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SOCIETY FOR INDUSTRIAL ARCHEOLOGY

**47th ANNUAL CONFERENCE
MAY 31 - JUNE 3, 2018
RICHMOND, VIRGINIA**

GUIDEBOOK TO RICHMOND



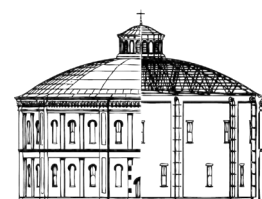
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GUIDEBOOK TO RICHMOND

SOCIETY FOR INDUSTRIAL ARCHEOLOGY
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*Philip Morris Leaf Storage Warehouse
on Richmond's Tobacco Row.*

HABS VA-849-31 Edward F. Heite, photographer, 1969.

CONTENTS

Acknowledgementsiv

INTRODUCTION

Richmond’s Industrial Heritage 3

THURSDAY, MAY 31, 2018

T1 - The University of Virginia19

T1 - The Blue Ridge Tunnel22

T2 - Richmond Waterfront Walking Tour24

T3 - The Library of Virginia26

FRIDAY, JUNE 1, 2018

F1 - Strickland Machine Company.....27

F1 - O.K. Foundry.....29

F1 & F2 - Tobacco Row / Philip Morris USA32

F1 & S3 - Tredegar Iron Works36

F2 - Industrial History of Petersburg41

F2 - Falling Creek Bridge50

F2 - Falling Creek Iron Works52

F3 - Fort Monroe54

F3 - USS *Monitor* / Mariner’s Museum56

F3 - Jamestown58

F3 - The Colonial Parkway60

F4 & S2 - James River and Kanawha Canal.....62

SATURDAY, JUNE 2, 2018

SB - Fulton Gas Works / Stone Brewing.....67

SUNDAY, JUNE 3, 2018

S3 - Richmond Railroad Museum70

Suggested Resources73

ACKNOWLEDGEMENTS

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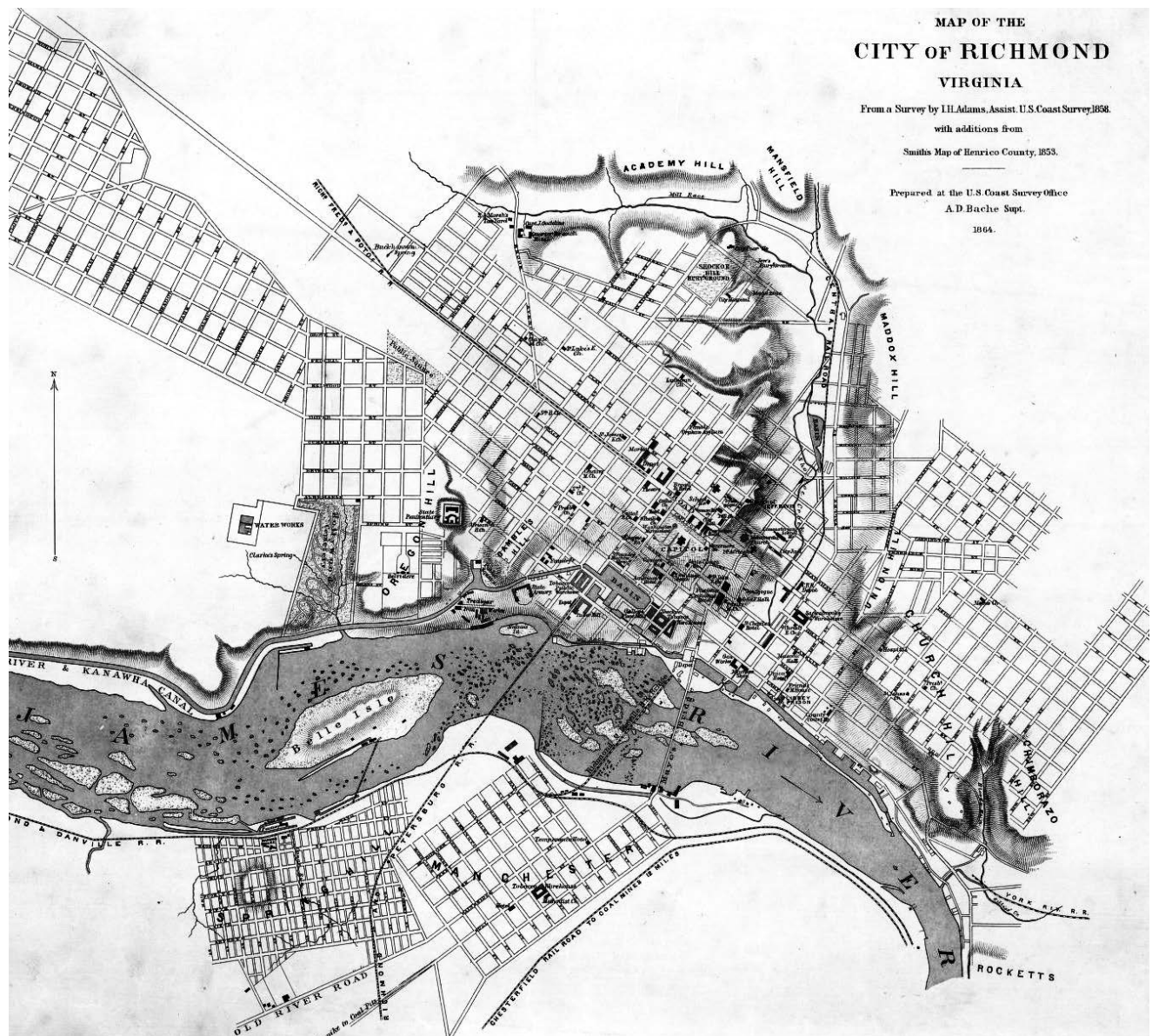
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INTRODUCTION

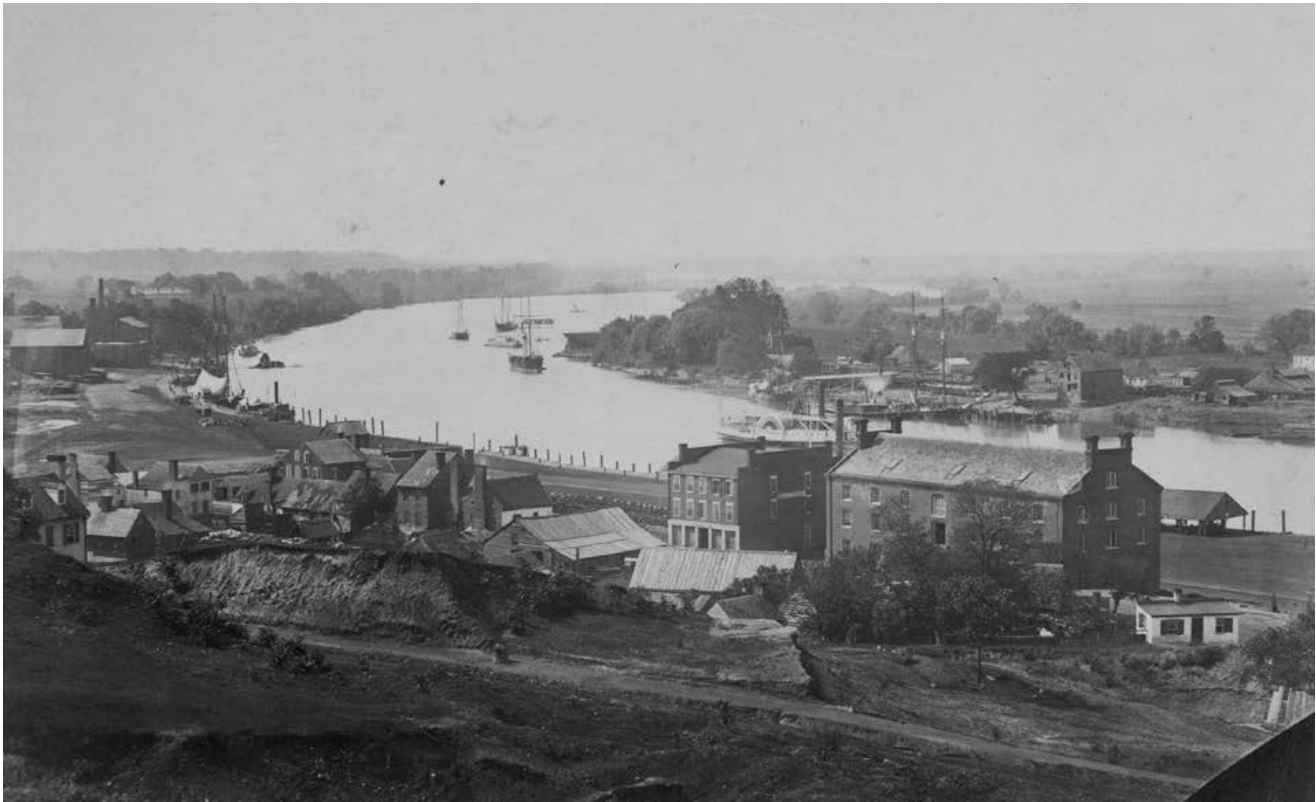


Map of the City
of Richmond,
1864. Courtesy
of the Library
of Congress.

INTRODUCTION

RICHMOND'S INDUSTRIAL HERITAGE

NATHAN VERNON MADISON



Byrd's Vision

When prosperous merchant and landowner William Byrd II resolved in 1733 to establish a small trading town along the falls of the James River, on a minute portion of the 26,000 acres he held in eastern Virginia, the commercial potential of what would become Richmond was evident. The James River provided a navigable waterway linking the colony's expanding western frontier to Jamestown, Williamsburg, and the Chesapeake Bay; further, the river's currents could easily be harnessed to power any number of mills along its path. The town of Richmond (possibly named for what Byrd considered a likeness to the town of Richmond in southwest London) was founded in 1737 with a population of 250. The town was relatively small in size (1/5 of a square mile) and largely situated on Church Hill and its southern valley. The town's layout consisted of blocks laid between First Street (modern day Seventeenth Street) and Ninth (Twenty-Fifth) Street, with cross streets demarcated (moving from river's bank, northward) as D, E, F, G, and H (modern

day Cary, Main, Franklin, Grace and Broad) Streets. The natural western border, formerly provided by Shockoe Creek (possibly a derivation of "Shacquanocan," a local Native American word for "stone," according to the records of Captain John Smith) was expanded in 1769 following the town's annexation of Shockoe Hill and the surrounding area, bringing the town's population to around 570. Prior to the founding of Richmond, the area showed little growth in industry, aside from agriculture, mining, and in-home manufacture of domestic goods such as farming tools and textiles. The first attempt at large-scale industry in the region had failed miserably; in 1619 an ironworks at Falling Creek, a few miles south of Richmond, was built and overseen by respected English ironmaster John Berkeley. However, "a fire shovel, tong and a little bar of iron" are the only goods recorded as having been produced at Falling Creek before 1622, when a massive uprising by local Powhatan Indians killed hundreds of British settlers and laid the ironworks to waste.

Rockett's Landing, looking eastward down the James River, ca. 1860-1865. Courtesy of the Library of Congress.



Panorama of Richmond, The Virginia State Capitol in view, 1912. Courtesy of the Library of Congress.

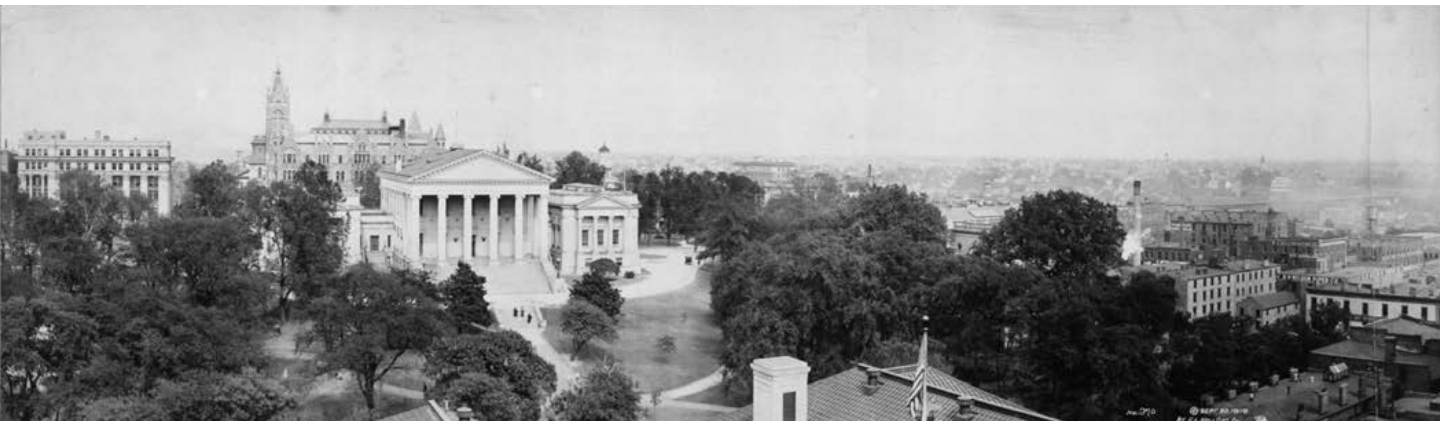
The faith William Byrd II placed in the industrial and commercial prospects of his new city was justified nearly as soon as the city was founded. Richmond, an inland port, was a natural inspection station for the colony's most important cash crop—tobacco. The amount of tobacco grown in the colony jumped astronomically in the relatively short amount of time since the colony's founding. Virginia's nascent tobacco industry yielded approximately 2,300 lbs. in 1616, a quantity that skyrocketed to 50,000 lbs. in only two years. By the 1730s, annual tobacco production was in excess of 30 million lbs., much of which passed through inspection stations in Richmond before exportation to surrounding colonies and to Europe. Shipping and passenger transport along the James River became exceedingly lucrative. In the 1730s, ferryman Robert Rocketts began a successful shipping business with a port on the Richmond side of the James, a region of the city that still bears his name. As towns and counties were established in the surrounding vicinity—Goochland County (1728), Chesterfield County (1749), the town of Manchester (1760)—the amount of commerce flowing to and from Richmond only increased as it became a commercial hub for the entire central Virginia region. One of the most successful industrial ventures ever in the Richmond region had begun years before the town was even founded. In 1709, the first commercial coal mines in North America opened in Richmond and, to a much larger extent, in nearby Midlothian, Chesterfield County. In the decades that followed, the 90,000-acre bituminous Richmond coal basin became the primary source of coal for North America until large-scale mining of anthracite began in Pennsylvania in the 1830s. In 1748, 50 tons of coal were mined in Midlothian. By 1798, annual production had jumped to 22,000 tons, reach-

ing 100,000 tons per annum in the early years of the nineteenth century, spreading to markets across North America, the Caribbean, and even Europe.

Richmond, and Revolution

When Patrick Henry gave his impassioned "Give me liberty or give me death!" speech at St. John's Church during the Second Virginia Convention, high upon Richmond's Church Hill on March 23, 1775, the city housed approximately 600 inhabitants and few industries beyond tobacco, coal mining, and shipping. British mercantilism required that raw materials be produced in the colonies and shipped to Britain for manufacturing, before being returned to America, resulting in a very limited number of full-scale industrial efforts in the New World being allowed, let alone attempted. Further, tobacco, while profitable on many levels, also ravaged and degraded the soil in which it was grown, necessitating new land purchases which kept many farmers perpetually in debt to British banks and prevented any large amount of capital to be set aside for investment in industrial entrepreneurship. Such subordination to Britain ended, however, when Virginia joined her sister colonies in Revolution following the Fifth Virginia Convention's declaration on May 15, 1776 that the Commonwealth was a free and sovereign state. Several months later, on August 5, 1776, the Declaration of Independence was read aloud to the gathered populace in Richmond.

On June 12, 1779, Virginia's seat of government was relocated from Williamsburg to Richmond, and with it came a flood of small industries—tailors, coopers, shoemakers, tavern-keepers, tanneries, and others. Three industrial enterprises in particular, born of wartime necessity, soon became targets for the enemy.



The newly-appointed Committee of Safety used tobacco to fund the provisional state government, as well as a militia, which until that point had largely depended on munitions and arms pilfered from royal armories or purchased abroad. Shortly after Virginia's independence was declared, the government ordered a foundry be built to produce firearms, cannons, and cannonballs for the state militia. By November 1778, large-scale ironmaking returned to the area in the form of the Westham Foundry, located on the northern bank of the James River slightly west of Richmond. Westham was managed by the state and overseen by ironmaster John Ballendine. Westham had 12 furnaces, 4 double stack and 8 single stack; a small shop for repairing arms; and a boring mill capable of boring 4 and 6-pounder cannons. In August of 1779, a small canal built to power the boring mill was completed, and the foundry was able to produce twenty 4-pounders. Pig iron was shipped to Westham from blast furnaces in Buckingham and Bedford, western counties abundant in iron ore deposits. Westham also produced commercial products, such as three 500-lb. iron hammers for the Hunter Iron Works in Fredericksburg. Smaller tools such as sledgehammers, anvils, shovels, spikes, and nails were also produced on the 3 ½ acre site. Westham was only the latest in a collection of ironworks across the state, most notably including John Tayloe's Neabsco Works in Prince William County and David Ross's Oxford Iron Works in Bedford County. Virginia's growing iron industry produced 900 tons of bar iron and 3,300 tons of pig iron in 1781 alone. In fact, by the time of the Revolution, the American colonies collectively were the third largest producers of iron on Earth.

To bypass the grip British blockades placed on

the state's ability to procure gunpowder from abroad, Virginia state senator and leading planter Archibald Cary, along with Jacob Rubsaman, a Jewish chemist from Bavaria sent under the auspices of the Continental Congress, founded a powder mill along the Pocoshock Creek in neighboring Chesterfield County, one of several the duo established in the surrounding area which collectively produced around 200 lbs. of gunpowder a day for Continental forces. Cary also founded, in 1777, the Chatham Rope Yard Company atop Shockoe Hill, near the provisional government's capital, to produce rope for ship riggings and other military necessities. These three industrial sites—Westham, Cary's powder mills, and Chatham – were among the primary targets of the British advance towards Richmond in early 1781. On January 5, British Brigadier General Benedict Arnold marched into Richmond and took the city, Governor Thomas Jefferson and the state government having evacuated the capital shortly prior. The following day, Arnold ordered his troops to destroy the rope works and powder mills, as well as the Westham Foundry. All three were destroyed, but not before Governor Jefferson had managed to transport weapons, supplies, and important records from Westham to points outside the city and out of Arnold's reach.

Interestingly enough, Governor Jefferson seemed to believe that the United States should refrain from industrialization outside of the needs of war, convinced that farming and husbandry were the highest civilian callings possible: "Corruptions of morals in the mass of cultivators is a phenomenon of which no age or nation has furnished an example," Jefferson wrote in his Notes on the State of Virginia (1781). "Let our workshops remain in Europe. It is better to carry provisions and materials there than bring.



Gallego Mills
on the Great
Basin, 1865.
Library of
Congress.

... [workshops] to the provisions and materials, and with them their manners and principles." Thankfully for the nation's fortunes, neither the United States nor Richmond followed such an example, with the post-war period heralding a surge in manufacturing, commerce, and industry that could scarcely be imagined in the preceding years. Richmond, over the succeeding decades, grew at such a rate industrially, that, by the time of the Civil War, the city was the industrial hub of the southern United States. What helped fuel this industrial ascension was the transportation and infrastructural boom that swept the country following independence.

The Young Republic

Chartered in Richmond on January 5, 1785, the James River Company sought to fulfill the vision of its honorary president, George Washington: the creation of an all-water route connecting Richmond to the ever-expanding western frontier. A linkage between the Mississippi and Ohio Rivers (via one of their tributaries, the Kanawha River) and the James would cement Richmond as the commercial and financial heart of the young republic. After several decades, the canal, despite holding the honor of being the first commercial canal with an operating system of locks in the United States, did not reach far beyond the limits of Richmond. After a brief period under state supervision in the 1820s, in 1832 the effort was revitalized and reorganized as the James River and Kanawha Canal Company. Un-

der the guidance of president James C. Cabell and Chief Engineer Charles Ellet, work commenced on the canal with renewed vigor, 3,500 workers laboring on the job in 1837 alone. Work on the canal (aside from maintenance and improvements along its path) ended in 1851 with a terminus in Buchanan, Botetourt County, more than 200 miles west of Richmond. While never reaching its intended goal of connecting the James and Kanawha Rivers, the canal proved an invaluable asset for both transportation and trade.

Just as work on the canal began in earnest, Richmond was growing as a hub of southern railroad lines, as well. The first commercial rail line in Virginia, a mule-assisted gravity rail connecting coal mines in Midlothian to the docks of Manchester, began operations in 1831. Within 30 years, no less than five railroads entered Richmond: the Richmond, Fredericksburg & Potomac (founded in 1836); the Richmond & Petersburg (1836); the Virginia Central (formally the Louisa Railroad, 1836); the Richmond & York River (1853); and the Richmond & Danville (1856). The James River and Kanawha Canal and Richmond's railroad depots, combined with the shipping trade that had remained a mainstay since before the Revolution, provided an infrastructure that allowed Richmond's industry to flourish.

Richmond's central agricultural industry,

tobacco, continued strong. As American and international tastes shifted from simple tobacco to manufactured products such as chewing (plug) and pipe tobacco, Richmond's tobacco warehouses were joined by tobacco factories. The 11 tobacco factories that existed in Richmond in 1811 ballooned to 50 by 1860, a year in which tobacco products manufactured in the city had reached a value in excess of \$5 million.

Flour-milling, one of the city's premier industries in the nineteenth century, had its origins in the colonial period. After his father's death in 1744, William Byrd III inherited the elder Byrd's extensive holdings around Richmond. Facing financial difficulties years later, the younger Byrd dispensed with portions of his property by instituting a £5-a-ticket lottery, with a total of 10,000 tickets made available. In 1772, Samuel Overton founded a flour mill slightly southwest of Shockoe Hill, near the banks of the James River on land purchased during Byrd's lottery. Overton produced at least 500 barrels of flour for the Continental cause in 1777. During the Revolutionary War, tobacco actually lost ground to wheat, with tobacco production in Virginia dropping from 55 million lbs. to 14.5 million lbs. as greater amounts of flour were needed to feed the Continental Army. Overton's mill was likely destroyed during Benedict Arnold's march through the city. In its place, other mills were built and thrived; by the 1850s, Virginia ranked as the fourth highest exporter of flour in the nation. Chief among Richmond's milling establishments was the Gallego Mills. Joseph Gallego, an immigrant from Malaga, Spain, operated flour mills in Richmond, alongside his brother-in-law Jean Auguste Marie Chevallie, beginning in the late 1790s. After a disastrous fire, the business was reorganized, and a new, larger facility was built in 1832-1833 near the James River and Kanawha Canal's Great Basin (present-day's Twelfth and Canal Streets). In time, the Gallego Mill became the largest flour mill on Earth, and, for many decades, the largest brick building in the United States. Thanks to a patented mixture that helped keep the flour fresher, longer than most of his competitors, Gallego not only served domestic buyers but dominated international markets in South America, Europe, and even as far away as Australia. By the early 1850s, the Gallego Mills employed approximately 80 individuals, manning 23 runs of burrs that were capable of producing 250,000 lbs. of flour a day. In 1860, 400,000 barrels of Gallego flour,



with a value of \$3 million, were shipped along Richmond's waterways and railroads. Gallego flour also played a role in popularizing coffee in the United States. Much of the company's product was paid for in Brazilian markets with coffee beans rather than currency; these beans were then shipped back to Richmond for sale aboard the company's own schooners, making Richmond the coffee capital of the United States for many years. Scotsman Thomas Rutherford began operating a mill not far from the Overton site in January 1801, an enterprise that in time ranked second in production only to Gallego, with the Rutherford mills (later under the direction of associate Edward Cunningham) supplying about 40 percent of the grain milled in Richmond in the years between 1818 and 1825.

The two largest industries of nineteenth century Richmond, tobacco and flour, were soon joined by a third—that of iron and metalworking—which by 1860 employed more than 1/5 of the city's workers. Much of the success of Richmond's iron industry is attributable to increased output from the nearby Midlothian coal mines. Between 1822 and 1841, a single coal mine at Clover Hill averaged over 87,000 tons of coal per annum; during its peak years of production, roughly 1822 to 1877, the entire Richmond coal basin yielded more than 50,000,000 tons of coal. In 1837, the Virginia Foundry Company, a small cast-iron foundry operating on the banks of the James on property formerly belonging to Samuel Overton, merged with the adjacent Tredegar Rolling Mill to create the Tredegar Iron Works. Named for the hometown of its chief engineer, Welsh immigrant Rhys Davies,

Haxall Mill and Gallego Mill ruins on the Canal after the burning of Richmond, 1865. Library of Congress.



\$5 bond issued by the James River and Kanawha Company, ca. 1830s. Courtesy of Nathan Vernon Madison.

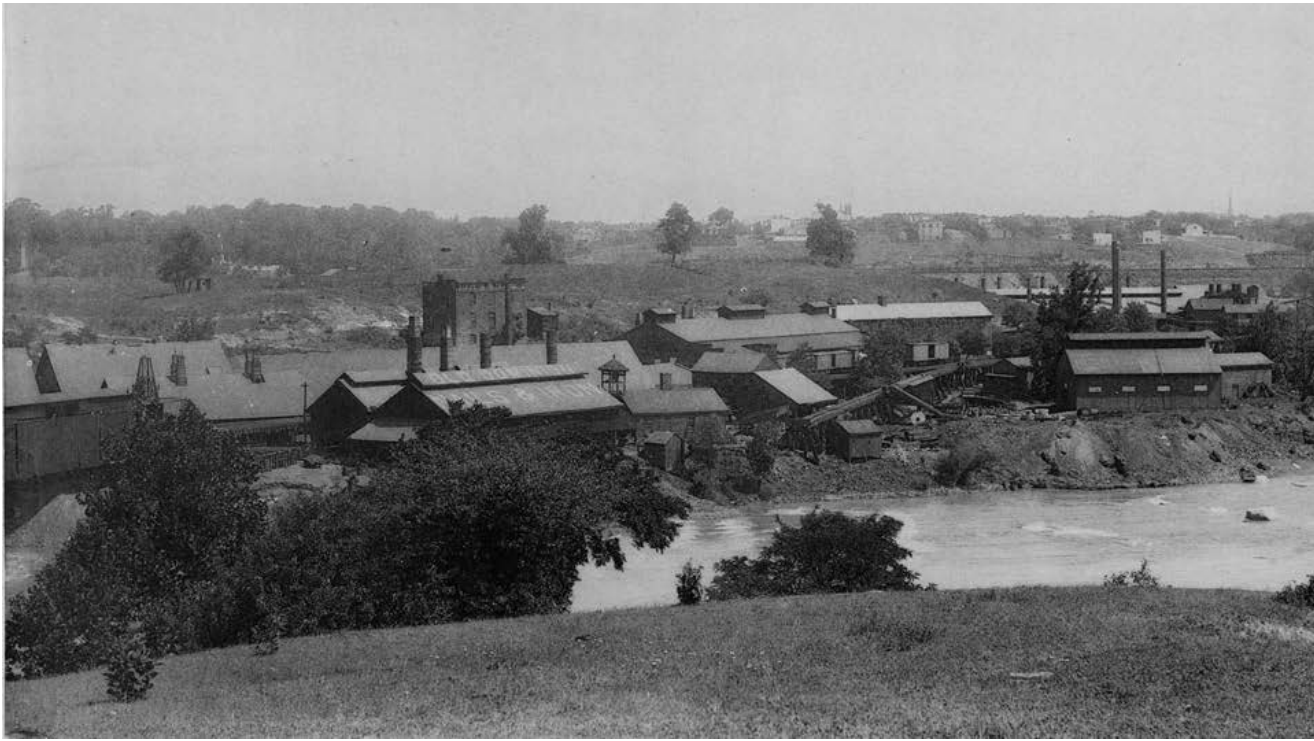
Tredegar benefited from the nascent railroad industry spreading across the state, and later from government contracts for naval vessels and munitions, under the guidance of proprietor Joseph Reid Anderson. By Spring 1857, nearly sixty locomotives had been produced at Tredegar. The company gained recognition across the country for the quality of its products, ranging from railroad spikes to its structural wrought iron, girders of which were used in the rebuilding of the dome of the Capitol Building in Washington, DC in 1859. Adjacent to Tredegar was the Virginia Manufactory of Arms; commissioned by the General Assembly in 1798 with construction completed several years later, the purpose of the Manufactory was to produce both small arms as well as cannons for the state militia. Its greatest periods of productivity were between 1800-1820. In 1845, a small iron-working operation began in the largely-unused manufactory. A year later, the Armory Iron Company was incorporated with Robert Archer, Joseph Reid Anderson's father-in-law, as president, and began producing railroad spikes, axles and rails, utilizing a massive overshot waterwheel, drawing on James River and Kanawha Canal water, to power its three furnaces.

Waterpower via the James River and Kanawha Canal was vital to the growth of many Richmond businesses. Tredegar at first utilized only a single raceway, with a head of 50 feet, to power its machinery. This later rose in number to four separate raceways, as facilities expanded with the absorption of the Armory Works in 1859. Gallego's burrs were powered by massive undershot waterwheels, which were also powered by canal water. However, the success of these, and many other, operations was also dependent on the use of industrial slavery. As industry grew in the city, so too did Richmond's enslaved population, much of which were either rented out to, or owned outright by Richmond businesses. In 1820, there were approximately 2,700

male slaves in Richmond, a number that more than tripled by 1860 to over 7,700. Richmond's tobacco factories employed the majority of the city's enslaved persons, with other industries following close behind, particularly ironworks such as Tredegar. In 1847, Joseph Reid Anderson, impressed by the acumen displayed by several slaves onsite, attempted to force his white workers to take slaves as apprentices, hoping they would transmit skills and knowledge that, up to that point were held largely by mostly foreign (and highly paid) master metalworkers. When his men went on strike in protest, Anderson fired them all and attempted to rely on a greatly-augmented slave labor force, before hiring white workers to once again fill the vacated ranks. While the enslaved population at Tredegar grew in succeeding years, Anderson never again tried to force apprenticeships on his workmen. Thousands of slaves helped build the James River and Kanawha Canal, at times making up more than 2/3 of the canal's labor force; as was the case at Tredegar, many showed amazing mechanical and technical abilities and were entrusted with highly-sensitive operations – much of the canal's locks system was actually designed by enslaved African-Americans.

Civil War, and Rebirth

Following Virginia's secession from the Union on April 15, 1861, Richmond's status as the industrial hub of the South and largest manufacturing center in the newly-formed Confederate States helped cement the decision to relocate the Confederate capital from Montgomery, Alabama to Richmond in May 1861. As was the case with the relocation of the state capital to Richmond 82 years earlier, the arrival of the Confederate capital and its accompanying officials, soldiers, and merchants resulted in an immediate increase in population – 38,000 swelling to well over 100,000, within the next two years. Richmond's various industrial concerns seemed fully capable of supplying the necessities of a wartime economy. Flour from the Gallego Mills could provide sustenance for the troops, while the city's various textile establishments, such as the Crenshaw Woolen Mill, could produce the blankets and uniforms required of a modern army. The Midlothian coal mines, the output of which had fallen in recent years beginning in the 1830s due to the growing dominance of Northern anthracite, were pressed back into service in earnest to provide fuel for the Confederacy. Aside from woolen mills producing uniforms and



Old Dominion Iron and Nail Works, on Belle Isle, ca. 1891. Courtesy of VCU Libraries.

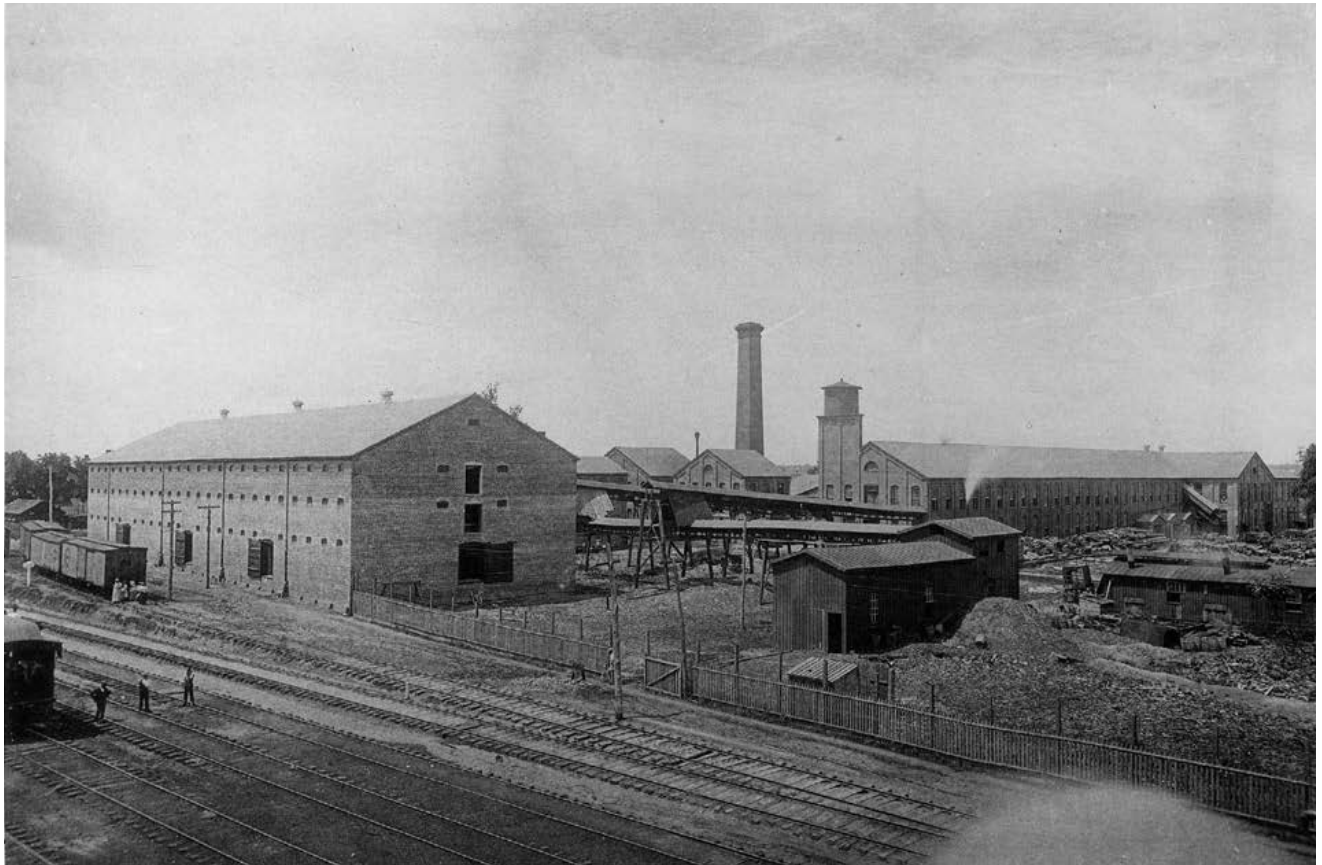
flour mills providing food for soldiers, Richmond's iron industry was the most important wartime industry throughout the entirety of the conflict. Tredegar alone produced 1,099 bronze and cast iron cannons for the Confederate war effort, and constructed the two-inch plating for the ironclad CSS Virginia; shortly before hostilities commenced, Joseph Reid Anderson began replacing all of Tredegar's overshot waterwheels with more efficient turbines, a process that continued during and after the war.

Just across from Tredegar, another prominent ironworks was in operation, on an island in the middle of the James River. Initially founded as the Belle Isle Manufacturing Company in March 1832, the company soon rebranded itself as the Old Dominion Iron and Nail Works. By 1860 the plant boasted seven puddling furnaces, over forty nail machines, a rolling mill, and a cooper's shop. That year, the entire Nail Works employed 221 workers, 21 of them enslaved. The Confederate government also established an ordnance laboratory on Brown's Island, adjacent to the Tredegar complex. Staffed largely by young women, the laboratory suffered a massive explosion in March 1863 which killed several dozen and injured scores more. Throughout the war, no less

than 14 foundries and machine shops operated in the city, in addition to 4 rolling mills and approximately 50 small-scale metalworking concerns. As railroad and canal infrastructure was destroyed by advancing Union troops, supplies to these industries withered, with Tredegar finally halting cannon production only several weeks before the fall of the city on April 3, 1865.

While much of the city's industrial and financial district along the James River was destroyed in fires set by evacuating Confederate forces, remarkably Richmond began to rebuild itself almost immediately after the end of the Civil War. The years between 1865 and 1873 were a period of rapid growth across the nation, but also for Richmond industry in particular; surprising, given the dire straits the city faced after the war. Whereas 43 separate, large-scale manufacturing facilities existed in 1859, only 16 remained usable and intact in 1866. The evacuation fires destroyed at least 800 buildings, across 20 blocks, including carriage factories, two paper mills, and the offices of several prominent companies, such as those of the Old Dominion Iron and Nail Works. The city did indeed rebuild, but Richmond would never again reach the zenith of trade and industry it had enjoyed prior to the war.

While the nearby Confederate Arsenal was



Richmond
Cedar Works,
ca. 1891.
Courtesy of
VCU Libraries.

destroyed, Tredegar was largely unscathed. The Iron Works was able to resume peacetime operations quickly, much of its immediate business stemming from the need to restore Southern railroads destroyed during the war, including all five lines that led into Richmond. By 1869, railroads in and out of Richmond were rebuilt enough to allow for over 18,000,000 lbs. of freight to pass through the city's depots. Tredegar sold over 85,000 tons of railroad spikes, bar iron, and other products between 1868 and 1872. The Gallego Mills, along with the nearby Haxall Flour Mills, were destroyed in the evacuation fires, but were rapidly rebuilt and pressed back into production, with Gallego able to produce 1,500 barrels of flour a day by 1873. Richmond's tobacco factories also rebounded quickly, so much so that by 1870 nearly 4,000 workers (both white and former slaves) were employed in 38 tobacco factories across the city.

The primary source of motive power for many Richmond industries, the James River and Kanawha Canal, did not survive the war unscathed. Already in some ways outdated by the growing prominence of railroads before the

war and suffering the ravages of both Union attacks and natural disasters after, the canal was in many aspects a relic of the Old South. With commercial and passenger traffic steadily declining, the Richmond & Alleghany Railroad purchased the canal's interests. Formed in 1880 for the sole purpose of modernizing traffic along the canal route, the company counted among its board members such prestigious names as inventor Cyrus McCormick and Maine Senator James G. Blaine. Trade and transport along the waterway continued as the Richmond & Alleghany laid rails along the canal's towpath. Use of the canal for shipping and passenger services ended in 1881, when the 193-mile railroad linking Clifton Forge to Richmond was complete. Thankfully for Tredegar, Gallego, and other Richmond businesses, the Richmond & Alleghany purchased and continued to honor all waterpower rights held by its predecessor, ensuring the survival of Richmond's most prominent establishments.

The coal mines around Richmond once again succumbed to cheaper, more accessible, and better-burning anthracite coal from Pennsylvania and other states. In 1868, approximately

45,000 net tons of Midlothian coal was shipped out via the canal, as opposed to barely 7,000 a decade later. Large-scale mining lessened throughout the remainder of the nineteenth century, and only small, intermittent operations continued until the 1920s, when commercial coal mining in the area ceased.

1873, and Renewal

The financial Panic of 1873 brought a temporary slowdown to Richmond industry, with many businesses closing while others were forced into receivership. One of many catalysts behind the Panic was the overextension of railroads during the post-war boom years. When rail lines failed to produce profits, they defaulted on loans from financiers such as New York's Jay Cooke, which in turn resulted in the bankruptcy of many of the nation's most powerful financial institutions, crippling the entire American economy. The Tredegar Iron Works was particularly hurt by the Panic, due to its position as a major supplier to railroads, many of which had gone bankrupt without making good on payments for products already under construction. Tredegar was forced into receivership in 1876, with Joseph Reid Anderson assuming the reigns as receiver. Richmond's other two mainstays, flour and tobacco, actually continued to increase in production and sales, despite 1873. Tredegar was out from under receivership by 1880, and Richmond industry in general rebounded from the Panic rather quickly, when compared with other cities.

Iron and steel recovered from the Panic at a remarkable rate. In 1880, Virginia held seventeenth place nationwide in the production of iron and steel products; by 1900, it was fifth in the nation, an increase of over 1,500%. There was optimism in the South (and some trepidation in the North) regarding the popular prediction at the time that, by the turn of the century, states of the former Confederacy could very well be the leading producers of iron and steel in the nation, with Virginia and Alabama at the forefront. The Old Dominion Iron and Nail Works constructed, in October 1887, the third Bessemer steel works in the entire South at its plant on Belle Isle, a modernization that helped make it the largest nail works in the region. Over 100 nail machines operated on the island alongside the two 3-ton Bessemer converters by 1890, and the entire plant was powered by a combination of water power and excess steam from the

site's 20 puddling furnaces. In 1894, the first tin plate mill in the South was established at the Nail Works, and by 1898 the number of nail machines had risen to 137, with the entire site capable of producing 300,000 kegs of iron and steel nails and spikes per year.

Richmond's flour mills, although never again reaching their pre-war levels, had rallied to the point that by 1890, the reconstructed Gallego, Haxall and Dunlop Mills were capable of collectively producing approximately 3,500 barrels of flour a day. Tobacco was a product that seemed to have no zenith as far as demand was concerned. There were an estimated 8,800 employees working in 120 tobacco manufacturing factories across the city by 1891, much of it along Richmond's famed "Tobacco Row," along East Cary Street at the foot of Shockoe Hill. Municipal and infrastructural augmentations were also a central topic in political and public discourse; the city gasworks and waterworks received much-needed upgrades in the 1870s and 1880s, and in 1879 the third telephone exchange in the nation opened in Richmond.

Diversification

The remaining years of the nineteenth century witnessed a return to prosperity and optimism for Richmond and the nation at large. Part of Richmond's prosperity in these years was owed to the emergence of many new industrial efforts that began before the Panic and survived. In 1871, 89% of Richmond's industrial output came from the collective efforts of tobacco manufacture, flour milling, and ironmaking; within 20 years, that percentage was nearly halved. Food, furniture, paper, transportation, and other endeavors enhanced the diversity of Richmond industries in the late nineteenth and early twentieth centuries.

In the summer of 1865, Alexander Delaney, formerly a locomotive machinist at Tredegar, joined the Metropolitan Iron Works, a small venture co-founded by former Tredegar workers William E. Tanner and Jacob Otto Ehbets, a native of Germany who had aided in the construction of the ironclad CSS Virginia. The firm eventually renamed itself the Tanner & Delaney Engine Company following Ehbets' departure. After several fires at its original site not far from Tredegar, the company built a massive complex at the northern end of Seventh Street. The new facility, shaped in the form of a giant "E," featured a

three-story office building; a 43 x 300-foot erecting shop; and boiler and machine shops measuring 66 x 196 feet each. An immense new foundry, as well as two water towers, a pattern storage shop, a bronze foundry, and a blacksmith shop, complimented the site. Following financial troubles that necessitated new management, Tanner & Delaney was rechristened The Richmond Locomotive and Machine Works in 1887, with first William R. Trigg, and then Richmond newspaper magnate Joseph Bryan, as president. By 1900, the company employed 2,000 at peak times, and was capable of producing 250 locomotive engines a year.

In 1868, Richmonder William Henry Parrish and 20 workmen began operating a single wood-working lathe in the remains of the Confederacy's infamous Libbie Prison. These humble beginnings led to the formation of the Richmond Cedar Works which, by the turn of the century, operated in a colossal facility, the largest woodworking plant on Earth at the time (over 12 acres) and employed 1,200-1,500 workmen, near Rockett's Landing in eastern Richmond.

Mann Satterwhite Valentine II, son of a prominent Richmond dry goods salesman, founded a company in 1871 that specialized in a unique form of liquid beef extract that could be used in both food preparation and by itself as a sort of "protein tonic." By 1877, the Valentine Meat Juice Company had erected a three-story plant at the corner of Sixth and Cary Streets, to produce even greater volumes of the meat juice that was hailed across the nation and around the globe, with the royal households of the United Kingdom, Russia, Japan, and other nations singing its praises.

Edward P. Thaw and several other investors founded the Albemarle Paper Manufacturing Company in February 1887, on a spot just below Hollywood Cemetery. Making use of waterpower from the James River and Kanawha Canal, the Hollywood Mill opened in 1888, utilizing an 88-inch Fourdrinier that produced more than 680,000 lbs. of blotting paper after its first year in operation. An initial group of 17 employees grew to 40 by 1890 as the company's fortunes flourished.

The horse-driven streetcars that had serviced Richmond since before the Civil War were joined in the Spring of 1888 by electric trolleys—the

first successful, commercial enterprise of such in the world. Richmonder A. Langstaff Johnson constructed the trolleys as designed by system engineer Frank J. Sprague of New York, under the auspices of the Richmond Union Passenger Railway. The service allowed for electric trolley travel across the city, from Church Hill in the east to several points west of Capitol Square, and a multitude of stops in-between. Sprague went on to design Boston's subway system, the first in the nation.

Lewis Ginter, a former Major in the Confederate Army who ran a small general goods store in Richmond before the war, returned to the city following a brief banking career in New York City – a career cut short by the Panic of 1873. Ginter and partner John F. Allen formed a company dedicated to producing one of the newest and most popular tobacco products of the time – cigarettes. Allen & Ginter's flagship brand, "Richmond Gems," produced at their factory at Seventh and Cary Street, became a sensation across the country and around the world, with sales offices established in Britain and continental Europe. In 1890, several leading tobacco manufacturers, in an effort to dominate the national and international trade, combined to form the American Tobacco Company, with Ginter's establishment operating as the Richmond branch of the larger firm.

A New Century, and a World at War

In 1900, with a population of 85,050, Richmond was the primary recipient of all industrial capital invested in the Commonwealth of Virginia. In 1901, the Richmond Locomotive Works merged with six other locomotive shops across the country (and one in Canada) to form the American Locomotive Company (ALCO). Headquartered in New York at the former site of the Schenectady Locomotive Engine Works, ALCO's primary purpose was to create a competitor capable of challenging Philadelphia's Baldwin Locomotive Company, the largest producer of locomotive engines in the nation at the time. Of the 4,500 locomotives constructed at the site, between the 1887 inception of the Richmond Locomotive Works and the closing of ALCO's Richmond branch in 1927, several engines of historical note were produced. In 1900, the Richmond Locomotive and Machine Works completed work on a wood-burning, 4-6-0 engine, serial number H2-293, that was sold to the Finnish State Railway. This engine carried Vladimir Lenin back

to St. Petersburg on the eve of the Revolution in September 1917. H2-293 is still on display in St. Petersburg's Finland Station. In 1926, Richmond's ALCO branch constructed Southern Railway 1401, a locomotive that led President Franklin Roosevelt's funeral train from Washington to his final resting place in Hyde Park, New York, and remains on permanent display at the Smithsonian Institution's National Museum of American History in Washington, DC.

Automobile manufacturing spread to many cities across the country following the resounding success of Henry Ford's enterprise in Detroit, and Richmond was no exception. Approximately 2,500 automobiles were produced by the Kline Kar Company at a newly-constructed site on the Boulevard near the western limits of the city, between 1912 and 1923. Several blocks away, the Richmond Iron Works Corporation, incorporated in 1911, produced several automobiles christened "The Virginian," before shuttering the following year.

As Europe marched towards world war, metal-working firms such as the Tredegar Iron Works, the Old Dominion Iron and Nail Works, and Richmond's ALCO branch, began accepting government contracts to produce shot and shell for the Army and Navy, as early as 1913. The E. I. du Pont de Nemours (Dupont) Company, in 1918, opened an extensive rayon-manufacturing complex in Chesterfield County. As America's participation in World War I was relatively brief, few industries in Richmond were dependent solely on a war economy. The Tredegar Iron Works was one of the few exceptions, their portfolio increasingly dependent on munitions contracts as more of their competitors diversified into steel manufacture. Industries with largely domestic, peacetime applications continued to flourish after the war. Albemarle Paper Manufacturing expanded its operations in 1919, purchasing the former Dixie Paper Mill's plant on Brown's Island. The mill's 72-inch Fourdrinier produced blotting and book papers, primarily, later installing larger Fourdriniers dedicated to government orders for envelopes. In 1925, a third Albemarle facility, the Riverside Mill, was constructed to produce products ranging from book stock to mimeograph paper using a 94-inch Fourdrinier. The Great Depression did not affect Richmond's industrial volume as detrimentally as it did other localities. Richmond's industrial output actually rose 59% during the Depression, while the national average as a whole dropped nearly 17%.



One reason for this was the size of Richmond's tobacco industry, a pleasure commodity that, even at the deepest levels of the Depression, experienced growth. Other Richmond industries actually benefited from the Depression in some ways, producing items that served as cheaper substitutes for more expensive products, such as Dupont's rayon displacing much-pricier silk. On the eve of World War II, Richmond boasted over 330 individual manufacturing facilities of varying size, ranging from the 23 acre complex at Tredegar, to small operations such as blacksmiths and shoe-makers. 1939 ended with more than \$373 million in manufactured goods produced within the city limits that year alone. A significant benefit to Richmond was that no new industries were created solely as a result of the war; rather, Richmond's existing industries engaged in the war economy, perhaps having to, at most, alter production methods or enlarge their workforce to meet quotas. Another benefit was the increased workforce the city gained following an annexation of surrounding land in 1942 that elevated Richmond to about 40 square miles in size and raised the city's population to over 208,000.

Tobacco remained supreme in Richmond industry, with the city's factories producing over 71 million cigarettes in 1941 alone, one-third of the nation's total number of cigarettes that year. Albemarle Paper Manufacturing's three plants led Richmond's second largest industry, that of paper and publishing products. Dupont continued to produce rayon at its 1918 Chesterfield plant; in 1929 a second Dupont facility opened in

Richmond from Hollywood Cemetery, 1902. In view are the James River and Kanawha Canal, the Chesapeake & Ohio Railroad along the tow path, and the smokestacks of Tredegar Iron Works. Courtesy of the Library of Congress.

Richmond, employing 600 workers and dedicated to the production of both rayon and cellophane. With the advent of World War II, DuPont became chief supplier of cellophane to the military, and employment at the company's second plant surged to approximately 4,450 during the war years. Tredegar Iron Works rebounded with government orders for practice shot and shell. The Old Dominion Iron and Nail Works used its Bessemer convertors and rolling mills to produce vital materials for the armed forces, particularly components used in American tanks.

Many diverse Richmond industries also contributed to the war effort. The Liphart Steel Company produced components for American aircraft carriers and other vessels. The Crawford Manufacturing Company in south Richmond (formerly Manchester, annexed by Richmond in 1910) deviated from its regular production of domestic textiles to fabricate flak suits and other types of troop armor. The Concrete Pipe and Products Company, founded 1925, delivered concrete anchors to the Navy. Even inmates at the State Penitentiary helped provide uniforms for the Coast Guard. Kingan & Company, a worldwide meatpacking company that opened its first Richmond branch in the early 1880s, spent \$400,000 to cover increased production of its canned ham and bacon products during the war. The defunct plant of the Richmond Car Works, a subsidiary interest of the Pullman-Standard Car Manufacturing Company, was purchased outright by the United States Navy in 1942 with the aim of aiding in warship construction. Despite occasional low-points, such as the April 1942 machinery explosion at Albemarle Paper's Hollywood Mill which resulted in the deaths of 8 workers, and the occasional unfounded rumors questioning the loyalty of the German-American proprietors of the Nolde Bakery, a Church Hill mainstay since 1892, the war years were generally beneficial to the nearly 39,000 Richmonders employed in manufacturing, much of that labor dedicated to the war effort. Between 1939 and 1946, the value of products manufactured in Richmond more than doubled, from \$373 to \$800 million.

Peacetime, and a Shifting Industrial Landscape

Post-war, many of Richmond's traditional firms either closed or underwent significant changes, just as new industries began to assert themselves. After 120 years in operation,

Tredegar Iron Works finally closed in 1957, a victim of both its failure to convert to steel production, and its inability to keep pace with the technological demands of government munitions contracts during the Cold War. Much of the company's machinery was moved to the south side of the James River, and a successor Tredegar Company, producing structural steel as well as the company's trademark iron spikes, operated well into the 1980s. Many other, smaller ironworks around the city began to close in the 1970s, such as the Old Dominion Iron and Nail Works, in 1972. Much of the Richmond iron industry came to an end due to an inability to meet pollution limits imposed by the newly-formed Environmental Protection Agency. The sprawling Tredegar complex itself was purchased by the Albemarle Paper Manufacturing Company, with the intent of using the former ironworks to link its Hollywood and Riverside Mills with the facility on Brown's Island. By 1962, Albemarle operated a number of subsidiary firms across several states, with a combined workforce of 2,300 and sales worth approximately \$45,000,000. That same year, Albemarle purchased the Ethyl Corporation of Pennsylvania for \$200,000,000. Renaming itself Ethyl soon after, the company shut down its Richmond mills as its focus began to shift from paper to chemicals, plastics, and petroleum additives.

E. Claiborne Robins, a young druggist who had taken over his father's small pharmacy in 1936, had built, by 1963, a pharmaceutical juggernaut with both manufacturing plants and research offices in Richmond, and profits of \$50 million, thanks in part to several popular medicines it developed, including Dimetane and Robitussin. By 1974, the profits of the A.H. Robins Company (named for his grandfather, Albert Hartley Robins) had soared to \$200 million. A significant portion of the city's economy came to be dependent not on manufacturers but rather merchandisers, with Richmond-based retailers such as Miller and Rhoads (1885) and Thalhimers (1842) establishing flagship stores in Richmond and expanding operations across the state, and in the case of Best Products (founded 1957), across the nation. Some new industrial facilities were built, including the massive, \$200 million Philip Morris cigarette factory on Commerce Road in 1973. More than 4,000 of Richmond's over 9,000 tobacco workers at the time were employed at this site



alone. Many national companies did not build plants in Richmond, but rather chose the city as the home for their corporate headquarters; such firms included the Reynolds Metals Company, Seaboard Coast Lines, the Ethyl Corporation, and Overnite Transportation.

Richmond, Today

The latter years of the twentieth century and the first decades of the twenty-first have witnessed unique changes and augmentations to Richmond industry. No longer the industrial hub of the South it once was, Richmond still boasts a significant number of industrial facilities, old and new. As of 2018, over 450 manufacturing companies call Richmond home, more than 50 of those belonging to the metallurgic industries, including Liphart Steel and Argus Steel Products (founded 1970). The O.K. Foundry (founded in 1911) still operates in south Richmond and is one of the area's leading fabricators of ornamental and decorative ironwork. Philip Morris still operates its 2 million-square foot Commerce Road facility (the company's sole cigarette manufacturing plant), capable of producing 600 million cigarettes a day. Altria (the parent company of Philip Morris until 2008) has maintained its corporate headquarters in the Richmond area since 2004. That same year, The Ethyl Corporation rebranded itself as New Market Corporation, and the firm has established a substantial research and development complex adjacent to its corporate headquarters on Gamble's Hill, overlooking the former Tredegar Iron Works. In the city where beer was first sold in cans (Krueger's Cream Ale and Krueger's Finest Beer in 1935), Richmond's craft beer industry has exploded in the last two decades, with no less than 30 craft breweries operating

in the city as of 2018. This number, which has placed Richmond among the highest levels of craft breweries per capita in the United States, includes many small, locally-founded establishments, as well as national brewers such as Stone Brewing, which finished constructing a brewery and taproom in eastern Richmond in 2016.

Perhaps one of the most interesting aspects of Richmond's industrial heritage in the twenty-first century is the new life that many of the city's historic manufacturing facilities have been given. Long abandoned industrial sites have been renovated and now house everything from movie theatres to condominiums, restaurants, and office complexes. The former Tredegar Iron Works has been resurrected as a tourist attraction, hosting museums and interpretive exhibits detailing the site's past. It is one of the city's most visited and popular areas, along with public parks located on nearby Brown's Island and Belle Isle, both former sites of heavy industry. Industry still exists and thrives in Richmond and, fittingly, this tradition survives side-by-side with the remembrances and remnants of the city's great industrial past. Reminders of Richmond's industrial heritage, which for the most part have not been torn down and discarded, but rather reinvigorated and rebuilt, live alongside and are recognized as an integral part of both Richmond's past and its posterity.

Richmond's skyline today. Courtesy Ben Schumin - Wikipedia Commons.

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TOUR SITES

TOUR SITES

T1 - THE UNIVERSITY OF VIRGINIA

ANN L. MILLER



The Rotunda / Academical Village

The original portion of the University of Virginia, the central grounds consisting of the Rotunda and the adjacent structures, are a UNESCO World Heritage site (along with Thomas Jefferson's nearby plantation home, Monticello). Designed by the University's founder, Thomas Jefferson, the Rotunda is the centerpiece of Jefferson's concept of an "Academical Village" in which students and faculty would live and study alongside one another. Modeled after the Pantheon in Rome, the Rotunda was conceived to house the library and to be flanked by faculty pavilions and student rooms.

The University was established in 1819. Jefferson presented his plans for the Rotunda to the Board of Visitors in 1821. He used detailed measurements of the Roman Pantheon to guide his design: the Rotunda is half the scale of the Pantheon, being 77 feet in height and in diameter of the dome. As Jefferson noted, "being half that of the Pantheon and consequently

one fourth in area, and one eighth in volume." The Rotunda was still under construction when Jefferson died in 1826; final construction took several more years.

Dominated by the Rotunda on the north, the Academical Village followed a unique U-shaped plan. South of the Rotunda are lines of flanking pavilions (five on either side, originally serving as faculty residences and classrooms), interspersed with student rooms, with a central terraced grassy court known as the "Lawn". All buildings are of brick, and are visually united by colonnades. Each pavilion is different in design, to illustrate diverse architectural elements, styles, and Classical precedents. The concept and design of the original structures reflect the influence of Thomas Jefferson, a number of his architectural correspondents such as Benjamin Henry Latrobe and Dr. William Thornton, and master builders chosen by Jefferson. To the rear of the pavilions are walled gardens with brick serpentine walls, and to the rear of the gardens

The Rotunda, with the Lawn in the foreground, formed the centerpiece of Thomas Jefferson's Academical Village at the University of Virginia. HABS VA-193-1.



Leander McCormick Observatory (top).

A serpentine wall (right) encloses one of the pavilion gardens behind the Lawn. HABS VA-193-D-1.



are “ranges” containing “hotels” (buildings with dining, gathering, and service areas, along with additional student rooms). Originally there were 108 student rooms: 54 on the Lawn, and 27 on each of the adjacent Ranges.

Additions over the years enlarged the pavilions and other structures, including the Rotunda. Electric lights were installed in University buildings in 1888. It was probably faulty wiring in the 1850s annex to the Rotunda that caused

the disastrous 1895 fire that nearly destroyed the Rotunda structure. Despite the dynamiting of the connection between the buildings, the Rotunda was gutted. The New York architectural firm of McKim, Mead, and White was hired to rebuild the Rotunda and to create new academic buildings to compensate for the loss of the annex. Stanford White's design for the rehabilitation included various changes from the Jeffersonian original. White's plans also included central heating and a mechanized ventilation system (in the final design, the central heat was retained, although the ventilation system was eliminated because of cost). The Board of Visitors also insisted that the rebuilt Rotunda be constructed with fireproof materials, and White commissioned Rafael Guastavino to create a vault of clay tiles for the interior structure of the dome. White also designed three new academic buildings at the base (south end) of the Lawn opposite the Rotunda. This construction closed off the southern vista which had previously been open. The creation of this building group enclosed the Lawn and set its dimensions: subsequent development of the University has occurred outside of the boundaries of the Academical Village.

A restoration of the Rotunda was undertaken in the 1970s, but the materials and systems were showing their age by the early twenty-first century. In 2012-2016, the structure underwent a state-of-the-art \$50 million restoration project, which stabilized the structure, allowed for much-needed new systems, expanded the building's use by students, and respected many of the original design intentions. In the process, considerable evidence of earlier construction practices, including debris from the 1895 fire containing early roofing materials, was uncovered. This evidence has allowed a fuller understanding of the construction and evolution of the Rotunda. In addition, ongoing research, archaeology, and restoration work on other original buildings is producing an increasingly more complete (and complex) view of the University's history, including building practices and appearances, early water systems, and information on labor and domestic support staffing, both slave and free.

Slavery at UVA

From its founding until the end of the Civil War, slaves, and some free blacks, performed the majority of support work (both domestic chores

and manual labor) at the University. Some slaves were hired from local owners; others were owned by faculty members or their families, and in some cases by the University. In contrast to many other Virginia colleges, students were not allowed to bring personal slaves. Work done by slaves at the University included building construction (particularly during the early years), cutting wood and making fires, cooking, cleaning, laundry, gardening, and grounds work. Other slaves opened buildings and were responsible for the heating and cleaning of lecture rooms and student living areas. Slave housing included basement rooms in pavilions and hotels, rooms in separate buildings, and, until 1834, some ground floor rooms in the Rotunda itself. After emancipation, some of the previously enslaved workers, as well as other blacks, continued to work at the University, although their living quarters probably were relocated to communities near the University. Documentary research and archaeology are continuing to uncover the story of these individuals who made possible the operation of the University.

Other Structures at UVA

Other items of interest at UVA that we hope to make part of the tour include examples of

Guastivino tiling, a functioning 1880s Observatory, and a striking 1960s sports arena. The University retains original plans and documents for many different structures, technologies, and time periods, and we hope to have images of these available as well.

Both the 1890s rehabilitation of the Rotunda and Old Cabell Hall (one of the buildings on the south lawn designed by Stanford White in the late 1890s) included Guastivino tiling for fireproofing purposes. The still-functioning McCormick Observatory (dedicated 1885) retains its buttressed walls on the outside, the mount and clock mechanism for the telescope, and its rotating dome roof. Its 45-foot dome and refracting telescope were the largest in the world at the time of the dedication. In addition to the two nineteenth century round buildings (the Rotunda and the Observatory), UVA is also home to a modern round structure as well: University Hall (familiarily called U-Hall). This 8,457-seat sports arena, with a pre-tensioned torsional ring supporting the entire structure, was opened in 1965 and was the home of the Virginia Cavaliers basketball team until 2006.

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T1 - THE BLUE RIDGE TUNNEL

ANN L. MILLER



East portal of the 1858 Blue Ridge Tunnel (at right in above photo). The C&O Railway constructed the modern tunnel at left in 1944. HAER-VA-5-1, Jack Boucher photographer, 1971.

The Blue Ridge Tunnel (a.k.a. Crozet's Tunnel) is a major mid-19th century engineering accomplishment. Constructed from 1850-1858, the railroad tunnel is 4,264 feet long, 16 feet wide, and 20 feet high, located 500 feet beneath Rockfish Gap in the Blue Ridge Mountains.

French immigrant Claudius Crozet (1789-1864), a graduate of the École Polytechnique in Paris, designed the Blue Ridge Tunnel. Among his many accomplishments, Crozet was a professor of engineering at the U. S. Military Academy in West Point, helped found the Virginia Military Institute, and served as its first president of the Board of Visitors. He twice served as chief engineer for the Board of Public Works of the Commonwealth of Virginia (1823-1831 and 1838-1843).

In 1849, Crozet was hired to build the Blue Ridge Railroad. This 17-mile route, stretching from western Albemarle County across the mountains into Nelson and Augusta counties was a section of a proposed route running

approximately 420 miles between the capital city of Richmond and the Ohio River (then the western boundary of Virginia, at Huntington). Crozet's plan for the Blue Ridge Railroad included the nearly one mile-long Blue Ridge Tunnel between Nelson and Augusta Counties, as well as three much shorter tunnels, embankments across deep hollows, and numerous culverts in Albemarle County. Although Crozet initially predicted that the Blue Ridge Tunnel would be finished by 1853, the unexpected hardness of the rock, especially the greenstone on the east side, turned out to be a formidable problem.

Of the approximately 30 contractors involved with the Blue Ridge Railroad, the majority of the contracting work for the railroad and the tunnel was organized by Irish immigrants John Kelly and John Larguey, operating as Kelly and Company. The partners had formerly worked as contractors on the Baltimore and Ohio Railroad in Maryland, and they brought with them a number of Irish immigrant laborers and their extended

families. The majority of these laborers were from County Cork, Ireland, one of the areas hardest hit during that country's potato blight and attendant Great Hunger of 1845-1852. Hundreds of Irish men, as well as 65 boys, were employed on the Blue Ridge Railroad, many of them on the Blue Ridge Tunnel. They worked at a variety of tasks, from blasting and drilling to clearing rock and other work. These laborers and their family members lived in various rental houses, bunkhouses, shanties and camps located, with work buildings, along the route of the railroad and around the tunnel sites.

The grueling work of blasting the Blue Ridge Tunnel and the other tunnels, done with only hand tools and black gunpowder in those pre-dynamite days, was underway by March 1850. The rate of progress in the Blue Ridge Tunnel varied from year to year. In 1851, the Irish labor force advanced from 19 feet a month on the east side to 72 feet on the west.

In addition to the Irish laborers, some 50 slaves were hired by Crozet to work along the line. They repaired grades, helped build culverts, cleared flooded ditches, broke stone into ballast, and otherwise readied the Blue Ridge Railroad for traffic. In 1854, the contract for the 33 black men working at the Blue Ridge Tunnel specified that they would not be allowed near the dangerous blasting. Instead, they worked as blacksmiths or floorers who cleared rock debris from the passage after explosions.

The Irish immigrant laborers perforated the Blue Ridge Tunnel on December 29, 1856, meeting within 6 inches of Crozet's carefully-engineered alignment. It took an additional 16 months before laborers finished blasting, laying tracks,

and lining some sections of the Blue Ridge Tunnel with bricks. Disgusted by repeated criticism of the tunnel project, Crozet accepted employment to construct an aqueduct for Washington, D C, in December 1857. He formally resigned from the tunnel project in January 1858.

The Blue Ridge Tunnel opened to traffic on April 13, 1858. At the time, it was the longest railroad tunnel in North America. The initially estimated cost of construction was approximately \$200,000. The final, actual cost was over twice that: \$488,000 in 1858 dollars. Though Claudius Crozet was not among the dignitaries who rode the first train through the passage, his professional expertise and visionary leadership were essential to the Blue Ridge Railroad and other lines built across Virginia in the 1840s and 1850s.

The Virginia Central Railroad assumed control of the Blue Ridge Railroad after the line opened in April 1858. State budget cuts beginning in 1855 slowed construction to the Ohio River, and the Civil War halted this work for the duration. The Virginia Central merged with the Covington and Ohio in 1868 to become the Chesapeake and Ohio Railway. In 1873, the route between Richmond and the Ohio River was completed at last. In 1944, a more modern railroad tunnel, located nearby, superseded the original Blue Ridge Tunnel and its railroad transportation use ceased. It is now in the process of being converted to pedestrian use as part of a regional greenway trail system.

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T2 - RICHMOND WATERFRONT WALKING TOUR

TONY OPPERMAN



Fall of Richmond, April 2, 1865, showing evacuation on Mayo Bridge. Currier & Ives, Library of Congress.

This walking tour will feature downtown Richmond's waterfront at the falls of the James River, historically the reason for the City's existence and its vibrant industrial and transportation history. The sites along the tour include canals, railroads, dams, bridges and factories – most dating from the nineteenth and early twentieth centuries. The tour length is about 3.5 miles and will cover both banks of the James River with duration of approximately three hours.

Beginning at the Omni Richmond Hotel on 12th Street, the tour will encounter the following sites along the river:

Canal Walk/Haxall Canal Built during the early nineteenth century for power generation, the Haxall Canal is separate from the nearby James River and Kanawha Canal which was used for navigation. The Haxall Canal continued to be used for hydroelectric power generation into the mid-twentieth century and now serves as the focus of a recreational trail.

Tidewater Lock This magnificent stone masonry lock structure was built in the early nineteenth century for the James River and Kanawha Canal, raising and lowering canal watercraft between the canal and the tidal James River.

James River and Kanawha Canal A remnant

section of the canal prism exists along the hillside above the Tredegar Iron Works, one of the few elements of the canal that remains visible in downtown Richmond. Originally conceived by George Washington, the canal was built during the early nineteenth century and remained in use until much of its right-of way was absorbed by urban redevelopment and the Chesapeake and Ohio Railroad in the late nineteenth century.

Chesapeake and Ohio Railroad Viaduct This elevated railway is part of viaduct three miles long, now carrying freight and coal trails for the CSX Corporation. Built in 1901, it continues to connect the coal fields of the Allegheny region to the international coal terminal in Newport News.

The Tredegar Iron Works (now part of the American Civil War Museum) was opened in 1837 and was one of Richmond's most notable industrial facilities, especially during the Civil War when it was the Confederacy's largest ironworks. For this tour, Tredegar illustrates the essential relationship between industry and the James River during the nineteenth and early twentieth century.

The T. Tyler Potterfield Pedestrian Bridge is a new element of Richmond's riverfront park system. It was completed in 2016 and constitutes an adaptive reuse/repurposing of an early twentieth century mechanical dam built to divert water into the Haxall Canal for hydroelectric generation. The use of the river has changed from industrial to recreational, and the Potterfield Bridge illustrates this transformation.

Richmond and Petersburg Railroad Bridge The masonry piers for the antebellum alignment of the Richmond and Petersburg Railroad are visible from many locations along the tour route. Built ca. 1838 by engineer Moncure Robinson as a Town lattice deck truss, the original bridge survived until April 1865, when it was burned by Confederate troops. On the south bank of the river, the abutment and piers have been repurposed for recreational use, functioning both as an overlook and as a rock-climbing feature.

Though not historic, the **James River Floodwall**, completed by the U.S. Army Corps of Engineers

in the 1990s, is part of Richmond's riverfront park system and carries the tour's trail along the south bank. It also accommodates the dam and head gate for the historic Manchester Canal, both visible from the Floodwall.

Manchester Canal Like the Haxall Canal on the north bank of the river, the Manchester Canal was constructed in the early nineteenth century for power generation and along its banks some of the industrial head gates are visible. The dam in the James River supplying water to the Manchester Canal also is visible and passes through the Floodwall.

Richmond and Danville Railroad Bridge Now operated by the Norfolk Southern Corporation, the Richmond and Danville Railroad was one of the evacuation routes for Confederate forces and officials when Richmond fell to Union forces in April 1865. Originally a multi-span covered through truss, today it's carried across the James River over Mayo Island on an early twentieth century bridge with seven Warren truss spans and passes through the Floodwall.

Mayo Bridge This early twentieth century concrete arch bridge, completed in 1913, incorporates aesthetic parapets and light fixtures, and is on the same alignment of the original Mayo Bridge across the James River that was built in the late eighteenth century. The original Mayo Bridge was burned by Confederate forces during the evacuation of Richmond in 1865, and remains of the earlier bridge's masonry piers are visible from the twentieth century structure.

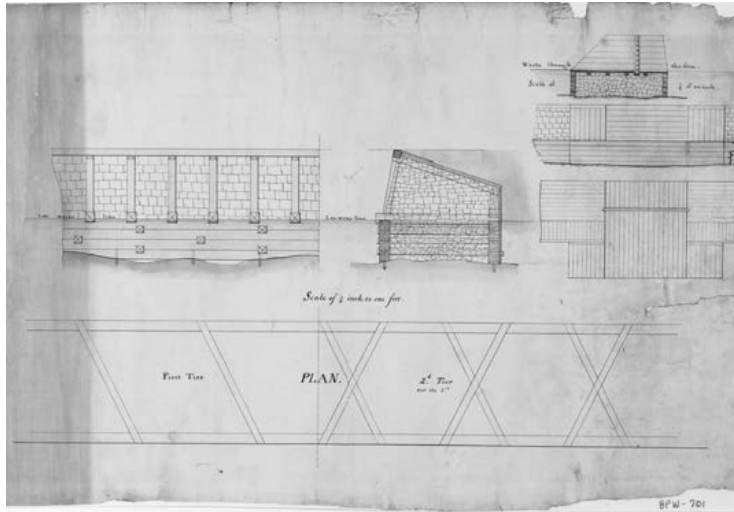


Pipeline Trail Also part of the riverfront park system, the Pipeline Trail consists of an elevated platform on a large steel drain pipe (early twentieth century) that carries run-off from city streets to a storage area. The most challenging rapids at the falls of the James River are adjacent to the Pipeline Trail, and the trail also affords wildlife viewing opportunities. Note that only a few participants can “walk the pipe” at a time, single-file.

Manchester Canal, HAER VA-44-11. Jet Lowe, photographer, 1986.

T3 - THE LIBRARY OF VIRGINIA

GREGG D. KIMBALL



Original engineering drawing for dam at Mayo Bridge, part of the Warwick Ship Canal. Courtesy of the Library of Virginia.

The Library of Virginia is one of the oldest cultural institutions in Virginia and exists to preserve and provide access to the state's incomparable printed and manuscript holdings. Established by statute in 1823, the Library's origins go back to the Colonial Council's library at the state house in Jamestown. Numerous volumes from this collection still reside in the Library. Originally serving as the library at the seat of government, the Library expanded its mission over the years to become the most comprehensive resource in the world for the study of Virginia history, culture, and government. The collection includes state archival records, private papers and manuscripts, maps, rare books, photographs, and much more. The Library provides broad access to these collections in our reading rooms and through digitization projects mounted on the website virginiamemory.com.

The records of industry and technology have always been an important part of the Library's collection. The records of Virginia's Board of Public Works (1816-1903) are rich in the details of the development of Virginia's internal improvements. Maps, plans, field surveys, and correspondence relating to canals, turnpikes, and railroads demonstrate the growth of the Commonwealth's transportation technology and document the state's topography. Prominent in the records is the work of famed French engineer Claudius Crozet who served as Virginia's principal engineer from 1823 to 1832 and later built a series of tunnels through the mountains

for the Blue Ridge Railroad Company. Other types of state records record the incorporation of every kind of industry and business, specifically the legislative petition collection and the State Corporation Commission records.

The Library's holdings also feature the private business records of companies large and small. Several railroad collections augment materials in the Board of Public Works collection and bring the story into the twentieth century. For example, the Chesapeake and Ohio Railway Company Records (1836-1943) are rich in maps and plans detailing rights of way and the expansion of the rail line. Likewise, the voluminous Tredegar Iron Company papers document the operations of the South's premier nineteenth century iron works. Tredegar's rolling mills, foundries, and machine shops became the heart of Confederate arms production during the Civil War, providing about half of the South's cannon production and famously rolling the iron plating for the CSS *Virginia*. The collection documents the mill's operations well into the twentieth century and includes correspondence, production records, and labor journals.

Supporting these manuscript holdings are rich stores of government reports, newspapers, maps, photographs, and other materials. The nearly one-million digitized pages of newspapers on the Virginia Chronicle portal provides access to articles on business and industrial developments from localities across the entire Commonwealth. For example, newspapers from Southwest Virginia—The Big Stone Gap Post, The Clinch Valley News, and others—provide a window into the development of the lumber and coal industries. Many other treasures await the researcher at the Library of Virginia. We hope you will visit us during the conference.

TOUR SITES

F1 - STRICKLAND MACHINE COMPANY

GREGG D. KIMBALL



In 1901, the journal *The Age of Steel* reported the birth of a new company: “the Strickland Machine Company, Richmond, Va., has been incorporated with a capital stock of \$10,000, for the manufacture and repair of all kinds of machinery. The incorporators of this company are Edward Whitlock, T. J. Walker, and Lee A. Whitlock.” Another period journal reported that the company would “make a specialty of making tobacco machinery,” which certainly was the intent of the founders. Ed Whitlock was the nephew of tobacco manufacturer Philip Whitlock, and Lee Whitlock was Philip’s young son. The elder Whitlock had built a prosperous tobacco company manufacturing cigars and cheroots, so prosperous that James B. “Buck” Duke’s American Tobacco Company bought him out in 1891. Whitlock remained in charge of the Whitlock branch, which became part of the

Lorillard Tobacco Company after the breakup of the American Tobacco trust.

The company’s original plant was located directly across from Richmond’s Tobacco Row on the 2300 block of East Main Street, and remained there until their recent move to 2400 Magnolia Court in Richmond’s Shockoe Valley. The company still bears the name of its first lead machinist and later vice-president Andrew C. Strickland, a native of Wake County, North Carolina. Strickland left the A. B. Cosby Machine Company to take his new post and led the works until his death in 1934. R. G. Harris, a long-time employee, took over the company after Strickland’s death. Over the years the company made and repaired machines and components for the railroad, defense, and tobacco industries, and built a strong reputation on the quality and

Original factory on East Main St., ca. 1909. Courtesy of Strickland Machine Company.

timeliness of its work in its machine shop and foundry.

Continually operating for over 100 years, Strickland has grown from a foundry and iron mill into one of the largest full service Computer Numeric Control (CNC) precision machine and fabrication facilities in Virginia. Today, under company president Matt McGee, Strickland's 60,000 sq. ft. facility allows for state-of-the-art machine and fabrication processes with overhead cranes rated up to ten tons. Strickland's

machine manufacturing "build to print" unit is one of the largest machine manufacturing operations in the Mid-Atlantic region, and one of only a few facilities able to offer such a wide range of services and able to handle both oversized and intricate projects.

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F1 - O.K. FOUNDRY

NATHAN VERNON MADISON

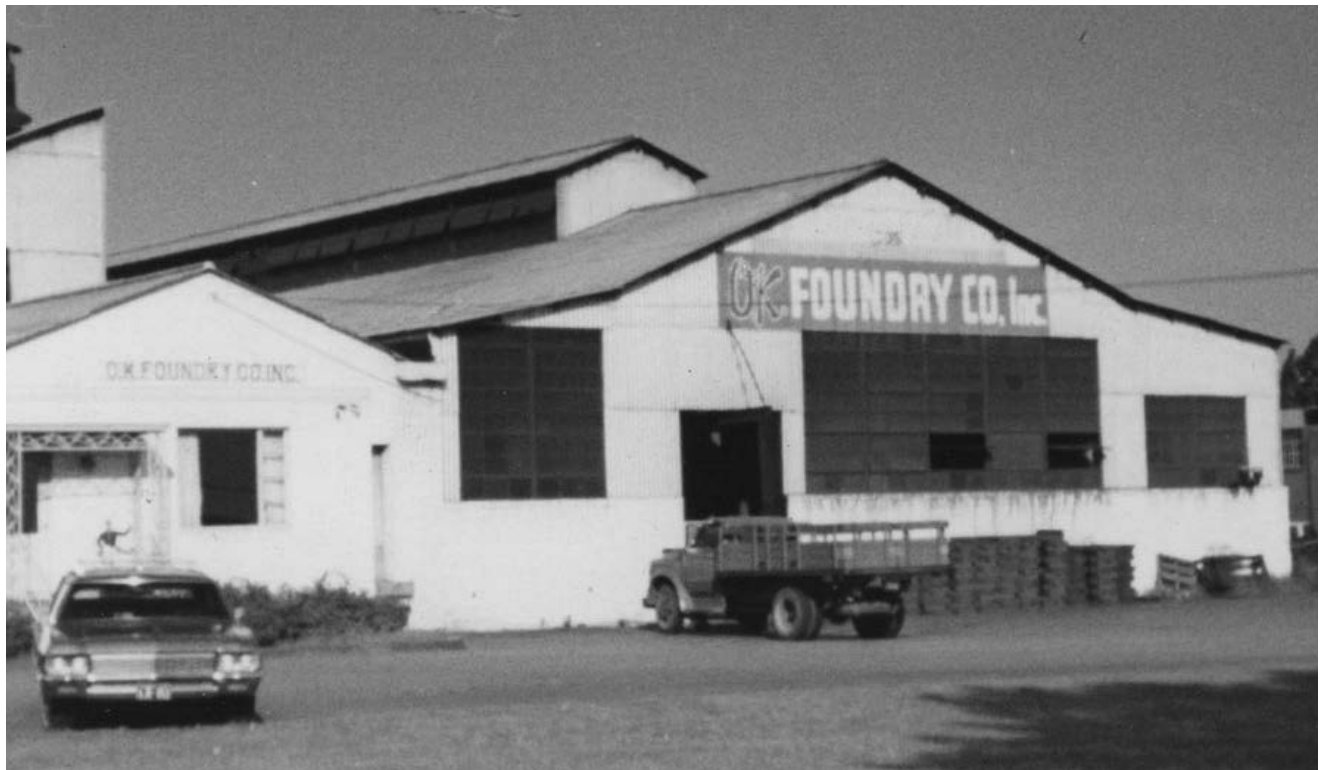


On September 7, 1918 the first cast of iron, 1,200 lbs. worth, was produced at the O.K. Foundry. Established the previous month by James O'Neil, Sr., James Goodwin, and E.P. Seifert, the foundry was built at a cost of \$5,000 along Hull Street, on Richmond's southside, formerly the independent city of Manchester which was annexed by Richmond in 1910. James O'Neil brought years of experience to the venture, having operated a small furnace of his own as early as 1912. This experience aided the firm in its inaugural years. Many of Richmond's principal industries, such as the American Locomotive Company (ALCO, the former Richmond Locomotive Works), the Southern Stove Works, and the American Tobacco Company, were among its earliest customers. O.K. fabri-

cated both machine parts for local industries' production lines, as well as components for final products. These included rolls, washers, and wheels for mill suppliers Stratton & Bragg of Petersburg; grates, furnace doors, and stove doors for Richmond Cedar Works and Cameron Stove Works; gear wheels and crankshafts for use in rolls at Standard Paper Manufacturing; and bases, wall plates, and post caps for the Richmond Structural Steel Company.

The company's fortunes continued to rise in succeeding years, necessitating an expansion. In November, 1947, O.K. Foundry began work on a new plant spread across two buildings that, when completed the following year, was six times larger than the previous facility, and

Pat O'Neil and workmen pouring molds at O.K. Foundry, ca. 1940. Courtesy of James O'Neil IV.



Above: The foundry's current plant, ca. 1970. Photos courtesy of James O'Neil IV.

At right: O.K. Foundry's original Hull Street building, under demolition in 1948.



more accessible to the James River and downtown Richmond. As in years past, O.K. Foundry benefited from its ability to concentrate efforts on custom products and specialty orders. The company proudly proclaimed in 1954, "Nothing is too small and few castings are too large for

the firm to produce." By the mid-1950s, O.K. also modified its casting process to make use of synthetic casting sands, which were far more economical and better suited to continuous casting than traditional sands. In July 1956, O.K. Foundry, now under the proprietorship of

O'Neil's sons, James, Jr. and E.P. O'Neil, reorganized its business structure and incorporated with an initial capitalization of \$185,000. E.P. O'Neil soon resigned from the company, leaving James O'Neil, Jr. in charge for the next twenty years.

In the 1960s, overhead sand droppers were installed to help facilitate the creation of green sand molds on the foundry floor. As was the case with many iron foundries in the mid-1970s, O.K. was censured by the Environmental Protection Agency (EPA) for the pollution produced by the company's top-loading cupola furnace, a longtime and dependable staple of the iron industry. In order to meet EPA demands, O.K. replaced its cupola in 1976 with an electric induction furnace manufactured by the Dixon Crucible Company of New Jersey. James O'Neil III succeeded his father upon the latter's death in 1976, and in 2006, nearly a century after his great-grandfather founded the company, James O'Neil IV assumed proprietorship of the family business. In the twenty-first century,

O.K. focused its business on the restoration of architectural iron, primarily fences, grates, and posts. Local patrons have included St. John's Church in Church Hill, Hollywood Cemetery, Virginia Commonwealth University (VCU), and Capitol Square. O.K. has also worked on restoration projects for the National Portrait Gallery in Washington, D.C. and Prospect Park in Brooklyn. As a sign of further diversification, a portion of the foundry has been set aside to host a cooperative effort between the company and VCU. Professors and their students are allowed to utilize the foundry's facilities and equipment to produce works of art in iron and bronze, providing burgeoning VCU artisans with metallurgic expertise once reserved for industrial endeavors alone.

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F1 & F2 - TOBACCO ROW / PHILIP MORRIS USA

CHRISTOPHER H. MARSTON, JOSHUA LEHURAY and GREGG KIMBALL

Tobacco has been one of the most important crops in Virginia since the seventeenth century. Most tobacco shipments left Virginia directly from plantation wharfs before the 1730 Warehouse Act, which designated the falls of the James River as one of forty locations in the colony of Virginia where inspectors graded tobacco. The Golden Leaf led to a thriving business culture in Virginia, and specifically in Richmond after it became the capital of the commonwealth in 1779. Numerous tobacco companies and factories sprang up by the mid-nineteenth century, each vying for an increased market share in the largest tobacco production market in the world by the 1840s. Due to the high demand for tobacco, companies built warehouses and processing facilities where purchasers could come to inspect the tobacco in the area of Richmond known as Shockoe Slip and Shockoe Bottom, convenient to the James River and Kanawha Canal, near the current day Omni Richmond Hotel. In the late nineteenth/early twentieth century, a section of Shockoe Bottom known as Tobacco Row emerged along Cary and Main Streets.

By the 1820s, a large amount of tobacco sales in Virginia were executed in Richmond's ware-

houses via a system of auctions run by official tobacco inspectors. By the end of the 1850s, Richmond had grown into the largest tobacco warehouse auctioning system in Virginia and North Carolina, with half of the tobacco grown between the two states sold there. In addition to warehousing, manufacturers built large factories employing as many as 150 hands in the late 1840s and 50s. Largely devoted to the production of plug chewing tobacco, these factories relied on enslaved labor as a work force. Industrialists owned some of their workers, but increasingly turned to a burgeoning slave hiring market for labor. A handful of two- to four-story antebellum tobacco factory buildings survive to this day, such as the William Grant Factory (1853), Myers Brothers Factory (1850), and the Turpin-Yarborough Tobacco Factory (1853, now known as the Pohlig Box Factory) on the 1900 and 2500 blocks of East Franklin Street. The Richmond Tobacco Exchange opened on May 26, 1858 allowing a large number of local Richmond warehouses to transport tobacco samples where merchants and buyers could examine and bid on them. The dramatic Evacuation Fires of April 2-3, 1865—set by retreating Confederates to destroy stores and arms—

The Turpin & Yarborough Tobacco Company constructed this factory in 1853. Converted to a paper box factory in 1909 by Pohlig Bros., it has been transformed into residential lofts. HABS VA-863-1.





destroyed Shockoe Slip and many downtown buildings west of Mayo's Bridge but left most of Shockoe Bottom and what is present day Tobacco Row intact.

Cigar, snuff, and plug tobacco production continued to lead the industry after the Civil War, but a fledgling competitor to their dominance began to appear. In 1875, the tobacco company of Allen & Ginter was formed in Richmond to make "apparently the first prepackaged cigarettes ever made" called Richmond Gems, which were hand-rolled by women. Cigarette production soon exploded in Richmond, with one-third of the world's cigarettes manufactured in its factories. By the mid-1880s, over 700 factories in Richmond were making 100 million cigarettes a year. Industry leaders also pioneered one of American business's greatest innovations: creating consumer demand versus merely meeting demand. The need for colorful and persuasive advertising and packaging drove the growth of allied Richmond industries including lithography and packaging. At some point, Carlton, L & M, Lucky Strike, Marlboro, Pall Mall, Tareyton, and other brands were manufactured in Richmond.

The new cigarette factories required larger structures for storage and production, and more

outside capital came into the industry. National mergers affected the tobacco industry, as the American Tobacco Company—controlled by James B. Duke (otherwise known as Buck)—absorbed several local concerns and a vast array of firms nationwide. Buck Duke's perfecting of James Bonsack's cigarette rolling machine and the resulting dramatic increases in production also fueled his company's dominance in the market. Government antitrust cases broke up the monopoly in 1911, and three of the "Big Four" companies that emerged from the litigation—American Tobacco, Liggett & Myers (formerly Allen & Ginter), and P. Lorillard—had manufacturing facilities on Richmond's Tobacco Row. A relative newcomer to the industry, Philip Morris, and a local firm, Larus and Brothers, also became part of the landscape.

Philip Morris & Co., Ltd. (incorporated in New York in 1919) moved into Richmond beginning in 1929, purchasing existing warehouses along Tobacco Row. Several tobacco warehouses and manufacturers located east of downtown, near rail lines and the riverfront, established in large multi-story timber and brick-clad bond warehouses, and fireproof concrete industrial buildings built in the 1880s to 1930s, all connected vertically by freight elevators. As late as the

The Philip Morris Leaf Storage Warehouse, constructed ca. 1883, became one of Philip Morris' facilities on Tobacco Row. HABS VA-849-3, Edward F. Heite, photographer, 1969.

1940s, 33% of the cigarettes produced in the United States came out of Tobacco Row's massive three- to six-story brick industrial buildings. In the 1920-1950s however, manufacturers introduced a new generation of high-speed cigarette production machinery, making many of the multi-story factories in Tobacco Row obsolete. Large tobacco companies began moving to the south side of the James, constructing newer single-story warehouses and high-speed cigarette manufacturing facilities arranged horizontally. Philip Morris assembled a large storage and production facility at Commerce and Stockton streets, and American Tobacco constructed an impressive Art Moderne-style factory called Model Tobacco in 1938-40. Likewise, stages of production that still employed hand labor, such as stemming (removing the stem from the leaf), were automated. A series of strikes among African American workers in the 1930s likely accelerated these changes.

A number of factors led to the gradual abandonment of Tobacco Row: regional industrial consolidation, declining cigarette consumption, changes in transportation, and modernization of production technology. P. Lorillard began leaving Richmond in 1962. Consolidated Cigar followed in 1969. Liggett & Myers closed its Allen & Ginter factory in 1970. Philip Morris moved all its operations to a modern new facility in the

Richmond suburbs by 1973. Once the American Tobacco Company closed its Lucky Strike plant in 1981, cigarette production on Richmond's Tobacco Row ceased to exist. Then, over a period of 25 years, developers and local businessmen invested over \$125 million to convert the former tobacco factories on East Cary Street into high-end residential lofts and commercial space. Subsidized by federal preservation tax credits, the major adaptive reuse project has transformed Tobacco Row into one of Richmond's trendiest neighborhoods.

Philip Morris USA Manufacturing Center
Although it left its aging facilities in the city of Richmond, Philip Morris stayed in the region, investing in modernization by creating a 200-acre campus for cigarette research and manufacturing on Commerce Road along I-95 South. Architect Ulrich Franzen designed the original Operations Center, which opened in 1964. Gordon Bunshaft of Skidmore, Owings and Merrill followed with the design for the 1.6 million square foot Manufacturing Center, where PM made their first cigarettes in 1973, with an output of 200 million/day. The square pylon showcasing various Philip Morris cigarette labels of Marlboro, Benson & Hedges, Merit, and Virginia Slims—visible from passing vehicles on I-95—was designed by advertising agency Chermayeff and Geismar.

American Tobacco Co.'s Model Tobacco factory (1938-40). Photo by Christopher Marston.





Altria Group became the parent company of Philip Morris in 2000, and moved its corporate headquarters from New York to Richmond in 2004. It spun off its international cigarette business into a separate company in 2008, making Philip Morris USA a domestic only company. In 2009, it closed its Carrabus County, NC facility, consolidating all of its production at its state-of-the-art Manufacturing Center. Philip Morris USA celebrated its 40th anniversary at the Commerce Road location in 2013, where half of all

the nation's cigarettes are produced. Its 2,000 employees produce 20,000 cigarettes a minute (600 million/day) in its super high-speed production machines (made by German company Hauni), making it the largest cigarette producing facility in the world.

Philip Morris' Manufacturing Center (below), opened south of Richmond in 1973. Courtesy of Philip Morris USA.

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F1 & S3- TREDEGAR IRON WORKS

NATHAN VERNON MADISON



Tredegar Iron Works, with a bridge to Brown's Island and the former Confederate Laboratory. Library of Congress, Alexander Gardner, photographer, 1865.

In 1837, the Virginia Foundry Company, a small iron works located on the banks of the James River, merged with the newly constructed Tredegar Forge and Rolling Mills. Francis Deane, founder and president of the Rolling Mills, contacted Rhys Davis, a Welsh ironmaster who had helped construct iron works across Europe, to request his expertise in designing the Richmond works. Named for the hometown of its Welsh superintendent, the newly-formed Tredegar Iron Works was one of the first vertically-integrated ironmaking establishments in the region. Pig iron produced in western counties was shipped along the James River and Kanawha Canal to Tredegar, where the foundry would melt it into castings, or prepare it for use in its puddling mills before being sent to the rolling mills. Coal for furnaces was readily accessible, thanks to the nearby Chesterfield and Midlothian coal mines, for decades the nation's single largest source of bituminous coal. Utilizing a head of 50 feet, Tredegar's various overshot waterwheels were powered via a single raceway from the

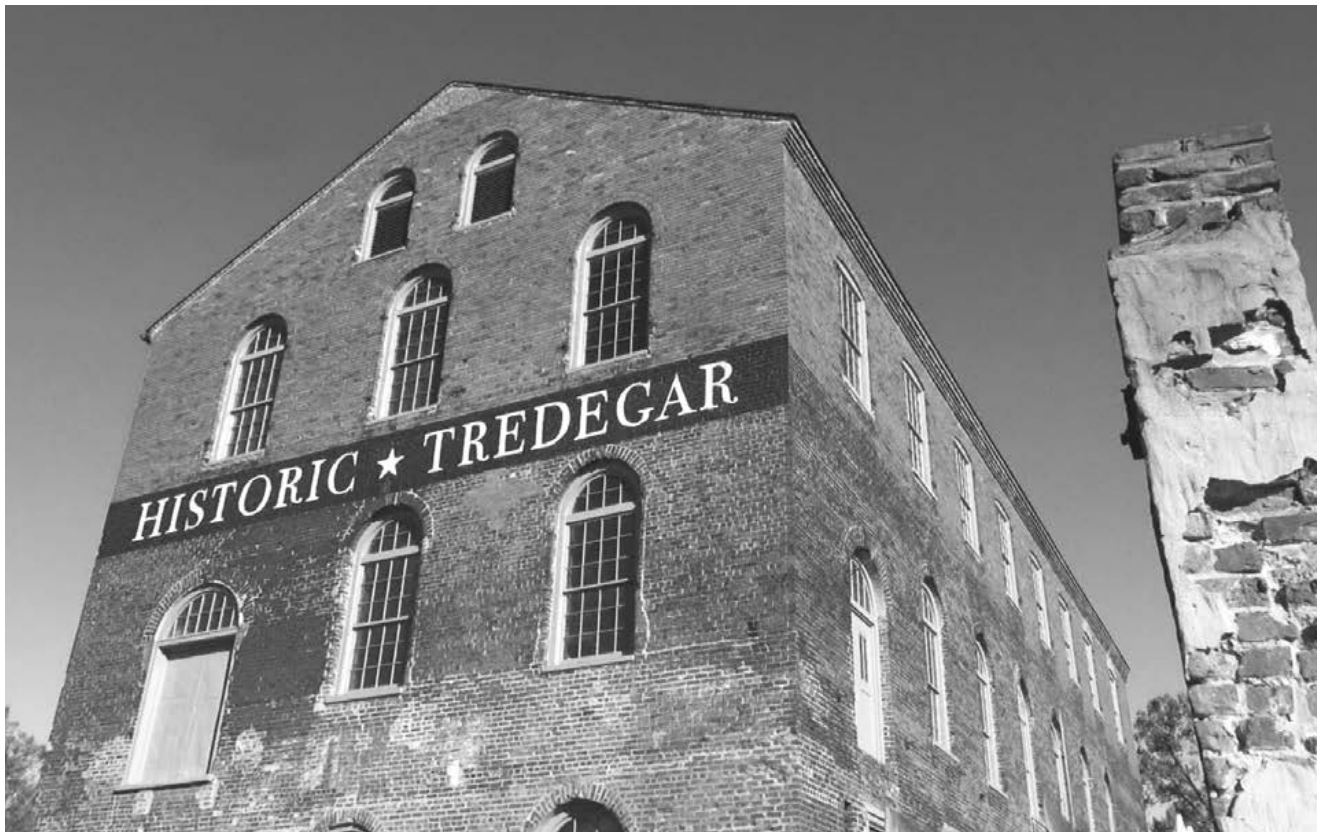
James River and Kanawha Canal, which ran along the works' northern boundary.

Initially, Tredegar served primarily local customers, providing tools and equipment for other manufacturing concerns. However, the company faced critical shortcomings almost as soon as it was founded. Poor managerial skills on the part of Deane, a nationwide economic recession in 1837, and construction on the canal in 1838 that halted waterpower for several weeks, all coalesced to create a situation that threatened to destroy the firm unless significant changes were undertaken. Deane was replaced as president by Nicholas Mills, a prominent Richmonder who operated several coal mines in the vicinity. In 1841, Joseph Reid Anderson, of Botetourt County, was hired as sales agent. Utilizing his connections as a West Point-trained engineer on the Shenandoah Turnpike project, Anderson turned the company's fortunes around, securing many lucrative customers and contracts. Anderson convinced Tredegar to invest in the manu-

facturing of cannons, and government orders quickly flowed into the firm. Anderson showed such managerial and organizational acumen that, in 1843, the shareholders allowed for the renting of the entire operation to Anderson, for \$8,000 a year. In 1849, Anderson bought Tredegar outright for \$125,000, and became sole proprietor and president of the firm. In the years that followed, Anderson recruited several partners and engineering experts to invest in, and help diversify, the Tredegar site. Additional foundries, machine shops, and mills were built. By 1857, sixty locomotives had been produced at Tredegar's three-story engine shop, many under the supervision of masterful locomotive engineers Jonathon Souther and Zerah Colburn. In 1859, Anderson purchased his partners' interests in Tredegar's operations, and once again consolidated all of Tredegar's operations under his individual control and renamed the venture J.R. Anderson & Company. That same year, Tredegar also absorbed the Armory Iron Works. Founded in 1845 and operating on the premises of the nearby Virginia Manufactory of Arms, the Armory Iron Works was managed by Dr. Robert Archer, Anderson's father-in-law, who was then given a senior position in the new company.

Anderson was a dedicated secessionist, and immediately volunteered for military service as soon as Virginia joined the Confederacy; granted the rank of General, Anderson was badly wounded in 1862 and, during his convalescence, was beseeched by Confederate President Jefferson Davis and General Robert E. Lee to return to Tredegar, where he could do far more to aid the Southern cause. During the Civil War, Tredegar served as the chief armorer to the Confederacy, supplying 1,099 bronze and cast iron cannons to Southern forces. Production ceased only several weeks before the fall of the city, after Union raids had destroyed the waterways and railroads vital to supplying the works with pig iron and fuel. It was at Tredegar that the iron-plating for the first ironclad, the C.S.S. Virginia, was rolled, after Anderson ordered his engineers to redesign the mills to allow for the rolling of two-inch thick plates. While a significant portion of Richmond was destroyed in the evacuation fires set by fleeing Confederates, Tredegar was spared major damage. It was back in operation first under Union control to help rebuild bridges across the James, and later under the guidance of General Joseph Reid Anderson, who received a pardon from President Johnson in September 1865.

View of Tredegar Iron Works today. Photo by Nathan Vernon Madison.



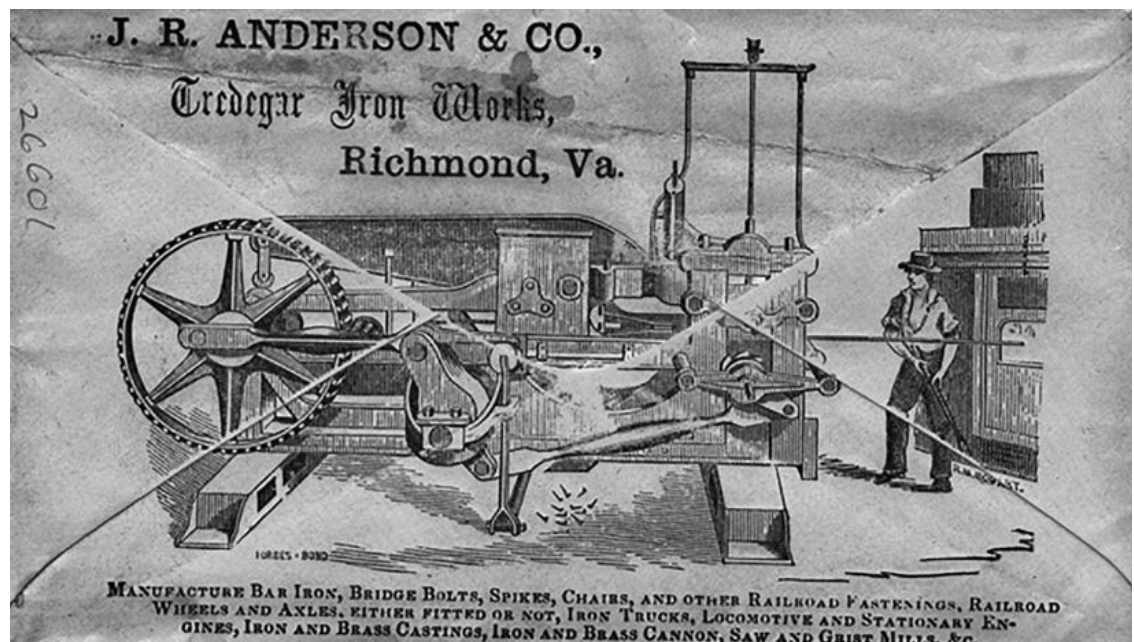
Upon resuming the control of his works, Anderson realized that a reorganization was needed if Tredegar was to both operate competitively and attract much-needed northern investment. In 1867, J.R. Anderson & Company was reorganized as The Tredegar Company, a corporate entity owning all of the Tredegar property with Anderson as the president, and primary stockholder. The years 1866-1873 were boom years for Tredegar. As railroads continued to expand across the country, Tredegar rose in prominence, becoming a chief supplier to the railroad industry. No longer producing locomotives, Tredegar was a principal manufacturer of railroad cars, car wheels, spikes, rail chairs, and other products in high demand. Customers ordered Tredegar spikes, not by the keg, but by the carload. Over 85,000 tons of railroad spikes, bar iron, and other Tredegar products were sold in the years between 1868 and 1872.

The post-war boom was brought to an abrupt halt with the financial Panic of 1873. Tredegar's position as a central player in the railroad industry, a monetary godsend in the years following the Civil War, only made it that much more vulnerable to instabilities of the economy. With railroads across the nation collapsing, many companies like Tredegar were left with cancelled orders and surplus inventory. The New York & Midland Oswego Railroad had ordered about 250 railcars over the course of the previous few years, many of which had not been paid for in full. For a week in January

1876, Tredegar ceased operations completely while negotiations with creditors took place. The company was placed into receivership, with Joseph Reid Anderson presiding as receiver. After all outstanding debts had been repaid, Tredegar emerged from receivership in 1880 and rebounded quickly. In 1876, Tredegar's foundry operations amounted to sales of approximately \$88,000. By 1880, foundry productivity increased so as to produce sales worth over \$850,000.

By the end of the 1880s, Tredegar had shut down all puddling furnaces on site. As iron rails, tools, and machines were replaced with steel, there emerged an enormous secondary market for scrap iron, which could be melted and repurposed far more cheaply than the cost of maintaining puddling furnaces, and paying puddlers, who were among the highest paid workers in the iron industry. In April 1887, one shipment alone of scrap iron rails, from London, weighed in at approximately 600 tons.

In 1881, the James River and Kanawha Canal ceased shipping and transportation traffic, as the Richmond & Alleghany Railroad completed laying its tracks along the canal's towpath. The railroad, however, honored all water rights it had inherited from the canal company, supplying hydropower to Tredegar's four raceways, water turbines having replaced all overshot waterwheels on site by the turn of the century.



Historic 1859 envelope from Tredegar Iron Works. Courtesy of the Library of Virginia.

In 1892, Joseph Reid Anderson died while on vacation in New Hampshire. A public funeral was held in Richmond where a funeral procession, composed largely of Tredegar workmen, walked the 1.5 miles from St. Paul's Episcopal Church to the General's final resting place in Hollywood Cemetery, near the graves of former U.S. Presidents James Monroe and John Tyler. General Anderson was succeeded as president by his son, Archer Anderson. A gifted polyglot and graduate of the University of Virginia, Archer Anderson had worked at the company since before the Civil War and was Tredegar's vice-president in the years leading to his father's death. Like his father, Archer served in the Confederate military, and was known throughout the remainder of his life as "Colonel Anderson."

The early 1900s still saw high production levels and profits for Tredegar, but the times were changing. An ever increasing amount of Tredegar's competitors were converting to steel production, with Tredegar's neighbor, the Old Dominion Iron and Nail Works on Belle Isle, installing Bessemer convertors at its plant as early as 1887. Tredegar never adapted to steel; the few instances when management seemed interested in the prospect of installing Bessemer convertors, and later open-hearth furnaces, there unfortunately tended to be an economic downturn just around the corner which prevented any such expansions. Tredegar's inability to develop into steel manufacture can be blamed partially on bad timing, but also on an apparent unwillingness to innovate. Tredegar continued to produce many patents, but these were largely for improvements upon existing items – the drive to diversify, shown by the company's entry into the locomotive and cannon industries in years past, was lacking by the early 1900s. Tredegar continued to be a prominent supplier to railroads, primarily in spikes and car wheels, and its horseshoe and mule shoe division was quickly becoming one of its most profitable divisions

Tredegar returned to munition production briefly during the Spanish-American War, and to a larger extent in the lead-up to America's involvement in the First World War. Between 1908 and 1913, more than \$1 million in government ordnance contracts were awarded to Tredegar; by 1918, that number exceeded \$3.2 million. One of the most common products Tredegar produced during this period was the Model

1907, ten-inch naval shell, weighing 1,047 lbs. each. In April 1914, Tredegar underbid several larger manufacturers to produce 600 shells for the Navy. While a boon to the company financially, these years also signaled Tredegar's increasing dependence on government contracts for its survival. When peace was officially declared in 1919, government orders dropped swiftly, although a healthy amount of naval orders continued. This was due to the Naval Act of 1916, in which President Wilson called for the creation of "the greatest Navy in the world," a massive battleship construction program that lasted until the limits imposed by the Washington Naval Conference of 1921-1922. In 1918, Colonel Anderson passed away at the age of 79; his son, Archer Anderson, Jr. was named as his successor. Under Archer, Jr. the company's bookkeeping system was overhauled and updated in 1922. Two new cupola furnaces were installed in the Central Foundry, to aid in the production of car wheels, and several automatic spike machines were purchased to replace older, hand-operated models, many of which dated to the time of the Civil War.

With a dearth of government contracts in the late 1920s and most of the 1930s, Tredegar suffered financially, operating at extensive losses for several years. However, the company's fortunes brightened with the American rearmament of the late 1930s. During World War II, Tredegar was part of the Philadelphia Ordnance District, a collection of munitions and war materiel suppliers under government supervision along the east coast of the United States, each given specific quota numbers to meet and considered a vital asset in the American war effort. Tredegar officials estimated that, in 1943, no less than 75% of all sales were to the government in the form of munitions.

In 1942, Archer Anderson, Jr. died at age 75. For the first time in nearly a century, Tredegar's next president would come from outside the Anderson family. A native of Ohio, Paul E. Miller had started at the company in the 1920s, having previously worked at the Bryden Iron Works of Catasauqua, Pennsylvania, and serving as vice-president of Tredegar at the time of Archer Jr.'s death. Tredegar's productivity fell following the close of World War II, due to the loss of lucrative government contracts. In 1946, the company's profits fell to -\$200,000. Orders for practice shells continued to reach the firm through the years of the Korean War, but

nothing that approached the numbers seen in previous years. Car wheels, one of Tredegar's most important products, ceased production in 1946 following government regulations that required wheels be made from steel alone. In 1947, Miller was succeeded by Raymond Worth Krise, a former manager at Pennsylvania's Milton Manufacturing Company.

Tredegar continued production until 1957, when Albemarle Paper Manufacturing purchased the company and its assets. Following the resolution of all Tredegar business, much of the metal-working equipment was relocated across the James River to Chesterfield County, where a successor Tredegar Company, led by one of J.R. Anderson's descendants, manufactured iron and steel products until the mid-1980s.

The original Tredegar site was used primarily by Albemarle for storage, and research and development projects due to a shift in the company's focus. Following Albemarle's purchase of the Ethyl Corporation in 1962 and the closing of its paper mills, the Tredegar property itself was left largely abandoned. After the destruction wrought by Hurricane Agnes in 1972, the city of

Richmond demanded that Ethyl either tear down all structures on site or try to preserve those that could be saved. Under the supervision of Ethyl executive Roy E. Johnson, an extensive restoration project began. Although the Central Foundry could not be saved, the Pattern Storage Building, carpenter shop, 1861 Gun Foundry, Tredegar Offices, and the company store were preserved. The site was opened to public use, first as a rental venue for large events, and later as a satellite site for the Valentine Museum. Following the closure of the short-lived Valentine Riverside, the site once again lay abandoned for several years. In 2000, the National Park Service relocated its Richmond Visitor's Center from Chimborazo Park to Tredegar's Pattern Storage Building, and in 2006 the American Civil War Center opened in the 1861 Gun Foundry. In 2013, the American Civil War Center and the nearby White House and Museum of the Confederacy merged to create a new institution, the American Civil War Museum. A new facility is currently being built in 2018-19, partially atop the remains of the Central Foundry, to house the combined artifacts and exhibits of both former organizations.

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TOUR SITES

F2 - INDUSTRIAL HISTORY OF PETERSBURG

H. EDWARD MANN

Colonial Period

Native Americans had settled at the falls of the Appomattox River and the area was an important crossroads long before English exploration began ca. 1645. By 1656, a permanent trading post—Fort Henry—was established, marking the western and southern extent of English settlement in the colony of Virginia. Petersburg was named for Peter Jones, who succeeded his father-in-law as the commander of Fort Henry. After Blandford Church was built in 1734, Petersburg was incorporated as a colonial town in 1748 and thrived, due in part to the ability of ocean-going sailing ships to sail up to the falls. In 1781, Petersburg was the biggest port in Virginia outside of Norfolk, shipping large amounts of tobacco and other agricultural products to markets around the world.

Revolutionary War

The Battle of Petersburg, fought in April 1781, targeted the city because it was a busy transportation center. The city stored military supplies and contained six tobacco warehouses; one was burned to the ground while tobacco was pulled out of the others and destroyed. The battle was a strategically important engagement and resulted in the death of General William Phillips – the only British General from the Revolution who is buried on American soil. Marquis de Lafayette led artillery strikes on Petersburg in actions against General Cornwallis in 1781. After the war, Petersburg became an important industrial center in a mostly agricultural state with few major cities.

Increased Industrialization in the First Half of Nineteenth Century

Manufacturing in Petersburg was stimulated by the War of 1812, but the city did not achieve industrial importance until the 1830s. During the antebellum period, tobacco and cotton were the leading industries in Petersburg. Joseph Martin in his *Gazetteer of 1835* recorded that Petersburg had “six tobacco factories, three cotton factories, two cotton-seed mills, six flour mills, one brass and cast-iron foundry, two earthenware potteries, numerous mercantile stores, and four druggist shops.” In the early 1800s, many Scottish merchants and commer-



cial traders settled in Petersburg. In 1815 a fire destroyed much of the city and an initiative to build only brick structures took hold, allowing many of the pre-Civil War buildings to survive to modern times.

Evolution of the Upper Appomattox Canal

From colonial times to the early 1800s, most of the agricultural products from the region were brought down to Petersburg via boats on the Appomattox River. Beginning in 1745, channels were cleared through rocky obstructions to help whitewater cargo boats running the river, perhaps as far up as Farmville, 95 river miles above Petersburg, or Planterstown, 23 miles above that. These early boats might have been long square-ended barges or double dugout canoes as on the James, designed especially to carry tobacco hogsheads on one-way trips downstream. After 1771, most of the craft were James River batteaux (invented by Anthony Rucker), wooden boats about 60 feet long and 8 feet wide, pointed at each end so they could go back upriver with city goods. One third of the batteaux were owned by free people of color.

In 1795, the Upper Appomattox Company was incorporated to make the upper river more navigable, and to build the 5-1/2 mile-long Upper Appomattox Canal around the falls, down to a canal basin and depot in Petersburg. The canal was built entirely by enslaved Africans owned by the company. The same falls provided water for

Top: Antebellum industrial Petersburg. Gas holder in center, Union pontoon bridge in foreground, ca. 1862. Library of Congress, Timothy H. O'Sullivan, photographer.



Stereoscopic view of Petersburg mills ca. 1862. Timothy H. O'Sullivan, photographer, 1865.

other canals, which powered Petersburg's mills, manufacturing wheat, cotton, hemp flax, wool and primarily tobacco, brought down the river and overland from the surrounding region to Petersburg. These goods were processed and eventually placed into the holds of ocean-going ships.

In 1831, boatmen shipped around 20,000 barrels of flour and 20,000 barrels of wheat; 5,000 hogsheads of tobacco leaf, and some tobacco stems; half a million pounds of manufactured goods: barrel staves, cotton, corn, salt lime and iron. When coal was first mined at the Clover Hill Pits in 1837, it was taken by mule, later by rail, to the docks at Epps Falls on the Appomattox. A batteau could carry seven tons of coal, and it took four days for a round trip to Petersburg. The Upper Appomattox Navigation was used for transport until 1902. By then, the canal had competition with railroads that could provide transportation for goods and people over a similar route as the canal in just four hours.

There are still impressive remains of the Upper Appomattox Canal, which opened by 1816. It still runs with water for two miles from Brasfield Dam, through Petersburg's Ferndale Park, down to a spillway. Below here the canal is now dry. The canal boats were lowered 33 feet through a flight of four stone toll locks where tolls were charged, and then crossed Rohoic Creek through a stone aqueduct. The remains of these structures are now on private property, but there is hope that someday they may be preserved. The last mile of the canal can still be traced where it ran between Upper Appomattox Street and Commerce Street down to the canal basin between Dunlop and South streets. This basin, now filled in, is a time capsule waiting to be professionally excavated. An historic canal-related stone building survives beside the canal at 1112 Upper Appomattox Street.

Tobacco Manufacturing in Petersburg

Over the centuries, manufactured tobacco has always been Petersburg's most important export. In fact, there were tobacco warehouses in Petersburg before there was a town of Petersburg. In 1730, Colonel Robert Bolling received authority to conduct an inspection at his tobacco warehouse on land known as Bolling's Point, probably on the site of today's Farmer's Market. In the first half of the nineteenth century, transportation advances helped increase Petersburg's status as a tobacco market, manufacturer, and exporter. In 1806, Scottish mapmaker John Melish wrote that Petersburg was "a place of considerable wealth and importance, carrying on a great trade in tobacco and flour, a considerable portion of which is with New York." By the 1820s, as many as 125 batteaux navigated the Upper Appomattox Canal at the same time. Many of them carried from six to eight hogsheads from as far away as Farmville to the port of Petersburg. The completion of the railroad from Wilmington to Weldon, North Carolina, and north to Petersburg became a boon to the city's tobacco industry.

Before the Civil War, there were 15 to 20 tobacco factories, each employing between 75 and 100 workers. Slave labor was the predominant form of labor in these factories, and the manufacturer either owned his own slaves or hired them on an annual basis. Unlike cotton factories and flour mills, tobacco factories did not need water power so they were located all over town, sometimes near the owner's fine residence. In the 1860 census, Petersburg contained 20 tobacco factories with a capital investment of \$587,000 and 2,516 employees. During the Civil War, many of the tobacco factories closed because of the great risk of exporting this product. Some of these factories served as hospitals during the war. Of the ten largest hospitals in Petersburg, eight were in

tobacco factories. Only one such structure from the period still exists in its original form—the Ladies Confederate Hospital located at 201 Bollingbrook Street.

Railroads Provide a Substantial Shift in Logistics

Beginning in 1833, Petersburg was connected to points south at Garysburg, North Carolina on the Roanoke River with the Petersburg Railroad and the evolution of its rail system culminated in the mid-1850s:

- In 1830 the North Carolina General Assembly and Virginia General Assembly granted a charter for the Petersburg Railroad with 60 miles of track to Weldon, NC, opening in 1833.
- The City Point Railroad, established in 1836, was the second railroad line in Virginia. The construction of larger ocean-going vessels—too large for the port at Petersburg—necessitated the need to run a nine mile-long railroad to the navigable portion of the James River at City Point (modern day Hopewell, Virginia).
- The Richmond and Petersburg Railroad was founded in 1836 and was 25 miles long. The site for the station for this railway is on Pocahontas Island; its foundations have been located and identified.
- The South Side Railroad was chartered in 1846 and completed to Lynchburg in 1854, a distance of 124 miles. The South Side purchased the City Point Railroad line in 1847. The line crossed the impressive High Bridge viaduct across the Appomattox 65 miles west of Petersburg. In June 1862, military activity on the railroad began when the South Side Railroad transported Union prisoners of war from Jackson's Valley Campaign through Petersburg en route to the prisoner of war camp at Salisbury, North Carolina and Confederate reinforcements north to General Robert E. Lee's Army for what became the Seven Days Battles from June 25 to July 1. The South Side Railroad Depot, the oldest existing train station in Virginia, built ca. 1855, is a centerpiece of Old Towne Petersburg.
- The Norfolk and Petersburg Railroad (N & P) was built between Norfolk and Petersburg, and the 85-mile long line was completed by 1858. William Mahone (1826-95), an 1847 engineering graduate of the Virginia Military Institute,



Above: Nineteenth c. peanut factories along Bank St. Christopher Marston, photographer.



Right: South Side Railroad freight depot, ca. 1855. HAER VA-28-1, David Sharpe, photographer, 1974.

was employed by Francis Mallory to build the N&P and eventually became its president prior to Civil War.

The convergence of five railroad lines into the city made Petersburg a thriving transportation hub and one of the most railroad intensive locations in the world. The five railroads with different gauges (some standard 4'-8 1/2", others five-foot wide) prevented continuous ease of transportation, yet it also presented the city with an opportunity. Since a supply of experienced inexpensive draymen (many of them free blacks) already existed from commercial activities at the port on the river—many of the same conveyances and



View of 1870s gasholder frame, Petersburg Gas Light Company. HAER VA-14-7. Jack Boucher, photographer, 1971.

employees were used to move railroad freight between the lines. As tonnage grew, warehousing the freight then became an increasingly necessary option. Finally, the opportunity to warehouse commodities and then speculate on the value of the product going up or down became a revenue producer for speculators. Therefore, Petersburg's merchants did all they could to ensure that passengers and freight would have to use local transportation and related services rather than simply slip through the city en route to other destinations. Many of Virginia's investment and brokerage houses got their beginnings with traders who developed their skills as commodity traders in Petersburg.

Many business leaders were reluctant to work towards connecting the railroads, as doing so would have a negative impact on their ancillary endeavors. However, Confederate General Robert E. Lee pointed out that the logistical impediments caused by this situation had a severely negative impact on the movements of men and

material. In May 1861, the Petersburg Common Council agreed to allow the construction of a rail link provided it was used only for military purposes and was dismantled after the war. On August 14, 1861, the new link opened, and it proved a boon to the rapid movement of troops and supplies between Richmond and Petersburg. Immediately after the war this improvement was removed—yet despite this seemingly significant impediment the city returned to being a bustling commercial center.

Appomattox Iron Works

Small industrial sites and machine shops sprang up to support the mills. These were manned by craftsmen who could fix the wooden or iron parts for tobacco processing, milling machines, and railroad equipment shops. Two major ironworks in Petersburg emerged before the Civil War, when the city was said to have produced 1% of the nation's foundry iron (Richmond and Petersburg together produced 2.9%). Uriah Wells, whose Petersburg Iron Works was the largest in town, came south in response to the establishment of the Petersburg Railroad. His foundry produced locomotives in the 1850s, and rail cars over a period of decades. Currently what is referred to as the Appomattox Iron Works is a unique complex of nine structures which detail the transition from an antebellum agricultural economy to the early decades of industrial development in the South following the War Between the States. The oldest structure is the machine shop at 28 Old Street constructed between 1810 and 1825. Within this and other buildings of the ironworks is one of the most complete physical records of an early iron foundry in the country. Mid-nineteenth-century machines, whose major working components are wood, stand by more sophisticated early cast-iron machines, some boasting simple pointed Gothic arch design at a time when the machine was regarded as ornamental as well as functional. The wood patterns from which the majority of the items were cast at the ironworks remain in long, uncatalogued shelves ranging from small gears and andirons, massive boiler doors, and three-foot-diameter gears. The structures that house the Appomattox Iron Works cover the range of styles from the Federal commercial/residential structures, to mid-nineteenth-century functional mill buildings, to the commercial architecture of a late nineteenth-century store.



Petersburg Gas Works

Chartered by the Virginia General Assembly in 1841, the Petersburg Gas Light Company began operation by 1851. The gasworks could produce 100,000 feet of manufactured gas per day and transmitted it throughout the city within 16.5 miles of pipe. The corporate offices were in the Mechanics Hall on the corner of Tabb and Sycamore Streets. During the Civil War, the works were constantly targeted for bombardment by Union artillery, positioned less than two miles away. The gasworks as a whole were struck 65 times, the main building 47 times—more than any other structure during the siege. 48 feet of the original 150-foot-long Retort/Purifier House (1851) remain. The extant Purifier House section is a rare survivor from the antebellum period. It is currently endangered. The highly decorative frame of one of the early “gasometers,” or gas-holders, at the gas works survived as an exhibit until about a quarter-century ago. What pieces that remain are owned by the City of Petersburg, and are scattered about town as displays.

Free Blacks as a Source of Labor

Across the river from the port of Petersburg was Pocahontas Island, the largest free black population in Virginia and, prior to the Civil War, one of the largest such populations in the United States, facilitating its importance as a station on the Underground Railroad. Free blacks from Pocahontas were a steady source of cheap labor and many had thriving businesses as draymen, boatmen, fishermen, and watermen; the island developed into a commercial center. Joseph Jenkins Roberts, who later became the first president of the African country of Liberia, lived on Pocahontas Island and worked in Petersburg.

Civil War Siege

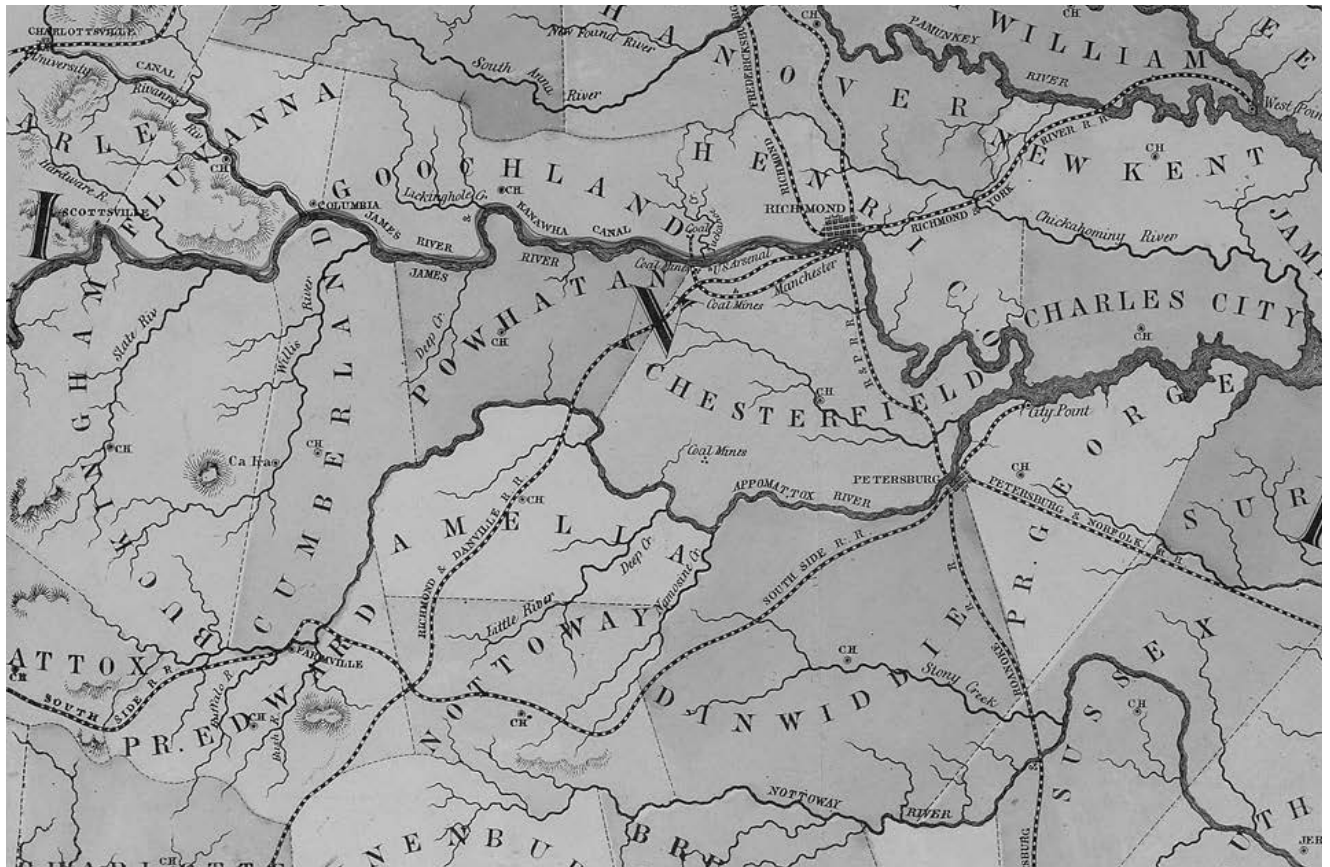
During the Civil War, Petersburg was the target of the longest siege/extended battle on American soil—292 days—and the sustained military actions directed at a civilian population were the first in American history. The 70,000 military casualties were the largest number for any campaign in the Civil War. The campaign’s most famous military action was the Battle of the Crater fought on July 30, 1865. President Abraham Lincoln spent most of the last three weeks of his life (March 25 - April 8, 1865) in the vicinity of Petersburg, and held his final battlefield conference with General Grant at the Wallace House and later visited Centre Hill Mansion.

Manufacturing during the Civil War

By 1860, Petersburg, with 18,000 citizens, was the second largest city in Virginia and the seventh largest city in the South, a result of the rare southern combination of manufacturing and transportation. This period of prosperity would begin to change as the protracted Civil War continued on. For the first few years of the war, Petersburg’s cotton and woolen mills (concentrated around the falls of the Appomattox at Campbell’s Bridge) continued to manufacture cloth. For example, between June and December 1863, 1.3 million yards of cotton cloth for the Confederate States of America (CSA) were produced by these mills. However, as Grant and the Union forces began to strangle the city by extending their lines to the south and west, access to raw materials dwindled during the last nine months of the war.

The South Side Railroad operated one of the city’s five ironworks. Its ironworks included a foundry, car shop, and engine repair shop; it

Documented artillery damage to the Gas Light Co.’s Retort/Purifier House. Library of Congress, Timothy H. O’Sullivan, photographer, 1865.



Detail from James River and Kanawha Canal map, 1857. Image courtesy of the Library of Virginia.

built railroad cars and repaired both engines and cars. After the war began, the ironworks in Richmond and Petersburg responded exclusively to military orders and no new rails, cars, or locomotives were built.

The CSA Leadworks at Petersburg were constructed by Josiah Gorgas, head of the Ordnance Bureau, in the summer of 1862 in order to provide a vital material for small arms and artillery ammunition. The works were located near the Weldon Railroad and Halifax Road southwest of the city. Lead ore was transported to Petersburg from Wytheville, Virginia and North Carolina via rail. The works averaged sending 1,000 pounds of lead ingots per day to Richmond. During the siege, Confederate troops were urged to collect expended ammunition, which was collected and sent to the leadworks to be recycled. The CSA Gunpowder Works and Magazine was operated by the CSA Arsenal and Ordnance Department from 1862-1865; it was located on the west side of Rohoic Creek between the South Side Railroad and the Upper Appomattox Canal.

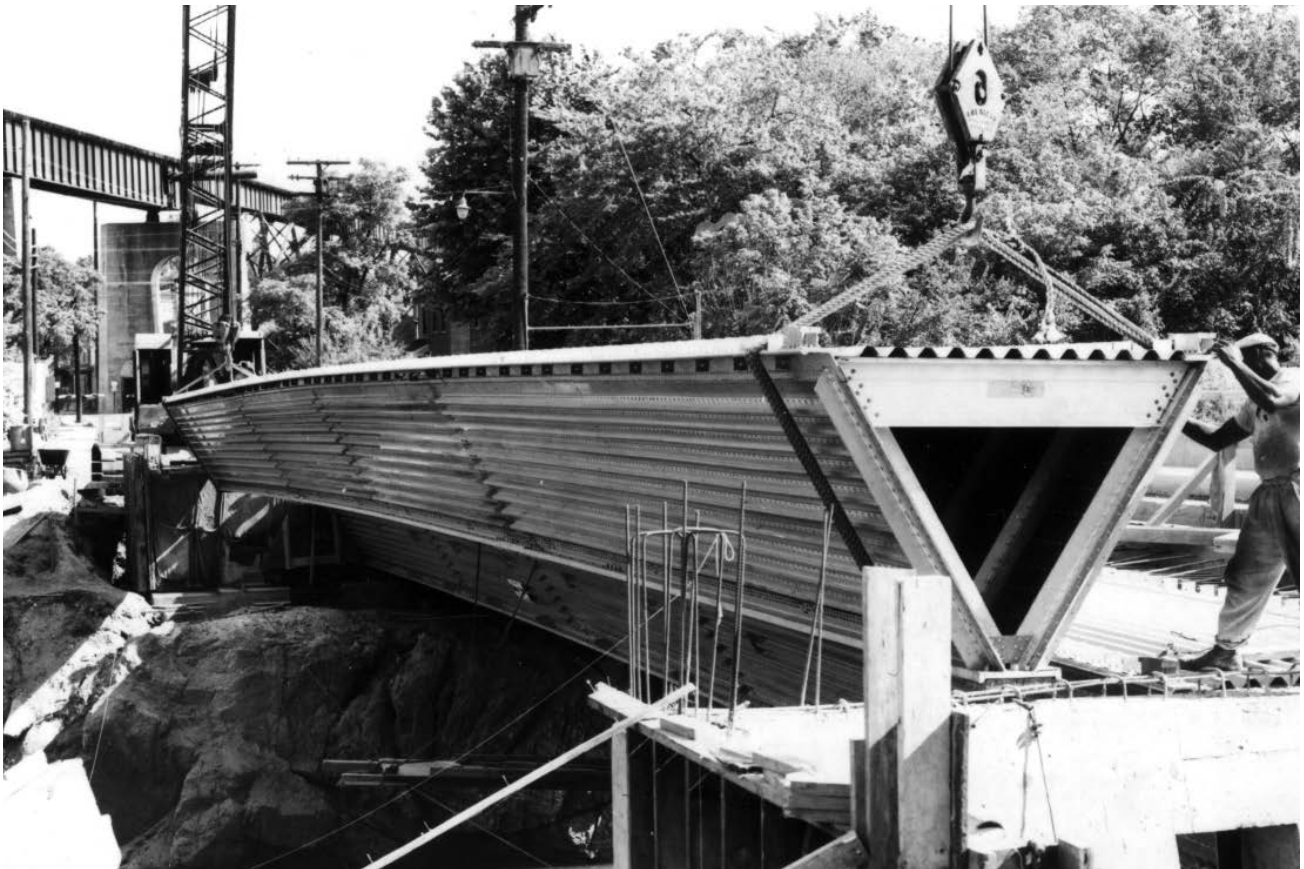
While the number of civilian casualties is

difficult to gauge, all local citizens—black and white—suffered a degree of deprivation for sustained periods. Soon after the beginning of the siege, non-military manufacturing ground to a halt, and the economic, environmental and ecological impact on Petersburg and the surrounding area over the next nine months was devastating.

After the War—Consolidation and Growth of Norfolk and Western Railway

Despite the massive level of destruction in the region, there were entrepreneurs who rapidly took measures to repair the existing infrastructure that remained. Much of the leadership was provided by former Major General (CSA) William Mahone, chief engineer on the Norfolk and Petersburg Railroad.

The N&P was severed by military actions during the Civil War. The portion east of Zuni (half-way to Norfolk) was held by the Union and the eastern portion of the City Point Railroad played a crucial role for Union General Ulysses S. Grant during the Siege of Petersburg when it operated as the United States Military Railroad. The South Side Railroad was also heavily damaged.



Aluminum Bridge under construction over the Appomattox River, 1961. VDOT photo.

After the war, Mahone quickly got to work restoring his N&P, and resumed his dream of linking the three trunk lines across the southern tier of Virginia to reach points west. He drove the 1870 merger of the Norfolk and Petersburg Railroad, South Side Railroad, and the Virginia and Tennessee Railroad to form the Atlantic, Mississippi and Ohio Railroad (AM&O). The AM&O extended 408 miles from Norfolk to Bristol, Virginia.

The AM&O operated profitably in the early 1870s but like many railroads encountered financial problems during the Panic of 1873. Mahone retained control of the AM&O for several more years before his relationship with English and Scottish bondholders deteriorated in 1876 and receivers were appointed to oversee his work. Mahone's role as a railroad builder ended in 1881 when northern financial interests took control. At the foreclosure auction, the AM&O was purchased by E.W. Clark & Co., a private banking firm in Philadelphia with ties to the Pennsylvania Railroad. In 1881, the AM&O was reorganized and renamed the Norfolk and Western Railway, and the headquarters moved to Roanoke. The line is still

in use 150 years later as Norfolk Southern, withstanding immense tonnages of coal traffic through Petersburg.

As a political leader in Virginia, Mahone was influential in the creation of Virginia State College in Petersburg, developed as the first fully state-supported four-year institution of higher learning for black Americans in the U.S. in 1882. Educational efforts at the college focused on agricultural and industrial arts.

Manufacturing during the period of 1865-1960 Much like what occurred after the Revolutionary War, the tobacco industry rebounded after the Civil War. In 1880 the second largest tobacco factory in the United States was in Petersburg. The city contained 12 tobacco factories, and 68% of those employed in the city worked in tobacco. The Dunlop Tobacco Factory, erected in 1887 at 45 Old Street, is still standing and was converted into a home for the elderly in the early 1970s.

The British American Tobacco Company increased its manufacturing of cigarettes and became the largest Petersburg employer (and

its largest single source of taxes) from 1910 to 1929. In 1917, the city's tobacco factories manufactured 2.1 billion cigarettes, 13.2 million cigars, 600,000 pounds of smoking tobacco, processed 50 million pounds of tobacco, and employed 4,000 people. From 1932 until October 1985, the Brown and Williamson Tobacco Company was the largest employer in the city, with 4,000 workers in three daily shifts.

Despite the boom in cigarettes, the shift in demand away from plug tobacco and the moving of cotton interests to North Carolina led to declines in these traditional Petersburg industries. Two industries that stepped into the void created by losses in tobacco and cotton processing were the manufacturing of trunks and optical lenses. An economic and municipal report prepared by the Chamber of Commerce in 1917 stated that Petersburg was "one of the most important tobacco, peanut, and trunk manufacturing centers in the United States." The trunk and luggage business in Petersburg had its beginnings in 1878 when Simon Seward and his brother-in-law, H. F. Munt, established a luggage factory on the north side of the Appomattox River. The 1903 city directory listed four trunk and bag companies: Seward, Thacker, Virginia, and the Petersburg Trunk and Bag Company. The 1907 city directory declared that "the largest trunk and bag factory in the world (Seward) is located here, and the combined output of this and the five other similar plants in the city exceeds that of any other place in the country." In 1915, nine companies engaged in the manufacture of trunks and bags, employed 2,000 workers, not counting many industries supporting the luggage industry—which included manufacturing of locks, hinges and handles. Titmus Optical, once the "world's no. 1 producer of prescription protective eyewear and vision screening instruments" began construction on its complex of buildings in 1919. In 1960, it was observed that Titmus Optical had developed in a half century into what was reputed to be the largest independent lens company in the country, employing 1,200 persons and ranked fourth nationally in the overall optical business. Additionally, the Southern Chemical Company, the original maker of Fleet Phospho-soda (an oral saline laxative still used in hospitals worldwide), was a well-known brand associated with Petersburg.

The legacy of these industries is represented by four early twentieth-century industrial buildings:

Petersburg Trunk and Bag Company (ca. 1915), Titmus Optical Company (ca. 1919), Rogers and Madison Trunk Corporation (ca. 1921), and Southern Chemical Company (ca. 1925). These buildings have been expanded numerous times during the intervening years forming complex industrial compounds included in the Commerce Street Industrial Historic District in the northwestern part of Petersburg. Four late nineteenth- or early twentieth-century cottages also remain in the historic district.

Constructed in 1961, the Aluminum Bridge carried Virginia Route 36 (Fleet Street) across the Appomattox River. It is the third bridge in the area known as Campbell's Bridge, the location of several antebellum cotton and flour mills. This structure is significant as the first aluminum bridge in Virginia, and the earliest of the four innovative Fairchild-designed aluminum bridges (bolted or riveted, stiffened triangular box beam/girder structures) that were constructed in the country during the early 1960s. The Route 36 bridge is a bolted triangular box beam. Reynolds Metals fabricated the girder system using 0.090-in (2.5 mm) 6061-T6 aluminum sheet. The three other Fairchild-designed bridges constructed (all riveted triangular box beams) were located in Sykesville, MD (Route 32 over Patapsco River, opened 1963, now closed); and Amityville, NY (a pair of bridges, Route 110 over Sunrise Hwy, 1963). The Aluminum Bridge was designed by Hayes, Seay, Mattern & Mattern engineers, and built by the Sanford Construction Company of Sanford, NC.

With the exception of Amsted Rail-Brenco train bearings currently produced in the city, the departure of Brown and Williamson Tobacco in the 1980s marked the end of manufacturing on a significant scale within Petersburg. Today service jobs are the most prevalent and the city's population has declined steadily over the past decade.

Despite the decline in the local economy, the architectural integrity of Petersburg remains surprisingly intact. The historic fabric of the city, which stretches from the time before the American Revolution to present day, has an abundance of structures, artifacts, and settings from the period 1815-1890. The Petersburg Preservation Task Force (PPTF) serves as the primary organization preserving, managing, and presenting Petersburg's rich and unique historic resources. Much of this activity is centered

on operating and managing three city-owned museums: Blandford Church (1735), Centre Hill Mansion (1825), and The Exchange Building (1842). PPTF is promoting visitation to the city through active collaboration with the National Park Service, the Virginia Tourism Corporation and regional tourism efforts, historical organizations, and businesses, particularly in Old Towne Petersburg. PPTF has undertaken a professional inventorying and cataloguing of Petersburg's historic archives. Thousands of items have been moved, largely by volunteers, to improved,

secure settings to ensure their preservation for future presentation and interpretation. In addition, media production crews frequently use these historic resources for filming movies and television episodes, such as *Lincoln*, *Mercy Street*, and *Turn*. Recent private ventures such as the establishment of the Trapezium Brewery, located in a former ice house, are an exciting part of the rebirth of Petersburg. The Society for Industrial Archeology's exploration of Petersburg's industrial heritage is another example of PPTF's outreach to showcase this historic city.

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F2 - FALLING CREEK BRIDGE

CHRISTOPHER MARSTON and ANN L. MILLER



Falling Creek Bridge. Photo by Christopher Marston.

Falling Creek Bridge was built ca. 1823 by the Manchester and Petersburg Turnpike Company. One of five bridges along the turnpike route, and possibly the turnpike's only bridge built completely of stone masonry, the Falling Creek Bridge was unusual on several counts. In an era when simple, short-lived wooden bridges were the rule, and masonry bridges were extremely rare in Virginia, the Falling Creek Bridge was notable for its material, its solidity, and for its attractive design and proportions. In 1829 company president James Henderson noted, "The bridge at Falling Creek is considered in this part of the world to be a structure of some elegance."

The two-span masonry arch was 134 feet long and 24 feet wide. Traces of molten iron found on the masonry suggest that some stone for the bridge may have been salvaged from the nearby Falling Creek Iron Works.

The structure served as a roadway bridge for over a century. The old turnpike route was improved and became U.S. Route 1 after the

establishment of the Virginia primary system. It was closed to vehicular traffic in the early 1930s, and one of first waysides in Virginia was designed around the old bridge.

Disaster struck the Falling Creek Bridge in 2004. In the massive flooding resulting from Tropical Storm Gaston's passage through central Virginia on August 30, 2004, the old stone bridge was virtually destroyed. Most of the parapets and roadbed were completely scoured out by the floodwaters, and the fill and the tops of the arch rings were exposed. The two barrel vaults remained standing, but were damaged and appeared to be in danger of collapse. A flood-borne pine tree which had broken out the top of the bridge was still caught above the arch rings.

The Virginia Department of Transportation (VDOT) secured the site in the aftermath of the storm, weighed its options, and coordinated with other agencies before deciding whether to salvage material, rebuild, or demolish the remains of the structure. A site meeting with

representatives from VDOT (Research Council, Richmond District, and Central Office), the FHWA, Chesterfield County, and the Virginia Department of Historic Resources was held at the Falling Creek Bridge site on September 24, 2004. The arches of the bridge, although damaged, were stable enough that the remaining structure was not in danger of imminent

collapse. It was decided that the most feasible option would be to stabilize the remaining structure as an historic ruin, where it survives to this day.

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F2 - FALLING CREEK IRON WORKS

LYLE E. BROWNING



View of surviving Falling Creek Iron Works timbers. Photo by Lyle Browning.

The Falling Creek Iron Works was the first blast furnace in the New World and also the beginning of heavy industry on the continent. From 1619 when construction started to its termination on March 22, 1622 by an attack by the Powhatans, a blast furnace was planned, under construction, seasoned and production started. However, despite four more attempts over the next 80 years, iron smelting at Falling Creek was not to be.

Between 1607 and 1610, Falling Creek was identified as a near perfect place for heavy industry. It was the only location on the James River between Richmond and the Atlantic Ocean where a sufficient head of water, ready supply of iron ore, and convenient water transport were in such close proximity. Communication back to the Virginia Company in England extolled the virtues of Falling Creek. Venture capitalists were contacted and Captain Benjamin Bluett was hired as ironmaster in 1619. The idea that iron could be smelted for good profit in Virginia was a multi-pronged operation. Bluett and 80 men were sent to build an ironworks. Unfortunately, Capt. Bluett died on the voyage; the Virginia Company records stated "The Chiefe men for the Iron Worke being dead at sea." Several of his men likewise perished from "seasoning," a process that killed from 50 to 90% of the early immigrants. Those same records also stated

"what will become of the Iron workes I know not all the principal officers and Chiefe men being dead... we are now in hand to doe what possible we can with Capt Bleuets Company having found an excellent water and good oare... yet without suply of good understanding workers and good Capinters there being very few left we shall doe littell." While it appears that Bluett had started on the ironworks at Falling Creek, the remaining workers were not able to complete the blast furnace at Falling Creek.

Despite the setback, interest in iron making did not stop. John Berkeley was hired in 1621 on the same conditions as Bluett. With a crew to finish one blast furnace, Berkeley, his son Maurice, and 25 others set sail for Virginia. In a letter back, Berkeley promised a plentiful supply of iron by "Whitsuntide" (June 9, 1622) ... And the Iron-workes brought after five thousand pounds expences to that assured perfection," as within three months they promised to send home great quantities. However, the Powhatans had other plans. The death of Chief Powhatan and the ascension of Opechancanough as paramount chief brought an end to any accommodation with the English who had by then expanded their settlements farther into Powhatan territories. A coordinated attack was planned for all of the English settlements for the morning of March 22, 1622. Hundreds of settlers were killed in the attacks. Their aim was to force the English to leave the Powhatan territory. At Falling Creek, only two children survived and the ironworks was destroyed.

Immediately after the 1622 uprising, a second iron working venture followed when ironmaster John Berkeley's son Maurice (who was away from the site and survived the attack), attempted to restart the Falling Creek Iron Works but was unsuccessful.

A third attempt was begun in 1634 to 1636 when Sir John Zouch came to Virginia. However, in his 1636 will he lamented that his son had spent upwards of £250 plus more of Zouch's own without getting the ironworks going again.

Fourth and fifth iron working ventures came after William Byrd I accumulated at least part

of the original Zouch land patent. According to Robert Brock (1885), Byrd undertook the revival of the ironworks at Falling Creek in 1687 and 1696. Unfortunately, the extent of his revival is unknown. He is credited with the erection of a sawmill and tannery on the property. An extant stone structure on the north side of the creek may be Byrd's.

The many successive attempts to smelt iron on an industrial scale at Falling Creek after the 1622 event were all failures. However, the

burning question was whether it got into blast under John Berkeley. A blast furnace produces two products: glassy slag that is discarded and pig iron that is the salable product. To date, one piece of the characteristic glassy slag has been recovered, although it has not been chemically fingerprinted to ascertain its origin. With this conclusive evidence in hand, it can be said that Falling Creek got into blast before its destruction.

TOUR SITES

F3 - FORT MONROE

T. ARRON KOTLENSKY



Top: Aerial photograph of Fort Monroe and vicinity. Public domain, 2007.

Above: Interior of typical casemate, showing the arc of the rail for rotating artillery. HABS VA-595-D-37, Jack Boucher photographer, 1988.

Designed to protect Hampton Roads from attack by sea, the U.S. Army Corps of Engineers oversaw construction of Fort Monroe from 1819 to 1836. The fort occupies an area historically called “Old Point Comfort,” situated at the southeastern tip of the Virginia Peninsula. Old Point Comfort has long been valued as a strategic naval choke point. From this level spit of land, military planners anticipated that a fortification could prevent enemy vessels from entering Hampton Roads. British colonial constructed two forts on Old Point Comfort officials in the seventeenth and eighteenth centuries, the first in 1632, and again in 1730, the second dubbed “Fort George.” During the Siege of Yorktown in 1781, French naval forces

built a battery on the largely abandoned Fort George.

During the War of 1812, the value of Old Point Comfort to American military leadership was highlighted when British forces temporarily took control of the area. After the war, political leaders and Army engineers moved to permanently fortify the “Gibraltar of the Chesapeake Bay.” Construction of the new fort began in 1819, and constituted a major element of the largest coastal defense program undertaken by the Corps of Engineers, what historians later termed the “Third System” of coastal fortifications. The Third System was an ambitious plan to expand seacoast defense fortifications. 42 Third System forts were constructed between 1816-1867 on the East Coast, Florida and Gulf Coast and West Coast around San Francisco. A young Brigadier General Joseph G. Totten was a member of the first Board of Engineers overseeing the initiative.

Officially named for President James Monroe in 1832, the fort was designed by Brigadier General Simon Bernard. Initially planned as a single tier of 380 casemates (pronounced “casements”), Fort Monroe was constructed in stone and brick according to a seven-front plan, encompassing approximately 63 acres. Earlier in the fort’s history, each casemate housed a 7.25-inch caliber Model 1811 Columbiad gun mounted on a swiveling carriage. An 8-foot deep moat encircled the entire outer face of the fort, with access to the fort interior provided by three sally port gates and a postern gate. Fort Monroe provided artillerymen protected fields of fire to strike at vessels approaching from the north and the east in Chesapeake Bay, with landward-facing batteries that could oppose infantry assaults. As no fresh water sources were available within the fort, a system of cisterns fed by collected rain water provided the fort’s water supply for much of its history.

Fort Monroe was first garrisoned in 1823 when Battery G of the 3rd Artillery Regiment assumed the post. As a first lieutenant, Robert E. Lee was stationed at the fort from 1831 to 1834. Like

nearly all other Third System fortifications, the fort never saw action against foreign assault and remained in Union hands throughout the duration of the Civil War. The fort allowed the Union to remain in control of the lower Peninsula and provide a haven for enslaved African-Americans. After the war, Confederate president Jefferson Davis was imprisoned at

the fort for two years. The U.S. Army continued to occupy the fort through the twentieth century, as a home for its Coast Artillery School and later its Training and Doctrine Command. As a military post, Fort Monroe closed in 2011.

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F3 - USS *MONITOR* / MARINER'S MUSEUM

T. ARRON KOTLENSKY



Gun carriage from the USS *Monitor* undergoing dry-ice blasting conservation treatment. Courtesy of the Batten Conservation Laboratory Complex, The Mariner's Museum.

A completely unique and novel warship for its time, the USS *Monitor* revolutionized naval vessel design in the United States and elsewhere following its launch in February 1862. Speedily built to counter the threat of the CSS *Virginia* (converted from the salvaged hull of the former U.S. Navy frigate USS *Merrimack*), the *Monitor* was designed by John Ericsson, a Swedish-born inventor and engineer with a long career in innovation. Despite his lingering resentment with the Navy over the USS *Princeton* accident in 1843, Ericsson convinced the Navy's Ironclad Board in September 1862 to adopt his design for a warship mounted with a revolving turret. Constructed in just over 100 days, the *Monitor* was commissioned in February 1862 and dueled the *Virginia* to a standstill on March 9, 1862, saving the remaining wooden-hulled Union vessels in Hampton Roads from destruction. Apart from its twin-gun revolving turret, the screw-propelled *Monitor* was powered by a compact vibrating side-lever engine that fit below the waterline

within the vessel's low freeboard and shallow draft. As a remarkable industrial achievement, the *Monitor* could be considered a product of New York State: its engine was constructed at the DeLamater Iron Works in Manhattan; its belt armor was rolled at the Albany Iron Works in Troy; its twin 11-inch smoothbore Dahlgren guns were made at the West Point Foundry; while its first commanding officer, Lieutenant John L. Worden, was a native of Scarborough, New York. The duel with the *Virginia* would prove to be its only engagement with an enemy vessel, as it foundered in a storm off Cape Hatteras on December 31, 1862 with the loss of 16 men.

The location of the wreck of the *Monitor* was not discovered until 1973, and the site was designated as the *Monitor* National Marine Sanctuary two years later. Interest in recovering the vessel increased over the ensuing years but plans to raise the entire wreck were soon proven too costly and impractical. Recovery plans were

revised to raise only the most intact and critical components of the *Monitor*, such as the turret and its two guns, engine, and propeller. Recovery efforts at the wreck site were undertaken by the Navy and the National Oceanic and Atmospheric Administration (NOAA) between 1995 and 2002, with the turret raised last. The recovered components were transported to The Mariners' Museum in Newport News, Virginia for conservation and study in the Batten Conservation Laboratory Complex and public interpretation as part of the USS *Monitor* Center. Con-

servation efforts on the largest pieces of the recovered wreck, namely the turret, guns, and engine, will continue until around 2030, with other conserved artifacts, such as the *Monitor's* four-bladed propeller and assorted personal effects of the crew, featured in the Ironclad Revolution exhibit in The Mariners' Museum.

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F3 - JAMESTOWN

T. ARRON KOTLENSKY



Archeological excavation of the ca. 1623-50 brewhouse and apothecary at Jamestown, under excavation by John Cotter and Edward Jelks in 1954-55. HABS VA-444-1.

With a royal charter granted by King James I in 1606, the joint-stock Virginia Company aimed to establish a colony in North America to extract resources for sale in England. Under the leadership of Captain Christopher Newport, three ships of the Company—Susan Constant, Discovery, and Godspeed—arrived in Chesapeake Bay in May 1607. A little over a hundred men of the first landing built a fortified site on a low-lying island along the north shore of the James River, 40 miles upriver from Hampton Roads. James Fort was initially built to provide protection from Spanish attack (which never came), with the surrounding Powhatan Confederacy considered a secondary threat. But over four-fifths of the 214 colonists who arrived at James Fort from 1607 to 1609 succumbed to disease and starvation by 1610, leading to temporary abandonment of the fort that year. Before and during this “Starving Time,” the leaders of the colony directed workers to harvest timber for clapboards for export to England, while skilled Polish, German, and Slovak glassworkers were brought to the

colony in 1608 to make glassware for export as well. As the colony fitfully grew after 1610, additional small craft industries, including blacksmithing and brewing, were introduced as skilled tradesmen arrived in greater numbers, often as indentured servants. These craft industries increasingly relied on the profits generated from the cultivation and export of tobacco that became the main source of income for the colony by the 1620s.

The year 1619 saw the first Africans arrive in the colony; initially they were regarded as indentured servants by colonial leaders, but by 1640 they were legally redefined as permanently enslaved. By this period, the settlement had expanded beyond its earlier enclosure within and around James Fort to the surrounding Jamestown, with several dwellings, shops, and warehouses south and east of the original enclosure. Until 1699, Jamestown served as both capital and minor entrepôt for the expanding colony of Virginia, with increasing numbers of English

settlers claiming land across the Tidewater area. Their expansion led to conflict with the Powhatan Confederacy, who coordinated a major attack on the English in March 1622, leaving 300 of roughly 1,000 colonists dead. The attack included the nearby Falling Creek iron works, leading to its abandonment.

Jamestown failed to regain its importance after burning during Bacon's Rebellion in 1676, and the colonial capital moved to nearby "Middle Plantation" in 1699, soon renamed Williamsburg. Jamestown became an isolated community and eventually transitioned into a plantation. Interest in Jamestown as an historic site gained in the years leading up to the 300th anniversary

of the colony's founding in 1907. The Association for the Preservation of Virginia Antiquities (or APVA, and now, Preservation Virginia) formed in 1893 to preserve what remained of Jamestown. Archaeological investigations were undertaken in the 1930s and 1950s under pioneering historical archaeologists J. C. "Pinky" Harrington and John Cotter. In the 1990s under the direction of Dr. William Kelso, archaeologists determined that much of the original three-sided fort remained intact, with excavations continuing to the present.

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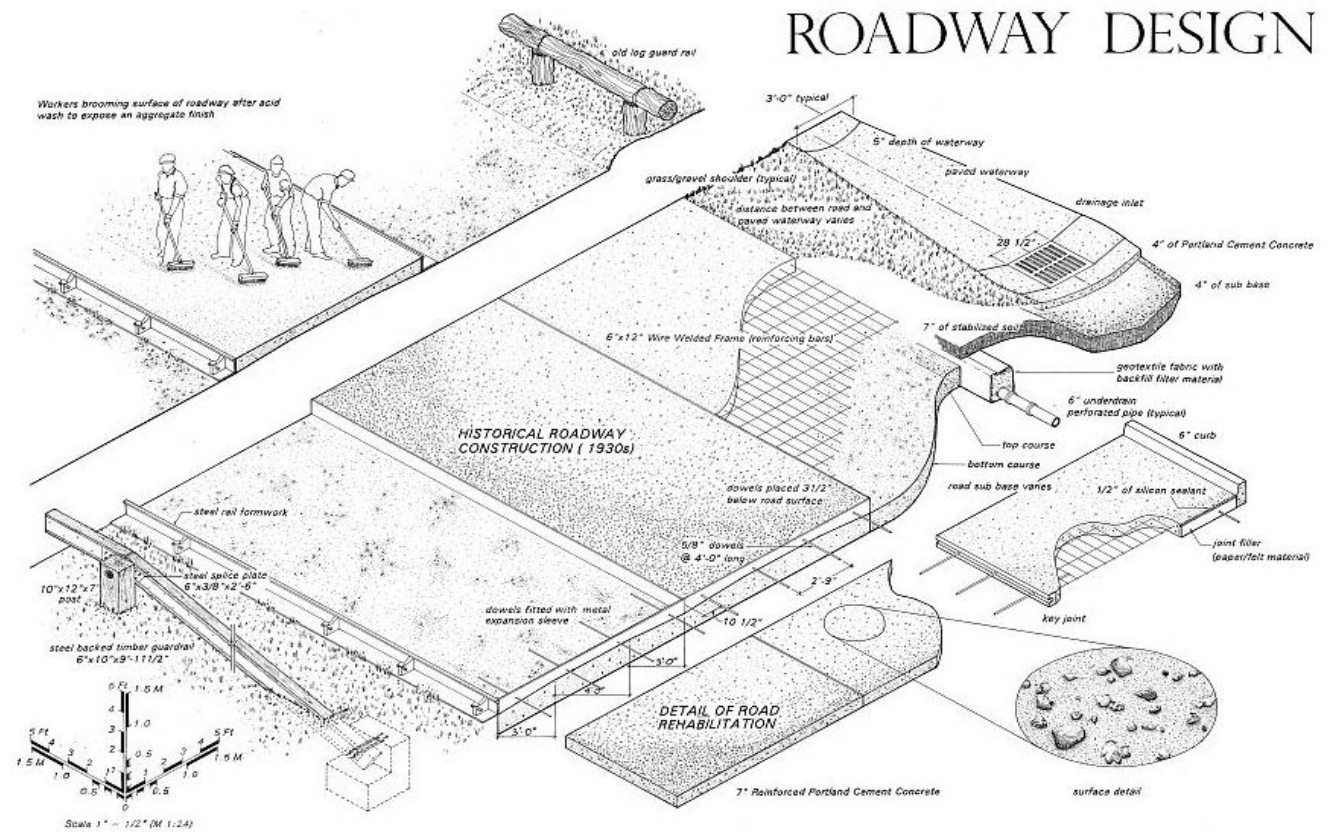
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F3 - THE COLONIAL PARKWAY

T. ARRON KOTLENSKY



Roadway design of the Colonial Parkway. HAER VA-48, sheet 4, Kevin Doniere, delineator, 1995.

Set within Colonial National Historical Park, the Colonial National Monument Parkway, or more commonly, the Colonial Parkway, is a 23 mile-long scenic parkway that connects Yorktown on the York River to Jamestown on the James River, passing through (and under) Williamsburg. First conceived in 1929, the Colonial Parkway was imagined as a limited-access corridor for motorists to travel between the three most visited sites of Virginia's Historic Triangle. Much of the interest in the creation of the Colonial National Monument (soon-after expanded into the present Colonial National Historical Park) was spurred from the revitalization of Williamsburg in the 1920s as a historical park, underwritten by John D. Rockefeller. The Colonial Parkway was designed as a two-lane drive with a 500-foot right-of-way to create a visual buffer between motorists and modern development that was considered intrusive to the historical character of the park. Initial surveys were undertaken in 1930 by engineer Oliver G. Taylor and landscape architect Charles E. Peterson,

both of the National Park Service (NPS). Drawing from recent experience in the construction of the Bronx River Parkway in Westchester County, New York, and earlier nineteenth-century ideas of bucolic landscapes, Taylor and Peterson designed the new parkway with broad, sweeping curves situated in a vegetated corridor that screened surrounding buildings from view. Political leaders, such as Virginia Governor Harry Floyd Byrd, viewed the parkway as a modern travel convenience that could attract visitors and their spending power to the Historic Triangle. Construction of the parkway commenced in 1931 but had only connected Yorktown with Williamsburg by 1937. Due to ongoing budget restraints followed by World War II, construction did not recommence until after the war, with the completion of the Williamsburg Tunnel and Halfway Creek Bridge. In 1955, with the 350th anniversary of the founding of Jamestown looming, the NPS completed the parkway to Jamestown Island. The Colonial Parkway remains today much as it was built, featuring a concrete



surface that was treated with a combination of water hosing, broom-brushing, and acid-washing to expose aggregate, with the intention to create “country road” visual appeal. The Colonial

Parkway’s overpasses and access ramps are reminiscent of similar period parkways built elsewhere, except that instead of using natural stone, they are faced with colonial brick.

C & O Railroad underpass over the Colonial Parkway. HAER VA-48-C. Bill Faust, photographer, 1996.

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TOUR SITES

F4 & S2 - JAMES RIVER AND KANAWHA CANAL

JESSE HARRIS, JOSEPH COSTELLO and WILLIAM E. TROUT, III

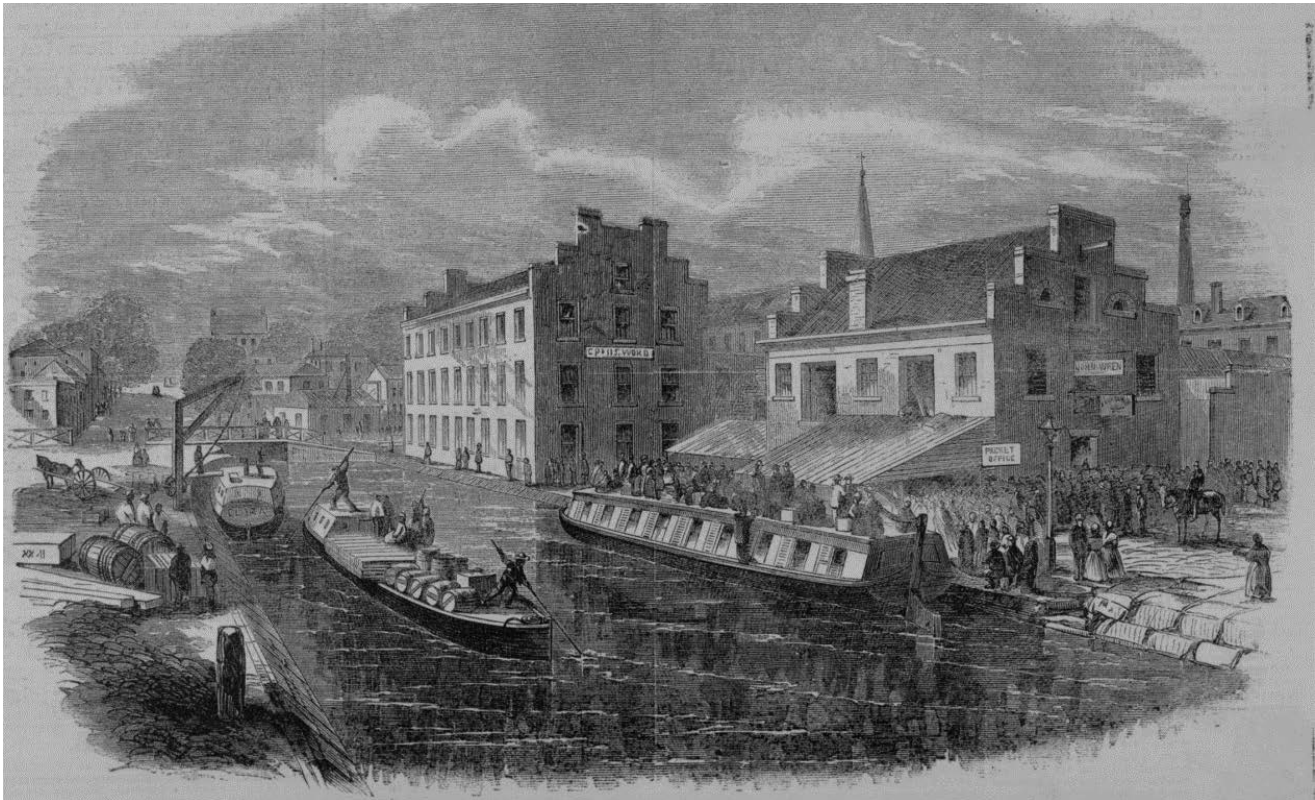


Byrd Park
Pumphouse.
HAER VA-34.

In its day, the James River and Kanawha Company was one of the largest corporations in America. It began as the James River Company over two centuries ago, in 1785, and elected George Washington as its first president. To Washington, the canal was more than a local enterprise. It was one of the vital commercial links needed to bind the Ohio and Mississippi valleys with the young United States, instead of with France or Spain. "The great object," he said, "is to connect the Western Territory with the Atlantic States; all others are secondary."

By the end of 1789, both of the canals around the falls of the James at Richmond were in operation, making the James River Canal the first operating navigation canal system with locks in America. It was designed for James River batteaux (large canoes) which ran the

white water except at the two canals, the Upper and Lower canals, around falls in Richmond. The Lower Canal had two stone locks and a protective stone arch at the entrance. This Lower Arch, which once had wooden gates, is still intact in Pump House Park. Washington passed through it in a batteau during his grand canal tour in 1791, with his crew all in red jackets. The Lower Canal was three miles long, from the Lower Arch down to Richmond's Great Basin, three blocks long and a block wide, where the Omni Richmond Hotel is now. At first, the canals were for white water batteaux. In the 1820s, the old canals were enlarged and rebuilt with a continuous towpath to take mule-drawn canal boats. The two stone locks now in Pump House Park are from that period. The new canal—the James River and Kanawha Canal—197 miles long



James River and Kanawha Canal. Harpers Weekly, 1865.

with a continuous towpath, was completed to Buchanan in 1851.

In 1880 the canal right-of-way became a railroad line, and the Great Basin became a rail yard. In 1983-1985, most of the Great Basin was dug up in downtown Richmond to construct the Omni Richmond Hotel and the James Center development. During the excavation, a graveyard of sunken boats and lost cargoes from the former James River and Kanawha Canal was unearthed. The discovery of original bateaux led Joe Ayers to build a replica and start the annual James River Batteau Festival, now in its 33rd year. Some of the basin's mud is still intact under streets, waiting for archaeologists. Thanks to hotel developer Henry Faison, the Omni is full of displays about the canal and the Great Basin excavation. The boats were discovered in the space where the parking lot is located under the hotel.

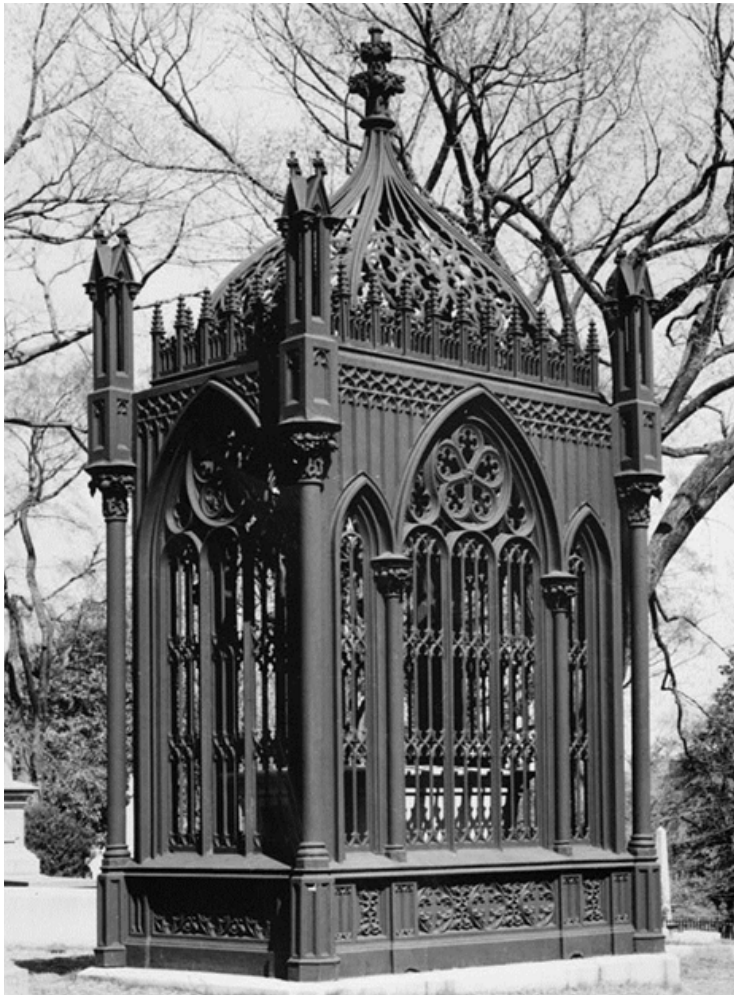
The canal tour begins at the Omni Hotel's front desk. There is a painting of the canal basin in the lobby, a bronze canal map on the atrium floor, and murals of the excavation at the bottom of the three glass elevators going down to the parking deck. Outside on Faison Plaza is a bell tower with a rotating batteaman, and

stones from the Tidewater Connection Locks laid out in the shape of two canal locks.

The tour continues on foot from Faison Plaza by walking to Reynolds Metals Tidewater Connection Locks Park. Five stone locks allowed canal boats to travel from the Great Basin down to the Richmond Dock to meet sea-going vessels. Two of the locks are left and were preserved by Reynolds Metals. Don't miss the stone arch marked with the initials of mill owners R.B. Haxall and L.D. Crenshaw.

The tour includes a Riverfront Canal Cruise along the Richmond Dock, ten blocks long. This was a harbor for sea-going ships. The tour boat captains provide an excellent narrative history of the canal. Note: The famous railway Triple Crossing can easily be seen from the tour boat. This is the only place in the world where three rail lines cross over top each other. It is just a short walk from the boarding point for those who wish to view it from that perspective.

Great Shiplock is a beautiful 1849 stone lock in a city park. Here ships as large as 35 by 180 feet were raised into the Richmond Dock, at the eastern end of the 400-mile JR&K Canal system. Don't miss the inscriptions at the lower



Monroe Tomb,
Hollywood
Cemetery.
HABS VA-843

end, facing the James River. The shiplock still has operable steel gates, but it is not in use since Norfolk Southern's railroad trestle blocks the canal.

To the left of the trestle, tour goers can see the concrete walls of William R. Trigg's shipyard lock, a huge lock intended to be 0.1 mile long to launch ships from his shipyard to the river. The lock was left unfinished when Trigg (who also founded the Richmond Locomotive Works) died in 1903.

Water power for the Tredegar Iron Works came from the Kanawha Canal, just up the hillside. The canal prism is dry now but the designer of a new arched bridge over it made sure that it is wide enough for canal boats when someday it is watered again. Nathan Madison will walk tour goers around the grounds.

Hollywood Cemetery is the final resting place for two American presidents, six Virginia governors,

two Supreme Court justices, 22 Confederate generals, and thousands of Confederate soldiers. The cemetery was designed in 1847 by noted architect John Norman of Philadelphia. James Monroe's Tomb, nicknamed "The Birdcage", is a cast-iron was designed by Albert Lybrock in the Gothic Revival style, cast by Wood and Perot of Philadelphia, and is a National Landmark Landmark. It was recently restored in 2016 for the 200th anniversary of Monroe's election as president. President John Tyler's monument was built in 1862. His death was the only one in presidential history to not be officially recognized in Washington, D.C. because of his allegiance to the Confederate States of America (CSA). Jefferson Davis, the only president of the CSA, was buried in Hollywood Cemetery beneath a life-sized statue amongst other members of his family.

Pump House Park sits in a scenic location at the Three Mile Locks of the original James River Canal system, the first locks opened in the United States. The park is home to Washington's Arch, built in 1791, which marked the official beginning of the James River and Kanawha Canal. President Washington envisioned this canal route connecting all the way to the Kanawha River (and eventually the Ohio River) in what is now West Virginia. However, the ambitious project made it less than halfway to its ultimate destination: Point Pleasant, 485 miles from Richmond, where the Kanawha meets the Ohio.

The Byrd Park Pump House is an impressive late nineteenth-century example of the Gothic Revival style, applied to a municipal industrial building. The building, which served as the city's waterworks from 1883 until 1924, is conveniently situated to draw water from the James River and Kanawha Canal as well as its own smaller canal. The facility pumped the canal-fed water uphill to the Byrd Park Reservoir, which served as the city's main water supply. The pump house site was also a popular gathering place in Richmond in the late nineteenth and early twentieth centuries.

The site inspired City Engineer Colonel Wilfred Emory Cutshaw to design the facility as a social venue as well as a waterworks. He provided for an open air dance pavilion on the second floor above the equipment room. The Byrd Park Pump House gained the reputation of being one of the only buildings in the country designed

and used as both a public utilities building and a social hall.

Main Street Station began its life as Richmond's official train station more than a century ago in 1901. It was designed in the French Renaissance style by Wilson, Harris and Richards Architects of Philadelphia (designers of the Reading Terminal). By the mid-twentieth century, flooding, downturn of the Shockoe Bottom district, increased popularity of air and auto travel, and the presence of the much-larger Broad Street Station (now the Science Museum of Virginia) led to the station's demise. Even after receiving recognition as both a State and National Historic Landmark in 1970, the station could not survive. Further deterioration occurred in 1972 when high waters from the James River flooded the station's first floor following Hurricane Agnes. A year after the last train service, fire damaged the station in 1976.

Main Street Station saw a hint of renewal in 1985 when a shopping mall opened in the train shed behind it. Flooding and economic hard times befell this venture, however, and the mall ceased operations two years later. In the early 1990s the shed became home to state health offices for 650 employees. With the prospects of multimodal transportation in Richmond's future, the city renovated and reopened Main Street Station to Amtrak service in 2003. Even with the protection of the city's floodwall, Shockoe Bottom was flooded again in 2004 by Tropical Storm Gaston. Today, Main Street Station continues to serve Amtrak travelers and serves as a popular venue for wedding receptions, private functions and corporate events.

Lumpkin's Jail. By the middle of the 1840s, the importation of human chattel from Africa had been outlawed and domestic slave trading had replaced international in supplying forced labor. New Orleans, a shipping port, and Richmond, a central city on the east coast, became the hubs for the transfer, sale and exchange of enslaved peoples from the various locations throughout the United States.

Lumpkin's Jail was located on a half-acre of land in what is now Richmond's historic Shockoe Bottom. The jail was known as "The Devil's Half Acre" because it was a holding pen; a punishment and breaking center for more than



300,000 enslaved persons from the 1830s until 1865, when Union troops took the city. Owned by slave dealer Robert Lumpkin, the jail was the largest antebellum slave trading site outside of New Orleans.

Lumpkin died shortly after the Civil War, when his African-American widow and former slave, Mary Lumpkin, inherited his estate. Mrs. Lumpkin leased the property to Reverend Colver in 1867, who used the land and buildings for a school to educate freed slaves. This new use of the jail earned the site a revised nickname, "God's Half Acre." The school later expanded and moved to a new location in 1870, eventually becoming Virginia Union University in 1899. In 2006, archaeologists were hired to excavate the buried site. During the course of digging, the James River Institute for Archaeology staff uncovered a large section of the cobble-paved central courtyard, the brick foundations of the kitchen building, a massive brick retaining wall that divided the site into upper and lower terraces, as well as the foundations of the former jail building itself. The excavation also yielded thousands of artifacts, including ceramics, bottles, glassware, animal bones, and many other everyday items discarded at the site throughout the nineteenth century. After the excavations were completed, the site was backfilled with dirt. The artifacts have been curated by the Virginia Department of Historic Resources. The Richmond Slave Trail Commission, established by Richmond City Council in 1998 to

Tidewater Connection
Locks 4 & 5,
looking east
from 12th St.
HAER VA-23-5.
Edward F.
Heite,
photographer,
1968.

help preserve the history of slavery in Richmond, included Lumpkin's Jail on a walking trail chronicling the history of the trade in enslaved Africans from their homelands to Virginia and

further south. In 2011, 17 Richmond Slave Trail Markers located throughout the East End of Richmond were dedicated to describe the role Richmond played in the history of slavery.

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Main Street
Station. HABS
VA-848.

SATURDAY BANQUET LOCATION

SB - FULTON GAS WORKS / STONE BREWING

NATHAN VERNON MADISON



On November 29, 1848, a city ordinance was passed in Richmond that called for the construction of “a suitable works for the manufacture and distribution of carbureted hydrogen gas from bituminous coal for the purpose of illumination through the streets, lanes, and alleys of the city.” By February 1851, a facility was erected on Cary Street, between 15th and 16th Streets, providing lights to city lamps and to over 600 private customers. That month, a general city-wide illumination was held to commemorate Washington’s birthday. However, it was quickly evident that the Cary Street location allowed for neither convenient access to unload supplies, nor room for expansion, and a secondary site was needed. There was also a fear on the part of many that locating the gasworks so close to the rest of the city could yield disastrous results, should a fire ever break out and reach the gasholders.

An 11-acre parcel, facing the foot of Chimborazo Hill to the north and Gillies Creek to the south,

in Richmond’s East End near the docks of Rockets, was chosen in 1853. The area in question was named for Irishman James Alexander Fulton who built a home for his new bride, Eliza Mayo in 1800. Christened Mount Erin, the estate was built upon land that was once occupied by the Powhatan tribe, and is the traditional site of the first meetings between Englishmen and Parahunt, the son of Chief Powhatan. The Fulton site was a vast improvement, as it allowed for expansions when needed, and coal from the nearby Midlothian coal mines could easily be shipped from Manchester, across the James River, and hauled to the works. Construction was completed in September 1856, and the production of gas for the city began the following month. A byproduct of gas production, a thick, viscous tar, was sold at the nearby docks, due to its use as a sealant for ships’ hulls.

During the Civil War, the Fulton Gas Works, along with the municipal waterworks and the Richmond fire department, were granted

Fulton Gas Works site as seen from the parking lot of Stone Brewing, Richmond. Photo by Christopher Marston.



Interior of the brew house at Stone Brewing's production facility in Richmond. Courtesy of Stone Brewing.

exemptions from service by the Confederate Congress to keep valuable employees manning the furnaces from conscription. Like many industrial concerns during the war, the gasworks were unable to procure new equipment until the end of the conflict, resulting in lower quality-gas produced for the public buildings, houses and over one thousand street lamps under the works' purview. In the years immediately after the war, many Richmonders switched to kerosene in their homes, rather than pay inflated gas prices due to the rising costs of lime and coal. In the 1870s, the gasworks' problems were compounded when it was discovered that several members of its administration had embezzled thousands of dollars from the works' annual budget. In 1885, the city began work on an electric power plant to power the city's street lamps, which had been switched from gas to electricity the previous year. In the 1880s, as part of general increase in infrastructure spending on the part of Richmond's city council, the Fulton Gas Works received much-needed repairs and renovations. Various private firms offered proposals to take over the gasworks' operations in succeeding years, but all were denied, ensuring that, through the early years

of the twentieth century, the Fulton Gas Works remained one of only five fully city-owned and city-operated utilities in the nation.

In the 1950s, pipelines began to carry natural gas to Richmond. In 1956, the Fulton Gas Works was shut down, the remaining buildings primarily used as a storage complex for propane gas. When Hurricane Agnes hit Richmond in 1972, the works were severely damaged and abandoned. Several structures from the Fulton Gas Works remain, including the steel frame of one of the facility's former gasholders.

As of March 2016, the eastern portion of the former Fulton Gas Works property serves as the parking lot for the Stone Company Store-Richmond. The new development represents Stone Brewing's first brewery along the east coast of the United States, twenty years after the founding of the company (now the ninth largest craft brewer in the United States) in San Marcos, California by Steve Wagner and Greg Koch. Much of the Stone Brewing complex occupies land once occupied by what is now called Historic Fulton, a neighborhood containing over 800 homes and businesses, that was demolished

during the city's Fulton Urban Renewal Plan of the 1970s. The 216,000 square foot Stone facility is capable of producing 600,000 barrels of beer a year at peak capacity, utilizing 40, 40,000-gallon fermentation tanks. Stone had plans to open a bistro and eatery in Richmond's nearby Intermediate Warehouse Terminal #3, formerly a sugar warehouse at 3101 East Main

Street and constructed in 1937. However, as of March 2018, Stone has decided the costs of needed upgrades and structural supports are not feasible, and the riverfront building is slated for demolition.

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TOUR SITES

S3 - RICHMOND RAILROAD MUSEUM

TYLER TURPIN and NATHAN VERNON MADISON

The Richmond Railroad Museum resides in and on the grounds of what was once the Hull Street Station of the Southern Railway. Organized in 1894, the Southern Railway was formed from the consolidation of the Richmond and Danville Railroad; the Richmond, York River, and Chesapeake Railroad; and several other lines running throughout the South. If taking into account all of the firm's predecessor railroads, the Southern Railway's origins arguably reach back to 1830 and the South Carolina Canal and Railroad Company.

The Southern built its Queen Anne-style depot located at 102 Hull Street in south Richmond (formerly the independent city of Manchester) in 1915. The depot is sheathed in Flemish bond brickwork with glazed headers and a Spanish tile

roof supported by decorative brackets. Architectural details include corbeled chimneys, and unusual sixteen-over-two wood double-hung sash windows. The Hull Street Station was one of six stations that the Southern Railway operated in Richmond, on both sides of the James River. In February 1957, the station was closed and leased to the Virginia Farm Bureau for storage purposes for several years. In 1982, the same year of a merger between Southern and the Norfolk & Western (which eventually led to the creation of the modern Norfolk Southern), the now-abandoned Hull Street Station was gifted to the Old Dominion Chapter (ODC) of the National Railway Historical Society (NRHS). The NRHS was founded by a small collection of 40 railroad historians and enthusiasts in 1935 and has since grown to count tens of thousands among



The restored 1923 H.K. Porter steam locomotive. Photos courtesy Old Dominion Chapter, NRHS.



its membership. The ODC was chartered in 1957, and has regularly held its meetings at the station since 1982. In 1987, a small museum opened up in a Railway Express car that had been moved to the property. The railroad museum was relocated permanently to the station's interior in November 2011, following years of much-needed renovations to the station itself, including the completion of Richmond's flood wall in the 1990s, which ended the annual floods which had plagued the site for decades. The Richmond Railroad Museum has on display a variety of restored station equipment and displays of Richmond area railroad history. There is a baggage car, industrial switcher locomotive, and caboose on display on the property surrounding the station. Its collection comprises a variety of artifacts, and memorabilia, including locomotives and rolling stock that operated locally for several different railroad lines and industries, featuring a restored 1923 O-4-O H.K. Porter steam locomotive.

Other former Richmond railway buildings that have survived beyond their original purposes and been given new leases on life include the former Seaboard Air Line Railroad Freight Depot, Broad Street Station, and Main Street Station.

The Seaboard Freight Depot, built in 1910, is located at 604 Hull Street in south Richmond. The one-story brick structure features a gable roof with extended overhangs, corbeled chimneys and raised pilasters at each corner. The original one-over-one wood double-hung sash windows

and four loading docks with wood doors survive. One can still read "1910 Seaboard" outlined in brick relief in the gable end facing Hull Street. The former depot is now occupied by Hull Street Sod Station.

Constructed between 1917 and 1919 from a neoclassical design by John Russell Pope, Broad Street Station served several rail lines. These included the Atlantic Coast Line Railroad, Norfolk & Western, and Seaboard Air Lines; it also served as the southern terminus of the Richmond, Fredericksburg and Potomac Railroad. With the completion of a new station on the outskirts of the city along Staples Mill Road, Broad Street Station closed in 1975. The magnificent structure was saved from scheduled demolition in January 1976 when it became the new home of the Science Museum of Virginia. Since its opening, the Science Museum of Virginia has preserved, updated, and expanded the station with its exhibits and theaters, and retains several reminders of Richmond's railway history, displaying a steam locomotive, a Richmond trolley car, several railway cars, and other artifacts. With construction beginning in 1900 and completed the following year, Main Street Station marked the crossroads for the then major north-south railroad, the Seaboard Air Line, and one of the principal east-west lines, the Chesapeake and Ohio. From the day it was opened, the station was regarded as "one of Richmond's most renowned buildings," as well as a prestigious ornament for the city, its iconic clock tower becoming one of Rich-

Former Southern Railway Station houses the Richmond Railroad Museum.

mond's most revered images. The station was built when rail travel was at its peak; however, by 1975 that traffic had declined to the point that the station was no longer of much use, and all passenger traffic ceased. Flooding of the first floor from Hurricane Agnes in 1972 and a fire in 1976 resulted in the station laying largely abandoned for several years, with the exception of the Virginia Department of Health renting out office space in the early 1990s in the station's former train shed. In 2003, under city ownership, Main Street Sta-

tion reopened to Amtrak passenger service; as of 2018 work is nearing completion on a full restoration of the building and its train shed, for use as a venue for public events and private rentals.

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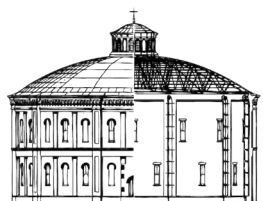
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