

## **ROCK ISLAND ARSENAL Rock Island, Illinois**

**Map 8-18**

**Photograph 8-17**

AS A PARTICIPANT in the Manhattan Project and early Cold War, this long-established Army complex easily managed to adapt its expertise to designing and manufacturing some of the necessary non-nuclear components of America's early atomic arsenal. The U.S. Government originally acquired the 946-acre island in 1804 through a treaty with the Sauk and Mesquakie Indians. At the beginning of the Civil War in 1862, Congress selected the site for one of the new Army arsenals to replace the Harper's Ferry Arsenal in Virginia, captured by the Confederates. The next year, the Army erected the first permanent structures on the western end of the island, and confined the first of more than 12,000 Confederate prisoners of war near the north-central shore. During the following three decades, the Army built the ten imposing stone manufacturing buildings for the armory in the center of the island. The Rock Island Arsenal (RIA) has contributed significant armament to all subsequent U.S. wars and police actions. Civilian employees from Illinois and Iowa manufactured artillery, tanks, gun mounts, recoil mechanisms, small arms, and grenade launchers on Arsenal Island. As production expanded, so did improvements in manufacturing technology and construction of new buildings and warehouses, later of reinforced concrete. Employment peaked at about 18,500 during World War II.

During the Manhattan Project, Rock Island contributed electrical and electro-mechanical bomb components to the effort at Los Alamos. The AEC began drawing support from the RIA in 1947, within months of its own creation. Over the years, the arsenal has manufactured non-nuclear components for various atomic weapons. From 1947 until 1952, the Pattern Division in Building 106 and the Forge and Heat Treat Division in Building 222 cast the armored steel casings of the Mark-III and Mark-IV atomic bombs. (The Mark-III and Mark-IV were essentially reengineered versions of the Fat Man bomb dropped over Nagasaki.) Workers loaded the empty casings onto railroad freight cars and shipped them south to the Iowa Army Ammunition Plant in Burlington. The casings then joined another train loaded with conventional high explosive lenses that continued to Kirtland Air Force Base outside Albuquerque, New Mexico. Personnel unloaded the casings there and trucked them to Sandia Base for assembly into the final weapons. From 1953 until 1963, the shop in Building 208 designed and built some of the non-nuclear electrical and electro-mechanical components for the Honest John, Little John, and Davy Crockett nuclear-capable infantry rockets. At that time, the basketball-sized Davy Crockett warhead was the smallest in the world. In support of the Navy, the RIA also worked on the Terrier missile, one version of which was nuclear tipped.

As one of the “free world’s largest manufacturing arsenals,” this registered National Historic Landmark has supplied military equipment for both domestic and foreign markets. The primary mission of the arsenal today is production of aircraft and infantry weapons, air defense weapons and artillery, armament for tanks and other transport vehicles for personnel and cargo, tools, simulators, and diagnostic equipment. The RIA’s public relations department does not claim a current nuclear weapons mission for the arsenal.

Arsenal Island’s beautiful park-like setting ornaments the middle of the Mississippi River. The wide lawns and peaceful wooded expanses belie the mission of their owner. Today, the apparent pace of weekday activities at the RIA seems unhurried, yet the atmosphere remains business-like. During past national emergencies, however, thousands of workers streamed in and out of the many brown multi-storied manufacturing shops every day. The enormous buildings and wide roadways between them are good indicators of the level of activity that has occurred here in the past and for which the arsenal is prepared in the future.

## **THE PERMISSIVE ACTION LINK**

BY THE EARLY 1950s, any trained soldier or civilian could easily arm and detonate the newer, simpler, and more standardized models of the atomic bomb. The possibility of illegal or irrational use of a nuclear warhead had become unmistakably evident. At the end of 1960, several members of the North Atlantic Treaty Organization grew concerned about the apparently loose custody of the nuclear weapons that the United States had deployed in their countries. To reassure the Europeans, the United States began to install into some of its atomic weapons “proscribed action links” (PALs), which Sandia National Laboratories (SNL) had designed. In 1962, President John F. Kennedy mandated that all land-based nuclear weapons in Europe be equipped with PALs to prevent their accidental or unauthorized detonation and to maintain the long-standing dual control of the devices by both the Department of Defense and the civilian-controlled Atomic Energy Commission. However, when military commanders found that the term “proscribed action link” tended to dissuade their field crews from actually using the weapons, they changed the meaning of PAL to “permissive action link.”

The first PALs were positive-control electromechanical locks with 5-digit dial-in codes. Over the next two decades, SNL upgraded PALs to include solid-state electronics and worked with the National Security Agency to develop cryptographic techniques for verifying code authenticity. Furthermore, designers buried PALs deep within their weapons to prevent someone from easily bypassing them. In the 1980s, the United States added the capability of PALs to receive secret authorization codes from remote command and control centers. This improvement enhanced weapon security and provided better records of weapon readiness. Today, environmental sensing devices protect some warheads by monitoring the physical environment the device experiences. If the actual conditions do not match the expected (*e.g.* high acceleration, followed by a certain period of free fall, followed by deceleration), the warhead is not armed. The “Class F” PALs in various modern nuclear weapons, including submarine-launched ballistic and cruise missiles, require electronic 12-digit coded authorization from a central command before fully releasing the weapons to the crew.

The island is open to the general public during daylight hours, and most areas are accessible. Photographs are permitted anywhere at the RIA except in restricted zones. The Rock Island Arsenal Museum is the only place in the armory specifically open for visitors. This second oldest Army museum in the country is located within Building 60 at the corner of Rodman and Gillespie Avenues and contains exhibits describing the history of the arsenal and displaying many of the items it has manufactured. More than 1,100 different firearms are also available for viewing. The museum is open daily from 10:00 AM until 4:00 PM, but is closed Thanksgiving, Christmas Eve, Christmas, and New Year's Day. Admission is free. The museum telephone number is (309) 782-5021, and group tours may be arranged by calling (309) 782-3488. Also for the military history enthusiast, Memorial Park is located at Rodman Avenue and East Avenue and displays a variety of weapon hardware.

Tourism ends at the closed doorways and guarded gates of this still-active armory. Buildings 106, 208, and 222 are restricted areas today, still producing military ordnance and equipment. The first two buildings are located along the southern side of Rodman Avenue. Visitors can find Building 222 from either Flagler Street or the new parking lot north of Beck Lane. Old 1940s and 1950s photos of the production lines in these three munitions plants are available from the museum gift shop.

### **How Do I Get There?**

The Rock Island Arsenal is located between Davenport, Iowa, and Rock Island, Illinois. From either downtown Davenport or Rock Island, drive to U.S. Route 67 or Illinois SR- 92, both of which parallel the Mississippi River. Government Bridge over the river links these two roads. You should drive onto Government Bridge to enter Arsenal Island. The armory is located east of the bridge. Although considerable parking space seems to be available on the island, use only those areas designated for visitors.