An Illustrated History
Of The
Rock Island Arsenal
And
Arsenal Island

Part Two

National Historic Landmark
FOREWORD

On 11 July 1989 the Rock Island Arsenal commemorated its designation as a National Historic Landmark by the Secretary of the Interior. This auspicious occasion came about due in large measure to the efforts of the AMCOM Historical Office, particularly Mr. Thomas J. Slattery, who spent many hours coordinating the efforts and actions necessary to bring the landmark status into fruition. Rock Island Arsenal Commander, Colonel David T. Morgan, Jr., was also instrumental in the implementation of the above ceremony by his interest, guidance, and support of Rock Island Arsenal’s National Historic Landmark, status.

Incidental to the National Historic Landmark commemoration, the AMCOM Historical Office has published An Illustrated History of Rock Island Arsenal and Arsenal Island, Part Two. Mr. Thomas J. Slattery is the author of this history and has presented a very well-written and balanced study of the beginning of Rock Island Arsenal in 1862 through 1900, including the arsenal construction period, the arsenal’s role in providing ordnance stores to the west, and its contributions during the Spanish-American War. This information was gathered from a number of primary and secondary sources including the author’s own files, the AMCOM Historical Office archives, and the Rock Island Arsenal Museum collection. Mr. Slattery would like to acknowledge the efforts of past and present historians who gathered and preserved historical sources maintained in the holdings of these two institutions. Mr. Slattery is especially appreciative of the contributions made in this area by his colleagues Mr. O. Bryan England, Mr. Ralph Krippner, and Dr. Robert Bouilly. Mr. Slattery would also like to thank Mr. Daniel Whiteman, Rock Island Arsenal Museum Director; and Mrs. Kris Leinecke, Rock Island Arsenal Museum Curator; for the use of the U.S. War Department’s War of Rebellion series, a compilation of the official records of the Union and Confederate Armies; and the Rock Island Arsenal Commander’s Annual Report to the Chief of Ordnance from 1871-1900.

Mr. Slattery’s history illustrates well the importance of individuals such as Thomas J. Rodman and Daniel W. Flagler in the construction of the great stone buildings which still stand today and serve as a silent tribute to these arsenal commanders. The history also addresses problems experienced during the construction of the arsenal. The reader will hopefully be enriched and educated by having learned something about Rock Island Arsenal’s illustrious past, and how the past has impacted upon the present arsenal as it continues to serve our nation.

Colonel David T. Morgan, Jr., is accorded special thanks for his support and enthusiasm. Special thanks are also extended to Mrs. Carol L. Secoy and Ms. Nancy Newton of the AMCOM Historical Office for respectively providing exemplary editorial and administrative support for this history. In addition, gratitude is extended to the Field Printing Office for its professional assistance.

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AN ILLUSTRATED HISTORY
OF THE
ROCK ISLAND ARSENAL AND ARSENAL ISLAND
PART TWO

By
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CHAPTER FIVE
SOLDIERS RETURN TO ROCK ISLAND

The history of Arsenal Island is divided into several periods of government occupancy. These periods are mirrored in the divisions of this history. Part one focuses on the federal government’s acquisition of the island; the reasons for this acquisition; the Fort Armstrong era; and the subsequent caretaker period which ended in 1863.

The Black Hawk War, the last Indian uprising in the state of Illinois, resulted in hostile tribes being transferred to reservation camps west of the Mississippi River, thus ending the Indian threat in Illinois. Therefore, with the need for Fort Armstrong diminished, the federal government reduced the fort’s status to that of a depot. From 1845 to 1863, a number of War Department civil custodians managed the affairs of Rock Island.

During the American Civil War, 1861-1865, the United States Army returned to Rock Island. This was the beginning of the second, or arsenal construction period which continued until approximately 1908 when the original Arsenal was completed and had its first test in meeting the demands of the Spanish-American War and the subsequent retrenchment. This second period began on 11 July 1862, when the United States Congress passed an act which established an arsenal on Rock Island. The next year, the Army Ordnance Department started construction of a storehouse on the western tip of the island, near the ruins of Fort Armstrong. This storehouse, completed in 1867, and known today as the Clock Tower Building, was the first permanent arsenal building erected.
A total of 12,192 Confederate soldiers were confined at Rock Island during the Civil War years of 1863-1865. The camp, constructed on the north central shore of the island, consisted of 84 wooded barracks and a variety of ancillary buildings. However only the Confederate Cemetery remains as a reminder of the prison’s existence.

CHAPTER SIX
ROCK ISLAND PRISON BARRACKS

During the Civil War the Union Army’s Ordnance Department had company on the island. Two separate army units operated on Rock Island during the last two years of the Civil War. Several months prior to initial construction of the Clock Tower Building in 1863, the U.S. Army Quartermaster Department began to build a prisoner of war camp on the north central section of Rock Island. The Union Quartermaster General Montgomery Meigs became aware of the island’s advantages in 1837 when he assisted a young army lieutenant named Robert E. Lee in surveying the upper rapids of the Mississippi River at Rock Island. General Meigs then ordered Captain Charles A. Reynolds to build a prison barracks large enough to accommodate 10,000 prisoners of war. In August 1863, Captain Reynolds began construction of the prison barracks near the north central shore of the island.

The prison, rectangular in shape, covered approximately twelve acres of land. Eighty four wooden-framed barracks, 22 x 100 feet in size, arranged in six rows of fourteen barracks each, comprised the containment area. Each barracks had a kitchen, with a stove and a forty gallon kettle for cooking, located at the west end of the building. Captain Reynolds built enough bunks in each barracks to accommodate 120 prisoners. A main avenue running east to west divided the camp and led to the two main gates. The barracks were enclosed by a twelve foot high rough board fence. A guard platform built four feet from the top of the stockade fence, on the exterior side, had a sentry box every 100 feet. Trenches maintained inside the fence served as a warning line. Sentries were ordered to fire at prisoners venturing beyond this point. The “dead line” supposedly deterred prisoners from tunneling under the stockade. In addition, the closeness of bedrock to the surface prevented tunneling near the southern side of the stockade.
Persons visiting the Rock Island Prison Barracks were required to obtain passes issued under the order of Colonel A.J. Johnson, prison commandant.

Colonel Adolphus J. Johnson, commanding officer of the Rock Island Barracks for most of its operational period.

The barracks were numbered consecutively from one to eighty four, and each building had a prisoner who served as sergeant of the barracks. Wooden bunks in three tiers, one above the other, extended the length of each building on each side.

The commandant of the prison, for all but a few early days of its twenty-month existence, was Colonel Adolphus J. Johnson. The government selected the Rock Island site for the prison for basically the same reasons it had chosen the island as the location for the new western arsenal—security, location, and space. In addition, government ownership made the island a prime location for both a prison camp and an arsenal. 

By the time the Rock Island Prison Barracks received its first Confederate prisoners-of-war in December 1863, the Union Army had established 21 other prison sites. During the course of the war, some of these prisons closed, while new prisons opened.

Prior to the arrival of the first Confederate prisoners, Colonel William Hoffman, the Union’s commissary general of prisoners, inspected the Rock Island Prison Barracks in November 1863. A few days before Colonel Hoffman’s visit, several barracks at the Camp Douglas prison near Chicago were destroyed by fire, thus necessitating the apparent relocation of some of the camp prisoners. It has been surmised that some of the Camp Douglas prisoners may have been sent to the Rock Island Prison Barracks. However, it is not certain whether this transfer actually took place.

Construction of the Rock Island Prison Barracks was behind schedule from the start. In the rush to organize prison camps to handle the influx of southern prisoners, the Rock Island prison opened before it was completed. Some of the prison guards were quartered in tents, others in local communities, and still others in cheap shanties built to house prisoners of war. Union Quartermaster General M.C. Meigs, in a letter dated 12 August 1863, instructed Captain C.A.
Reynolds that: "That barracks for prisoners at Rock Island should be put up in the roughest and cheapest manner – mere shanties, with no fine work about them."70

The first 488 Confederate prisoners arrived at Rock Island by train on 3 December 1863. They had been captured in the Battle of Lookout Mountain in southeastern Tennessee. Hundreds of curious citizens gathered to watch the prisoners be unloaded on the far western edge of the island. In an effort to control the crowd, local police officers and their deputies confined the spectators to a roped-off area. The prisoners were marched past the crowd a mile or so inland to the prison.71

Within a few weeks the prison population rose from the original 468 to over 5,000 prisoners. Eventually, the prison population grew to 8,594 prisoners, the largest number of prisoners held at any one time at the Rock Island Prison Barracks.72

Though the prisoners’ existence at the Rock Island Prison Barracks was harsh, especially by present day standards, living conditions were relatively typical of prison camps in the north. Most southern prisoners had difficulty adjusting to the cold winter of the North and, unfortunately, the first prisoners arrived during a severe cold spell with temperatures plummeting to thirty degrees below zero Fahrenheit. Not long after the prison had opened, the supply of winter clothing and blankets for the prisoners became depleted; however, nearby coalfields provided each barracks with sufficient heating coal to burn in the barrack’s stoves.

Diaries kept by Confederate prisoners and recollections written after the war were two valuable sources of material regarding prison conditions at Rock Island. One prisoner at the Rock Island Prison Barracks, Lafayette Rogan, recorded in his diary these comments in regard to the winter he experienced at Rock Island:
Below: An illustrated view of the Rock Island Prison Barracks depicting sentinels, gate, barracks, and prisoners. The first Confederate prisoners arrived by prison train on 3 December 1863 during a particularly bitter cold spell. Ill-clothed for severe winter weather and carrying smallpox disease among them, many of these prisoners died at Rock Island during their confinement.

1 January 1864 – The coldest day I have ever felt. Thermometer 30 (degrees) below zero...
3 January 1864 – I suffer greatly for blankets. Many fellows have no blankets yet and are very thinly clad. Such men suffer terrible. We sleep by reliefs (to man the fires in the barracks) and fill each bunk heads and tails fashion. I fear that disease and death will be the result of all this suffering. Deaths have already occurred from freezing.73

In addition to surviving the bitter winter cold of the North, Confederate prisoners had to endure exposure to a deadly smallpox epidemic, among other contagious diseases. Within days of the barracks opening, the prison was hit by the smallpox. In a hurry to complete the camp's construction, the Quartermaster Corps had failed to erect a prison hospital. Without a hospital, adequate medicine, or a well-equipped medical staff, hundreds of prisons and prison cadre became infected. Initially, prison doctors diagnosed ninety-four cases of smallpox among the first prisoners. Unfortunately, they did not detect all the cases, and those that processed into the camp undetected exposed the entire camp to the dreaded disease.74 Colonel Johnson, the prison commandant, arrived only a short time after the prison was constructed and had little time to address and ameliorate logistical problems relative to the well being of the prisoners.

Conditions did not improve at the Rock Island Prison Barracks until Ambrose M. Clark, assistant surgeon general, arrived in February 1864 to inspect the island camp. He immediately instituted corrective measures such as establishing a temporary hospital isolation ward in fenced-off barracks and ordering a half-dozen pest houses be built on the southern shore of Rock Island, away from the prison. During his stay at Rock Island,
from 10 February to 4 March 1864, Surgeon Clark had plans drawn up for an adequate hospital, sufficient to care for the non contagious disease cases. His report to Colonel Hoffman stated, “The most urgent necessity exists for the speedy completion of this (prison hospital) building. For in the great rush to open the prison, not only was the building of barracks for the cadre not completed but the construction of a prison hospital was overlooked.” Clark also noted the conditions which enhanced the spread of smallpox, such as the faulty drainage system of the prison compound. The prison was situated in a low land area of the island, causing water to drain in, rather than out, of the camp. Therefore, during the spring of 1864, the camp ground was constantly wet and muddy. Clark also noted that a marsh located near the southeast corner of the prison would have to be drained before summer.

Approximately two months later, in April 1864, Clark returned to inspect the Rock Island Prison Barracks and filed his report to Colonel Hoffman on 8 April 1864. In his report Clark described the prisoners’ living conditions at Rock Island as having somewhat improved. He found the prison barracks well-heated, ventilated, and sufficiently stocked with food and blankets. However, Clark reported that the corn bread tasted rancid to the prisoners and made them ill; the condition of the prison grounds and its water supply were still poor and several unsanitary conditions and practices still continued at the prison. The latter included prisoners tossing their kitchen refuse and wash water on the ground near their barracks. The wash water contributed to the standing water and muddy conditions of the grounds within the stockade. Collectively, the garbage, standing water, and muddy grounds severely hindered the prison’s already inadequate drainage system. Prisoners also emptied and washed barrels from their privies in the river twice a day. Only makeshift laundry facilities were available to the prisoners, and according to Clark, not heavily used.

Clark further noted in his April report to Colonel Hoffman that improved sanitary conditions and new clothing for convalescents
were necessary to stem the camp’s smallpox epidemic. The surgeon general attempted to purify and disinfect the prisoners’ clothing by thoroughly boiling the clothes; then subjecting them to the fumes of burning sulfur; and finally, a second boiling. This method seemed to effectively destroy the infection since no new cases were traced to the use of the boiled clothing. Later, however, Clark commented that he did not trust this procedure and thought new clothing should be furnished to all prisoners who had been released from the hospital and returned to their quarters.  

Under Surgeon Clark’s instructions, all soldiers and prisoners infected with smallpox were quarantined in the newly erected pest house on the south shore of the island. Other corrective measures were undertaken by Clark, such as the construction of a sewage system to improve drainage and sanitation conditions, and the development of a sufficient water supply system in the prison.

The post surgeon’s morning report of sickness for 4 March 1864 provided some insight into the epidemic faced by the medical staff of the Rock Island Prison Barracks. Surgeon William Watson, U.S. Volunteers, listed 350 prisoners sick in their quarters and 714 in the temporary barracks hospital. Of those in the hospital, 420 were smallpox cases.  

As previously mentioned, the death toll from disease increased steadily among prisoners and guards after the camp opened in December 1863. Smallpox claimed 98 prisoners and three guards in December 1863; 231 prisoners and four guards in January 1864; and 350 prisoners and ten guards in February 1864. The War Department, alarmed by these statistics, reversed an earlier directive issued by Colonel Hoffman which had halted construction of the Rock Island Prison Hospital. After pest houses and laundry facilities were constructed, as recommended by Assistant Surgeon General Clark, a gradual decline in smallpox cases and deaths occurred.
Below: The Rock Island Prison administrative buildings, possibly after the Rock Island Arsenal assumed control of them following the Civil War. Since, traditionally, post flagpoles were planted near a headquarters building it could be assumed that these structures were temporarily administrative buildings for the arsenal.

Clark also ordered the relocation of the original Rock Island Confederate Cemetery, which had been adjacent to the prison compound, to its present site. During the twenty months that was in operation, more than 1,964 Confederate prisoners died while confined at the Rock Island Prison Barracks. Smallpox, combined with pneumonia and diarrhea, accounted for the majority of these deaths. In the same time frame, 171 Union guards died of diseases or exposure to the elements while serving guard duty. The bodies of dead Union soldiers not claimed by their families were reinterred in the current Rock Island National Cemetery on Arsenal Island.

Because of the smallpox epidemic at the prison, the government issued the following instructions through the Rock Island Argus newspaper:

Visitors to these stations, out of mere curiosity, will in no case be permitted. Persons having business with the Commanding Officer, or Quartermaster, may, with the permission of the Commanding Officer, enter the camp to remain only long enough to transact their business. When prisoners are seriously ill, their nearest relatives, parents, wives, brothers or sisters, if they are loyal people, may be permitted to make short visits; but under no other circumstances… (will) visitors be allowed to see them without the approval of the Commissary General of Prisoners.

The prison commandant, Colonel Johnson, initially permitted the southern prisoners to receive clothing and food packages from sympathetic local citizens, friends, and relatives. Colonel Johnson also allowed the prisoners to correspond with their relatives and friends, but their unsealed letters were censored at the prison by Captain A.D. Collins, post quartermaster, and Colonel Hoffman. Letters
left: Clam shell trinkets carved by Confederate prisoners at the Rock Island Prison Barracks. The prisoners used them to barter and to sell to guards and visitors.
right: Confederate soldiers making trinkets out of clam shells from the Mississippi River.

Books provided a temporary escape from the monotonous routine of a prisoner's life. Other diversions undertaken by prisoners included attending church services, organizing skits, forming singing groups, gambling, and debating the many issues of the war. Tobacco, blankets, clothing, books, and personal items, acquired in several different manners by the prisoners, made their incarceration bearable. Some of the prisoners volunteered their labor on prison construction projects, such as the building of the prison sewer system; and each prisoner that worked, depending upon his skill, received a credit of five to ten cents a day on his account at the prison sutler store. Enterprising prisoners also used their craft skills to fashion rings and trinkets from available material such as gutta percha (a hardened tree sap or resin) and mussel shells. These ornaments were inlaid, cut out, and often polished into the shapes of eagles, doves and fish. The trinkets were traded or sold to the guards for tobacco or peddled to local citizens.

By 1864 the North had become aware of the wretched conditions that Union soldiers had been enduring in southern prisons. The report of deplorable treatment of Union prisoners of war at Andersonville, Georgia, site of the infamous Confederate prison, caused bitter resentment in the North. In June 1864, Secretary of War Edwin Stanton ordered Union prisons to enforce stricter rules for Confederate soldiers.

At the Rock Island Prison Barracks, Colonel Johnson zealously followed these instructions. He restricted the type of packages prisoners could receive from relatives and friends by no longer accepting food baskets addressed to individual prisoners. Instead, Colonel Johnson had these baskets delivered to the sick wards. Only clothing packages were to be received by individual prisoners. Further restrictions included prohibiting
the sutler’s wagon from entering the compound and doing business with the Confederate prisoners. Supposedly, in response to conditions at the Andersonville Prison, Colonel Johnson also ordered that prisoners’ rations be reduced to fourteen ounces of bread and twelve ounces of “fresh” beef. In addition, the prisoners were to receive a quart of hominy per man each day. The Southerners made hominy soup and also boiled other food, serving it in sauce pans produced from canteens and burned-out stove pipes. The prisoners had a difficult time swallowing the course yellow corn bread provided by the prison and asked for flour to bake white bread, with varying degrees of success. At times slab bacon was added to the prisoners’ diet. Years after the Civil War, former Confederate prisoners who had been incarcerated at Rock Island during the war wrote colorful accounts which depicted episodes of prisoners eating stray dogs and cooking rat stew.85

Many southern prisoners suspected that harsher rules ordered by Colonel Johnson were part of a Union plan to reduce their allegiance to the South, and entice them to join the Union Army. If so, the program enjoyed a measure of success.

On 8 December 1863 President Abraham Lincoln had announced his Amnesty Proclamation to Confederate prisoners. Confederate prisoners who pledged their allegiance to the United States and who agree to enlist in the Union military service would receive amnesty. These “galvanized Yankees” were recruited to fight Indians on the Western Frontier and to man Union ships on the high seas. At the urging of General Ulysses S. Grant, Lincoln agreed not to employ former Confederate prisoners on the battlefield against their fellow southerners. In the heretofore mentioned Diary of Lafayette Rogan 1863-1865, Rogan, a prisoner-of-war clerk at the Rock Island Prison Barracks, recorded briefly in his 9 February 1864 entry,... “Navy Roll of 644, traitors to our country (was) completed today.”86 On 1 September 1864 President Lincoln wrote the following to War Secretary Edwin Stanton:

...there are at Rock Island, Ill., as rebel prisoners of war many persons of northern or foreign birth, who are unwilling to be exchanged and be
sent South, but who wish to take the oath of allegiance and enter the military service of the Union.87

Within a few weeks after President Lincoln’s proclamation, Rogan again wrote in his diary, “Yanks make a call for volunteers offering $100 for (a) year as bounty and promise not (to) oppose them... (by returning to) the rebel Army.” The next day Rogan’s entry read: “The heart grows sick and the soul sinks within me when I see so many deserting our (South’s) cause. From 1,500 to 2,000 of the prisoners here will enlist for frontier service.88 Another Confederate prisoner, B.M. Hord, wrote an article in 1904 for Confederate Veterans Magazine titled, “Forty Hours in a Dungeon at Rock Island,” in which he states that those who took the oath and joined the Union Army or Navy were moved to a new pen for their protection. Twelve barracks in the southeast corner of the enclosure, near the main entrance to the prison, were cordoned off and the occupants transferred to other barracks. No longer technically prisoners, these new Union recruits were furnished with the clothing and rations of a Union soldier. Southern soldiers who remained loyal to the South stayed in the main compound called the Bull Pen. During the camp’s existence, nearly 3,000 rebel prisoners “escaped” the confines of the Rock Island Prison Barracks by volunteering for frontier or sea duty within the Union Forces.89

Prison records cited forty-one successful escapes. Colonel Johnson reported the details of one such escape to Colonel Hoffman in a letter dated 25 June 1864:

COLONEl: I have the honor to report that on the night of the 14th instant ten prisoners of war made their escape from the prison enclosure by tunneling under Barracks 42, their egress being made directly under the parapet. The last two were discovered by the sentinel, who gave the alarm, and all necessary measure taken for their
recapture, which has resulted in securing seven of them. Three were taken on the island, four near Rock River, about four miles distant, and one was drowned in attempting to cross the slough. Mounted patrols have been on the track of the remaining two until today, with the fair prospect of taking them. Barrack 42 was used for a variola ward during the prevalence of that disease and while the pest houses were being erected, and has been kept unoccupied since by request of the surgeon. The tunnel was made on the south side of the prison. Deep trenches had been made on the north, east, and west sides to prevent tunneling, it being deemed unnecessary to trench on the south side in consequence of the rock coming so near the surface. A trench has now been made down to the rock on that side also.\textsuperscript{90}

The Confederate prisoners were guarded by troops of the 4\textsuperscript{th} Regiment of the Veterans Reserve Corps; the 37\textsuperscript{th} Iowa Regiment; various “100 day” volunteer regiments; and the 108\textsuperscript{th} U.S. Colored Infantry Regiment. The 4\textsuperscript{th} Invalid Corps Regiment was a veteran reserve organization comprised of wounded soldiers who were no longer fit for regular military service. Under the command of Colonel Richard H. Rush, the 4\textsuperscript{th} Invalid Corps were the guards at the Rock Island prison when the camp received its first Confederate prisoners in December 1863. Shortly thereafter, Colonel Johnson arrived at Rock Island and assumed command of the prison barracks in January 1864. In the same month, the 37\textsuperscript{th} Iowa Volunteers Regiment arrived to supplement the guard force.

The 37\textsuperscript{th} Iowa Volunteers, known as the “gray beard” regiment, was comprised of men too old for conscription. George Washington Kincaid, an Iowa pioneer settler and member of the state’s
First Constitutional Convention sought first federal, then state, permission to form a unique regiment of men too old to enlist in the Regular Army. Iowa Governor Samuel J. Kirkwood granted his approval and appointed Mr. Kincaid the commanding officer of the 37th Iowa Volunteers. The regiment of “gray beards” was exclusively composed of men forty-five years of age or older; 428 men over the age of fifty, 145 of which were in their sixties, and one man, Curtis King of Muscatine, Iowa, who was eighty. Attractive as a public relations endeavor for the Union Army, the “gray beards” were to be exclusively used as garrison and guard troops. Used in this capacity, the 37th Iowa Volunteers relieved troops better fit for combat duty. The uniqueness of being the oldest regiment to serve in the U.S. Army initially earned the regiment celebrity status in the North. Among these troops were men who had prior military service dating back to the War of 1812. However, the novelty of federal service eventually wore off under the strain of everyday and the bone chilling winter winds that whipped across Rock Island.  

In October 1862, the 37th Iowa Volunteer Regiment was comprised of ten companies when it was mustered into the army at Camp Strong, near Muscatine, Iowa. The “gray beards” initially served provost and garrison duty in St. Louis, Missouri, and earned commendations and praises for their service in St. Louis, Missouri and Alton, Illinois. However, they did not receive accolades for their duty at Rock Island. In April 1864, Lieutenant Colonel John F. Marsh inspected the prison barracks for the Inspector General’s Office. His written findings included this critical comment regarding the “gray beard” regiment. “(A) regiment of decrepit old men and the most unpromising subjects for soldiers I ever saw.” In another instance, Surgeon August M. Clark reported to Colonel Hoffman concerning his inspection of the Rock Island Prison Barracks:

Colonel Kincaid, Thirty-seventh Iowa
Volunteers, (should) under no circumstances placed in command of their post. He is altogether too slow and easy, and his officers and men appear to have no idea of the value of discipline.94

On 24 September 1864, the U.S. 108th Colored Infantry Regiment, commanded by Lieutenant Colonel John Bishop, a white officer, arrived by train to assume guard duty at the Rock Island Prison Barracks. The regiment’s recruits, primarily from the slave population of north and west central Kentucky, enlisted for a three year term of service.95

Confederate prisoners expressed first indignation, then anger, over the prospect of armed former slaves in uniform guarding over them. Lafayette Rogan expressed these emotions in his diary, writing, "A regt (regiment) of contrabands arrived at this post for garrison duty." His next day entry read: “The contrabands have no yet come of the parapet. We hate it but I suppose we must submit to this indignity… (as) we have to other.” Two days later, Rogan wrote: “8,000 Southern men today are guarded by the slaves who have been armed by the tyrant. One of our number was killed and two wounded last night in cold blood.”96 It was not long before black guards had earned a reputation for shooting prisoners. Prisoners accused the guards of firing without provocation into their barracks and shooting prisoners without cause. However, in at least one instance, the post commander, Colonel A.J. Johnson, appointed a commission of officers to investigate the shooting death of a prisoner; and after deliberating on the evidence, the commission acquitted Private John Cowherd of Company C. 108th U.S. Colored Infantry Regiment, of all blame in the shooting of John P. McClanahan, prisoner of war, assigned to Barracks 8. The commission ruled that Private Cowherd acted in accordance with the spirit of his instructions, and discharged his duty as a good soldier and faithful sentinel.97
Prisoners and guards who disobeyed orders were often assigned to “ride” a narrow wooden rail, known as “Morgan’s Mule”. The guilty party “rode” the rail for several hours with his feet dangling above the ground.

The 108th Colored Infantry Regiment remained at Rock Island until May 1865. On the eve of their departure to Mississippi, the Rock Island Argus commented, “the colored soldiers, as a general thing, have conducted themselves with great propriety, since they were stationed here.”

In a separate section of the National Cemetery, at the far east end of the island, are fifty graves of the men of the 108th who died while serving the Rock Island Prison Barracks. Also buried in this section were the sixteen southern “galvanized Yankees” who died prior to being assigned to the Western Frontier.

A total of 12,192 prisoners were confined to the prison barracks during its existence. Of this number, 730 Confederate prisoners were transferred; 3,876 exchanged; and 5,581 released. The last two prisoners were released from the prison hospital in July 1865. After the prison was closed, the 207 buildings, including the prison barracks, hospital, and garrison building, were turned over to the Arsenal. All of these structures have long since been razed. The last vestiges of the prison disappeared in 1909. Only the Confederate Cemetery remains as a permanent reminder of the existence of the Rock Island Prison Barracks.

The cemetery was relocated to its present site in February 1864. Between 1906 and 1912 a congressional commission responsible for marking the graves of Civil War dead provided the grave markers. Each year Memorial Day commemorative ceremonies are held at the cemetery.
Prior to the Civil War, prominent army officers such as Brigadier General Thomas S. Jesup, Quartermaster General, expressed the importance of Rock Island. In 1852 General Jesup wrote:

The site of Fort Armstrong, Rock Island, is one of the most valuable in our western country for an armory. The whole water power of the Mississippi River is available there. The island is under the control of an agent, who resides on it, and who is under the order of, and reports to, the quartermaster of Saint Louis. The agent should protect the property from depredation. I would not advise that any part of it be rented or leased.\textsuperscript{101}

The legislation which authorized the building of an arsenal at Rock Island in July 1862 envisioned only a small facility designed for the “deposit and repair” of ordnance and provided $100,000 for the building of the Arsenal. Besides Rock Island, Indianapolis, Indiana, and Columbus, Ohio, were designated as additional sites for the building of other small arsenals.\textsuperscript{102} As a result of the destruction of Harper’s Ferry Armory, in Virginia, Congress realized the necessity of federal arsenals being far from the Mason-Dixon Line. Rock Island, being situated in the upper Mississippi River, satisfied this criteria. None of the Arsenal buildings, however, were completed at Rock Island during the Civil War.

Shortly after Congress had passed the Act of 11 July 1862, establishing an arsenal at Rock Island, General C.P. Buckingham conducted a preliminary inspection of the island for the War Department. On 24 October 1862, he wrote to the Secretary of War:
Right: Edwin M. Stanton served as Secretary of War during the period in which plans for the Rock Island Arsenal were expanded and upgraded to include manufacturing operations.

The island is, without a doubt, the best place for an arsenal. The only question connected with the location of an arsenal at this point is, I conceive, whether it shall be at the upper or lower end of the island... I think the advantages of the lower end of the Island for the purpose of an arsenal are superior to those of the upper end.\textsuperscript{103}

In 1862 the army appointed a board of officers to inspect the island and to recommend a construction site for the first buildings. The officers were to further report on the type of construction material to be used for the buildings. The board consisted of three ordnance officers: Major C.P. Kingsbury; Major F.D. Callendar; and Captain T.J. Treadwell. In their report to the Chief of Ordnance, the officers recommended the first Arsenal building, designated “Storehouse A” and today known as the Clock Tower Building, be constructed on the western tip of the island. The officers also recommended limestone from LeClaire, Iowa, as the building material for the Arsenal structures.\textsuperscript{104}

As views of prominent military leaders such as General George D. Ramsey, Chief of Ordnance, became known, sentiment in Washington began to develop for a larger arsenal that had originally been provided for in the Act of 11 July 1862. General Ramsey, in a February 1864 letter to Secretary of War Edwin Stanton expressed his views on the advantages of having a manufacturing arsenal at Rock Island.

...After a careful study of this question of location, there is no position which, to my mind, affords too many advantages, and, at the same time, presents so few objections, as Rock Island, in the Mississippi River.
Below: The original location of the Chicago, Rock Island and Pacific railroad tracks across Arsenal Island and the site of the first railroad bridge from the island to Davenport, Iowa. Relocation of the tracks and bridge to the far western edge of the island in 1872 allowed the Arsenal to use the entire island for expansion. Note: Storehouse A (Clock Tower Building) was situated east of the proposed bridge and track route.
Right: Major Charles P. Kingsbury was one of the three ordnance officers that selected the site of the first Rock Island Arsenal building. Afterwards, he became the Arsenal’s first Commanding Officer and supervised its construction from 3 August 1863 to 16 July 1865. In addition to his duties as Commander, Major Kingsbury armed and equipped Iowa, Wisconsin, and Minnesota Volunteers during the Civil War.

In a military point of view it is perfectly secure from an enemy, advancing either by the lakes or the river. From it, supplies can be transported in any direction and at any season of the year. It is in the midst of a country teeming with coal and wood, and especially adapted to agriculture—an important element in cheapening labor. The site is elevated far above river floods, the climate and situation are health(y), and while the island is sufficiently isolated to secure it from sudden attacks, it is near enough to the cities of Rock Island and Davenport to afford ample accommodation for all necessary employees.105

The board of ordnance officers submitted the following report to the Ordnance Office, dated May 18, 1863:

The undersigned, appointed a board under orders from the Ordnance Office, dated May 6, 1863, to select a site for certain buildings pertaining to the proposed arsenal at Rock Island, respectfully report: That they have carefully examined the ground at the lower end of the Rock Island, selected by the War Department for United States arsenal, and recommended that the front of the principal storehouse be on the prolongation of a line drawn from the southwest corner of a wooden building, now occupied by a tenant, (possibly the old General Winfield Scott headquarters or one of the old Fort Armstrong buildings) and that the southwest corner of said storehouse be placed at a point of this line 300 feet distant from said wooden building, the said line... (bearing) about south 40 degrees, west.106

In addition, the board selected two possible sites for an ammunition magazine, also on the west end of the island. Once the officers’ final report was approved, Major Charles P. Kingsbury was appointed to command the initial construction of the Arsenal.107
Ironically, in 1861 Major Kingsbury served as superintendent of the Harper's Ferry Armory in (West) Virginia for two days prior to the destruction of the armory’s weapons and the abandonment of the installation in an effort to prevent Confederate sympathizers from seizing the supply when they arrived a few hours later to capture the armory.  

Construction of the first building on the island began in 1863, and in April 1864, the cornerstone of the initial permanent building, storehouse A, was laid. Builders using LeClaire limestone erected a five story tower, nearly 120 feet in height, which housed a clock with dials facing in four directions. The clock’s four dials were twelve feet in diameter, with a minute hand six feet long and an hour hand approximately five feet long. Kingsbury’s successor, Brevet Brigadier General Thomas J. Rodman, purchased the clock from its manufacture, A.S. Hotchkiss Company, New York, New York in 1867. Considered to be one of the finest in the country, the clock may be the only timepiece of its kind still operating with its original parts. The massive weights which operate the clock hang the length of three floors, and its clock bell weighs about 3,500 pounds. The clock was purchased for $5,000.00. Constructed during President Abraham Lincoln’s administration, the Clock Tower was the only building erected from the original arsenal plans.

On 19 April 1864, Congress passed into law an act that authorized the army to reclaim the entire island and to settle all legal land claims held by others. This act, originally introduced as a bill on the floor of Congress by Illinois Representative Elihu B. Washburn, provided Major Kingsbury with the capability to build an arsenal equal to the Harper’s Ferry Armory, and capable of manufacturing ordnance stores. Earlier legislation had only allowed the development of a depot. General Ramsey’s statements in his letter to
Secretary of War Stanton, confirmed the intention of the Act of 19 April 1864. Ramsey wrote that the act authorized the Secretary of War to take complete and permanent possession of the island on behalf of the United States. The act stipulated that the island was to be held as a military reserve by the War Department, and that an arsenal for the construction, deposit, and repair of arms and munitions be built and maintained on the island.\(^\text{111}\)

A prerequisite, however, to the creation of a large manufacturing arsenal was the removal of settlers and manufacturing establishments on the island. Between the two periods of military occupancy on Rock Island, portions of Rock Island had been settled by civilians. These individuals believed the government would eventually release the land for public sale. In the meantime, they had already staked-out or claimed the more valuable sites, such as those sections at the eastern end near the dam. However, once Congress approved the Act of 11 July 1862, followed by the Act of 19 April 1864, civilian domicile of the island was short lived. A board of commissioners appointed by the president of the United States reviewed and settled the more legitimate claims. In 1865, President Andrew Johnson appointed Major General J.M. Schofield, Mr. James Barnes of Springfield, Massachusetts, and Mr. Sheldon M. Church of Rockford, Illinois, to this board.\(^\text{112}\)

The commission conducted hearings in October of 1866, at which time witnesses testified and presented evidence as to the validity and value of their claims. The commission adjourned on 19 October 1866, and on 4 February 1867, submitted its final report to the Circuit Court of the Northern District of Illinois. Judge Drummond reviewed the compensation due to each claimant and awarded the sum of $237,429 as final payment to settle these claims.\(^\text{113}\)
In 1868 a wooden bridge, built by the city of Rock Island, to the Arsenal Island was carried away by ice. The federal government had purchased the bridge and a sandbar known as Wilson’s Island for $18,600 in 1866. Colonel Rodman ordered a rope-ferry to operate between the city and the island until a new iron bridge was completed.

The Congressional Acts of 19 April 1864 and 22 June 1866 empowered the Secretary of War to take complete and permanent possession of Rock Island, including the island’s access bridges and water power. In doing so, the city of Rock Island received $14,357 for its wooden wagon bridge and causeway over Wilson Island which connected the town with the island of Rock Island. The city of Rock Island had erected the bridge in 1863, but in 1868, a spring ice thaw destroyed it. Major Kingsbury, while commanding the construction of the Arsenal’s Clock Tower Building, ordered a rope ferry installed as a substitute bridge until a new bridge could be constructed in its place in 1872.

The city of Moline, Illinois, received $2,000 for its bridge and the roadway that connected Mill Street in Moline with the island. Mill owner and land developer, David B. Sears, received $145,175 for 35.45 acres of land on Rock Island. His land was considered more valuable than others because it was developed and was located near water power from the wing dam at the east end of the island. Sears had surveyed, plotted, and lotted his island property in the hopes of developing an island city. However, only a few lots were sold by the time the government had repurchased the property from Sears.

The government also awarded Colonel George Davenport’s family $40,740 for its 150 acre estate on Rock Island. The location of the Davenport property, which was near the original arsenal construction site, and the improvements made on its property, enhanced its monetary value and importance to the government. Government payments were especially generous considering both David B. Sears and Colonel Davenport had originally obtained their island properties for $1.25 per acre. With the exception of the claims of George Stephens, Jonathan Huntoon, and Timothy Woods, the remaining six claims were small. The government settled these smaller claims for approximately $1,000 each.114
In letters to the Chief of Ordnance, Major Kingsbury approved the actions taken by the commission, however, he encountered difficulties with both the settlers on the island and with the soldiers who had been building the prison camp on Rock Island. Adding to these difficulties was the fact the city of Rock Island built a wagon bridge from that town to the island without Major Kingsbury’s permission. To add insult to injury, the mayor of Rock Island, anxious to capitalize on business from the new prison barracks, now sought the major’s permission to construct a road from the wagon bridge to the prison barracks on the north central portion of the island. Major Kingsbury ironically approved the request, but stipulated that the road be built away from his construction operations at the storehouse site near the ruins of Fort Armstrong. But once the road was completed, traffic between the prison camp and the town of Rock Island frequently left the road while taking a short-cut to the prison and encroached upon the arsenal building site. These annoyances, and those created by wandering horses, cattle, and other livestock owned by the squatters on the island, hindered Major Kingsbury’s construction operations.

Major Kingsbury also had to deal with delays in the shipment of limestone to Rock Island. The contractor, Joseph Parkins, claimed he could not continue to provide the stone at the contract price of $7.50 a perch due to a sharp depreciation in the dollar in 1864. (A perch is a unit of measurement used in stone work, usually 16.5 feet (1 rod) by 1 foot by 1.5 feet, or 24.75 cubic feet.) Also, since the Mississippi River level had become so low, it was not possible to deliver the stone from the quarries by water.115

In addition to these difficulties, Major Kingsbury was often called from his duty as Arsenal Commander to personally attend to the receipt and delivery of arms and supplies to volunteer troops in Iowa and Wisconsin, and frequently had to travel to Milwaukee, and Madison, Wisconsin and to Des Moines, and Keokuk, Iowa to supervise the
distribution of arms. A detachment of soldiers of the 4th Regiment, 186th Co., was assigned to guard Arsenal property and construction sites on the island in April 1864. Conflicts between the prison guards and the construction workmen were an ongoing problem until the end of the Civil War.

Soldiers of the Quartermaster Department, who were building the prison on the interior of Rock Island, also routinely encroached upon Major Kingsbury’s construction site; and their actions caused friction between the two commands. On 26 February 1864, Major Kingsbury wrote to the prison barracks commandant, Colonel A.J. Johnson, to complain about teamsters hauling supplies and materials to the prison site and often leaving the road to trespass through arsenal grounds. Major Kingsbury notified the Chief of Army Ordnance that Colonel Johnson’s men also had chopped down an excessive amount of timber. Major Kingsbury reminded the Chief of Ordnance that the entire island would soon be permanently reserved for ordnance purposes by congressional legislation, and that the prison barracks served only as a temporary purpose and should have been replaced on grounds which were already cleared.\(^\text{116}\)

In further correspondence dated 17 March 1864, Major Kingsbury again complained to the Chief of Army Ordnance that the prison command had once more encroached on his building site. Colonel Johnson took control of the Colonel Davenport House after the government reacquired the property. The Arsenal Commander requested that the Chief of Army Ordnance immediately transfer possession of the Davenport House to the Ordnance Department. Major Kingsbury viewed Colonel Johnson’s arbitrary action as another example of the prison’s encroachment on Arsenal grounds, and argued that it was imperative the Davenport House be retained by the Arsenal as it would save the arsenal the expense of building an office and additional storage area. In accordance with instructions from the Chief of Ordnance, Colonel Johnson relinquished the house to the Ordnance Department.\(^\text{117}\)
Conflict continued, however, between the two commands. On 10 June 1864, Major Kingsbury again wrote to Colonel Johnson regarding the activities and conduct of the commandant’s men. He complained that men quarrying stone for the U.S. Government on the other side of the river were driven from their work by the musket fire of the prison guards, and that the quarry workers’ lives were endangered by this practice. Obstacles such as these, and the failure of the contractor, Joseph Parkins, to deliver the LeClaire limestone as scheduled, delayed the completion of the storehouse building.

These delays and difficulties frustrated and discouraged Major Kingsbury. He had already begun construction of “Storehouse A” prior to congressional legislation which authorized the army to reclaim the entire island. Less than a dozen firms and individuals continued to sue portions of Rock Island after the passage of this act. Reluctant to move, they persuaded Major Kingsbury and government authorities in Washington to allow them to remain as long as their operations did not interfere with the arsenal’s construction plans.

In May 1865, the new Chief of Ordnance, Alexander B. Dyer, visited Rock Island to inspect the construction site and to discuss several significant issues with Major Kingsbury which impacted on the future development of the arsenal. These issues were the removal of the squatters; future use of the prison barracks; plans for a greater arsenal; location of buildings; and water power development. Removal of the remaining private parties from Rock Island proved more difficult than imagined. Tired after two years of arguing with squatters, stone-cutters, and local authorities, Major Kingsbury finally gave up. In June 1865, he requested and received a release form his command at Rock Island. Left unfinished was the partially constructed Clock Tower Building, “Storehouse A”. On 27 June 1866, a full year after Major Kingsbury’s departure from Rock Island, the federal government acted upon the land claims.
Edwin M. Stanton, Secretary of War, acting upon Major Kingsbury’s request for reassignment, switched the commanding officers of Rock Island Arsenal and Watertown Arsenal. Kingsbury’s successor, General Thomas J. Rodman, obtained his superior’s approval for design changes proposed in the Clock Tower Building, and in the overall plan for an arsenal at Rock Island. The two major changes approved were the placement of gables in the ends of the building with windows in each to light and ventilate the loft, and an increase in the height of the clock tower by twenty feet to accommodate the change in the height of the roof. The Clock Tower, completed in 1867, served as a support for the main hoist which lifted supplies to the floors of the main building. General Rodman’s alterations in the design increased the usefulness of the building and created a more imposing structure. Since its construction, the Clock Tower Building has become one of the most visible and recognizable landmarks on the Rock Island Arsenal and of the upper Mississippi River.
Historians credited Rodman’s method of casting gun tubes, which produced the Rodman Gun, as being one of the most significant advancements in ordnance technology of the Civil War period.

Rodman’s revolutionary casting method reversed all previous methods by having the inside of the gun tube cooled by flowing water while the exterior side of the flask mould was heated by the casting fire. His method cooled the gun from the inside so the iron next to the bore solidified first, thereby increasing the strength of the gun tube.

**CHAPTER EIGHT**

**THE RODMAN YEARS AT RIA**

The U.S. Army Ordnance Department decided to build a manufacturing arsenal at Rock Island and selected Brevet Brigadier General Thomas J. Rodman to command it in 1865. Rodman, a brilliant graduate of the U.S. Military Academy Class of 1841, had an impressive record of service prior to his assignment at Rock Island. He had investigated and developed new ordnance concepts in the field of metallurgy and propellants, and his rank of Brevet Brigadier General was bestowed on him for meritorious and distinguished service in the Ordnance Department during the Civil War. Rodman maintained this honorary commission until his death in 1871. However, his actual military rank was Lieutenant Colonel. Since a lieutenant colonel was referred to as a colonel, Rodman’s rank will be referred to as such from this point on.

**The “Rodman Gun”**

One of Colonel Rodman’s greatest achievements was the development of the “Rodman Casting Process,” which revolutionized the art of casting cannons. His casting method cooled an iron gun from the interior, while keeping the exterior in a fluid state. The inner walls of the gun solidified first causing successive layers of metal to shrink one upon another. The result was a stronger, safer cannon that was more reliable, and...
The Rodman Gun designed for seacoast protection was also used to arm the monitor-type Union vessels during the Civil War. Note: the notches at the rear of the tube were used to assist in elevating the weapon.

Colonel Rodman transformed the design of cannons into a science. He consolidated the ballistic knowledge of foreign military powers and applied the science of his day to cannon design. With the development of the steam engine, methods of calculating pressure were available to Colonel Rodman. Through his scientific research of internal ballistics, Rodman was able to determine the pressure curve for specific guns. Based on this information, he designed the Rodman Gun so that the gun tube was cast thickest at the point of greatest pressure and then narrowed as the pressure decreased. The new “coke bottle” shaped and the new casting process made the Rodman gun a major technological improvement over past designs and placed the Rodman gun among the most significant weapons advancements of the Civil War. In fact, historians credit Colonel Rodman and his gun with discouraging European naval intervention in the American Civil War. Installed as coastal artillery, the Rodman gun was vastly superior to the European naval weapons, and, therefore, served as a deterrent to any European nation which contemplated naval action against the American continent.

Rodman Gunpowder

Colonel Rodman’s later work on gunpowder also proved significant. He developed a new gunpowder formula which laid the groundwork for the modern pellet powder. By 1860, he had begun to develop powder to fit the caliber of the gun by devising a formula whereby gunpowder could be compressed into disks. These disks, referred to as perforated cake powder, were approximately one or two inches thick and pierced with holes. The perforated powder burned slower than ordinary cannon powder. Rodman’s perforated cake powder also provided more thrust and a more uniform pressure along the gun’s bore, thereby reducing the strain on the gun and increasing its firing distance.

Earlier experiments with different types of powder led Rodman to the development of “prismatic” powder. This prism-shaped powder maintained chamber pressure at a greater level than other gunpowder without increasing the
Right: Colonel Rodman earned the rank of Brevet Brigadier General for his distinguished work in the field of metallurgy and propellants during his command of Watertown Arsenal, in Massachusetts, during the Civil War.

pressure or strain on the gun tube. The muzzle velocity of the projectile was also increased without an additional strain on the tube. This concept increased the surface area of powder by perforation and made angles on the outer surface of the gun thereby promoting rapid even burning. Rodman may well be called the Father of Scientific Study of Internal Ballistics as the result of his achievements in the field of ballistics at Watertown Arsenal, Massachusetts, during the Civil War.122

At the close of the Civil War, Colonel Rodman turned his engineering genius to the field of architecture and building construction at Rock Island Arsenal. As previously mentioned, in 1865, the secretary of war granted Major Kingsbury his request for reassignment by having Kingsbury and Rodman exchange commands. Under Major Kingsbury’s command, Arsenal improvements were confined to the small quarter section of Rock Island which extended west of the Chicago and Rock Island Railroad tracks. The remaining three-fourths of the island, east of the railroad tracks, was not developed. The Chief of Ordnance instructed Rodman to examine the island thoroughly regarding future development of the Arsenal. Upon his arrival in August 1865, Colonel Rodman inspected the island, and immediately wrote to Washington, in his letter, he expressed his belief that ongoing expansion of the facilities would be necessary, and that the entire island would have to be reserved for that purpose.

Rodman’s Master Plan

Rodman welcomed the opportunity to build a well-designed, National Arsenal at Rock Island. His plans called for the development of an arsenal larger in scale and scope than originally designed. The War Department endorsed Colonel Rodman’s concept of a large arsenal at Rock Island, which was centrally located and easily accessible by rail and river. Though not its first Commanding Officer, Colonel Thomas J. Rodman is today considered the “Father of the Rock Island Arsenal” because of the critical role he played in the design and expansion of the arsenal.
Below: Colonel Thomas J. Rodman, the second Rock Island Arsenal Commander, has historically received credit for the conceptual design of the 19th century Rock Island Arsenal. Rodman relocated the site of the Arsenal to the center of the island and initiated the relocation and improvement of access bridges to the island. While in the midst of supervising the building of the Rock Island Arsenal, Colonel Rodman died on 7 June 1871, and was buried adjacent to the National Cemetery on Arsenal Island.
Two weeks after filing his report, Colonel Rodman met with Brigadier General Alexander R. Dyer, Chief of Ordnance, to discuss future plans for the Rock Island Arsenal. After careful scrutiny of Rodman's broad plans, General Dyer approved them. Rodman returned to RIA and from October 1865 until February 1866 developed more specific plans for the Arsenal. His plans and drawings for the Arsenal included designs for a manufacturing complex, an officer's residential zone, and a water power plant. Rodman's grand plan called for the complete use of the island for building purposes. He moved the site of the Arsenal's construction to the high ground in the center of the island to allow for future expansion, and to make better use of the potential waterpower of the Mississippi River.

Rodman's master plan included the construction of ten great stone shop buildings, divided equally into two facing rows along the main east-west thoroughfare, and now designated Rodman Avenue. These stone shops formed the core of the Arsenal's 19th century manufacturing complex. Major ancillary buildings, such as the Post Headquarters, Fire Station, Barracks Building, and storehouse, bordered the manufacturing shops. North of the manufacturing complex Rodman placed the military residential zone which consisted of the RIA commanding officer's quarters and quarters for his subordinates. Rodman designed the Commanding Officer's quarters, known now as Quarters One, in an Italianate villa style. The assisting officer's quarters, built along Terrace Drive overlooking the Mississippi River, were constructed over the site of the Civil War Rock Island Arsenal Prison Barracks and were of more modest Italianate design than was Quarters One.

Colonel Rodman's plan also included the construction of an arsenal dam and powerhouse south of the manufacturing buildings on the southern channel of the Mississippi River, now known as Sylvan Slough. He conceived the use of the telodynamic system of cables and towers which mechanically transported power from the river
to the southern row of shops along Rodman Avenue.

Rodman initially planned to construct manufacturing buildings with enclosed court yards. However, before finalizing his plans, he revised the drawings and opened the court yards to provide additional natural light. Natural lighting was a major consideration in architectural design prior to the advent of electricity. Rodman also added protruding portico entrances to the sides of the manufacturing buildings which improved their appearance and strengthened their walls. He inserted a foot bridge and small artificial lake into the plans to serve as a buffer between the residential and manufacturing zones and to provide an attractive path by which the officers could pass to and from work.

Rodman’s plans featured construction of a manufacturing complex which combines both arsenal and armory capabilities at one installation. The five shops built along the northern edge of Rodman Avenue, Buildings 60, 62, 64, 66, and 68, formed the Arsenal’s small arms plant and were collectively known as Armory Row. The buildings housed manufacturing Shops B, D, F, H, and K, respectively, the five shops built along the southern edge of the avenue, Buildings 102, 104, 106, 108, and 110, formed Arsenal Row. These shops were designated for general ordnance manufacturing and included Shops A, C, E, G, and I. Each center shop was constructed on one story with a gables monitor roof. The middle shop in Armory Row, Building 64, functioned as a rolling mill and forge shop; the center shop in Arsenal Row, Building 106, functioned as the Arsenal’s Foundry and Blacksmith Shop. The other eight shop buildings were uniformly constructed with three stories. The ten manufacturing buildings all had the same “U”-shaped floor-plan with 300-foot wings extending back from a 210-foot by sixty-foot base. Each of the eight three-story buildings covered slightly more than an acre of land, with a little more than three acres of floor space. The ten Rodman-planned, symmetrically-designed, stone shops still stand today along both sides of Rodman Avenue.
A National Arsenal at Rock Island

Construction of the first manufacturing shop buildings began in 1866 and continued until the last stone shop, Building 68, was completed in 1893. Erected over a nearly thirty-year period, the arsenal's stone buildings reflected the feeling of Manifest Destiny which swept Congress and the nation in the latter 19th century. This view was reflected in the comments of Brigadier General Stephen V. Benet, chief of army ordnance, in a letter to William W. Belknap, secretary of war:

The Rock Island Arsenal in its present incomplete state, now supplies all the militia of most states and territories drained by the great river (Mississippi River) and its tributaries, many of the fortresses that guard the coast line of the Gulf of New Mexico, and more than one-half of our Army, now scattered from the Mississippi River to the Rocky Mountains and beyond. When completed and fully equipped as a manufacturing arsenal, its capacity will equal the supplying of all the armies that may be organized in the Mississippi River Valley in any war of the greatest multitude.124

Earlier, Brigadier General Alexander B. Dyer had written the Secretary of War on 24 October 1871 that:

(Rock Island Arsenal) should be made the great arsenal of deposit and construction for the Mississippi Valley, and that it should possess the manufacturing capacities of the national armory at Springfield, Massachusetts, and of one of our larges arsenals of construction, and it was planned with that end in view, and has been so built.125
Built-of-Stone: The Construction of 19th Century RIA

The story of the construction of the Rock Island Arsenal shop buildings is one of the more fascinating tales in the history of Arsenal Island. The inception and growth of the Arsenal stone buildings occurred during the commands of Major Charles P. Kingsbury (July 1863- July 1865), Brevet Brigadier General Thomas J. Rodman (August 1865- June 1871), and Brevet Lieutenant Colonel David W. Flagler (June 1871- April 1886). By the conclusion of Flagler’s command in 1866, the Arsenal’s direction of development already was so firmly established that it continued on for an additional decade or so without significant change.

In 1866, Rodman ordered cheap temporary shops with gabled monitor roofs be constructed on the future site of Shop A (Building 102). He also temporarily converted prison barracks along Gillespie Avenue to serve as a make-shift headquarters and officers’ quarters. From these inexpensive, temporary wooden buildings, the Arsenal began initial construction work for the permanent stone buildings.

19th Century Greek Revival Architecture of the Arsenal Stone Shops

For nearly the first three decades, the Arsenal primarily concentrated on the completion of Rodman’s ambitious construction program. Shops B (Building 60) and C (Building 106) were the first of the ten stone shops under construction. The 19th century Greek Revival architectural style of these and the eight future buildings featured pillowed or rock-faced limestone accented by pilasters, architraves, and pedimented gable ends. The ten original shop buildings were built of massive rock-faced limestone.

Unlike his predecessor, Colonel Rodman did not procure stone quarried from LeClaire, Iowa; instead he acquired stone from Sangers and Steel of Joliet, Illinois. Since the stone derived its name from the region in which it was quarried, Shops B and C, and several of the other stone
Below: A rear view of Arsenal Row with Shop A (Building 102) under construction in foreground. Shop A was built 1873-1876. The last building visible in the photograph is one-story and has small windows in entablature of structure which indicates the building is Shop E (Building 106), the Rock Island Arsenal Foundry. Note the typical derrick or crane in the courtyard of Shop A.

buildings, were said to be built of Joliet Limestone.

An immense project such as this required enormous quantities of stone and the manufacture of considerable amounts of construction hardware. In the year 1869 alone, 2,925 railroad cars of stone were received for use in building the shops, dams, and bridge. Stone masons laid 5,510 cubic yards of stone in new shop buildings, while an additional 6,100 cubic yards of stone were laid in the dam wall project. The stone work required the repair of 92,321 stone cutter’s tools during the year. The Chief of Ordnance, in 1869, approved the building plans for the Commanding Officer’s quarters. Also during that year, workmen erected the first Rodman-planned Arsenal building which was a circular limestone reservoir, that exists today only as a ruins.127

Generally speaking, the limestone was shipped by train to the Rock Island Arsenal from the various quarries. Early maps of the island showed a single railroad track that extended from the main line at the western tip of the island to the construction site of the manufacturing buildings. The stone was unloaded from rail cars and placed in a centrally located stone yard. Workmen used tramways and derricks to transport the stone from the yard to the actual building site. A tramway, an open box-shaped street car pulled by horses, operated on tracks in single units. Derricks also operated on tracks which ran the length of the construction site. These large cranes, consisting of movable booms equipped with cables and pulleys connected to an upright beam, hoisted and moved the heavy stones into place. The small circular marks made by the ice-prong-like clamps, which were embedded into the stone prior to it being hoisted into place, are still visible a century later.
Difficulties Procuring Stone

Delays in delivery of stone hindered the construction progress of the Arsenal and, on occasions, resulted in stone-cutters and masons being laid off until the next shipment arrived. Rodman periodically stationed an officer at the quarries to oversee the government’s interests.

These delays in particular affected the construction of Shops B and C, and the building of the Commanding Officer’s quarters. Discontented with their contract, Sangers and Steel sold stone originally quarried for the Arsenal to customers willing to pay a premium price. The Joliet firm demanded an increase in government payments and refused to ship any more stone to the arsenal until its demands were met. Sangers and Steel halted its stone deliveries to the Rock Island Arsenal for the last time in August 1870. Colonel Rodman eventually purchased stone from Mr. Edwin Walker of Lamont, Illinois, at an average price of thirty-eight ½ cents per cubic foot, which was one ½ cents less than the price demanded by Sangers and Steel. Sangers, however, formed a partnership with a Mr. Moody, and again received contracts to provide limestone for the construction of the Arsenal buildings. This stone was nearly identical in color, texture, and quality to the Joliet stone.128

A local newspaper article of the period provided insight into the size of the labor force engaged in the construction. The Davenport Daily Democrat issue of November 10, 1870, noted the federal government employed about 1,000 men to work on various Arsenal construction projects including Shops B and C, and the Commanding Officer’s quarters. The article further stated that the Commanding Officer of the Rock Island Arsenal was assisted by an efficient staff of officers and civilian supervisors. The newspaper article specifically cited Mr. A.T. Fleming, master armorer; Mr. William Channon, master carpenter; Mr. R. Lloyd, master mason; and Mr. George Downs, foreman; as holding these supervisory positions at the time the article was printed. In addition to
the workmen, a large number of horse and mule teams were engaged in the construction activities.

Labor Disputes

A labor force of this size did not operate without some problems, and on occasion labor disputes slowed construction of the arsenal. Events happening elsewhere also had an impact on Colonel Rodman’s progress at Rock Island. For example, congressional legislation passed during the construction of Shops B and C established an eight hour work day for all laborers, workmen, and mechanics employed by, or on behalf of, the government of the United States. The wages paid under the old and new work plan were:

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<tr>
<th></th>
<th>10-hour day</th>
<th>8-hour day</th>
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<tbody>
<tr>
<td>Laborers</td>
<td>$1.80</td>
<td>$1.44</td>
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<tr>
<td>Masons</td>
<td>$4.50</td>
<td>$3.60</td>
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<tr>
<td>Carpenters</td>
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<td>Machinists</td>
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<td>Teamsters</td>
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The daily wages of master workmen, which ranged from $4.00 to $6.00, were not affected by the new law. After being paid according to the new wage plan, many laborers refused to continue to work on the building projects. The island temporarily became nearly deserted. The Rock Island _Union_ newspaper expressed the opinion that:

The government pays pretty liberal wages, and if the old employees refuse to work under the rulings of the Secretary of War, it is probable that their places will soon be supplied by others.

However, Colonel Rodman met with the stone-cutters and raised their wages so that they would be compatible to those offered stone-cutters for an eight hour work day in Chicago, Illinois, and St. Louis, Missouri.

The rebuilding of Chicago after the great fire of 1871 drastically increased the demand for stone and stone craftsmen. The Arsenal, therefore, was forced to increase its pay to skilled labors due to the flight of Arsenal workers to Chicago.
Procuring Building Materials from the East

Initially a large portion of the building materials for shops, such as B and C, were produced by private firms situated in the east. The New York firm of Cooper & Hewitt furnished most of the fifteen inch iron “I” beams used in the construction of the first and second floors of Shops B and C. Union iron Mills of Pittsburgh, Pennsylvania, provided eleven inch “I” beams that were also used in the building of the first floors. The Phoenix Iron Company of Philadelphia, Pennsylvania, furnished nine inch and eleven inch beams, wrought iron columns, and cast iron columns. It also manufactured caps and cases for both shops, plus the wrought iron frames for their roofs. Contractors shipped these purchased columns in sections which were riveted together by arsenal workmen.133

Local Tri-Cities Firms Awarded Contracts

Gradually, local and regional private contractors received an increasing number of Arsenal contracts. The Arsenal awarded James Clark & Sons, of Utica, Illinois, the cement contract at $1.55 per 300-pound barrel; W. B. Barnes, of
Charlie Hipwell arrived at Rock Island Arsenal in the early 1870s as a foreman of an east coast roofing firm. Recognizing the opportunity at the arsenal, Hipwell formed his own business in Davenport, Iowa, and prospered as a slate roofer and dealer.

Rock Island, Illinois, received the lime contract for ninety cents per 200-pound barrel delivered; F. Hass, also of Rock Island, provided copper material at $13,000 per shop building; Atkinson & Murdock, Rock Island, Illinois, laid the fire-proof brick arches in Shops B and C for $15.50 per 1,000 bricks; and Mr. J.S. Keator, Moline, Illinois, supplied pine lumber for $17.00 to $22.00 per 1000 board feet. In addition, several private firms, beginning with Sanger & Steel, provided limestone from the quarries near Joliet, Illinois for the construction of the Rock Island Arsenal.  

Colonel Rodman, and his successor Major Flagler, also awarded contracts for building to private firms in Iowa. The firm of French & Davies, Davenport, Iowa provided the oak flooring for Shops B and C at $41.00 per 1000 board feet. Mr. Charles C. Hipwell, foreman of Aiken and Company, Pittsburgh, Pennsylvania, after supervising the slate work of these first two shop buildings, left that firm to establish his own business in Davenport, Iowa. His Davenport firm slated practically all the stone shop buildings and officers’ quarters. Initially the slate contract was awarded to Lyman Bridges of Chicago, Illinois, but within a short time the roofing company of Knox, Kine, and Company of Pittsburgh, Pennsylvania, had replaced Bridges. Mr. Bridges had his contract with the Arsenal canceled after he failed to comply with the terms of the agreement in regard to quality of material or timeliness.

Aiken and Company eventually replaced Knox, Kine, and Company and completed the slate roofing of Shops B and C for $15.25 per square of slate. This represented a savings of $5.75 per square over the canceled contract price. Mr. Hipwell received the remaining slate contracts with bids under $10.00 per square.  

The Arsenal also purchased all the lumber required for building a particular structure in advance so that the wood could be stacked for seasoning before being used to make doors, door frames, window sashes, and window frames in the arsenal shops. The Arsenal saved money and time by manufacturing these items and their accompanying hardware.

**Rodman Tensile Test Machine**

Acquisitioning quality building material to construct the Arsenal was a concern of Colonel Rodman and his successor, Major Flagler. Colonel Rodman, determined to procure high grade iron for his Arsenal, built a tensile test machine which he used to test iron samples of private contractors to determine if their samples met government specifications.
Iron, Copper, Slate, and Other Building Materials

Besides limestone, Arsenal builders used an enormous amount of other material in the construction of the stone buildings. For example, Shop B (Building 60) alone was built with more than 780 tons of wrought iron supplied by eastern mills. Roofers originally covered the building with a slate roof of 51,500 feet, with heavy sheet copper gutters and iron snow guards an inch thick. Stone-cutters formed the upper tier of the shop building, and then lined the gutters with copper. Shop B was furnished with more than 1,000 feet of such guttering. Wrought iron trusses were used to support the roof. Builders fastened the rafters of the shops securely on one end by mortising them into the stone, and dowelled the opposite end upon iron ball bearings which rested in grooves carved into the stone. A corresponding groove in the foot of the rafters covered the ball bearings; this allowed for seasonal expansion and contraction caused by the heat of summer and the cold of winter without damaging the wall of the shops. Carpenters covered all but the third floor of the shops with one ½ inch thick oak. The third or attic flooring was covered with pine of the same thickness.\(^{136}\)

Workmen constructed the shop buildings of massive rock-faced limestone with approximately three foot thick walls starting at the base of the building and tapering about six-inches with each additional story. This tapering created a step effect which provided a shelf or lip upon which iron beams...

Right: Ornate cast-iron staircases were a product of the 19th century RIA foundry and are still in use in the stone shop buildings.

rested. The exterior walls rested on a foundation built upon bedrock. The seventy-six piers of masonry and cement anchored in the basement of the stone shops supported the columns and floors of the above stories. Each pier was partially imbedded beneath the surface flooring of the basement and rested on bedrock. Layers were constructed of fire-proof brick with vaulted ceilings beneath each floor of the manufacturing shops, among the lattice of “I” beams. The brick arches were then covered with plaster. These fire-proof brick, vaulted or arched, ceilings were designed to prevent fire from spreading to the wood flooring of the next story. Beneath each ceiling lay the open bay of the machine shop.

The open bay interior of the shops provided light and space for manufacturing operations. The shop interior featured cast-iron, a few wrought iron columns, and ornate cast-iron stairways which are still in use today.

Improvements During Rodman’s Command

Colonel Rodman supervised the completion of the Clock Tower and had three of the large stone buildings near completion at the time of his death in 1871. These three structures were: Shop B (Building 60), Shop C (Building 104), and the Commanding Officer’s quarters, now known as Quarters One (Building 301). The Greek revival architecture of Shops B and C provided the style for subsequent industrial and administrative buildings constructed at the Arsenal during the 19th century.

Other improvements during Colonel Rodman’s tenure as Commanding Officer of the Rock Island Arsenal, 1865-1871, included the settlement of civil property claims on Rock Island and the approval of his plans for a combined armory and arsenal at the island. Colonel Rodman enhanced access to the island by having a wagon bridge to the city of Rock Island erected. In addition, by having the Chicago, Rock Island and Pacific
Railroad tracks relocated to the western edge of Arsenal Island. He initiated the construction of a double deck bridge from Rock Island to Davenport, which was completed a year after his death. He also contracted for water power, had the Arsenal grounds cleared for new buildings, and laid a network of roads throughout the island.

**Rodman’s Funeral**

Colonel Rodman’s habit of working long hours as RIA commander took its toll on his health. Ignoring his doctor’s warnings, he continued his demanding daily routine which led to his death at the age of 56 on 7 June 1871. His funeral service was conducted inside the nearly completed Commanding Officer’s quarters which he designed. Rodman was buried on Arsenal Island, as he requested. His gravesite today is adjacent to the National Cemetery, which was once the old post cemetery.

The respect bestowed upon Colonel Rodman by the Arsenal and surrounding communities were reflected in the size of his funeral procession. The funeral was conducted in elaborate style. An army band led the funeral cortège, followed in succession by a military escort, the horse drawn carriage on which lay the coffin, a number of carriages containing the Rodman family, and more than 1,000 civilian mourners – many of whom had worked for Colonel Rodman. Before Rodman’s death the army had assigned a young captain named Daniel W. Flagler as his assisting officer. Flagler succeeded Rodman as the Arsenal’s third Commanding Officer and proceeded with Rodman’s plans for the construction of a grand arsenal.
CHAPTER NINE
THE FLAGLER YEARS AT RIA

The Commanding Officer’s Quarters

Among Flagler’s first tasks as Rock Island Arsenal Commander was the completion of the commanding officer’s quarters begun by Rodman. Although begun in May 1870, the Commanding Officer’s quarters was not completed until October 1871, nor was it landscaped until the spring of 1872. Delays in procuring stone slowed work on the quarters during the summer months and forced work to be continued into the winter season. Fire, hot water, and salt were used to prepare the mortar. The building walls were finally completed in January 1871.138

Day workers were hired to complete the remainder of the structure. Army Ordnance officers supervised these workmen who were hired primarily by the day, due to the shortage of building stone caused by delays in procurement and delivery of quarried stone from the contractor. The officers also conducted the necessary engineering work which included tests, experiments, and calculations for the project.

Once completed, the Commanding Officer’s quarters’ features included a massive I-shaped main core, a west wing, and an observation tower above the east side of the main block. The building’s foundation was constructed of two foot thick limestone masonry. Its exterior walls were built of Joliet limestone, and its interior load-bearing walls were made of plaster brick masonry. Large wrap-around piazzas, or porches, which stretched around the east and north sides of the building, featured girded iron grillwork forged at the Rock Island Arsenal. Also, most of the building’s brass fixtures, including door knobs, hinges, and other metal hardware, were produced in the Arsenal shops. The structure was covered with a hipped roof which contained skylights and a tall square observation tower. The nearly 20,000 square feet of floor space within Quarters One was divided.
Below: The Rock Island Arsenal Commanding Officer’s quarters, now designated Quarters One, was completed in 1871. This structure, built of Joliet limestone approximately two feet thick, contains over 50 rooms and is today considered the largest family residence owned by the U.S. Army.
Below: Quarters Four, circa 1880s. Subaltern Officer’s Quarters 2, 3, and 4 built 1872-1874, east of Quarters One, along Terrace Drive overlooking the Mississippi River. These quarters were scaled-down Italianate villas modeled after the Commanding Officer’s quarters.
The Rock Island Arsenal iron-melting furnaces situated in Shop E (Building 106) during the late 19th century. The Foundry initially poured castings of hardware used in the construction of Rock Island Arsenal buildings.

Below: Constructed in 1874, Shop E continuously functioned as the Rock Island Arsenal Foundry until 1988, when the operations were relocated in the new Kingsbury Manufacturing Complex.

into over fifty rooms which explains why the quarters is today considered the largest government residence next to the White House. The Commanding Officer’s quarters became the architectural model for the scaled-down Italianate design of the subaltern officer’s quarters built east of Quarters One. These subaltern officer’s quarters consisted of Quarters Two, Three, and Four.139

Workmen began erecting Shop E (Building 106) and the RIA blacksmith shop in 1871, and finished shortly after the completion of Shops B and C in 1873. After the completion of Shop E, workers transferred the machinery in the temporary structures to the recently finished Shops C and E, and then razed the temporary structures. In 1871, Colonel Rodman ordered cupolas (cylindrical shaft type blast furnaces used for remelting metals such as iron before casting) for the Foundry. These new furnaces allowed the Arsenal to produce iron columns, angles, and other necessary parts for the construction of buildings. From that time on, the Arsenal Foundry and Blacksmith Shop were actively engaged in the production of building materials or ordnance supplies.

The continued acquisition of commercially-produced iron which repeatedly failed to meet specifications of the contract frustrated Major Flagler. As a result, he instructed Lieutenant W. P. Butler to test iron samples sent to Rock Island by N.S. Bouton and Company of Chicago.

The tests provided the iron samples to be inferior in strength, weight, and character. The arsenal sent a record of the testing results to N.S. Bouton and Company. The Chicago firm proceeded to have its iron retested by another firm: the American Bridge Company. Lieutenant Butler traveled to Chicago to inspect the testing procedures after the American Bridge Company had asserted that N.S. Bouton and Company’s iron tested satisfactorily. He found their methods questionable and stated in his report that:
Below: Drawing of cast iron columns for Shop A cast in RIA Foundry. Columns such as these were made of iron recycled from Civil War era horseshoes, cannonballs, and gun tubes. The Doric columns which are visible in the old manufacturing shops were forged at the RIA. The riveted columns visible in Buildings 60 and 104 were purchased from private eastern firms and shipped unassembled to Rock Island.

... On examination, the machine of the American Bridge Company was found to be a heavy hydraulic cylinder, using glycerin instead of water. The piston is 17 inches in diameter. The gauge is the ordinary mercury gauge, very carelessly used. No allowance was made for friction. Its results should not, therefore, shake confidence in the machine (Rodman’s tensile testing machine) at Rock Island Arsenal. All measurements were made roughly, by an ordinary two foot rule, in the tests of the American Bridge Company while those at the Arsenal were to within 0.0001 inch.140

The Rodman tensile test machine measured the capacity of a metal to resist force, whether tensile, transverse, torsional, or crushing. Internal force could also be applied by the machine to test strength of cylinders. The machine had a testing range of 50 to 100,000 pounds. In 1899, the Rodman tensile machine was still in operation, and was being set up in Shop D, in anticipation of the establishment of an armory at Rock Island to manufacture rifles.141

Scrapped Civil War Relics Recycled Into Iron Columns

Major Flagler, anxious to reduce construction costs and eliminate delays caused by delinquent deliveries, decided the columns could be produced in the Arsenal shops. He wrote the Chief of Ordnance for approval of his idea to convert tons of old horse shoes, cannons, and other accumulated Civil War scrapped metal into wrought iron bars. These bars could then be cast into the iron needed for construction of the stone shops. Previously, it was the government’s policy to sell all scrap metal to dealers. Once approved, the salvage operation proved successful. Flagler boasted that the metal produced by his Arsenal’s Blacksmiths and Foundry masters was of superior
Below: A late 19th century view of machinists at work in Shop C (Building 104). The commercially made, riveted columns, and the machines being driven by a center source of power indicate that this is an interior view of Shop C. Note: the fire-proof brick-vaulted ceilings typical of all the 19th century RIA shops.
Below: Cross section drawing of ceiling and floor construction of Shop A, date 1885, and traced in 1944. Note: Tapering of the exterior wall by six inches at each story furnished a lip or shelf upon which the beams rested. Also note the fire-proof brick-vaulted ceilings which were plastered over, and the position of the columns placed directly above each other to support the ceiling and floor above.
quality compared with the metal available commercially.\textsuperscript{142}

The Foundry only made castings, which resulted in savings that paid for the pattern forms, thereby contributing to the uniformity and symmetry of the original stone buildings. By recycling the island’s supply of scrapped metal into iron columns, the arsenal saved the government approximately fifty percent or more of a private contractor’s price. Iron pipes for sewers mains, fences, roof trusses, and various other fixtures were produced from this recycled metal. Arsenal workers also salvaged brass saved from artillery projectiles, along with other metals. Brass rotating bands from these projectiles were turned into hinges, locks, and other hardware used in the building of the stone shops.\textsuperscript{143}

\textit{The Moline Review} newspaper of 1 November 1879 printed a descriptive paragraph about the work being accomplished at the Rock Island Arsenal during late 1879:

\begin{quote}
Col (Brevet) D.W. Flagler, the commandant of Rock Island Arsenal, is pushing his vast building operations with commendable energy. Acres of huge stones are scattered over the grounds and the click of the hammer and chisel is heard from hundreds of busy mechanics. In the foundries the serviceable shot and shell accumulated and captured during the war are being worked up into iron railings and stairways, bronze doorknobs, sash weights and pulleys and the hundreds of other metal appliances required in the erection of the immense shops. The closest economy is practiced and every available piece of metal is applied to some use. The machinery of the shops is all run by the water power and the longer it is used the more its usefulness is demonstrated.\textsuperscript{144}
\end{quote}
Below: Arsenal workmen removing scrapped canteens, cups, and other metal items from courtyard of Shop C (Building 104). The Arsenal initially sold the scrap metal to salvage dealers until RIA Commander Flagler received permission to melt down the metals and recast into building hardware.

Difficulty Securing Bedrock For Shop D, 1871-1872

Shop D’s (Building 62) excavation in 1871-72 had uncovered a pocket or cavern beneath the surface of the building site. Lieutenant Charles Shaler, Jr., ordnance officer in charge of the excavation, submitted in his report a description of the character of the pocket and the method used to secure the foundation. He states that the excavation began in early May 1871.

The foundation was laid with considerable difficulty and at great expense. According to Lieutenant Shaler, what had initially appeared to be solid rock often turned out to be a thin sheet of clay. A seam of clay ran through the north end of each wing which, when moist, was very loose, but when dry was so hard that a pick was required for its removal. The seam of clay was about thirty feet in width. As the excavation reached thirty-four feet beneath the surface, water poured into the excavation. Lieutenant Shaler wrote that:

A sewer, built to carry off water from the roof of Shop B, burst one evening after a heavy rain and by morning had flooded the excavation. The water seeped into the ground and was carried off by a subterranean passage not apparent before the incident. Continuing rain halted work for that day, and by the next morning a large area of ground had sunk into the opening. Arsenal workmen cleared out the opening and used sheathing boards to support the walls against future collapse. Again, heavy rains interfered with work, making the clay too plastic-like causing large limestone boulders, some weighing over three tons, to slide toward the excavation, caving in the sheathing. It was necessary for the third time to remove the material, and the broken sheathing boards and beams which considerably slowed the operation.
Lieutenant Shaler went on to report that this third attempt at excavating the site was successful down to the water level. Further excavation, however, revealed a wide cavern or pocket that passed through the center of the west wing across the foundation site in a southeasterly direction. The floor of the cavern was covered with sand, and according to Shaler, "ripple marks were found that showed it to have been a water course." To obtain a sound footing for the walls of Shop D, a "core of belton," concrete mixture containing round pebbles, was laid in a convex arch of seven consecutive layers that abutted the side walls of solid rock. In this pocket alone, 270 cubic yards of stone were laid. Lieutenant Shaler also found it necessary to conduct arches of this type in five different places. The actual foundation for Shop D was made of stone from a quarry on Arsenal Island located near the ferry boat landing.¹⁴⁶

1873, Iowa Convict Labor Quarry Stone for RIA

In 1873, the Rock Island Arsenal procured stone for the construction of the Post Building (Building 225), in addition to the subaltern officer's quarters (Quarters 3), from quarries in Stone City, Iowa. Convicts from the Iowa State Penitentiary in Anamosa, Iowa, quarried the limestone. The price paid for the stone, which was delivered by railroad car to the Arsenal, was $48.00 per cubic yard. Martin Heisey and J.A. Green, both of Anamosa, Iowa, received contracts to provide rubble stone (irregular fragments or pieces of rock used in masonry); pilaster blocks of stone (used in rectangular columns with capital and base that were set into walls as an ornamental motif); and dimension stone priced at $12.50 per cubic yard delivered on rail cars to the Arsenal. On one occasion, the delivery of stone was slow due to the difficulty experienced by contractors in securing transportation. Railroad companies originally arranged to deliver the stone, but the agreement did not last. Trains from Anamosa ran only to the Duck Creek Rail Station on the west bank of the Mississippi River. Stone shipped by rail to the
Duck Creek station was unloaded and transported by wagon teams over five miles to the Arsenal.

Construction of Barracks Building

In addition to the shop buildings, plans called for the construction of ancillary structures such as the Barracks Building (Building 90). Though originally designed similar to the architecture of the shops, design changes in the barracks were made to reduce construction costs. The walls were built of range rubble, without the tool marks characteristic of the heavy ashlar stone used in the construction of the shop buildings. Even with these alterations the cost of the building exceeded its original estimate. The labor situation at Rock Island Arsenal and the subsequent cost of construction was also greatly affected by the irregularities in the procurement of stone. Because of the unsettled labor picture, it became necessary to leave the third floor of the Barracks Building, designed to accommodate 200 soldiers, partially unfinished for a time. As an aside, its floor plan included a kitchen, mess rooms, sewerage, water supply, heating, pantries, storerooms, and water closets in addition to sleeping bays. Nearby an additional mess, a bakery, and laundry buildings were constructed as auxiliary structures to the Barracks Building.

1879-1880, Difficulties in Finding Bed-rock for Shop H

Other problems hindered and delayed construction of the Rock Island Arsenal. Major Flagler considered the excavation of building foundations among the most difficult work encountered in his tenure as Arsenal Commander. He cited the excavation of the foundation for Shop H (Building 66), which occurred in 1879-1880, as the most troublesome. To support the immense weight of the stone buildings, each shop structure’s foundation was constructed upon solid bedrock. The foundation supported the stone walls preventing the building from sinking under such tremendous weight. Furthermore, in each building,
Seventy-six stone piers were constructed to support the interior floors. The columns that secured the upper stories of the buildings were placed directly in line with the stone piers below.

The difficulties that had to be overcome in order to obtain a secure foundation for Pier #26 of Shop H were drastically more serious than any of the other similar cases. Workmen on Pier #26 excavated to a depth of seventy-four feet while operating in a space only ten by twelve feet wide. This excavation was considerably deeper than those dug for other shop buildings. A network of sheathing timbers, irregularly wedged into place to prevent the pit walls from collapsing, consumed even more space. The timbers had to be especially strong to resist pressure from loose sliding boulders. Steam pumps, pipes, and plank tubes further cluttered the floor of the excavation trench, and workmen had to hoist material through the plank tubes.

Major Flagler ordered that deep vertical soundings be conducted from the bottom of Pier #26’s excavation pit. Workmen used sledge-hammers to drive steel-pointed, jointed iron bars and drills into the floor of the excavation in search of solid rock. The drills passed through layers of soft clay that alternated with loose rock, sand, and gravel. According to Flagler, “the ooze or wash of the soft clay through the sheathing sometimes left vacant places behind the sheathing till caving in filled them up.” The loosely-filled, clay mixed with stone was so soft in places that workers and tools were in danger of suddenly sinking out of sight. Sounding rods striking these isolated large boulders produced false surroundings, thereby adversely affecting the trained ear of the workmen. In addition, the workers discovered irregularly-shaped crevices or pockets that had been formed by underground water pressure. It appeared a ravine, carved by an ancient waterway, ran diagonally in a southeast to northwest direction through the construction site of the shop buildings. This ravine affected the excavation of several
shops, in particular, two-thirds of shop I, nearly all of Shop H, half of Shop K, and a corner portion of Shop D. However, it was during the excavation of Shop H, specifically Pier #26, that the builders had greatest difficulties due to the discovery of the largest of these crevices. In their search for good solid bedrock to secure Shop H’s pier foundation, arsenal workers had excavated below the water level of the Mississippi River. Steam pumps were used to pump out water by the gallons which had flowed into the excavation trench. The inflow of water made deeper excavation impractical, and further sounding attempts seemed useless. Flagler stated in his report to the Chief of Ordnance that:

…I (Flagler) would then have filled up the hole, abandoned putting in a pier, and have substituted therefor the iron column and truss described a few pages back, had not the careful soundings made at this point led me to fear that the foundations of the adjacent main wall of the building, put in the previous year, were not as secure as I had supposed.

Major Flagler realized that the foundations work done this previous year, in 1879, was not built upon solid bedrock as he had earlier thought. Flagler decided to excavate as far as possible and do whatever was necessary to secure and strengthen the “old foundation”. Unsuccessful in attempts to find solid rock to support the foundation of Pier #26, Flagler ordered that heavy beams of timber, called piles be, driven into the earth as a substitute bedrock for the pier foundation. At the bottom of the excavation, piles were driven with the use of a timber tube which guided the drop-weight among the sheathing timbers, and prevented accidents to workmen. The drop operated within the thirty foot tube and protected the men working in the excavation trench from being struck by the drop-weight as it hammered down on the piles. The 900 pound drop-weight, powered by steam, continued to strike the pile until its drop of twenty-seven feet could no longer move the pile. The loose, water-saturated clay was a poor material to sustain piles. The bottom end of the piles were shod with heavy sharp-pointed iron shoes to split, break, or push aside boulders embedded in the clay. Twenty-six twelve-inch square piles were driven to depths varying from fourteen to seventeen feet.
The flow of water into the trench increased the difficulties of finding a footing for the piers and created serious problems which hampered the excavation of the foundations for Shop H. Steam pumps were placed at low places in the trench to drain and discharge water through pipes and troughs into sewers. Numerous hand pumps were used to reduce the cost of exclusively using steam pumps. The removal of water from so many pits over such a large area was a difficult task. After excavating, it was necessary to operate the pumps until the masonry was raised above water level. The workmen doing the digging had to stand in one to two feet of water, especially after the excavation passed below the water level of the Mississippi River. A couple of small pumps operated around-the-clock discharging approximately 180 gallons of water from the pits.155
Major Flagler described the procedures followed by the workmen in securing the footing for the (old) foundation of Shop H in his report to the chief of ordnance ending 30 June 1880. He stated that:

Arsenal workmen cleaned the loose rock and mud from the crevice which ran beneath the old foundation, before they drove in the piles. Workmen used long hoses and other devices to clear the space and to refill it with well-rammed concrete. A pump operated continuously, keeping the water low enough so that the piles could be driven with an inclination under the old foundation. Using this method, the bed of concrete and loose fragments of rock were jammed more firmly into the crevice.

Once the workmen finished driving the piles, they evenly sawed the tops off. The interstices of spaces between the piles were cleaned out to a depth of four feet and then refilled with concrete, well-rammed with iron tamping bars. On top of the concrete, workmen placed footing stones, twelve feet thick. Upon the footing stones, laborers laid ordinary masonry with occasional courses of footing stones, till the surface of the ground was reached. The work continued until heavy frost set in. Hot water was used at times for mixing the mortar and keeping it warm till it could be lowered in the pit below the frost line. Workmen brought the masonry up to within seven feet of the surface. Then laborers filled the hole with clay till warm weather arrived. In the spring, workers removed the clay and completed the pier. The workmen commenced the excavation on August 1, and completed it on November 4, 1879. The arsenal finished the pile driving on November 16, and the masonry work on December 4 of that same year.
Right: The repair and replacement of cracked wall in East wing of Shop H. The foundation was not secured on solid bed-rock which over a period of years caused the wall to sink under the tremendous weight of the massive stone wall. The wall was repaired and secured 35 years later at a cost of $65,000.

Alternative layers of concrete and Joliet rubble-stone masonry were laid and held in place by large footing stones. Major Flagler cited in his report to the Chief of Ordnance that it took seven weeks to excavate and fill the crevice, during which time 402 cubic yards of masonry, including concrete and stone rubble, were used. Despite the use of pumps while putting in the masonry, much of the concrete had to be laid in water. Flagler reported that: “gangs of men” were employed at night and during the weekends a portion of the time. He credited Mr. W.A.P. Totten, foreman of laborers, in charge of the masonry work, for their efforts in supervising the project.157

By the end of June 1800, a total of 4,292 cubic yards of masonry had been put into the foundations of Shop H (Building 66), followed by an additional 4,647 cubic yards used for the foundations of Shop H the next fiscal year. The two year total amounted to 8,939 cubic yards which measured over a 1,000 more yards of masonry than would be later used in the walls.158

In 1880, Major Flagler wrote a final report to the Chief of Ordnance pertaining to the difficulties that his workmen had encountered in securing foundations for shop buildings, in particular, shop H. He concluded the report with his opinion as to the worst foreseeable scenario that could possibly happen in regard to these foundations. He stated that the foundation of Shop H would settle only a little and would occur very slowly. He felt that since the foundations could not give way to endanger the structure the worst that could possibly happen would be sufficient settling of the wall foundation to cause serious cracks in the wall. If that occurred, Flagler believed the only remedy would be to disassemble and rebuild the wall.

Thirty-five years later, Major Flagler’s prediction as to “the worst that could ever happen” occurred. By 1912, Arsenal photographers had begun to document cracks in the wall of Shop H. By 1915, the east wall of each wing of Shop H was dismantled and rebuilt.
1880, Appropriation Law Changed

Another major hindrance to the building of the Arsenal had nothing to do with procuring stone; maintaining skilled laborers; or finding bedrock to build upon. Rather, it had to do with federal law which required that appropriations made in June of one year had to be used before June of the following year. In essence, the funds had to be used within the same fiscal year that they were appropriated. Any unspent balance had to be returned to the U.S. Treasury Department. This law caused extreme difficulties because it was hard to finish a building in one year. Little outside work could be accomplished during the long winter months; therefore, work was often suspended during cold weather, and was further delayed while waiting for new appropriations from Congress. Colonel Rodman and Major Flagler both complained to their superiors regarding this method of funding. Not until 1880 did the government finally exempt buildings at Rock Island Arsenal from this legal restriction. Before this the Arsenal lost several of the best working months of the year while waiting for congressional appropriations to be passed and made available on the first of July of each fiscal year.¹⁵⁹

1880, Announcement for Bids for Building Material

With the use of local newspapers, such as The Moline Review, announcements that the Rock Island Arsenal was accepting bids for building material were widely disseminated. On the following page is an announcement of this nature which ran on 16 July 1880.¹⁶⁰
Below: The Rock Island Arsenal Commander placed notices in local newspapers announcing that the Arsenal was accepting bids for specific building materials. The Moline Review carried the announcement below on 16 July 1880.

Proposals for Wrought Iron I Beams.
Rock Island Arsenal, Ill., June 24, 1800.

SEALED PROPOSALS are invited to furnish, delivered on cars at this Arsenal, about -- 830 pounds 15 in. I Beams, 200 lbs. per yard.
430,000 pounds 12 in. I Beams, 200 lbs. per yard.
480,000 pounds 12 in. I Beams, 125 lbs. per yard.
480 pounds 12 in. I Beams, 125 lbs. per yard.
127,000 pounds 4 in. I Beams, 30 lbs. per yard.
90,000 pounds 7 in. Deck Beams, 58 lbs. per yard.
20,000 pounds Angle and T irons.

Full bills and specifications can be obtained from the undersigned. All the Iron must be delivered within five months after date of contract, but the contractor may deliver it as much sooner as he pleases.

The successful bidder will have to enter into contract, and give good and sufficient bonds.

The Government reserves the right to reject any or all bids, and if necessary, bidders must show that they are able to perform the contract.

Bids from irresponsible parties who are not members or agents of firms competent to perform the contract, will not be considered.

Bids will be opened at 10 a.m. July 14th, 1880, and bidders are invited to be present.

D. W. FLAGLER
Major of Ordnance
Commanding
Below: A late 1800s photograph of 7-inch siege howitzer and RIA made carriage. Probably the artillery harness equipment on the horses was manufactured at the Rock Island Arsenal. Note the high water tower which once stood just south of the multiple-sided water reservoir. Possibly a road test on a newly completed carriage model documented by the photograph.

To further illustrate the difficulty the Arsenal encountered in obtaining stone during its major construction period of the latter 19th century, the Arsenal made announcements in local newspapers stating that it was again seeking to procure building stone. One such advertisement soliciting bidders appeared in the 15 August 1881 issue of the Moline Review-Dispatch. It explained the bidding procedure in the following manner:

PROPOSAL FOR STONE

Rock Island Arsenal Ill., Aug. 15, 1882. SEALED PROPOSALS are invited to enter into contract to furnish, delivered at this arsenal, about 1800 cubic yards of Dimension, Ashlar, Rubble and Footing Stone for the construction of one store-house.

The architecture of this building is to be similar to the barracks already built at this arsenal. Bidders should not make bids until after examining drawings and specifications, and obtaining full information at my office, and should also examine the work of the building mentioned above.

Bidders must state the name and location of the quarries from which they will furnish stone; be prepared to show that they have such control over quarries as to insure their ability to furnish the stone, and the quarries must be opened sufficiently to show that the required amount of stone can be obtained from them, the stone must be of known good quality and endurance, and not differ greatly in appearance from that in the shops and adjoining buildings.

The successful bidder must give good and sufficient bonds for a faithful performance of his contract. The U.S. reserves the right to reject any or all bids. Proposals must be in triplicate, and will be opened Sept. 20, 1882. Bidders are invited to be present.

D.W. Flagler,
Lt. Col, of Ord., Comd.
Innovations in Construction of Arsenal Buildings

During the course of a building project that took 30 years to complete, some innovations appeared in the construction of the arsenal stone buildings. As early as 1872, Major Flagler had experimented with the use of concrete for paving and construction. He reasoned that if a mixed concrete with the proper toughness and hardness could be produced at the arsenal, it would be more economical and more durable than stone. Major Flagler's early tests, however, failed to produce a consistently hard concrete. To be noted is the fact that Flagler was promoted to the rank of Lieutenant Colonel in 1881.

It was not until 1883 that Flagler's investigations and experiments in producing suitable concrete proved satisfactory. The successful concrete mixture was initially used in the construction of Storehouse “A”. Storehouse “A” was the first of a series of storehouses originally planned to be erected behind each of the manufacturing shop buildings. Storehouse “A”, located to the rear of Shop A (Building 102), measured 254 feet by sixty feet, with two porticos fifteen feet by sixty feet. The four-story building had a total area of 63,600 square feet. This storehouse was the first Rock Island Arsenal building built with an all-concrete foundation. From this time on, all Arsenal foundations, basement floors, and most sidewalks were constructed in concrete. The concrete replaced the more costly flag-stones used in earlier construction. flag

Flagler's experiments with different types of cement led him to recommend the use of “South Bend” Portland cement produced in South Bend, Indiana. He found it superior to the best English cements available. Not only was the quality superior, but the cost of the South Bend cement was more economical at $2.85 per barrel of 400 pounds delivered. Flagler, in describing the methods employed by his workmen, provided some insight into how the stone buildings were
constructed. He reported that:

… The arsenal obtained sand, of good quality, from local contractors for 63 cents per cubic yard delivered by wagons at the work site. The rock, a very hard limestone containing large quantities of flint, which had been excavated from the water power canal project in the south channel of the Mississippi river, was hauled across the river on ice during the winter. The limestone cost, delivered at the work site, .50 cents per cubic yard. Workmen used a Totten crusher to pulverize the stone. For foundation work, the crusher was placed at the edge of the basement excavation and the rock was poured from the crusher onto a plank at the edge of the basement, a drop of seven and a half feet. A sprinkler kept the pile of broken rock thoroughly wet. Workmen then shoveled the rock into barrows and dump boxes for thorough mixing with sand and cement. Eventually the workmen became expert enough to measure the ingredients with their shovels.

Wheelbarrows were used to transport concrete to foundation work nearby. When transporting the concrete over distance, workmen pushed it in dump boxes of one cubic yard capacity, on tramway cars. These cars were afterwards used for delivering stone and mortar to the derricks for building walls of the stone shops. Workmen did not wet the concrete until it arrived at the place of use, and just prior to dumping it, water was added. A layer of concrete was thoroughly rammed and tamped until its surface was just covered with water.
Below: Water sprinkler (appears to be in back of Shop A, Building 102) used to water down the road to keep the dust down.

CONSTRUCTION COSTS

Flagler included the following breakdown of material and cost in his report so that in the future, the Army Ordnance Department would use it as a guideline in determining construction costs.\(^{164}\)

INGREDIENTS AND COST

<table>
<thead>
<tr>
<th>Material</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 cu. yd. crushed rock</td>
<td>$0.50 before crushing</td>
</tr>
<tr>
<td>1 cu. yd. sand at 63 cents</td>
<td>$0.21</td>
</tr>
<tr>
<td>1 cu. yd. cement (1 barrel) 400 lbs</td>
<td>$2.85</td>
</tr>
</tbody>
</table>

Cost of material per yd. $3.56

Capacity of crusher 33 yds. per day.

Labor to lay 33 cu. yds. of concrete: 2 men at crusher; 2 mixing sand/cement and bringing to crusher; 2 mixers; 2 wheelbarrow men; 2 tampers 10 men in all, at $1.50 per day each... $15.00

Cost of running crusher $2.75

1 mason superintending $2.75

Miscellaneous expenses $2.00

Total for 33 yds. $22.50

Labor for 1 yd. $0.68

Material for 1 yd. $3.56

Cost per yd. $4.24
Three different Arsenal Commanders closed out the 19th century following Flagler’s departure in 1886.

Colonel Thomas G. Baylor, RIA Commander, 1886-1888.

Colonel James M. Whittemore, RIA Commander, 1888-1891.

Colonel Adelbert R. Buffington, RIA Commander, 1892-1897.

**Improvements During Flagler’s Command**

Following Rodman’s master plan, Flagler supervised completion of the Commanding Officer’s quarters in 1871, Shop C in 1872, and Shop B in 1873. Between 1874 and 1886, Flagler built seven stone buildings on Main Avenue: Shops A, B, E, F, G, H, and I. Also, Flagler added to the manufacturing core several ancillary buildings, including a magazine, barracks, fire station, lumber shed, storehouse for Shop A, Gate House, and Officer’s Quarters 2, 3, and 4 during his command of the Rock Island Arsenal. After Flagler’s departure in April 1886, Colonels Baylor, Whittemore, and Buffington commanded the Rock Island Arsenal. The Arsenal’s last stone buildings were completed during the tenure of these three Arsenal Commanders.

**Construction After Flagler Departs RIA**

The close of Lieutenant Colonel Daniel W. Flagler’s term as Commanding Officer in 1886 virtually brought to an end the first great construction period of the Rock Island Arsenal. Flagler had essentially completed the original plan of General Rodman. Few important construction projects were concluded at the Arsenal after his departure and before the turn-of-the-century. However, the following projects from the late 19th century do merit recognition.

Following Flagler’s term as Commander, the construction of the final Rodman-plan buildings, Shop K (Building 68) and Storehouse K (Building 56) lagged and continued to drag on slowly through the commands of Colonels Baylor, Whittemore, and Buffington. Arsenal workmen had completed the storehouse for Shop K in 1893; seven years after its foundation had been laid. In that same year, skilled laborers applied the finishing touches to Shop K, a good 12 years after its initial construction.
Building 360, The Old Post Headquarters 1889-1922

In 1888, Congress appropriated funds for the construction of a new headquarters building, later designated Building 360. The Rock Island Arsenal maintained its headquarters in this building until after World War I. In 1922, Arsenal operations were reduced and consolidated into fewer buildings. As part of this return to peacetime status, the Arsenal Headquarters was transferred to Shop B (Building 60).\(^{165}\) Though not an Arsenal structure, the rebuilding of the Government Bridge from Davenport in 1895-1896 should be included as a major construction project on Arsenal transportation. One project that Rock Island Arsenal Commanders repeatedly requested appropriations for, during the last decade and a half of the 19th century, was the building of a new post hospital.

Quarters 34, The Old Post Hospital

The building then used as a hospital was a drafty old frame confederate prison building. Colonel Buffington expressed his frustration and defended the necessity of replacing the Arsenal's old hospital building in his report to the Chief of Ordnance dated 1896. He argued that

…Previous reports have been made as to the inadequacy of the post hospital. It is an old frame structure, erected during the Civil War, about thirty-five years ago (for prison purposes). It is drafty and leaky, and the timbers are decayed. Patients placed in this building for treatment must have blankets hung around their beds in cold weather to keep off the draft, and the beds must be
moved from place to place in wet weather to avoid the rain. The Inspector General had reported that this building is utterly unfit for hospital purposes and not worth repairing. Estimates have been repeatedly submitted, and are again included this year. It is really a cruelty to place a sick man in this structure.\textsuperscript{166}

Unfortunately this project did not receive congressional approval until after the turn-of-the-century. In 1907, a brick building was constructed as the new hospital. Today this building functions as officer's quarters (Building 81) for the Rock Island Arsenal.

The RIA's First Great Period of Constructions Comes to a Close

A decline in appropriations for construction at Rock Island coincided earlier with Flagler's departure from the Arsenal. Essentially, the arsenal's building phase had been completed, and the conclusion of Colonel Rodman's original plan was in sight. Congressional priorities turned to providing appropriations that would furnish shop machinery; provide adequate sources of power to the shops; maintain Arsenal roads and grounds; and improve the access bridge from Davenport, Iowa. The first great construction period of the Rock Island Arsenal was brought to a close in the decade and a half prior to the turn-of-the-century.
CHAPTER TEN
WATER POWER AT ROCK ISLAND

The Mississippi River’s potential water power at Rock Island and the island’s access to water and rail routes made Rock Island a choice western site for an armory or arsenal for manufacturing of supplies. These natural attributes also made Rock Island an attractive plum for commercial development.

In the late 1830s, long before the construction of the Arsenal, private enterprise began developing water power in the south channel of the Mississippi River, now known as Sylvan Slough. In February 1837, the legislature of Illinois granted to David B. Sears and John W. Spencer a charter to build a dam across the south channel of the Mississippi River near the head of Rock Island, across from Moline, Illinois. Mr. Sears and associates controlled the water power for several years. In 1851, the firm of Pitts, Gilbert, and Pitts from New York acquired the dam and remained in control of its water power until 1859. After a scheme to raise money for improvements and repairs through the sale of bonds failed, the entire property was turned over to the stockholders. Horace K. White and his New York associates then purchased bonds for improvements and repair of the dam, which eventually led to White’s acquisition of the property on 25 April 1864.

As previously mentioned, on 19 April 1864, Congress approved an act which authorized the Rock Island Arsenal Commander to clear the island of all property claims made by private parties and local communities. This act provided for establishment of a board of commissioners, appointed by the President of the United States. The board reviewed the legitimate claims and made recommendations as to their settlement.

In February 1865, Charles Atkinson and associates obtained a charter from the state of Illinois for the Moline Water Power Company, and by December of that same year they purchased...
the water power franchise at Rock Island.¹⁶⁷

Rock Island Arsenal’s water power history spanned more than 50 years, from 1865 to after the turn-of-the-century, and during those years at least eight major water power-related projects were completed by the Rock Island Arsenal. The eight projects included: construction of a stone lateral dam wall in the south channel of the Mississippi River; excavation of a tail race canal through solid rock; building of a stone dike along Sylvan Island; construction of the Arsenal dam; building of an Arsenal power house; digging of tunnels and erecting of towers to transmit the power to the shops by wire cable; building a stone dike at the edge of the island’s shore to the head of the island along the south channel; and extending a wing dam off the main channel of the Mississippi River from Benham’s Island. Flagler wrote in his History of the Rock Island Arsenal that:

Work on the upper (dam) wall, the island earth dike, the stone dike, the canal, and wing dam were carried on simultaneously and although an account of expenditures on the water power was carefully kept, the cost of the different parts of the work was not kept separately.¹⁶⁸

Colonel Rodman initially planned to use condensed air to power the machines in his Arsenal shops. His plan called for transmitting condensed air from Benham’s Island dam on the north channel and from the old Moline dam on the south channel of the Mississippi River to the Arsenal shops. He quickly abandoned this idea, and developed a new plan to mechanically transfer power from a dam on the south channel of the Mississippi River, which was near the construction site of the Arsenal manufacturing buildings.

As early as 1865, Colonel Rodman proposed using water power derived from the Moline Water Power Company to drive the
machinery in his Arsenal shops. He suggested building a masonry dam and allowing Moline Water Power Company to use its water at the east end of the dam, while the Rock Island Arsenal used its water downstream at the west end of the dam.

As earlier stated, Congress passed another act on 22 June 1866, which further empowered the Arsenal Commander to take complete and permanent possession of Rock Island, including the island’s access bridges and water power. On 27 June 1866, Congress appropriated $100,000 to secure water power at Rock Island.169

Authorized by the above congressional legislation, Colonel Rodman notified the Moline Water Power Company to vacate by 1 September 1866 all portions of the south channel that separated Rock Island from the Illinois short. After lengthy negotiations, Charles Atkinson, president of the Moline Water Power Company, agreed to relinquish to the federal government his company’s rights to the water power and property, north of the south channel’s mid-line. This included sandbars (deposits of sand), stone, or other materials adjacent to Rock Island. In exchange, the government agreed to provide in perpetuity, free of cost, one-fourth of the water power derived from existing of subsequent plants to the Moline Water Power Company. In addition to the above agreement, the Moline Water Power Company reserved the privilege of renting to customers any surplus power not needed by the arsenal. On 22 September 1866, the Moline Water Power Company received authority from the Chief of Ordnance to collect rent or fees from nearby factories using their water power.170

Flagler reflected in his History of Rock Island Arsenal, that the one-fourth agreement, in exchange for the Arsenal’s use of the three-fourths of the water power was the key to the government’s difficulties with the Moline Water Power Company. Flagler wrote:

…It is presumable that the right of the company could have been purchased for less sum than this ($500,000) and the United States would have been left sole owners of all the power, and would have been free form a troublesome, ‘entangling alliance’ with a private corporation.171

Congress passed a joint resolution empowering the Secretary of War to administer the recommendations of the 1864 and 1866 commissions to adjust claims stemming from
actions taken by the government to regain complete possession of the island.

The joint resolution enabled the acting Secretary of War General Ulysses S. Grant to enter into an agreement regarding water power for the Arsenal at Rock Island. In accordance with this resolution, the United States and the Moline Water Power Company signed a contract, dated 18 June and 20 August 1867. The contract, which included the recommendations of the commissioners, became the basic agreement between the federal government and the Moline Water Power Company. The Moline Water Power Company later, however, filed several complaints against the United States Government for not fulfilling the terms of this contract. In 1869, the plan for water power development at Rock Island was modified to include the construction of two dams: the Moline (lateral) dam and the Rock Island Arsenal dam.

The lateral dam stretched from the Moline shore, at the point where the buildings of the Moline Water Power Company were situated, downstream approximately one mile to a portion of the Moline mainland which jutted out into the slough. Colonel Rodman selected the narrowest point in the slough for construction of the Arsenal dam across the south channel.

Before the use of electricity, power had not been transmitted over a great distance very successfully. The crude technology of the 1860s and 1870s precluded the long distance use of electricity. Only those buildings and factories situated in the immediate vicinity received adequate power. For this reason two dams were necessary, the lateral dam at Rock Island was constructed parallel to the Moline shore so that private factories along the slough could directly receive water power.

Likewise, the Rock Island Arsenal needed its dam constructed nearer to the Arsenal shops.
The Moline and Benham’s Island dam sites were too far from where the Arsenal shops were being built to be considered adequate sources of power for these shops.

John Deere, DeWitt Dimock, John Gould, and Charles Atkinson were among the investors that had an interest in the development of Moline’s river front property. The government’s drive to regain possession of the entire island of Rock Island included the accesses and water power to the island which forced several private firms operating on Rock Island to relocate. Dimock & Gould, and Company, a woodenware and lumber firm, moved its business from the island and re-established it along the Moline shore to take advantage of the water power under development.

The spring flood of 1868 partially washed away the old Moline dam. The Moline Water Power Company urged the Rock Island Arsenal to remove the damaged dam and to construct the propped lateral dam. The remaining portion of the old Moline dam accumulated dirt, timber, rock, brush, garbage, and silt deposited around the dam.

In addition to developing water power, another objective of the parties involved was to control the flood waters of the Mississippi River. Besides carrying away portions of the old Sears Dam, the flood of 1868 also washed away the old wooden bridges which connected Moline to the island, and connected the city of Rock Island to the island. Moline investors viewed the results of the flood as an opportunity to replace the crudely
constructed old Moline dam with a new federally built one, which would increase the value of Moline’s river front property.

After the spring flood of 1868, the work of removing the old dam and building the new Moline (lateral) dam was done simultaneously. Unfortunately, flood waters struck again in the fall of 1869 and carried away portions of the coffer dam walls being erected. Moline Water Power Company, anxious to have the water power project advanced to the point where it could begin using the power, offered to share in the repair of the dam. Colonel Rodman, representing the government, reached an agreement with the Moline Water Power Company on 28 October 1869. Under the terms of the agreement Moline Water Power Company replaced the coffer dam walls, and the Arsenal agreed to remove the old Moline dam and begin work on the new lateral dam wall. In order for these projects to proceed, portions of the slough were drained of water at the work sites. Coffer dams made this work possible by creating a temporary watertight enclosure. The enclosed area then was pumped dry exposing the river channel bottom so that the work could proceed at the old and the new dam sites. Mr. S.W. Wheelock, Moline Water Power Company, supervised the Moline firm’s part of the project, and Captain Morris Schaff of the Rock Island Arsenal was in charge of the government’s work at that time. The dam wall was completed in December 1869, with the exception of 100 or so feet at the wall’s lower end, which was not built until 1871-1872. The coffer dams were removed in the spring of 1870, and Moline Water Power Company began using the water power in August 1870.175

Moline’s lateral dam contained a series of flume openings or chutes, each with its own gate house. Each gate house contained an individual turbine or wheel which transmitted power mechanically by turning a shaft or cable that led directly to the factory. In a sense, each factory had...
Below: The 1874 plan of the Telodynamic Power System at Rock Island Arsenal. Lines “MR” in front of each row of shops depict proposed underground shafts whereas lines designated “QPS” represented the reduced system which was eventually installed. Under this plan lines of wire rope were used to transmit 300 horse power to the shops.

its “own miniature” water power plant. Unfortunately for Moline, the south channel was lower towards the Moline shore than towards the Arsenal Island’s side of the channel, and this low water area behind the lateral dam became a stagnant collection point for debris and dead animals which caused sanitation hazards.176

In 1869, the original plan was revised to include the excavation of a tail race canal constructed by the Rock Island Arsenal to carry-off the stagnant water and debris that had collected behind the dam wall. Under this agreement, the government was required to dig a canal through that portion of Moline which jutted into the slough. In addition to the canal, the government had to construct dikes along the Moline shore to protect against high water. The digging of the canal turned out to be a major undertaking for Arsenal Commanders, Rodman and Flagler. In June 1871, Colonel Rodman died, and his successor, Major Daniel W. Flagler, inherited the unfinished water power project. The project included blasting a canal 2,000 feet long and 200 feet wide through solid rock to the depth of the river bed. Once completed, that portion of the land cut off from the canal formed an island known as Sylvan Island. Major Flagler later wrote that: “Rock was found generally two feet underground, and nearly the whole excavation (of the canal) was through limestone containing flint, and difficult to work.”177 Flagler provided the following details pertaining to the work performed in the slough. He recalled that:

...The rock taken from the canal and not used in the dike was deposited in large mounds or “dumps” on the Moline Company’s land near the canal, and has been used very
Right: Telodynamic tower and wheels used to transmit power over wire cables to the rear of shops on south side of Rodman Avenue. This tower was situated east of East Avenue and south of Rodman Avenue.

considerably since in building roads, foundations etc., for the arsenal. Large quantities of it have also been used in the same way in (cities of) Moline and Rock Island.

The rock had to be blasted throughout, and was hauled in wagons both to the “dumps” and the dike. A good deal of expense was incurred in maintaining roads for hauling over the rough deposited rock on the dike, movable plank ramps were required to enable the teams to get down off the dike and another road along the foot of the dike was required for returning teams. ¹⁷⁸

Captain Morris Schaff and A. Mordecai were in charge of the excavation and dike work. They were assisted by Captain M.L. Poland, Lieutenant Charles Shaler, and Lieutenant Wright.

The federal government undertook the expense of excavating a canal and building dikes in such a manner as to meet the terms of its agreement with the Moline Water Power Company. The cost of building the 4,000 foot long dam wall and excavating the 2,000 foot long canal was nearly $500,000 in 1872. The workforce building the dam and dikes, and excavating the canal increased to 900 workmen and 75 teams during the fiscal year ending 30 June 1872.¹⁷⁹

Work on deepening the canal continued into the latter months of 1871. Heavy rains and cold weather delayed the progress of the Arsenal workmen. On 23 December 1871, high water broke the coffer dam, and a few days later the temperature plunged to 16 degrees below zero Fahrenheit. The pumps stopped operating due to the cold weather and work was abandoned until the next spring.¹⁸⁰

The canal was finally completed in the autumn of 1872, but not without strained relations. Mill owners whose businesses were interrupted by the loss of power caused by the closing of their chute openings during the excavation of the canal challenged the Arsenal Commander’s permission and discharged water through the canal. As incoming water forced Major Flagler’s workmen to suspend their work and as the water threatened to collapse the coffer dams, the situation became
volatile. Mill owners threatened to shoot anyone who tried to close the gates. In turn, Major Flagler resorted to using soldiers to secure the gates. Considering the expense and difficulties encountered by the Arsenal in its efforts to meet the terms of the agreement, it might have been more economical for the government to have purchased the complete rights of the Moline Water Power Company, than to have entered into a joint enterprise with them.181

**Arsenal Dam and Power Systems**

In July 1872, the Secretary of War approved construction drawings of an Arsenal dam between Rock Island and Sylvan Island. A board consisting of three ordnance officers, appointed by the Chief of Ordnance, visited the Rock Island Arsenal to examine plans for the Arsenal dam and water power system. A major obstacle in devising a transmission system was the distance between the source of power and the buildings where the power was to be used. Electrical power was not yet feasible and steam was too expensive to use on such a large scale. The Arsenal, therefore, devised a system by which power could be transmitted mechanically from the dam to the arsenal shops.

Initially, four methods of transmitting power to the Arsenal manufacturing buildings were considered: compressed or condensed air; a rigid covered shaft system using tunnels to connect to the shops; a telodynamic or wire-rope (cable) system; and a combination wire-cable and shaft arrangement. After four days of review, the board of officers approved combining the telodynamic wire-cable system with the shaft method. By combining the two systems, the Rock Island Arsenal could temporarily set up a wire-rope or telodynamic...
system that would be economical to install and would allow time to further develop the more complicated rigid shaft system.\textsuperscript{182}

Using the telodynamic system to transmit power over a great distance had yet to be tried in America. Major Flagler corresponded with several European firms that had manufactured wire-rope and had built telodynamic systems in Germany and other European countries.

The telodynamic system mechanically transmitted power to the Arsenal shops by using water, which passed through openings at the dam, to rotate turbines. The rotation of the turbines was transferred through gears which, in turn, rotated a large drive wheel. This wheel, fifteen feet in diameter, functioned as a large drive pulley from its location inside a power house adjacent to the dam. An endless cable loop extended from this ground station northward along First Avenue to a pulley at the top of a tower. From there, wire-cables, one-inch in diameter, formed loops which turned additional elevated wheels at the rear of the shop buildings situated south of Rodman Avenue. Long main drive shafts ran just below the ceilings of each shop area, constantly rotating when the telodynamic system was activated. Individual machines were powered by engaging a clutch drive belt connected to the overhead shaft.\textsuperscript{183}

Beginning in 1874, Major Flagler had all gear work and shafting for the power system manufactured at Rock Island Arsenal’s foundry and shops, and in conjunction with the power system, Major Flagler ordered metal to produce the castings needed for the power system.

In the mid 1870s, another controversy between the federal government and Moline Water Power Company occurred. Brigadier General Stephen V. Benet, Chief of Ordnance, visited Rock Island Arsenal in May 1875, and made a complete inspection of the water power projects at Rock Island. The following February, Major Flagler traveled to Washington DC, to participate in discussions with officials of the Moline Water Power Company, their attorneys, the Secretary of War, and the Army’s Chief of Ordnance. No solutions to the conflicts between the government and the
Moline Water Power Company were arrived at as a result of these discussions. The Moline Water Power Company was anxious about the completion of a variety of water power related improvement projects.

During Major Flagler’s term of command the following water power related projects were completed:

1. A stone dam wall 2,307 feet long, 18 ½ feet high above the river bed; 8 feet thick at the bottom, 3 ¾ feet at the top, strengthened by buttresses 3 feet wide and 3 feet thick at the bottom and placed 13 feet apart. The wall had at least 37 openings or chutes for use by the Moline Water Power Company.

2. A tail race canal carved through solid limestone 2,000 feet long and 200 feet wide.

3. A stone dam dike along Sylvan Island which connected the lateral dam wall with the government dam.

4. A masonry dam wall, laid with dressed stone, extending from the end of the dike to the shore of the island of Rock Island, near the shops. This dam wall had 40 openings for water wheels.

5. A power house and line of towers to transmit the power from the dam to the shops by means of wire-cables.

6. A stone dike about one-and-a half miles long, edging the shore of the island to its head to protect against flooding in low places.

7. A wing dam extending up the Mississippi River approximately 2,000 feet.  

However, Major Flagler’s achievements did not escape criticism from the Moline Water Power Company. Throughout Major Flagler’s and his predecessor, Colonel Rodman’s terms as Commanding Officers of the Rock Island Arsenal, the Moline Water Power Company contended that the government had not fulfilled its contractual obligations.

In an effort to resolve these differences, Congress passed a resolution on 3 March 1877 that formed yet another commission. This
commission reviewed all contracts entered into between the United States Government and the Moline Water Power Company. George W. McCravey, Secretary of War, appointed three officers to the commission: Brigadier General A. A. Humphries, Chief of Engineering, U.S. Army: Lieutenant Colonel H. G. Wright, U.S. Army, Corps of Engineers; and Major Henry L. Abbot, U.S. Army, Corps of Engineers. They were appointed by Special Order No. 72, dated 5 April 1877. After concluding its study, the commission submitted its report to Congress in June 1877. The report essentially stated that the allegation by the Moline Water Power Company that the United States Government had not complied with the terms of its agreement of 1867 could not be supported. The Moline Water Power Company countered the decision of the commission by filing a lawsuit in the U.S. Court of Claims against the United States Government. The case was eventually dropped by the court due to lack of prosecution on behalf of the Moline Water Power Company. The telodynamic system was installed in 1878, and the first use of Arsenal water power in the shops occurred in February 1879. All the shops that comprised Arsenal Row on the south side of Rodman (Main) Avenue, with the exception of Shop A, had access to the power carried by the telodynamic system. However, only Shops C and E actually received power from the wire cable and tower arrangement. Of the two, Shop C consumed the greater amount of the power since the Arsenal's early manufacturing operations took place in that building. Shop E, being the foundry, did not require as much power. The U.S. Government and the Moline Water Power Company negotiated a new contract which was signed by the president of the water power company and the Secretary of War on 28 August 1882. The new agreement listed work yet to be performed by the government and the funds necessary for those projects. The work included improving the water power pool; deepening the canal; placing six new openings or chutes for water wheels in the wall or dike;
and reserving any unused balance of funds for future development and maintenance of the water power system. According to the Moline Water Power Company, once this was accomplished, the company would fully discharge the United States Government of any further obligations to develop water power.186

**Water Power Related Projects Provided Jobs for Tri-Cities**

Practically on an annual basis, from 1867 to well past the turn-of-the-century, Congress appropriated funds for the construction of water power related projects at Rock Island. The tri-cities communities which then surrounded Arsenal Island benefited economically from the federally-financed projects. For over a forty year period, Congress had appropriated more than a million dollars for development of water related improvement projects at Rock Island. A large share of that sum went to local tri-cities firms and laborers hired as day workers or contracted for longer periods of time on these projects. At times, close to a 1000 workmen were employed by the Rock Island Arsenal to work on the various improvement projects being completed in the south channel of the Mississippi River and above Benham’s Island in the Main Channel.

Advertisements soliciting sealed bids for a variety of labor appeared routinely in local newspapers. As an example, the Moline Review-Dispatch printed the following announcement inviting bids for blasting and hauling rock from the water power pool at the Rock Island Arsenal.187

**PROPOSALS FOR BLASTING AND HAULING ROCK**

ROCK ISLAND ARSENAL, IL, May 14, 1881

Sealed proposals are invited for blasting and hauling in wagons, about 20,000 cubic yards of rock, from the water power pool at this Arsenal...
Below: Workmen laying first course of stone at the east end of construction for the Arsenal Dam, dated 28 October 1889. Note the roof of the main pulley house in background.

Between August and November 1881. Plans and drawings can be seen and specifications and forms for bids can be obtained at this office.

The successful bidder will be required to give good and sufficient bonds for a faithful performance of the work.

The United States reserves the right to reject any and all bids. Bids will be opened at 10 A.M., May 31, 1881, and bidders are invited to be present.

D.W. Flagler,
Major of Ordnance
Commanding

By 1890, the combination of wire-cable and rigid shafting to generate power was inefficient and obsolete. The Arsenal’s makeshift arrangement, at best, provided only limited power to a portion of the Arsenal shops. Frequently power failures occurred due to friction which jammed the shafts; and at times, due to cables which snapped or developed too much slack.

Also by 1890, technology in the transmission of power had advanced to such a degree that it became feasible to update the Rock Island power system. Arsenal Commander Colonel James Whittemore in 1890 recommended to the Chief of Ordnance that the Arsenal’s geodynamic and shaft system be abandoned in favor of electricity. His recommendation did not receive immediate action by the chief of ordnance other than ordering additional studies be done of the arsenal’s water power system. The Arsenal’s wire-cable and rigid shaft system had at that time provided enough energy for the relative light Arsenal workload being done in Shops C and E. Despite improvement to the dam and construction of a frame power house in 1892, it became apparent the Arsenal’s water power was no longer adequate. In 1899, a fire destroyed the Arsenal’s wooden frame power house, thereby placing the installation’s power plant out of commission. The
Right: A copy of a photograph included in the Annual Report of Chief of Ordnance, 1892, depicting workmen operating electric drills to break up the solid rock portions of the river bed and deepen the water power pool.

Below: Workmen building coffer dam during winter of 1891. Coffer dams were used to hold back the water so that construction of the dam and deepening of the water power pool could be accomplished.

army, not wishing to expand an inadequate, obsolete power system, decided instead to modernize the Rock Island Arsenal’s entire power system by switching to hydroelectricity.

Additional Water Power Related Projects

In 1896, a new concrete dam was constructed for the Moline Water Power Company between Sylvan Island and the Moline mainland. The old Moline dam tail race, no longer needed, was filled in and was used as a railroad bed. All that remains today of the Moline’s lateral dam are a few gate houses. The extension of the wing dam up river nearly two miles to the Duck Creek chain of rapids in the Mississippi River’s main channel was completed in 1899.\textsuperscript{188}

At times, the annual appropriation for water power related projects was greater than that appropriated for the construction of the Arsenal itself. Congress passed the following acts for the development of water power at Rock Island Arsenal.\textsuperscript{189}

<table>
<thead>
<tr>
<th>ACT</th>
<th>APPROPRIATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Act of June 27, 1866</td>
<td>$100,000</td>
</tr>
<tr>
<td>Act of June 8, 1868</td>
<td>80,000</td>
</tr>
<tr>
<td>Act of March 3, 1869</td>
<td>150,000</td>
</tr>
<tr>
<td>Act of July 15, 1870</td>
<td>20,000</td>
</tr>
<tr>
<td>Act of March 3, 1871</td>
<td>20,000</td>
</tr>
<tr>
<td>Act of June 10, 1872</td>
<td>110,000</td>
</tr>
<tr>
<td>Act of March 3, 1873</td>
<td>18,000</td>
</tr>
<tr>
<td>Act of June 23, 1874</td>
<td>5,400</td>
</tr>
</tbody>
</table>
Below: In 1892, the coffer dam collapsed under the pressure of high water caused by an ice gorge; repairs delayed the completion of the water development project.

<table>
<thead>
<tr>
<th>ACT</th>
<th>APPROPRIATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Act of March 3, 1881</td>
<td>50,000</td>
</tr>
<tr>
<td>Act of August 7, 1882</td>
<td>100,000</td>
</tr>
<tr>
<td>Act of March 3, 1883</td>
<td>20,000</td>
</tr>
<tr>
<td>Act of July 7, 1884</td>
<td>18,500</td>
</tr>
<tr>
<td>Act of October 2, 1888</td>
<td>275,000</td>
</tr>
<tr>
<td>Act of August 30, 1890</td>
<td>101,000</td>
</tr>
<tr>
<td>Act of July 1, 1898</td>
<td>45,000</td>
</tr>
<tr>
<td>Act of March 3, 1899</td>
<td>21,350</td>
</tr>
<tr>
<td>Act of March 3, 1901</td>
<td>130,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$1,624,750</strong></td>
</tr>
</tbody>
</table>

Extraordinary repairs to the Rock Island Arsenal water power were provided by the following appropriations:

<table>
<thead>
<tr>
<th>ACT</th>
<th>APPROPRIATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Act of October 2, 1888</td>
<td>$25,000</td>
</tr>
<tr>
<td>Act of August 18, 1894</td>
<td>$30,000</td>
</tr>
<tr>
<td>Act of March 2, 1895</td>
<td>$37,500</td>
</tr>
<tr>
<td>Act of June 4, 1897</td>
<td>$28,150</td>
</tr>
<tr>
<td>Act of June 6, 1900</td>
<td>$97,000</td>
</tr>
<tr>
<td>Act of May 27, 1908</td>
<td>$28,500</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$246,150</strong></td>
</tr>
</tbody>
</table>
Right: The Rock Island Arsenal provided ordnance stores to troops stationed along the Western Frontier. From the Battle of the Little Big Horn in 1876 through the Battle of Wounded Knee in 1891, the RIA manufactured and supplied weapons and equipment used by frontier soldiers, such as those pictured guarding captured hostile Sioux Indians who had participated in the massacre of Custer and a portion of his 7th Cavalry at the Little Big Horn, in Montana.

Below: A late 19th century view of RIA gun yard, probably taken on a Sunday afternoon outing on Arsenal Island.

CHAPTER ELEVEN
19th Century RIA Operations

During its first decades from 1863 to 1893, Rock Island Arsenal’s activities consisted primarily of building construction; water power development; and organization of a storage depot. However, as early as 1869, with barley more than the Clock Tower Building completed, Colonel Rodman had Arsenal workmen cleaning, repairing, and packing breech-loading rifles, infantry accouterments, and artillery equipment. In his report to the Chief of ordnance for fiscal year 1869, Rodman alluded to the fact that Rock Island Arsenal workmen cleaned and repaired 55,361 pieces of infantry equipment and 503 sets of artillery harnesses. Practically all this work was completed by hand.191

Noteworthy was the fact that Rock Island Arsenal depot operations developed earlier than the Arsenal’s manufacturing operations. The Union Army began storing military equipment on Rock Island at the end of the Civil War as the army reorganized and closed several storage depots in different states. The Army’s Ordnance Department then transferred the holdings of those closed depots to Rock Island. Because of its strategic location, the Arsenal served as a repository for ordnance stores which, in turn, could easily be shipped by river or train to western military posts during times of Indian hostilities. After 1875, the Rock Island Arsenal supplied practically all the ordnance stores required by the army in the west.

While depot activities expanded during the 1870s, construction of the Rock Island Arsenal continued. By 1875, manufacturing Shops B (Building 60), C (Building 104), D (Building 62), and E (Building 106) had been completed. In addition, Shop A (Building 102) and Shop F (Building 64) were under construction. In May 1875, Brigadier
General Stephen V. Benet, Chief of Ordnance, arrived at Rock Island to inspect the construction at the island and was impressed with the progress. He then instructed Major Flagler, the Arsenal Commander, to begin manufacturing operation. At first, items such as waist-belt plates were produced at the Arsenal in limited quantities. Eventually, orders for other military equipment increased in volume and in importance. New missions or functions were also awarded to the Rock Island Arsenal and some of the Arsenal’s current functions were expanded.

In November 1875, General Benet sent the Rock Island Arsenal Commander an order for 3,000 sets of infantry equipment and 3,000 saddles. On 7 December 1875, an article appeared in the Rock Island Argus newspaper announcing that:

...Some 50 to 60 men are employed at Rock Island Arsenal manufacturing infantry equipment, covering saddles and doing miscellaneous leather work for the cavalry army of the service. This is the first manufacturing ever done in the way of equipments for the Army and this Arsenal.

In 1875, Brigadier General Montgomery Meigs, Quartermaster General, directed a board of officers to develop army standards for heating buildings, and at the same time established general specifications for size and construction of army stoves. In November 1875, officers completed their design of army issue stoves which included cast-iron and wrought-iron wood and coal heaters and cooking ranges.

On 28 August 1876, the Quartermaster Department solicited bids for the production of 160 heating stoves and forty cooking ranges. The Ordnance Department submitted the low bid on the cast-iron heaters, and received a contract to produce 100 stoves at the Rock Island Arsenal. The Arsenal also received production orders for sixty wood and forty coal heaters. In addition to the Rock Island Arsenal, two private contractors were
awarded contracts to manufacture stoves to army specifications.

In 1878, the Rock Island Arsenal produced 201 heating stoves and became the army’s primary producer of stoves. Two years later, in 1880, the Arsenal delivered 256 stoves to be completed in 1881. By the mid-1880s, many Army barracks were heated by general issue stoves manufactured at the Rock Island Arsenal.195

Earlier, in 1875, the Rock Island Arsenal's manufacturing operations included a Harness Shop, a Carpenter's Woodworking Shop, a Cloth and Canvas Shop, and an Equipment Shop. The Arsenal also had a Machine Shop, Blacksmith Shop, Foundry, and Polishing and Plating Departments. Prior to the Spanish-American War, Rock Island Arsenal manufacturing focused primarily on the construction of Arsenal buildings. The Arsenal's Carpenter Shop produced doors and window frames for the buildings under construction. Arsenal carpenters also made furniture for the officers' quarters and desks for the offices.

The Rock Island Arsenal Foundry fabricated construction material and shop equipment during the latter part of the 1880s. Castings of brass hardware, such as hinges, roof straps, and pulleys, had been initially produced in the old temporary wooden forge shop during the late 1860s. Once Building 106 (Shop E) was completed in 1873, the casting of iron trusses, columns, beams, and staircases were also produced at the island. From 1873 to 1988, Building 106 was in continuous operation as the Rock Island Arsenal's Blacksmith Shop and Foundry.

Harnesses were produced at the Arsenal from 1875 until the Harness Department was transferred to Jefferso...
manufactured army leather gun belts, straps, cartridge pouches, saddle bags, gun slings, rifle scabbards, and revolver holsters. The number of harness makers employed at the Rock Island Arsenal prior to the Spanish-American War fluctuated from twelve to forty with the size of orders received by the Arsenal Commander. However, the work force of the Arsenal Harness Shop rose to slightly over 1,000 employees during the Arsenal’s peak manufacturing period of the Spanish-American War.197

Because of the demand for harness hardware and repaired rifles, a Metal Polishing and Plating Department was established at the Rock Island Arsenal. Workmen in this department polished all sizes of buckles, hooks, buttons, hinges, bites, handles, and scabbards. In addition, rifle barrels, swords, and bayonets were plated and polished by workers in the department. By 1876, Arsenal workmen had begun to fabricate and repair haversacks and other canvas cloth-made accouterments for army-issue. During the late 19th century, the Woodworking Shop produced wooden saddle trees and arms chests. Besides parts for harness and saddler repairs, Arsenal workmen made buttons for McKeever cartridge boxes, and casts for an order of 1,000 spurs in 1881.198 In 1882, a power press for manufacturing metal meat-can handles was installed in the tin shop. As early as 1882, the Arsenal was engaged in experimental research and development. The Arsenal Commander’s report to the Chief of Ordnance for that year included details of an experimental entrenching tool (a spade) manufactured at the Rock Island Arsenal.199

In 1885, a Jewelry Department was added to the Equipment Shop. Arsenal jewelers produced pins, badges, trophies, and insignias for saddle gear. A total of 5,000 silver marksmen’s pins, and 2,000 sharpshooter’s badges were manufactured by the Jewelry Department in 1885.200 Also in 1885, the first electroplating at the Rock Island Arsenal was performed in Shop C. the shop had a small electroplating machine with a wash tub and pumice
stone tray, plus stones jars for cleaning and dipping metal. In this shop, officer saber scabbards and metal parts to sabers belts were repaired and replated. Other manufacturing worthy of mentioning during the 1880s included the production of metal skirmish targets and the fabrication of gun carriages. By 1884, steam hammers, heavy punch presses, and shear forging and machine shop equipment for heavier manufacturing were being produced in Shop C. In 1886, the Arsenal produced harness pack outfits for the Hotchkiss mountain gun carriage.

During 1886, the infantry equipment, cavalry accouterments, horse equipment, material for target practice, artillery harness, field and siege carriages, caissons, battery wagons and forges, and many other articles required by the army, were manufactured at this arsenal.

In the 1890s, the Rock Island Arsenal received additional responsibilities as a result of reorganization in the army’s manufacturing program. The reorganization was spurred by technology developed during the Civil War. In the 1880s, the Army Ordnance Department designated Watervliet Arsenal near Albany, New York, as the site of the Army’s new gun tube factory for heavy-caliber seacoast defense cannons. Watertown Arsenal near Boston, Massachusetts, did not have the capacity to produce the heavy carriages for the new seacoast guns and maintain its old production schedules. To expedite work on the heavy carriages, the Army selected Rock Island Arsenal to manufacture a portion of the carriages formerly produced at Watertown Arsenal. The RIA began to manufacture field and siege artillery carriages in 1892. In 1893, the RIA completed the last Rodman planned stone shop, Shop K, Building 68. By 1894, the RIA was producing machine gun carriages; limber caissons, battery wagons, and carriages for siege guns. Initially, RIA’s Machine Shop and Field Gun Carriage Shop were established in Shop C, Building 104. However, this peacetime arrangement of equipment and operations were inadequate for the sudden demand caused by the
Below: The Rock Island Arsenal Machine Shop crew, in 1896. Note the "old world" appearance of several of the workmen. The number of employees in the machine shop totaled only a few hundred prior to 1898. During the Spanish-American War RIA employment reached a pre-WWI peak of nearly 3,000.
Spanish-American War. To accommodate the increased quantity of production orders for leather, tin, cloth accouterments, and gun carriages, the Arsenal’s Machine and Field Gun Carriage Shops were moved to Shop G, Building 108. Mr. George Patterson, master machinist, was credited with organizing the gun carriage operation once it was moved to Building 108. Colonel Stanhope Blunt, RIA Commander, requested that Mr. Patterson be transferred to RIA from Watervliet Arsenal for precisely that mission. The production of artillery carriages remains one of the RIA’s primary areas of specialization to the present time.202

The Spanish-American War’s Impact on the RIA

On 15 February 1898, the U.S. battleship Maine blew up in the harbor of Havana, Cuba. Many Americans believed that Spain, to whom Cuba belonged, blew up the Maine. Congress on 19 April 1898 passed a resolution declaring that the people of Cuba should be free and independent from Spanish rule. It also authorized the president to use military force to carry out the resolution. On 24 April 1898, Spain retaliated by declaring war on the United States: 24 hours later the United States Congress reciprocated with its declaration of war against Spain.

Demand for War Materials and Supplies

Subsequent to the sinking of the Maine, the Army discovered it did not have sufficient carriages and harnesses for the field guns it had on hand. Moreover, production of field and siege guns, along with their carriages, needed to be drastically increased. On 9 March 1898, the Chief of Ordnance sent an urgent message to RIA. The telegram read, “work (should) be pushed (at RIA) on all existing orders as rapidly as possible, and extra shifts of workmen (should) be employed.”203 As the job orders increased, so did the Arsenal’s employment, and by the end of March 1898 the Arsenal’s manpower increased to 608 employees. In early spring of 1898, the RIA commander hosted a conference attended by the commanding officers
of Alleghany, Indianapolis, and Columbia Arsenals. The purpose of the meeting was to organize the war effort, and as the result of this conference, each arsenal was assigned parts to manufacture. Many of these parts were then shipped to RIA for assembly.

On 26 March 1898, RIA received orders to produce 25,000 complete units of infantry equipment. Within two weeks after receiving this order the RIA Commander was sent a directive to "press work on all field gun and siege gun carriages as rapidly as possible, employing extra shifts of men as far as economical."204

On 21 April 1898, four days before the United States declared war against Spain, RIA received instructions to increase its output of infantry equipment to 75,000 units and to begin producing 10,000 sets of horse equipment. The next day, the RIA Equipment Department began working day and night on two ten-hour shifts. On 5 May 1898, the Chief of Ordnance ordered an additional 54,000 units of infantry equipment; 5,000 units of cavalry accouterments; and 5,000 units of horse equipment. Thereafter, the RIA continued to receive orders, practically on a weekly basis. Some were for major items of production such as the 9 May order for the manufacture of 102 field carriages and limbers; 150 caissons and limbers; seventeen battery wagons and forges; in addition to the production of 6 carriages for siege guns.205

By 16 June 1898, the demand for equipment became so critical that the army had to order RIA to procure from private contractors, an additional 10,000 complete outfits of cavalry and horse equipment. As the demand for orders grew, so did the number of items procured from private firms. By July 1898, 46 private contractors were delivering finished ordnance products to RIA during the Spanish-American War. A total of 131 private contractors delivered the following principal stores to the RIA: 351,400 yards of dyed duck material for covering canteens; 1,000 yards of cotton webbing
Below: Rock Island Arsenal Tin Shop, showing a workman making metal meat-can handles during the 1898 Spanish-American War period. Accouterments such as meat cans, forks, knives, and canteens were produced by the Arsenal during the war with Spain and later during World War I.
for haversacks, blanket bags, etc.; 654,000 pounds of tin plate for meat cans, canteens and tin cups; 79,900 pounds of brass wire for buckles, rings, hooks, etc.; 89,500 pounds of sheet brass for buckles, rings, hooks, etc.; 954,000 feet of linen rope for lariats; 205,300 pounds of harness-leather backs; 1,262,000 square feet of leather for collars, bridles, bars, and straps, saddles, carbine scabbards, saddlebags, etc.; 1,161,900 pounds of steel and iron for gun carriages; 133,000 feet of basswood and ash for saddletrees; and 690,000 feet of additional lumber for ammunition chests, packing boxes, work benches, etc.206

Production at RIA During Spanish-American War

The United States Army was not prepared for war in 1898. It operated primarily with Civil War era technology and supplies, and was undermanned. A small workforce of approximately 500 men and boys were employed in the Rock Island Arsenal shops at the beginning of the Spanish-American War, many of whom were temporary employees. They were hired only for the period it took to complete a particular order. Nevertheless, by the time the war ended, the Arsenal’s manpower had increased to six times its prewar figure. At its peak employment of 2,900 in August 1898, the RIA turned out 6,000 complete outfits of infantry equipment every day.207

The Spanish-American War was the RIA’s first major test of its capabilities to meet emergency wartime production. The Arsenal performed well, although the production potential was barely tapped. Only the equivalent of one and a half of the ten stone industrial shops contained machines for manufacturing. Practically all of the RIA’s production by machine was performed in Shops C and E, now designated as Buildings 104 and 106.

The RIA used the vast floor space in many of the vacant buildings for a variety of projects.
Below: During the Spanish-American War practically all the RIA manufacturing occurred in Shop C (Building 104). Work that did not require machines and could be performed by hand was conducted in other buildings. Although the 1898 war with Spain was the RIA’s first major test, only Shop C and E (Building 106) were heavily engaged in manufacturing. Not until World War I would all ten shop buildings be used in production of ordnance stores.
which could be performed by hand labor. The first floor of Shop A, Building 102, became the receiving and issuing center for masses of raw material shipped to the RIA. In the east wing of Shop A, carpenters built only the portions of ammunition chests which required no machine operations. Unserviceable stores, items needing repair, were mostly stored and repaired in Shop B, Building 60. In September 1898, the repair and cleaning of Springfield rifles initially took place in the east wing of Shop C, but as the work increased, the operation was transferred to the first floor of Shop D, building 62. A forty horse-power engine and boiler placed in the court of the shop furnished the steam power which operated a line of shafting with twenty polishing wheels and two lathes with wire brushes used to repair or refurbish parts of the rifles. In July 1898, eighty-five men and boys cleaned and repaired approximately 600 rifles per day. At the conclusion of this project, Arsenal workers completed work on nearly 50,000 rifles and carbines with a cost for this maintenance work of sixty-eight cents per weapon. The rifles received from the field were in bad condition, and most were very rusty with numerous broken parts. At peak output, the crew also completed approximately 7,000 bayonet scabbards per day. Harness makers occupied the second floor of Shop G, where nearly 700 men and boys made leather equipment and sewed felt and duck covers over canteens. Shop G was used for these activities because it had water and restroom facilities which the north row or armory row shops did not. In Shop H, Building 66, workers painted gun carriages, limbers, and caissons. However, not until World War I would all ten of the Arsenal 19th century-built stone shops be equipped with machinery and used as industrial buildings.  

During the Spanish-American War, Rock Island Arsenal Commander Colonel Stanhope Blunt placed his subordinate officers directly in charge of specific operations. Captain O.B. Mitcham was responsible for the repair of unserviceable stores,
including the Springfield rifles. He also served as the installation’s Quartermaster and Paymaster. Captain W.S. Peirce was in charge of the Blacksmith Shop and Foundry, plus all gun carriage and equipment work performed in the Machine Shop. Lieutenant O.C. Horney was the officer in charge of tin, polishing, carpentry, and harness shops. He also supervised the expansion of shop operations from Shop C to other shops.\textsuperscript{209}

The RIA literally equipped the American soldiers who fought in the Spanish-American War. Blanket bags manufactured by RIA were used by soldiers as a type of duffel bag in which to carry personal belongings. Other items produced at the Arsenal for the soldiers’ personal use were haversacks for carrying rations; canteens fashioned from sheet tin and covered with felt and a heavy thick duck cover; meat cans used by soldiers as frying pans; and plates, tin cups, eating utensils, and bayonet scabbards.

The Arsenal also produced a variety of cavalry and horse equipment. These included items such as wooden saddle frames of saddle trees, and assortment of rings, hooks, straps, and other paraphernalia used for carrying or holding cavalry articles. Other leather items included carbine scabbards, saddlebags, saddles, surcingles (a girth that binds a saddle, pack, or blanket to the body of the horse), bridles, halters, straps, and artillery harnesses. The RIA produced in large numbers other horse equipment such as picket pins, nose bags, horse brushes, curry combs; and pistol holsters, spurs, and saber belts.

In addition, the Arsenal functioned as a depot during the Spanish-American War. Much of the ammunition and small arms made elsewhere, along with articles produced by RIA, were held in reserve on the island before delivery to troops in the field. During the Spanish-American War the Arsenal’s labor force operated two ten-hour shifts, six to seven days a week. Earlier, during the Indian uprisings of the later 1880s and early 1890s, the
RIA met urgent production demands for ordnance stores by running portions of the shop operations at night. Because the shops were not equipped for night work, Arsenal workmen functioned under inadequate, temporary lighting provided by candles and lamps. During the Spanish-American War, the RIA received a small appropriation for extension of the electric lighting beyond the limited lighting already available in one office and a shop. However, this lighting was not sufficient to provide direct lighting for the workers. Candles and lamps were still used as supplementary lighting for most night operations. The Arsenal Commander states in his annual reports to the Chief of Ordnance during the war that it was essential to extend the electric lighting to other shops, some other buildings, and to the principle roads of the Arsenal. 210

Although the RIA devoted its energy toward the war effort, the Arsenal continued to maintain the island’s ground and roads. In 1898, over 200 young trees were planted along Main Avenue, now designated Rodman Avenue, and along the side of Shop K, Building 68. Arsenal roads, especially Main Avenue from the manufacturing shops at the flagstaff to the principal western entrance, were damaged during the war due to the heavy increase of vehicular traffic. Bicycles and wagon teams transporting employees to and from the Arsenal by way of Main Avenue not only damaged the Arsenal’s main thoroughfare but also accounted for the increase in accidents on the island. To lessen the traffic on Main Avenue, the RIA commander ordered the construction of a special route for bicycles just south of and parallel to Main Avenue. Arsenal employees signed a petition for an extension of a single track of the Tri-City Railway Company onto the island to a point just south of the RIA shops. Recognizing that the track would alleviate the Arsenal’s traffic problems, Colonel Blunt sought and received approval from the Secretary of War for a revocable license granted to the company as long as it met specific Arsenal
conditions. Also because of the heavy traffic, the RIA Commander recommended to the Chief of Ordnance that Fort Armstrong Avenue, located at the west end of the island and connecting the bridges leading from the island to the cities of Rock Island, Illinois and Davenport, Iowa, be covered with granite pavement rather than macadam.211

Impact of Spanish-American War on RIA

The Spanish-American War led to the permanent expansion of workforce operations and facilities at the RIA. During the war, the Arsenal rearranged its machinery and began to install automatic machines to improve production. After the war, the RIA constructed a brick water power plant which replaced the old small power house destroyed by fire. In 1901, the first electrical power generators used at the Arsenal were installed. Electric wires replaced the telodynamic system of towers and brought electrical power to the shops through underground passages.212

Additional lights were installed in the shops and offices to provide a safer work environment for the Arsenal’s second work shift. Arsenal grounds and buildings were also improved during the war; and additional roads, bicycle paths, and trolleys were added to improve transportation.

RIA Begins to Make Rifles

As a result of the Spanish-American War, the Rock Island Arsenal performed valuable production work by manufacturing personal soldier accouterments; infantry, cavalry, and horse equipment; and field and siege artillery carriages. This experience provided the basis for technological achievements accomplished at the Arsenal in later years.

Largely due to its outstanding production record during the Spanish-American War, the Arsenal acquired a new mission which was to
manufacture a new rifle. In the Spanish-American War, the U.S. Army became dissatisfied with its standard-issue Krag-Jorgensen Rifle. The weapon was obsolete and slow to reload. The army began a search for a replacement, one which could be clip or magazine loaded. To expedite the production of a new weapon, Congress, in 1899, appropriated funds to equip the nearly empty armory shops at Rock Island with small arms machinery. However, due to the army’s delay in selecting a new rifle, it was not until December 1904 that the Rock Island Arsenal’s small arms plant began producing the new standard-issue model Springfield 1903 Rifle.213

In 1897, Brigadier General Daniel W. Flagler, Chief of Ordnance, himself a former commanding officer of the Rock Island Arsenal, selected Major Stanhope Blunt to command the Arsenal at Rock Island and to direct the development of its new armory. General Flagler was well acquainted with the physical plant at Rock Island Arsenal and was aware of the original plan to combine armory and arsenal facilities at the Rock Island installation. In fact, as the third Rock Island Arsenal commander, General Flagler had earlier supervised the construction of the majority of the arsenal’s stone manufacturing buildings that formed the arsenal’s industrial core. When the need for an additional armory surfaced, he quickly persuaded Congress to appropriate funds to equip the empty buildings at Rock Island Arsenal’s armory row.

The 19th century came to a close with the Rock Island Arsenal finally realizing the plan of Colonel Rodman, the first Arsenal Commander to propose a combined arsenal and armory at Rock Island. During the early 1900s, the United States Army’s transformation from horse to auto drawn artillery occurred at the Rock Island Arsenal. Part three of An Illustrated History of the Rock Island Arsenal and Arsenal Island will chronicle that transformation and other key events.
Below: Saddles made, tin cups formed, and gun carriages assembled; 19th century Arsenal employees board horse-drawn taxies during an evening rush hour before the turn-of-the-century.
Below: Main west entrance Gate House to Rock Island Arsenal. The Gate House, built in 1876, was used as a place of temporary confinement for persons arrested for infraction of government regulation on the bridges. Circa, 1898.
Below: Arsenal employees enjoying a noon-hour baseball game during the late 1800s. The building in the background to the left is Storehouse K (Building 56), behind Shop K (Building 68).
“The charming island of Rock Island, three miles long and a half a mile wide, belongs to the United States, and the government has turned it into a wonderful park, enhancing its natural attractions by art, and threading its fine forests with many miles of drives. Near the center of the island one catches glimpses, through the trees, of the vast stone four-story buildings, each of which covers an acre of ground. These are the government workshops; for the Rock Island establishment is a national armory and arsenal.”

Mark Twain (Samuel L. Clemens)
Life On The Mississippi River
First Published 1874.