non-textile industrial complex. At Lummus some post-World War II structures, probably warehouses, have few or no windows and walls of cinder-blocks or sheet metal. A 1960s or 1970s brick office building is probably the only architect-designed piece of the Lummus fabric.

In the late 1970s, Lummus and Continental, a successor of Daniel Pratt's factory, were the only remaining American producers of cotton gins. By the 1990s, only Lummus remained as a U.S. producer and at this writing that position is in jeopardy.

Distribution & Configuration of Cotton Gins

While not really an industrial operation, the gins produced by Lummus, Pratt, Winship, and others did, unlike the factories, have a distinctive configuration and were a significant part of the agricultural processing complex in many Georgia towns for almost a century. Thus, preservationists should recognize, appreciate, and be able

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of North Carolina, Chapel Hill.

to evaluate these structures.

Initially most gins were found on plantations or they were part of integrated grist-saw-gin complexes. After the Civil War, better roads, the availability of inexpensive steam engines and the expansion of the rail meant a concentration of gins into crossroads communities. The following illustrations show the physical evolution of gin houses from horsepower to steam power and how the cotton press which compressed the bale moved from a wooden screw outside the gin house powered by mules to inside the house next to the gin. The big improvement after the Civil War was the development of air blowing systems which sucked the seed cotton into the gin house and moved the fiber once it had been separated from the seeds. This improvement produced what seem like smokestacks protruding from the roofs of the structure.[13]

Modern (post-1940) gins houses still resemble the Winship operation. They are covered with corrugated metal and are raised to allow the suction pipes to remove the cotton from the Electricity has replaced steam and the gin saws revolve at a higher speed, but they still process the crop around which so much of the history of Georgia has rotated.

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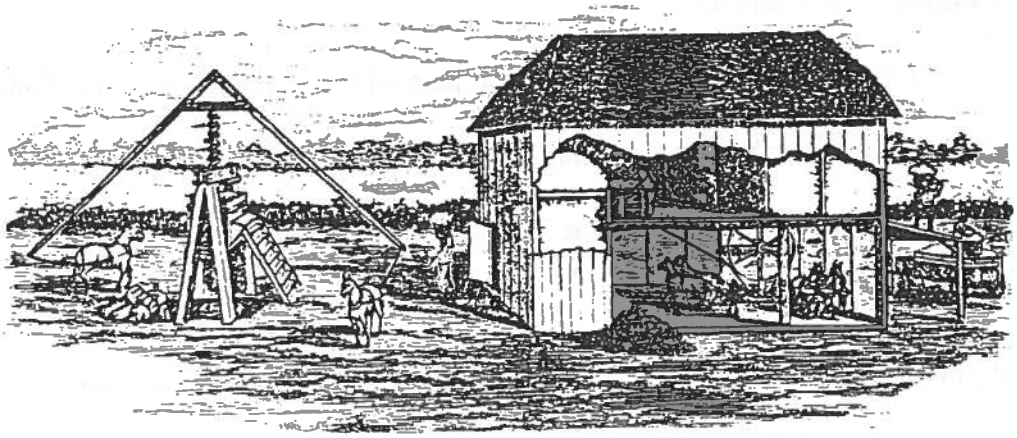
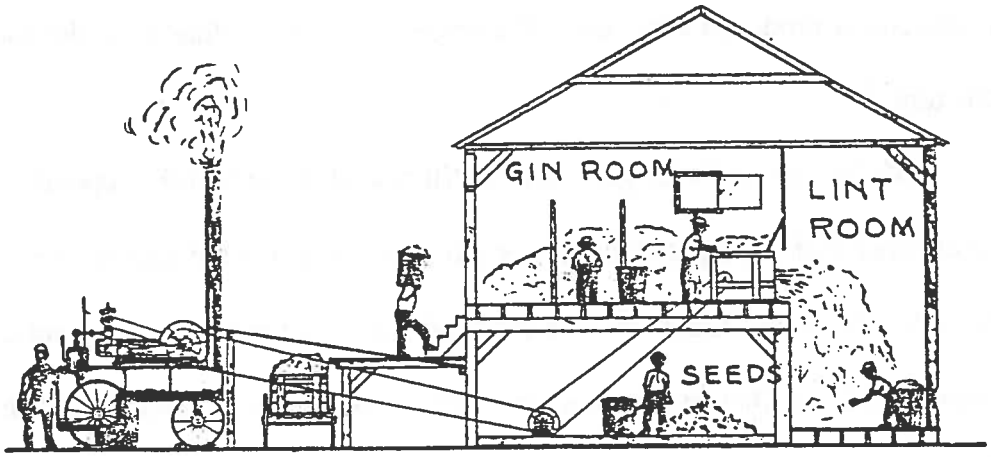
[13]Both the antebellum and the post-bellum types of gins can be viewed in Georgia. The earlier at Westville, Stewart County, and a later, steam-powered one at Agrirama. in Tifton.



An early American Cotton Ginning installation, using 2-story building, temporary storage and gin stand on the 2d floor, power drives at ground level, and press in the gin yard. From the 1899 catalog of Munger Improved Cotton Machine Mfg. Co.

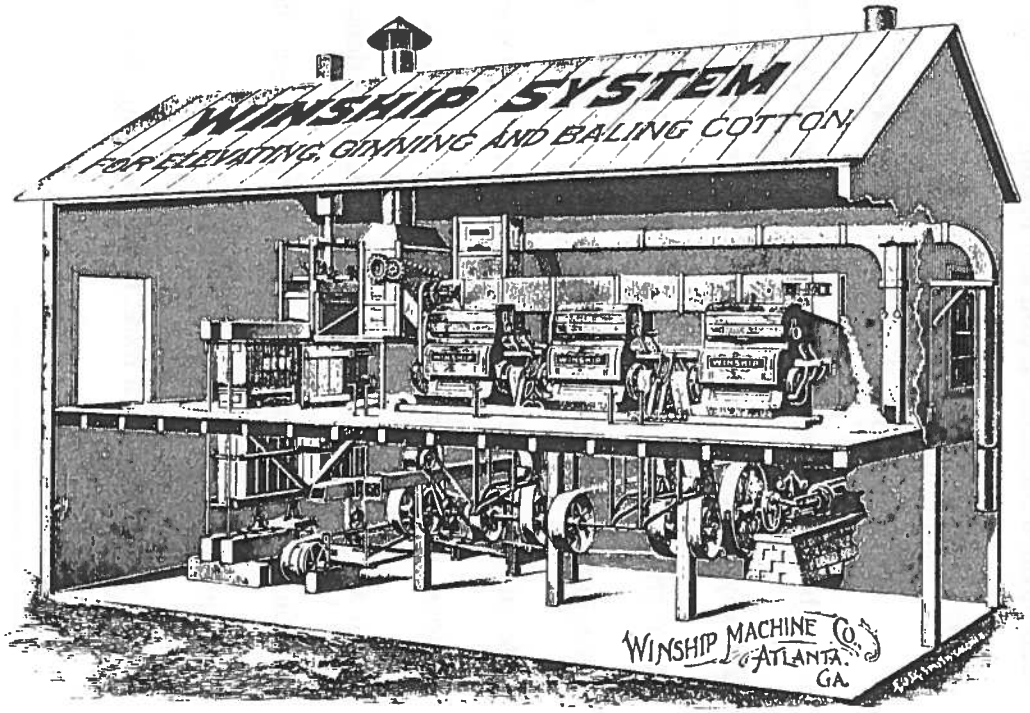


A Carolina single-stand cotton gin about 1890. Note the temporary stalls for seedcotton storage on the second floor, along with the gin stand. The lint blow room is two stories high. Press is not shown, hence was probably a yard press. Drawn by Prof. D. A. Tompkins.

Images & captions from Bennett, *Saw-Toothed Ginning*.

WINSHIP MACHINE CO., Atlanta, Ga.

ESTABLISHED 1853.



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CHAPTER VII

COTTON SEED OIL MILL

For every pound of lint produced by ginning cotton, two pounds of seeds remain; only a small proportion of that seed is needed for planning. During much of the 19th century farmers and gin men viewed the residue of ginning, the seeds, as being of little monetary value. That condition changed during the 1880s with the creation of the cotton seed oil industry. The growth of pre-processed foods which accompanied industrialization and urbanization during this period created new uses for cotton oil, as did the expanding use of fertilizer.

According to O.B. Stevens, Georgia's Commissioner of Agriculture in 1901: "This by-product of the cotton is worth to the farmers of Georgia millions of dollars annually. Not even the cotton factory, whose coming to the fields, is hailed as a harbinger of good to the planter, is more closely allied to the agricultural interests of Georgia than the mills that utilize the seed, once held in such poor esteem."[1] The difference between the long-heralded textile factories and the new oil mills was obvious: by 1900 many new textile mills in the South were simply moving from the North and such migration failed to expand the demand for cotton fiber. Oil mills, on the other hand, represented a new industry which did expand the market for a cotton-based product.

The mills within these new processing plants extracted oil from the kernel

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[1]Stevens & Wright, *George Historical and Industrial* (1901), 48.

leaving a residue of seed-meal and hulls. The oil served many functions. After some refining, it became summer oil which food producers, not these mills, used in oleomargine, butterine, cottolene, lard, candles, and salad oil. Stevens asserted that cotton seed oil "has to a considerable extent taken the place of olive oil." Cool pressed winter oil became a substance employed for miners' lamps, in medicinal compounds, to temper steel and in other manufacturing processes. It supposedly ranked second to sperm oil for illumination. Stevens did not bother to define the gap between number one and number two, but it must have been substantial.

The meal cakes and hulls were used for animal feed or for fertilizer. Some farmers simply feed this residue to their stock or they used it in this form or mixed with compost to supply nitrogen for their fields. These products also formed a major ingredient in commercial fertilizer. The production of these two items were linked in Georgia; in 1900 nearly a third (32) of the state's 110 fertilizer manufacturers also extracted cotton seed oil.

In 1880 no cotton seed oil mills existed in Georgia, but they grew rapidly during the next two decades, especially in the closing years of the century. By 1896, 20 mills, and by 1900, 52 of them operated throughout the cotton regions of the state; only the mountains and the coastal timber area (Brunswick) lacked oil mills by that date. (See chart and list below.) The 87% increase in the value of their products between 1896 & 1900 was part of the return of prosperity, usually dated from 1898. The beginning of cotton oil mill boom occurs with the appearance of the neo-classical, Corinthian-columned mansions in many Georgia towns. Some merchants

probably owned one of each. Like those ostentatious houses, these mills were located in towns or cities, not in the countryside.

Growth of Georgia's Cotton Seed Oil Mills, 1880-1900

Year	Number of Mills	Capital	Amt Paid for Seed	Value of Product	% of Growth
1880	0	$0	$0	$0	-
1890	17	$992,131	$1,298,421	$1,670,196	-
1896	20	-	$1,400,000	$1,800,000	7%
1900	52	$2,500,000	$5,000,000	$14,000,000	87%

Statistics & list of mills drawn from information in Stevens & Wright, *George Historical and Industrial* (1901).

List of Georgia Cotton Seed Oil Mills in Operation in 1900

Americus Oil Company, Americus
Athens Oil & Fertilizer Company, Athens
Arlington Oil & Fertilizer Company, Arlington
Blackshear Manufacturing Company, Blackshear
Carrolton Oil Mills, Carrolton
Cedartown Oil & Fertilizer Company, Cedartown
Conyers Oil Company, Conyers
Co-operative Manufacturing Company, Forsyth
Dawson Oil Mills, Dawson
Dublin Oil Mills, Dublin
Excelsior Manufacturing Company, Washington
Elberton Oil Mills, Elberton
Farmers Cotton Oil Manufacturing Company, Locust Grove
Fort Gaines Oil & Guano Company, Fort Gaines
Griffin Oil & Fertilizer Company, Griffin
Gainesville Oil Company, Gainesville
Gate City Oil Company, Atlanta
Georgia Cotton Oil Company, Atlanta
Georgia Cotton Oil Company, Macon
Georgia Cotton Oil Company, Augusta

Georgia Cotton Oil Company, Rome
Georgia Cotton Oil Company, Columbus
Georgia Cotton Oil Company, Albany
Georgia Farmers Oil & Fertilizer Company, Madison
Grovania Oil Company, Grovania
Hardman Oil Company, Harmony Grove
Interstate Cotton Oil Company, Augusta
Jefferson Oil Mills, Jefferson
Jackson Oil Mills, Jackson
Lathrop Oil Mills, Hawkinsville
LaGrange Mills, LaGrange
Lavonia Cotton Oil Company, Lavonia
Middle Georgia Oil & Fertilizer Company, Hogansville
McBride Oil Company, Newnan
McBurney Oil & Fertilizer Company, Warrenton
Macon Oil & Ice Company, Macon
Milledgeville Oil Mills, Milledgeville
Monroe Guano Company, Monroe
McCaw Manufacturing Company, Macon
Mutual Oil Company, Macon
Pelham Oil Mill, Pelham
Rockdale Oil & Fertilizer Company, Conyers
Smithonia Cotton Oil Mills, Smithonia
Southern Cotton Oil Company, Savannah
Southern Cotton Oil Company, Atlanta
Talbot Company Oil Mills, Talbotton
Valdosta Guano Company, Valdosta
Washington Company Oil Company, Tennille
Walton Oil Company, Social Circle
West Point Oil Mills, West Point
Wilkins & Jones, Waynesboro

A comparison of the initial distribution pattern of cotton and oil mills, which occurred almost a century apart, illustrates the difference between a pre- and post-industrial technology serving the same product. Cotton gins were originally introduced at the plantation level and utilized hand or water power. With improvements in transportation, equipment, and power sources, gins were consolidated into larger operations at cross-roads and in towns. Oil mills, even

though they processed an agricultural product, began in towns (see above list). From their inception, they relied on steam and then electricity, and the road net allowed farmers or ginners to bring their seeds to the mill. The presence of one of these mills in a town seemed to indicate that it was a vibrant community; they always possessed good rail connections.

Cotton seed oil mills were built adjacent to cotton gins, often under the same ownership. Some textile mills, especially those with a gin, maintained their own cotton seed oil mill. Paragon Mill, a flour mill on the canal in Augusta, was converted into a cotton seed oil mill in the mid-1870s. According to the *Handbook of Augusta* (1878), the cakes, formed from the residue after the oil was removed, "are exported largely to England, where they are in great demand as stock." Georgians would follow their example. The cotton seed cakes would eventually help to form the basis of both the animal feed and fertilizer industry.

In keeping with the consolidation of business firms found at the turn of the century, the Georgia Cotton Oil Mills and the Southern Cotton Oil Mills would attempt to create a monopoly as they absorbed many of these smaller operations during the next two decades. As late as 1940, cotton oil was still a major production of Georgia.

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