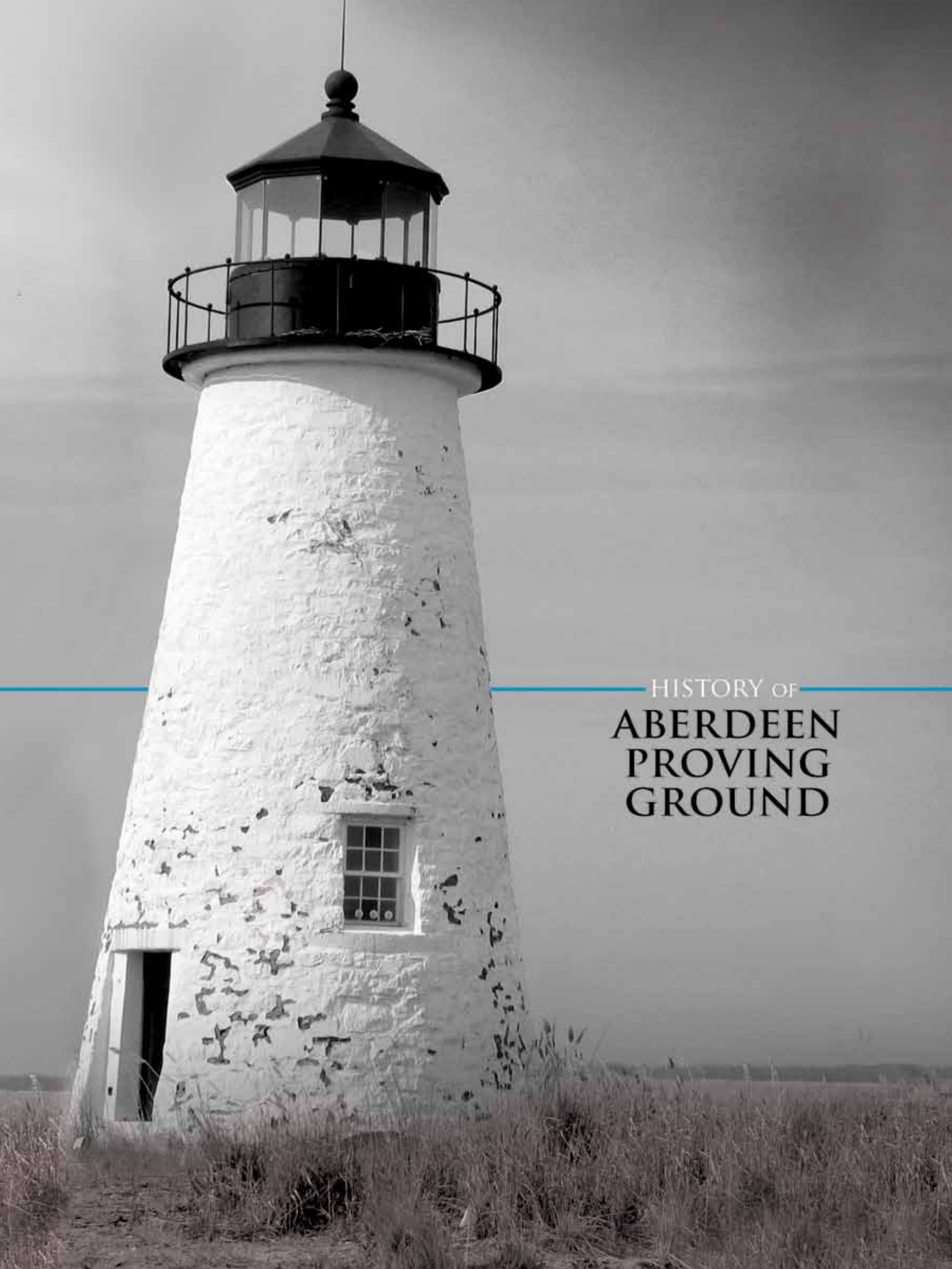

HISTORY OF ABERDEEN PROVING GROUND

ABERDEEN PROVING GROUND

MARYLAND

APG

DEDICATED-1917-SERVICE

Disclaimer

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Cover: Pooles Island Lighthouse

The Water Battery at Aberdeen Proving Ground

TABLE OF CONTENTS

3 Preface

5 Part I: Early History
6 Bush River Neck
8 Gunpowder Neck
10 1608: Captain John Smith
12 1661: Nathaniel Utie
14 1669: Old Baltimore
16 1720: Quiet Lodge
18 1773: Gunpowder Meeting House
22 1814: Waterfowling
24 1825: Pooles Island Lighthouse

28 Part II: World War I
30 Aberdeen Proving Ground
32 Edgewood Arsenal
36 1917: Eminent Domain and the Founding of Aberdeen Proving Ground
38 1918: The Main Front
40 1918: The Influenza Epidemic

42 Part III: Between The Wars
44 Aberdeen Proving Ground
46 Edgewood Arsenal
48 1920–1939: Early Aviation
50 1922–1940: Fort Hoyle

52 Part IV: World War II
54 Aberdeen Proving Ground
56 Edgewood Arsenal
58 1940: The Stones—RDECOM Headquarters
62 1940: The Flamethrower
64 1942: The Doolittle Raid
66 1942: The Bazooka
68 1942: Atkisson Dam
70 1943: Testing the Jeep
72 1943: The Women's Army Corps
74 1944: Prisoners of War
76 1946: Anzio Annie

78 Part V: Post World War II
80 Aberdeen Proving Ground—North
86 Aberdeen Proving Ground—South
92 1946: Operation Paperclip
94 1947: Eniac
98 1954: Nike Missile Battery
100 1966: Lunar Roving Vehicle Testing
102 1971: Merger of APG and Edgewood Arsenal
104 2005: Base Realignment and Closure

PREFACE

Aberdeen Proving Ground (APG), Md., was established in 1917 during World War I. The site for APG was one of the most scenic and productive farming areas in Harford County. Once the Army took control of the land, APG quickly became a critically important asset for national defense. It provided the testing, development and training necessary for modern military forces.

APG's primary mission has changed little. Organizations have changed names frequently, new organizations have come and gone and APG grew in physical size during World War II. Otherwise, it has remained focused on providing the best equipment and materiel possible.

This brief history of APG is dedicated to our primary reason for existing — the Warfighter.

PART I

EARLY HISTORY

BUSH RIVER NECK

The site of Aberdeen Proving Ground–North is a peninsula created by the Bush River and Chesapeake Bay. Before the first European settlers came to the area, Native Americans used the land for hunting and fishing. In 1608, Capt. John Smith explored the upper Chesapeake region, including the Bush and Susquehanna rivers. By the late 1600s, European settlers arrived and built small log houses, none of which stand today. Nathaniel Utie was one of the first settlers to live on Spesutie Island (Latin for Utie's Hope). He constructed a manor house on the north end of the island. As a military leader, he helped solve conflicts with Native Americans in the 1660s.

William Osborne, another early settler, owned land on the Bush River. Before Harford County was created from Baltimore County, the county seat was on Osborne's land and named Baltimore in 1674. Although it was not much more than a courthouse and an inn, it remained the county seat until 1696. No buildings remain today from what is now called Old Baltimore.

For the next 100 years, additional settlers arrived because of the good soil and abundant natural resources. Robert Smith, Secretary of the Navy (1801–1809) for President Thomas Jefferson and Secretary of State (1809–1811) for President James Madison, built a house about 1810 on Spesutie Island. Although the house was demolished long ago, portions of the foundation of this grand "villa" remain today.

After the Civil War, the area became known for duck–hunting clubs and farms. The New York Rod and Gun Club purchased 700 acres on Spesutie Island in 1889 and built a large hunting lodge. For farming, the area was known as the Garden of Eden for its shoe peg corn and the canneries to process it. Several prominent cannery owners lived in the area, including Charles W. Baker (at Plumb Point) and F. O. Mitchell and Brothers (near Perryman). Three farmhouses from the early 19th century remain: Quarters 1 (Baker House), Building 84 (Hopkins House) and Building 5650 (Mitchell House). The Baker and Hopkins houses are used for officers' quarters today.

Top Right
1889—Spesutie Rod and Gun Club
The New York Rod and Gun Club purchased 700 acres on Spesutie Island in 1889. The Gun Club was converted to apartments in 1945, damaged by a deadly fire in 1949 and was demolished in 1976

Top Left
c1810—Robert Smith Villa
Robert Smith was the Secretary of Navy (1801–1809) and Secretary of State (1809–1811). He built this house on Spesutie Island about 1810.

Left
c1800—Quarters 1
The oldest part of this farmhouse was probably built in the late 18th century. It became the APG quarters during World War I. It was renovated and expanded several times.

GUNPOWDER NECK

Top Left
1720—Quiet Lodge
The brick portion of the house (the dark color section) is the oldest. The Army added the wooden portion for officers' quarters.

Top Right
1773—Gunpowder Meeting House
The first church built on this site was probably a log cabin. The current brick structure was completed in the early 1800s.

Right
Early 1900s—Cadwalader House
Called the Thomas Francis Cadwalader House, it became officer's quarters during World War I.

Aberdeen Proving Ground–South is located at Gunpowder Neck, a peninsula created by the Bush and Gunpowder rivers in Harford County. Before the first European settlers arrived, Native Americans used the land for hunting and fishing. In 1608, John Smith explored the upper Chesapeake region, including the Bush River. The small island just south of the peninsula, called Pooles Island today, was named after Nathaniel Powell, one of Smith's explorers. By the late 1600s, European settlers began to move into the region and construct small log houses, none of which stand today.

During the 1700s, settlers began constructing larger, permanent buildings. Two structures remain from that period. Quiet Lodge, or Presbury House (Building E4630), was built in 1720 and home to James Presbury, high sheriff of Baltimore County. The Presbury family became staunch Methodists. In 1773, Bishop Francis Asbury ordered the construction of Gunpowder Meeting House (Building E5715) just north of Quiet Lodge. It was one of the first Methodist churches in Maryland.

In 1825, Congress approved the construction of a lighthouse on Pooles Island. It stands today and is Maryland's oldest lighthouse. By the middle 1800s, George Cadwalader, an Army general and lawyer from Philadelphia, bought most of the peninsula. He constructed a summer mansion (demolished in 1924) on Maxwell Point and leased portions of his land to tenant farmers.

During the Civil War, the railroad bridges over the Gunpowder and Bush rivers on the northern end of the peninsula were partially burned by Southern sympathizers in 1861 to prevent Union troops from entering Baltimore. In 1864, Confederate Maj. Harry Gilmor partially burned the Gunpowder River Bridge and skirmished with a small Union infantry force protecting it.

After the war, the Cadwalader family continued to own the largest portion of Gunpowder Neck. George Cadwalader died in 1874, and his nephew John inherited his land and continued to use Maxwell Point as a summer resort. Most of the remaining land was leased to tenant farmers.

In addition to the Cadwaladers, there were several hunting clubs using Gunpowder Neck before World War I. Many famous people visited the clubs, which became prominent.

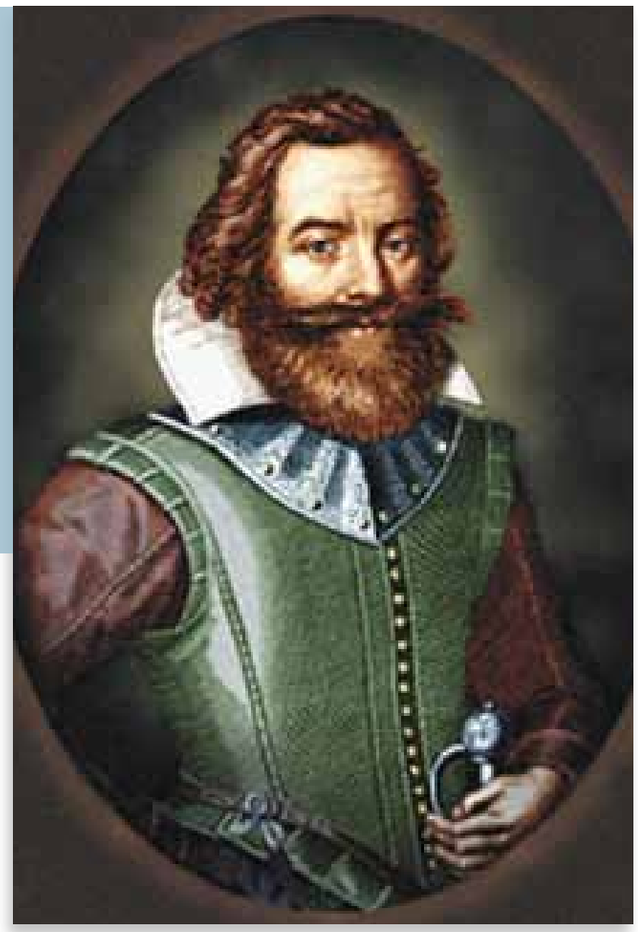
CAPTAIN JOHN SMITH

[We called] a rocky river where the Massawomeks went up "Willowbyes River,"in honor of the town our Captain was born in and that honorable house [of] the Lord Willowby, his most honored good friend. "Powell's Isles" and "Smal's Point" is by the river Bolus, and the little bay at the head "Profit's Pool" […] are named after the discoverers.

At 27, John Smith arrived at the mouth of the Chesapeake Bay in 1607 after a lengthy and miserable voyage across the Atlantic Ocean. Taken prisoner under mutiny charges during the trip, he discovered that the King of England had designated Smith a member of the newly formed governing council of Jamestown.

The first summer in Jamestown was deadly as many died from disease and malnutrition. To escape the rivalries of the colony, find passage to the western ocean, discover gold and locate the colonists of the Lost Colony of Roanoke, Smith gathered 14 men for a voyage up the Chesapeake. Throughout this voyage and a second one later the same summer, he kept a journal of the incidents that befell his crew, along with detailed descriptions of his surroundings. He charted the land and waterways and later constructed an elaborate and fairly accurate map of the Chesapeake Bay. In the key of the map he published in 1612, Smith stated that "you see the little crosses on rivers, mountains, or other places, [that] have been discovered; the rest was had by information of the savages, and are set down according to their instructions."

Within a few days of returning from his first voyage, Smith set out on a second. He kept most of the same crew from



the first voyage. Of those he took with him were James Bourne, Richard Featherstone, Thomas Momford and Michael Sicklemore. He adding Nathaniel Powell and dropped William Cantrill and Ralph Morton. Anthony Bagnall replaced Walter Russell as the physician. Edward Pising took Robert Small's place as carpenter, William Ward replaced John Powell as tailor and blacksmith James Read remained behind. Included in the second voyage also were Fisherman Jonas Profit, fish merchant Richard Keale and soldiers James Watkins and Anas Todkill.

The trip was devastating to his men. Only six, including Smith, remained physically fit. Smith's exploration of the Chesapeake took nearly all summer, and after exploring the major waterways (including the Bush and Gunpowder rivers) by August, he reached the high water mark of their exploration and proceeded up the Susquehanna River to its falls. During the course of his travails, Smith also explored Carroll's Island (naming it Smal's Point after Robert Small, a soldier from the first voyage) and Pooles Island (naming it Powell's Island after a member of his first exploration team). On Aug. 8, Smith returned south to explore other rivers on the way to Jamestown.

In all those places and the furthest we came up the rivers we cut in trees so many crosses as we would, and in many places made holes in trees, wherin we writ notes, and in some places crosses of brass to signify to any [that] Englishmen had been there.

Captain John Smith

Susquehanna River
Northeast River
Elk River
Bush River
Sassafras River
Maryland
Patapsco River
Dover
Annapolis
Washington
Patuxent River
Delaware
Potomac River
Nanticoke River
Chesapeake Bay
Pocomoke River
Virginia
Rappahannock River
Mattaponi River
Richmond
Pamunkey River
Piankatank River
Chickahominy River
York River
James River
Nansemond River
Elizabeth River

1661: NATHANIEL UTIE

One of the most colorful figures in early Maryland history is Col. Nathaniel Utie, who was born around 1620. He was a soldier of fortune, Indian trader, politician, landowner and mediator.

After political intrigues caught up with him in Virginia, Utie moved to Maryland in 1649. By May 1658, he held a license to trade with Indians for fur and to apprehend unlicensed traders. In July, he was appointed to captain local forces.

Also in 1658, Utie began to acquire property. His first holding was 350 acres in Towne Neck. At year's end, he recieved a grant of 300 acres on the Sassafras River. In February 1659, he received an additional grant of 800 acres at Oakington. In 1661, he was granted 2,300 acres of Spesutia Island, which he originally named Spesutie or Utie's Hope. As the grant was a manorial grant, Utie took the title, Lord of the Manor. The federal government purchased Spesutia Island in 1945 and incorporated it into APG.

Utie was not a stranger to controversy. Baltimore County was in the middle of the international fur trade between the English, Swedes and Dutch. The spheres of influence meeting each other caused friction, leading Utie to be sent to meet with the Dutch at New Amstel (New Castle, Del.) in September 1659. He claimed the Delaware region belonged to Maryland under the Lord Baltimore Charter. The dispute continued until 1664 when English forces overran New Amstel. Utie was also involved in a controversy involving Thomas Thurston, a Quaker.

By 1661, Utie's reputation and experience dealing with Indians made him a key figure in negotiations. The Provincial Court often met at his house for deliberations, culminating in a meeting in May with the governor to investigate Indian attacks on colonists. As a result of this investigation, a peace treaty with the Indians was concluded.

Utie turned to politics in 1662, serving as a representative for Baltimore County in the Lower House of the Assembly. He also held a seat in 1666 and 1669. In 1666, he was appointed as a commissioner to negotiate an agreement among Maryland, Virginia and North Carolina to suspend tobacco planting for one year to raise its price.

Utie was married three times (Mary Lawrence, Elizabeth Carter and Elizabeth Goldsmith), but his only son, John, died in infancy. Utie died in 1675, and his estate passed to a nephew, George.

Left
Map
Map of Captain John Smith's Exploration of the Chesapeake Bay

1669: OLD BALTIMORE

There is not an exact date when Baltimore County, Md., was founded. The first European colonists settled the area in search of fertile soil for tobacco farming. Land surveys began in the county around 1639, and the county was established by 1659. The original limits of the county included the current Harford and Carroll counties, part of Cecil County and Baltimore City. Its first county seat was organized in 1669 and was named Baltimore Town or Baltimore on the Bush River. The site is now known as Old Baltimore.

Old Baltimore was established on Chilbury Point between the Bush River and Romney Creek (part of APG today). It was easily accessible by water, an important mode of travel, and it lay on the Post Road, a principal north–south route between New England and Virginia, between the ferries on the Bush and Susquehanna rivers.

By about 1671, Old Baltimore had a courthouse. Maryland's Governor Council ordered that a tavern (then called an ordinary) be built at the courthouse to provide lodging for people who traveled to the town when court was in session. James Phillips, a prominent and wealthy man living in the area, built the tavern on land belonging to William Osborne, who operated the Bush River ferry. In 1683, Baltimore County issued Phillips a license to operate the tavern, which was in his house. In the same year, Maryland's General Assembly designated Old Baltimore as an official tobacco port and appointed Phillips and Osborne to complete the town's first land survey. In 1688, Phillips was appointed as port officer with the responsibilities of weighing and inspecting tobacco and tracking all other imports and exports.

The death of James Phillips in 1689 probably signaled the end of Old Baltimore serving as the Baltimore County seat. Records indicate the county court met in Gunpowder in 1691. By 1712, the county seat had moved to Joppa Towne.

Old Baltimore was considered a memory by 1773. In late 1997 and early 1998, archeologists and the Cultural and Natural Resource Management Office at APG unearthed a site at Old Baltimore's location. Because the site is in a restricted area, there had been no development. More than 17,000 artifacts have been uncovered, which indicate a developed, European lifestyle at the edge of the wilderness. Included are English and Dutch architectural and kitchen items; English, Dutch and locally produced tobacco pipes; a coin (farthing) dating to King Charles II of England; and a hand–blown glass wine bottle seal. Some artifacts from Old Baltimore are displayed at APG for public viewing.

"The artifacts convey 'a vivid picture of 17th Century daily life abuzz with various activities, including food and beverage consumption, smoking and socializing at Old Baltimore.'"

Brochure, Old Baltimore, R. Christopher Goodwin & Associates, Inc., undated.

1720: QUIET LODGE

Quiet Lodge, also known as Presbury House, is in the Edgewood Area of APG and overlooks the Gunpowder River. The origin of the name Quiet Lodge is unknown. The land was originally deeded to John Collett Jr. Collett came from England in 1658 with his father and two brothers, but he did not have the land surveyed until 1662. On his death in 1673, Collett left the property to his cousin, Matthew Gouldsmith. Gouldsmith then left the property to his niece, Martha Gouldsmith Presbury, the wife of James Presbury, high sheriff of Baltimore County. They had the land resurveyed in 1718. The site they selected for their house was on Elk Neck between Canal Creek (formerly called Elk or Elk Neck Creek) and Wright's Creek (formerly called Deep Creek).

Although the date of construction is unknown, Presbury probably completed the house in 1720. The design was a 20–foot by 40–foot two–story brick house with a fireplace at each end. There was also a narrow attic running the entire length of the house. The bricks for the house came from England as ballast aboard ships or were made locally, according to conflicting accounts. The wood supporting beams were all hand sawn or hewn from native timber. The fancy brickwork attested to the skill of the workers. As a "signature" in the bricks, the workers placed a patterned geometric diamond shaped hallmark on the east wall. This hallmark was evidence of the pride shown by the masons. The pattern was created by a mixture of glazed brick and intricate masonry. Around the front door were placed bricks with the Presbury family information on them. Inside, the walls were simply plaster over the bare bricks. Large arched fireplaces were constructed at each end of the basement for cooking. A central staircase led to the second floor. There were two rooms both upstairs and downstairs.

During the late 1770s, the Presbury house was closely connected with early Methodism. The house was frequently mentioned in the journals of early Methodist preachers. Francis Asbury, the first Methodist bishop in the United States, visited the house and stayed overnight about 14 times from 1772 to 1777. The Rev. John Littlejohn also visited the house at least once in 1777.

In 1799, Etienne J. Raphel (also spelled Raphael) and his wife, Jane Elizabeth, purchased the house. The Raphels were French refugees and parishioners of St. Ignatius Church. Etienne Raphel died in 1811 and was initially

buried in a brick vault under what is currently Weide Field. He was later reburied in the cemetery at St. Stephens Church in Bradshaw, Md. His son, Stephen J. Raphel, lived in the house for many years until he sold it to Gen. George Cadwalader in 1854. The Cadwalader family owned the land until 1917.

The Army purchased the entire Gunpowder Neck peninsula in October 1917. The Presbury house was included in the land appropriated for a chemical–shell filling plant during World War I. The post was later named Edgewood Arsenal and grew in size throughout the war. After the end of World War I and demobilization, part of Edgewood was designated Fort Hoyle and assigned to the Field Artillery in 1922. Fort Hoyle was named after Brig. Gen. Eli D. Hoyle of the 6th Field Artillery, who died in 1921. At least one account stated that the Presbury house became the temporary headquarters of Fort Hoyle. In 1924, the headquarters was moved to another building, and the Presbury house was remodeled into officers' quarters. A frame addition and porch were added at this time. In 1940, Fort Hoyle was disestablished, and the Presbury house became part of Edgewood Arsenal again.

The house continued to be used as officers' quarters and was remodeled periodically. In 1958, the original floor joists and center supporting timbers were replaced. The original wooden banister remained in place. All the interior walls were covered with plasterboard, and the floors were covered with wooden tiles. In the 1980s, the living room fireplace, covered with plasterboard for many years, was uncovered and brickwork completed to reflect the original brickwork of the house.

In 1974, Quiet Lodge was declared a national historic Site. By the 1990s, the house was no longer suitable for officers' quarters because of its age and restrictions on modifications. It was then used as an office for the Army Community Services.

1773: GUNPOWDER MEETING HOUSE

The Gunpowder Meeting House could be one of the oldest Methodist meeting houses in America. The building is 26 feet by 35 feet and consists of one room with a loft. The construction materials were brick and mortar, Which contained oyster shell.

The history of the church was closely connected with the Joseph Presbury House or Quiet Lodge, built in 1720, and the establishment of Methodism in America. Bishop Francis Asbury directed construction of the church in 1773 on one acre of land, commonly known as "Presbury Discovery," deeded on March 13, 1773, to nine trustees for one shilling by Joseph Presbury. A later deed, dated Oct. 4, 1838, in which Mary Ann Watters conveyed to Mary Saunders the tracts of "Collett's Neglect" and "Presbury's Discovery" contained the clause: "Excepting and reserving one acre of ground with building thereon as formerly conveyed by Joseph Presbury to certain trustees for a place of worship."

The church eventually became known as the Gunpowder Neck Methodist Episcopal Church and its membership came from Edgewood, Magnolia and Gunpowder Neck. In 1886, the congregation divided, and the church was abandoned. In 1890, the church was sold to a black Methodist Episcopal congregation and was used as a schoolhouse and church. One account described how the "white folks" stood in the balcony to watch their servants "get religion." The one–room schoolhouse held classes throughout the week, and church services were held in the evenings and on Sundays. The name of the church was changed to the Gunpowder Station of the Methodist Church of Magnolia but was often referred to as "Old Presbury." A small cemetery was apparently established in the 1890s behind the church, although no evidence remains.

After the Army took over Gunpowder Neck in 1917, the Harford County Board of Education, which then operated the school, sold the building to the government for $225 in 1919. The Army used the building as a band headquarters and then as a grenade storage facility.

The building decayed, and by the 1960s, it was described as "unsightly and in a hazardous condition." On Jan. 31, 1963, the building was approved for destruction, but it was removed from the list Dec. 13, 1963. The church was again placed on the destruction list April 19, 1966, with the approval of the Edgewood Arsenal commander as the last requirement.

Later in 1966, Col. William W. Stone Jr., the new commander, saw the building during his orientation tour. Instead of destroying it, he instructed the post engineers in November 1966 to check with historical societies about the buildings. The response from the Methodist Historical Society and others convinced Stone to try to have the building declared a historical site and preserved. A federal survey of the building was completed Jan. 20, 1972.

The first step for renovation consisted of a structural review. An architect completed a historical and architectural study to estimate the restoration cost. Orin Bullock Jr., the historical architect, concluded the building was restorable and the current structure was built between 1820 and 1860 on an older foundation. He thought portions of the earlier structure still remained.

The cost of the restoration project was $70,000. Much of the work involved restoring the original brick facing because many bricks were worn or missing. Workers replaced some of the missing or damaged bricks with bricks taken from other parts of the building. They also were careful in mixing the mortar to make sure it matched the existing mortar. They replaced all the existing door and window frames with replicas ordered from a supplier that specialized in 18th century hardware. They also installed a new roof, deck overlay and plaster ceiling and rebuilt the balcony and stairway in the back of the building and the pulpit in the front.

Calvin Dixon, chief of the Architectural Branch of the Facilities Engineering Directorate, was in charge of the restoration. He said: "We made every effort to restore the building exactly as it was. The construction workers put in a lot of hard work into making the building look like it had originally."

Additional work included a new concrete subfloor and electrical service. In January 1983, the Army completed the project, and the building was added to the National Register of Historic Places.

The first church service in 66 years in the building was held Aug. 4, 1983, and conducted by Lt. Col. W. R. Ward, chaplain at the Edgewood Chapel. Today, the Army continues to preserve the church for historical tours.

DANGER

5115

1814: WATERFOWLING

It has been said the best part of Harford County, the Bush River and Gunpowder River Necks, was given away in the early 20th century through land appropriations by the federal government.

The 70,000 acres of land purchased by the Army in 1917 to establish APG included a fertile farm area, linked by railroads supporting local canneries. In addition, there was another natural resource found along the long coastline that bordered the new post – waterfowl.

From 1814 until APG's construction, hunting clubs were established in eastern Harford and Baltimore counties. The shores of Gunpowder Neck, Bush River Neck, Carroll Island and Spesutie Island provided the ideal nesting and feeding grounds for flocks of waterfowl. Influential and wealthy sportsmen purchased or leased portions of the shoreline for duck hunting. The first known club was The Maxwell's Point Gunning Club, founded by an association in 1819 from Baltimore, who hunted on 180 acres.

Gen. George Cadwalader from Philadelphia knew the area's value and started buying property on Gunpowder Neck in 1840. He eventually owned about 7,000 out of 13,000 acres of the Neck, which included about 40 miles of shoreline. The Cadwalader family constructed a large timber hunting lodge at Maxwell's Point. The infrastructure was constructed to support duck hunting, stables, race tracks, greenhouses and formal gardens. The Cadwaladers added to their wealth by leasing portions of shoreline to other duck hunters for up to $2,000 annually.

Two of the wealthiest clubs, both with New York members, were The San Domingo Farm Club (more than 200 acres near Maxwell's Point) and The Spesutia Island Rod and Gun Club (about 1,700 acres on Spesutie Island). The San Domingo Clubhouse was described as a three–story frame house with high ceilings; large, open fireplaces; carpets; antiques; and oil paintings. Famous visitors to these two clubs included President Grover Cleveland and New York Gov. David B. Hill.

One of the most famous clubs was the Carroll Island Gunning Club (about 1,200 acres) on Carroll's Island. In addition to hunting, the club held the pedigree of the Chesapeake Bay dog breed for more than 100 years. To a hunter, a dog was as important as a weapon.

Left
Maxwell Point, Duck Hunting Spot

1825: POOLES ISLAND LIGHTHOUSE

Dwarfed by America's tallest lighthouse at Cape Hatteras, N.C., (207 feet), the Pooles Island Lighthouse, the oldest standing lighthouse in Maryland, is 40 feet tall. Pooles Island Lighthouse is one of six lighthouses owned or managed by the Department of Defense.

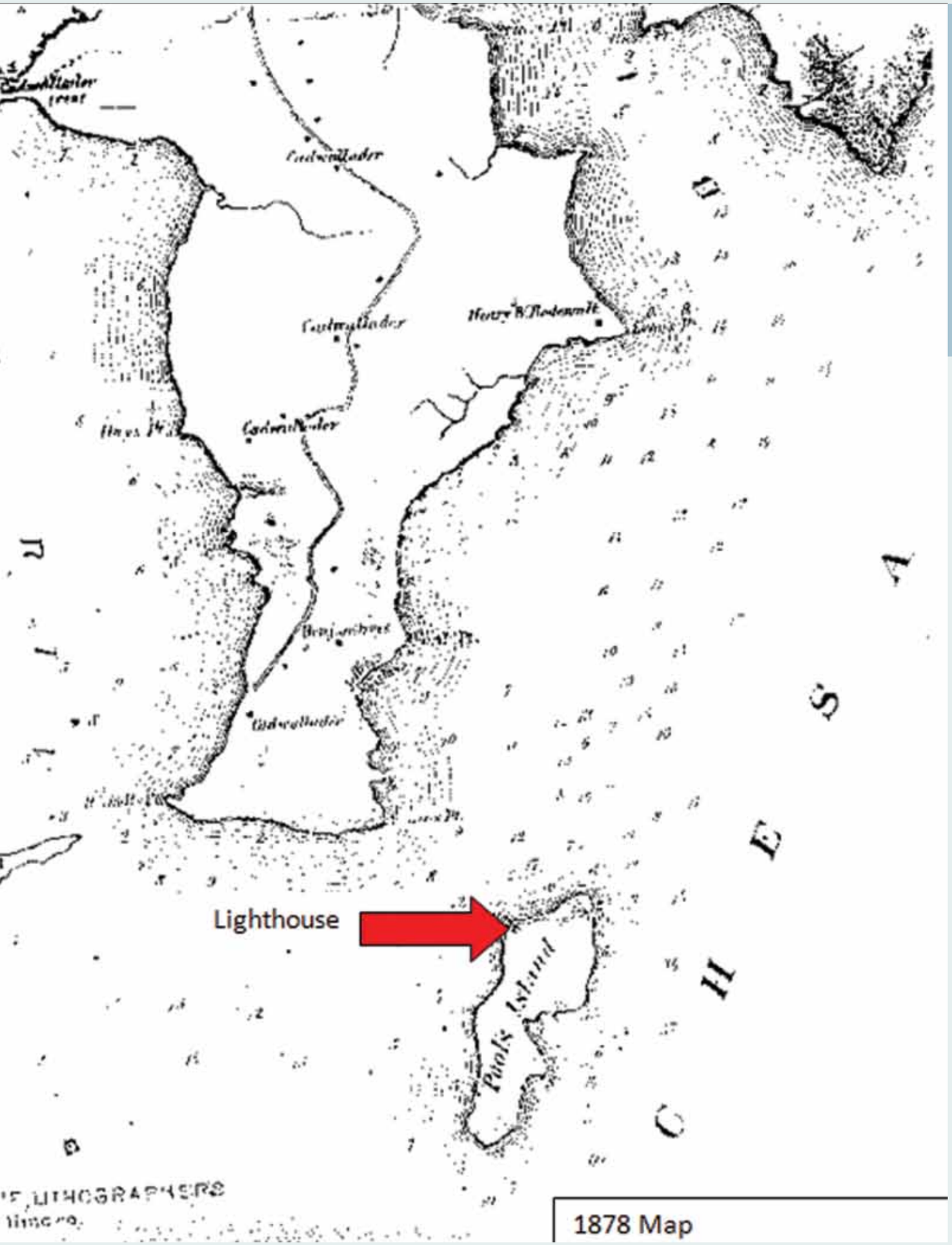
The land known as Pooles Island was first mentioned in historical records in 1608. That summer, John Smith explored and mapped much of the Chesapeake Bay, including the island, which he named Powells Isles, after one of his companions (the plural may be based on an incorrect impression that there were two islands). The name evolved into Pooles Island. Besides the lighthouse, the island's only other settlement was a farm, which raised hay and vegetables and later, peaches, which were known for their good taste.

By 1824, Congress realized that the island's location was strategic and authorized building a lighthouse by the Lighthouse Service under the Department of the Treasury. The lighthouse would protect shipping on the Bush and Gunpowder rivers and the shallow channel of the Chesapeake Bay located west of the island. The lighthouse would not serve the deeper channel east of the island.

Construction of the lighthouse and the one–story keeper's house began in April or May 1825. One of the builders, John Donahoo, received a commission to build 12 lighthouses on the Chesapeake Bay, one of which was the lighthouse at Concord Point in Havre de Grace, a virtual twin to Pooles Island. The granite used to build Pooles Island Lighthouse was mined from nearby Port Deposit. Nine oil lamps provided the lighthouse's protecting beacon.

Although a primitive technology, the beacon was visible for more than 11 nautical miles. In 1867, improvements were made to the lighting system. Additionally, throughout the remainder of the 19th century, the lighthouse's support facilities were upgraded, including construction of a cow stable, poultry house and boat house. None of those buildings survived.

Pooles Island Lighthouse is now part of APG. In 1917, the federal government acquired the majority of Pooles Island (approximately 200 acres) from the estate of Charles C. Homer to include in the establishment of APG. The Bureau of Lighthouses, under the Department of Commerce, retained approximately seven acres for the lighthouse complex. The acquisition of the island ended the era of the lighthouse keeper at Pooles Island and began automated lighting operations.



1878 Map

Time has not been kind to the lighthouse. In 1939, the Bureau of Lighthouses merged with the U.S. Coast Guard, which deactivated the lighthouse and removed the lighting mechanism. Pooles Island served as an artillery impact area until the early 1970s. Twenty years of disinterest elapsed until 1994 when the Army submitted a proposal to have the lighthouse placed on the National Park Service's Register of Historic Places.

While the proposal went through the approval process, a major lighthouse restoration and stabilization project began in October 1995 and continued through the fall of 1996. The work adhered to requirements set for National Register–eligible properties and met the guidelines established by the National Park Service. The project included mortar repair, sanding and painting. The Directorate of Safety, Health and Environment kicked off the project by cleaning the inside and outside of the lighthouse. Coast Guard Reserves Lighthouse Maintenance Unit (Curtis Bay, Md.) performed mortar repair. The USAG's Department of Public Works Carpentry Shop and Lead Abatement Team performed woodwork and sanding/painting, respectively. A local resident volunteered to paint the lighthouse.

On Feb. 19, 1997, Pooles Island Lighthouse was officially listed as a historic place. In 2010, the lighthouse celebrated its 185th anniversary. Today the lighthouse is symbolic for the increasing growth and importance of APG, "lighting a path to the future."

PART II

WORLD WAR I

ABERDEEN PROVING GROUND

Right
World War I—
Aerial View of APG
Plum Point was the location for officers' housing, the parade field, enlisted soldiers' barracks and the hospital. The civilian barracks were in the upper right corner. The test ranges, including the Main Front and Trench Warfare Range were a short distance away.

In April 1917, the United States entered World War I and quickly realized the nation was unprepared to provide the equipment and weapons necessary to win the war. For the testing of artillery and weapons, Sandy Hook Proving Ground, N.J., proved inadequate, and a search started for a new proving ground site. After considering Kent Island across the Chesapeake Bay, the Army selected the peninsula in Harford County because of its rural location and accessibility by train and water.

On Oct. 6, Congress authorized the purchase of about 35,000 acres of land (excluding Spesutie Island). The president issued three proclamations taking over the land, which allowed the Army to buy out landowners, many of whom protested the loss of the prime agricultural land owned by their families for generations. The Army started construction of a proving ground Oct. 20. Civilian and military personnel worked on the project, which was called the Proving Ground at Aberdeen. Peak civilian strength was about 3,600, and more than 3,800 contractors also contributed. The peak military strength was about 5,000 soldiers. The Army constructed 324 buildings by 1918 for $3.4 million. The first post commander was Col. Colden Ruggles, who assumed command Jan. 1, 1918.

The next day, the first artillery gun was fired from the main front in a heavy snow storm. The wife of Edward V. Stockham, a former landowner, had the honor of firing the 3–inch Model 1905 field piece. The Army fired more than 5,000 rounds in January.

For mission work, the Army constructed a post headquarters (Building 310), an assembly plant (Building 314), a machine shop (Building 315), an instrument building, warehouses and magazines. To house the civilian and military personnel, a small city was constructed. In Aberdeen, the Army built 65 single houses and five dormitories for civilian employees. They also built 50 civilian barracks on post. For the military, they constructed 60 enlisted barracks, 12 single–family quarters (Buildings 2–10, 20–23, 25 on Plum Point) and six two–family officers' quarters (Buildings 70–71, 80–83 on Hopkins Loop). In addition, the Army completed a hospital for 250 patients, a YMCA and guest quarters. A small cemetery was started in August 1918.

In 1918, the post's mission grew from artillery firing. The site of Old Baltimore became a balloon bombing range for the 28th Balloon Company. A small airfield was constructed for the 271st Aero Squadron. Other projects

included the testing of anti–aircraft weapons and tanks. The Railway Artillery School and the Ordnance Engineering School moved to the installation to start a training mission. As part of the testing program, an early version of a modern computer was completed when the Aberdeen Chronograph started calculating the velocity of artillery shells.

By the end of the war in November 1918, the post had tested almost every type of weapon used by and developed for the Army. In recognition of this important mission, War Department General Order No. 6, 1919, named the post Aberdeen Proving Ground and made it a permanent installation.

EDGEWOOD ARSENAL

Top Right
World War I—
Main Front Testing
A 3–inch field gun set up for test firing at the Main Front in 1918.

Bottom Right
World War I—
Post Headquarters
Building 310 was constructed as the Post Headquarters in 1918.

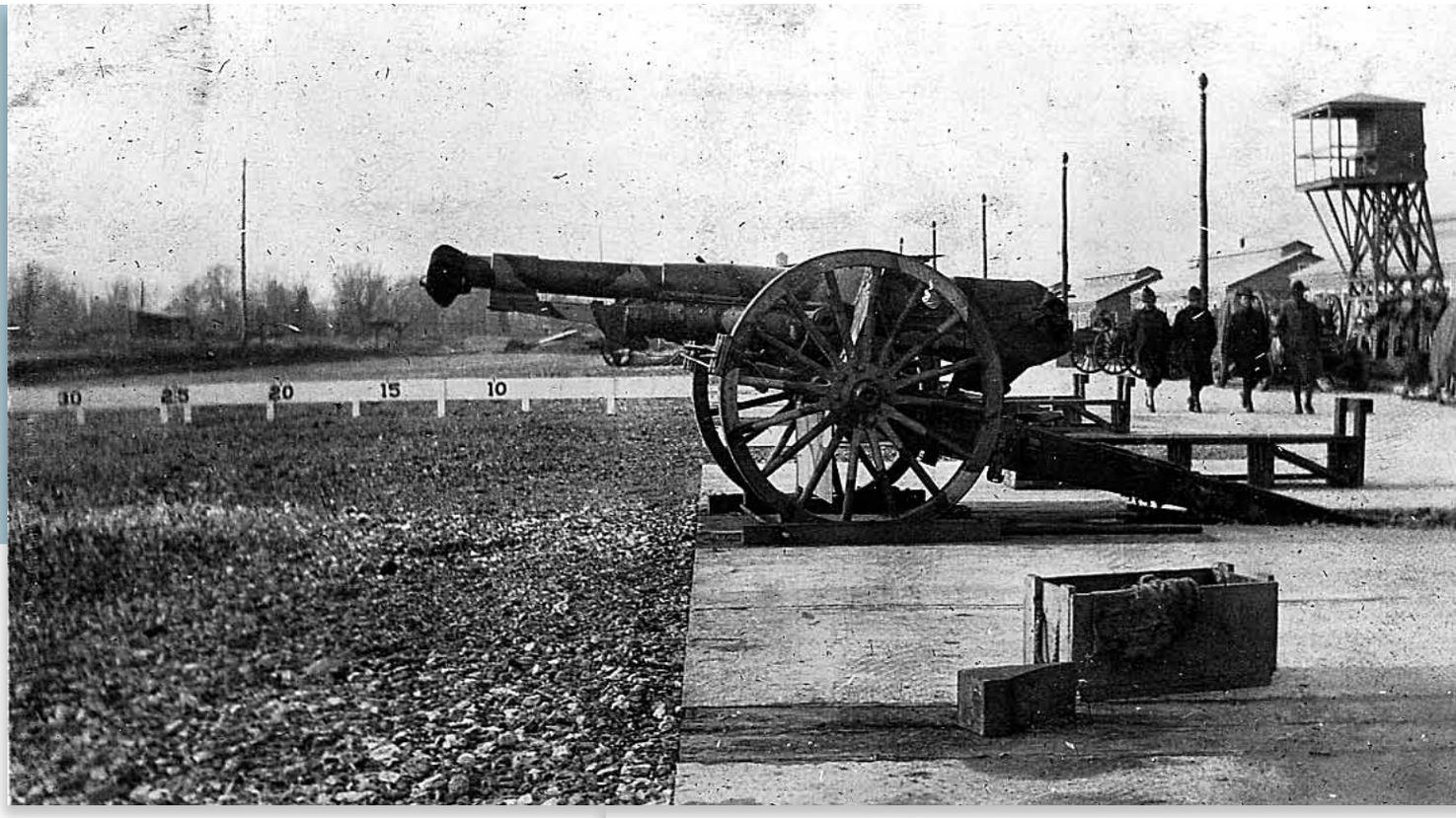
In April 1915, Germany initiated large–scale chemical warfare in an effort to break the Allied lines at Ypres, Belgium. The attempt failed, and soon, both sides escalated the use of chemical weapons. Despite the continuing use of chemical weapons, when the United States entered the war in April 1917, the U.S. Army had no training programs, equipment or weapons to fight a chemical war.

In October 1917, President Woodrow Wilson approved Gunpowder Neck as the site for the Army's first chemical weapons arsenal. This led to a massive government construction project that quickly displaced the Cadwaladers and their tenant farmers.

During one of the coldest recorded winters, civilian construction workers began building what was initially called Gunpowder Neck Reservation and later Edgewood Arsenal. The power plant (Building E5127) of Shell Filling Plant No. 1 was the first permanent building completed. The rest of Shell Filling Plant No. 1 became operational in April 1918. Within a short time, 75mm chemical shells were being filled and then readied for shipping in the three warehouses (called shell dumps) across the street from the plant (Buildings E5179, E5165 and E5158). The Army later completed a second shell–filling plant but was unable to complete a third before the end of the war.

In addition to the shell–filling plants, the Army built four chemical–agent production plants at Edgewood. Chlorine, phosgene, chloropicrin and mustard agent were selected for production. By the summer of 1918, chlorine and chloropicrin were no longer considered important because of improvements made to gas masks during the war. Portions of the mustard and phosgene plants remain today. In addition to the chemical agent production and shell–filling operations, the post also completed its first chemical laboratory.

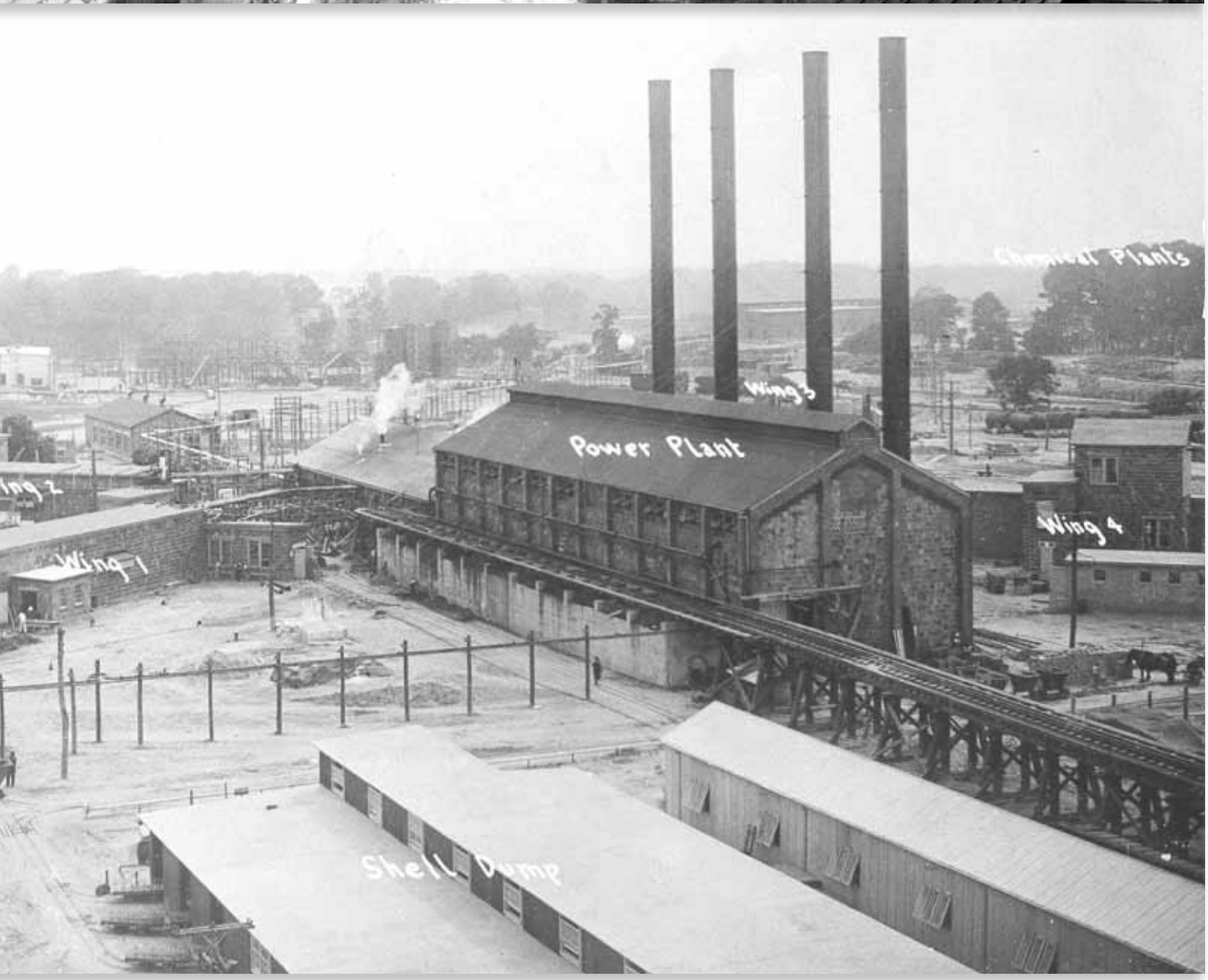
Because of the dangers of chemical agents, military personnel assumed the operations of the chemical–agent filling and production plants from civilians. Despite little knowledge or experience in running these plants, only three soldiers died at Edgewood Arsenal during the war from chemical–agent exposure out of 7,000 military assigned to the post.



With a growing population, Edgewood constructed a 314–bed hospital. Most patients in 1918 suffered from influenza. There were as many as 1,300 patients, some lying in corridors because of the lack of room. Almost 200 died from disease during the war. A small cemetery was started behind the hospital for those not sent home for burial.

Although most troops working in the plants lived in temporary wooden barracks, the Army completed 16 permanent two–story troop barracks for enlisted men. Most officers lived in abandoned farmhouses throughout the post or in the new officers' quarters building (Building E4650).

By the end of World War I, the post had shipped 450,000 chemical shells to Europe, although most arrived too late to be used. Still, the soldiers of Edgewood Arsenal and its parent organization, the Chemical Warfare Service, contributed to the war and helped bring about the Armistice on Nov. 11, 1918.


Power Plant
Wing 3
Wing 4
Wing 1
Shell Dump

Top Left
World War I—
Mustard Agent Plant
Mustard agent was considered "King of the Battlefield" during World War I. The last of the plant's four buildings were removed in 2010.

Bottom Left
World War I—
Shell Filling Plant
Shell Filling Plant No. 1 consisted of four filling wings and the central power plant. Only the power plant remains today.

Top Right
World War I—Laboratory
The first chemical laboratory was completed in 1918 and was used until the early 1970s.

Bottom Right
Armistice Day
The end of World War I on Nov. 11, 1918, was celebrated at Edgewood Arsenal with a ceremony.

1917: EMINENT DOMAIN AND THE FOUNDING OF ABERDEEN PROVING GROUND

Left
Col. Colden Ruggles

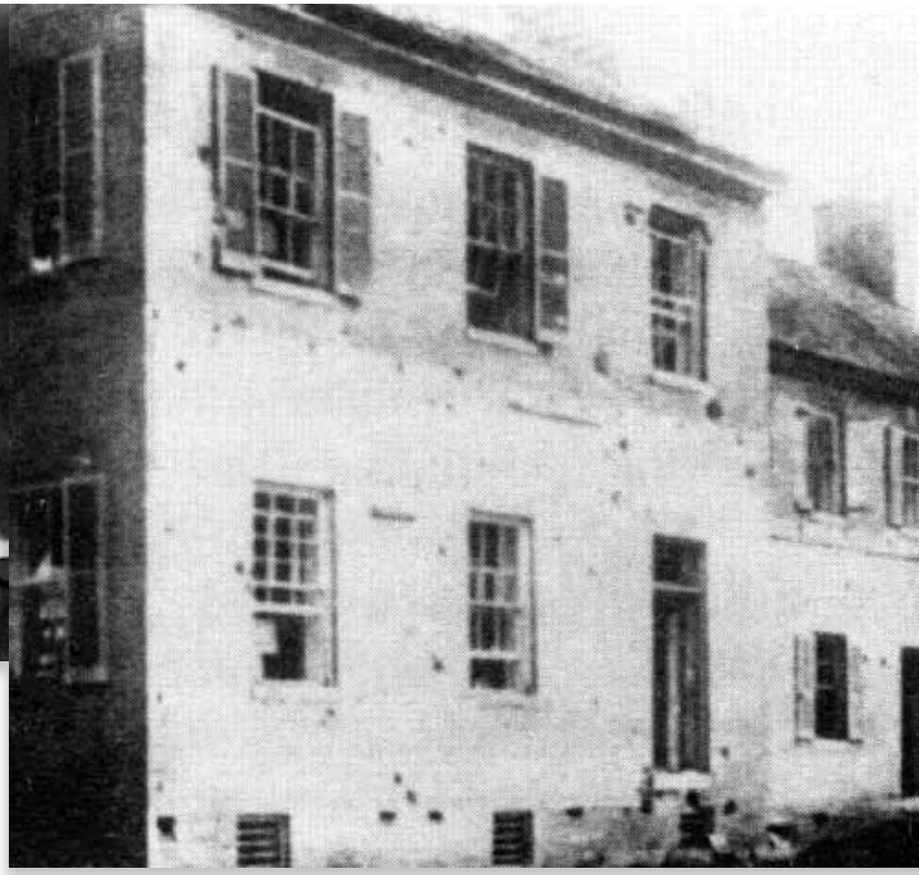
Right
Several of the original land owners' homes were left standing and became targets for ordnance testing on firing ranges. This is one such home, originally owned by the Malcolm Family.

Shortly after the United States entered World War I, APG was founded in 1917 out of necessity. Sandy Hook Proving Ground, N.J., the Ordnance Department's primary proving ground, was too close to a large population in New York City. The water transportation lanes to and from the installation were constantly congested and competed with New York Harbor traffic for space. Land was also limited at Sandy Hook.

As a result, the Army was forced to look for other locations to establish operations. Col. Colden Ruggles was assigned to find a location for the new installation.

Ruggles was extremely qualified to complete the task given to him by Secretary of War Newton D. Baker. As the commandant of Sandy Hook Proving Ground, Ruggles was one of a few men who knew what was needed for the construction of the proposed testing site. After extensive surveying across the country, he initially chose Kent Island for the new proving ground. However, he soon found that Kent Island residents did not want to live near an Army installation. Protests escalated, and the pressure to find an alternative to Kent Island became overwhelming. Frustrated, Ruggles turned to his friend, Maj. Edward V. Stockham, who suggested the farms near Aberdeen in Harford County. Stockham was a native of Perryman and Harford County, and he believed the county could supply the land and isolation needed by the Army for ordnance testing. After surveying the town and surrounding area, Ruggles agreed that Aberdeen was an appropriate spot for a new facility. Ruggles suggested Aberdeen to the War Department, which sent the recommendation to Congress for approval.

Using the sparsely applied principle of eminent domain, the U.S. government sought to ensure what happened at Kent Island would not occur in Aberdeen. Like the citizens of Kent Island, the residents south of Aberdeen initially objected to losing their land to the government for the construction of the new post. However, unlike the Kent Island residents, they lacked the political support from legislators in Annapolis to successfully oppose Ruggles' decision. Eminent domain states the federal government has the ultimate right to all property as long as the seizure is "in the best interests of the country" and the owners of the land are compensated according to "set requirements." As long as Aberdeen land owners were offered compensation, they had to turn over their land to the Army. On Oct. 6, 1917, Congress approved legislation designating $7 million for the purchase of lands and housing in the Aberdeen area for the new proving ground, displacing more than 3,000 people. Local farmers were offered $100 per acre.

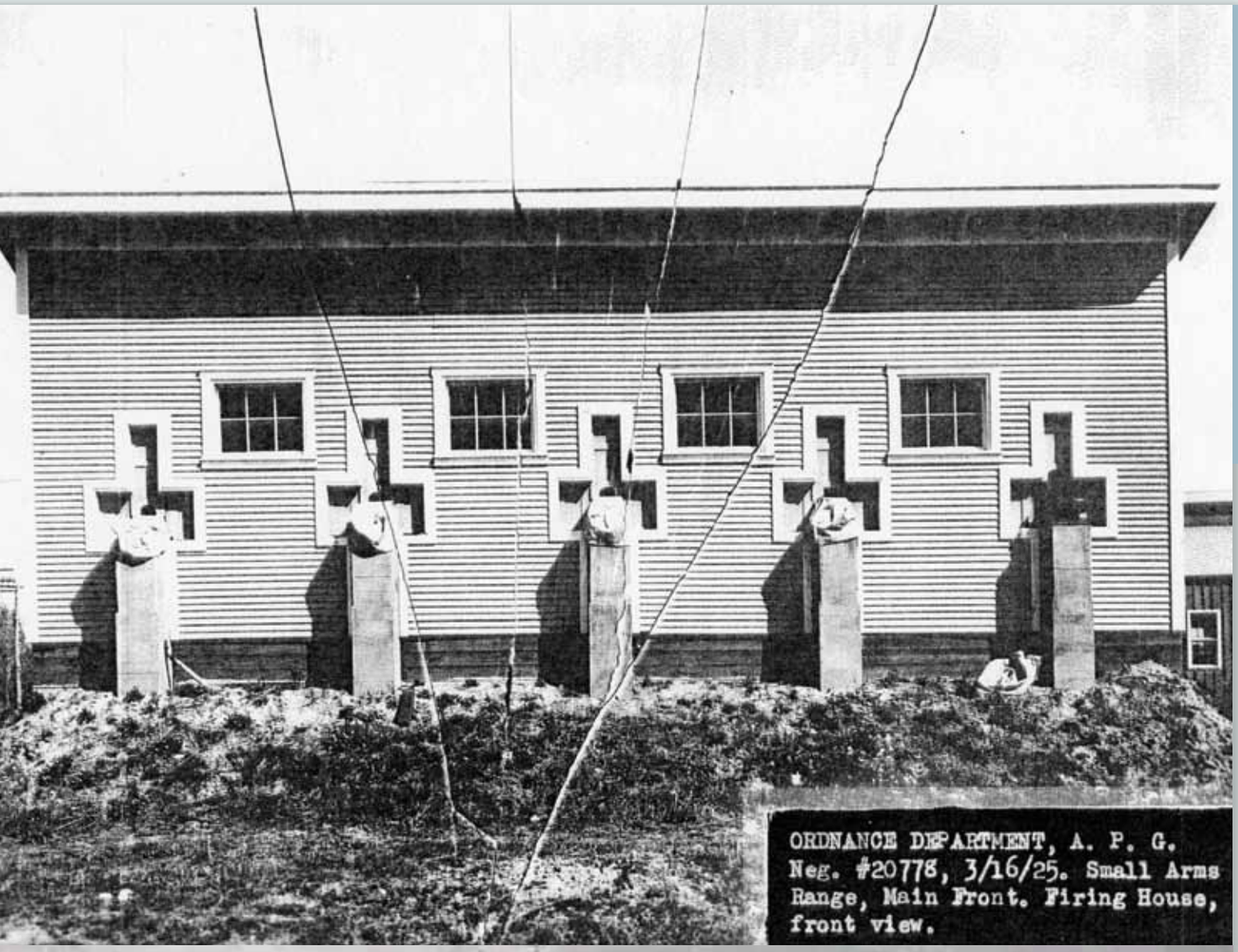


On Oct. 14, 1917, President Woodrow Wilson proclaimed the post at Aberdeen to be formally established (making it the Army's oldest active proving ground). Six days later, the U.S. government took formal possession of the land and assigned the Maryland Dredging and Contracting Company of Baltimore to begin building. On Jan. 1, 1918, Ruggles assumed command of APG. The next day, Ruggles presided over the firing of the first gun, which began ordnance testing.

The land owners lost their farms, homes and any possessions they left behind in the hurried evacuation, mostly without initial compensation. Some farmers who gave up their land would not receive compensation for almost 20 years (in a few cases, it came only after their case was taken to the Supreme Court and Congress). Their sacrifice (in most cases a patriotic and willing sacrifice) allowed for the vital establishment of APG, which contributed to the research, testing and development of weapons and armor that saved thousands of lives during the wars and conflicts after 1917.

"Patriotic citizens, responding to their country's call, vacated their lands and, in some cases, left their homes, businesses, livestock, and equipment; all within 72 hours. Relying on the word and assurance of their country's representatives for compensation of their losses in property and business, these Harford Countians gave up their livelihoods in support of the war effort."

"An Assessment of the Applications of Eminent Domain in the Founding of APG," Harford Historical Bulletin; (No. 85; 2000)


ORDNANCE DEPARTMENT, A. P. G.
Neg. #20778, 3/16/25. Small Arms
Range, Main Front. Firing House,
front view.

1918: THE MAIN FRONT

The Main Front is the designation for oneof several ordnance testing sites at APG today. It was established in 1918, only a few months after President Wilson's proclamation founded APG. One of the Army's primary reasons for establishing a proving ground at Aberdeen was to create a location where ordnance could be fired, tested and evaluated for improvement. The Main Front's mission was to test guns and munitions to give the Army the research it needed to improve the Warfighters' weapons during World War I and beyond.

Originally referred to as a Main Proof Battery, the recently established Proof Department operated the Main Front. This Main Proof Battery was a half–mile long, making it the largest firing range at APG at the time. The Main Front, along with Trench Warfare, Railroad Range, Water Range and Aviation Field, included 16 range towers that assisted in the coordination and firing of ordnance. In continual operation since 1918, the Main Front is one of the oldest firing ranges in use today in the Army's ordnance testing program.

Ruggles, his staff and spectators, both military and civilian, gathered to witness the first firing Jan. 2, was one of winter's coldest days. The opening ceremonies took place in a blinding snowstorm. The wife of Edward V. Stockha, Ruggles' longtime friend and confidant fired the first shot. The first projectile fired was a Bartlett–Hayward Company 3–inch shrapnel shell. Spectators cheered as a white cloud of smoke and metal shot out from the gun. The casing of the first shell was given to Howard Bruce, a representative of Bartlett–Hayward Company. Not long after the first shell was fired, a second shell was fired 400 yards before exploding in a white cloud over the test range. Witnesses said that the 90th shot was delayed as civilians were walking toward houses on the testing field 2,000 yards away from the firing line. A safety officer removed the pedestrians so firing could resume.

More than 5,000 rounds were fired in the first three months of operation. By the end of the war, 70,768 rounds had been tested. The Proof Department at APG estimated that more than $338 million was spent on primers, fuses, powder, munitions and other items needed for proof work by the end of 1918.

1918: THE INFLUENZA EPIDEMIC

Top Right
The APG Rapid Fire Newspaper Healines for Oct. 10, 1918.

Middle Right
The doctors, nurses and staff of the Edgewood Arsenal Station Hospital in 1918

Bottom Right
Pvt. Jet Parker, assigned to the Edgewood Arsenal Station Hospital in 1918 during the influenza epidemic

APG and Edgewood Arsenal were affected by the Spanish Influenza Epidemic of 1918 that killed about 50 million people worldwide. The virus attacked one–fifth of the world's population. Within months, it had killed more people than any illness in recorded history.

A local newspaper, the Harford County Aegis, reported Oct. 25, 1918, that influenza came from Valencia, Spain. However, others speculated that the virus had not originated from the Orient, not Spain. Their evidence was that influenza first appeared on the German's eastern front in the summer of 1917.

1918 was the height of U.S. involvement in World War I, and many influenza deaths occurred in military camps, where soldiers lived in close proximity. This made it easy for the disease to spread rapidly.

At Edgewood Arsenal, there were as many as 1,300 patients packed in the station hospital. Pvt. Jet Parker, who was stationed at the hospital, wrote: "Conditions are bad at the hospital. All of the wards are filled so they have placed cots along each side of the long corridors and divided them off into [additional] wards." More than 200 Edgewood soldiers and civilians died of influenza and other diseases during the war. Influenza affected the sick and those who cared for them. At least three female nurses of the Army Nurse Corps died at Edgewood Arsenal.

Among those who died at APG was Gilbert Ames Bliss' wife, Helen Hurd. Bliss was an American mathematician known for his work on the calculus of variations. During World War I, he and Oswald Veblen worked together at the APG range firing area, applying the calculus of variations to correct shell trajectories for the effects of wind and density factors on accuracy.

It is unknown how many Harford County civilians died during the influenza epidemic, but the county did incur deaths, as did the rest of the United States, which lost between 500,000 and 700,000 lives.

RAPID FIRE

PUBLISHED BY THE ENLISTED MEN OF THE A.P.G.

Volume One — ABERDEEN PROVING GROUND, MD., THURSDAY, OCT. 10, 1918. — Number Twenty-Th

Hospital Reports 500 Cases of "Flu"; Death Claims Nine Victims

With the epidemic of Spanish influenza still enveloping the country, conditions at Aberdeen Proving Ground continue on the upward trend, although the situation is not serious or alarming. Seven deaths during the past week make a total of nine since the scourge dealt its blow upon this camp. In comparison, however, with the number of deaths recorded in other camps we can be proud of the good work performed by the Medical Corps

tion Company. The remains of Pvt. Halm, Cpl. Barnes, and Cpl. Davis were sent to their homes, while the body of Pvt. Marosi, who resided in Nevada City, Nev., was interred in the Reservation Burial Ground.

Shortly after the death of Cpl. Barnes a telegram was received from his mother saying that she and her daughter would arrive here Tuesday

Continued on Page Eleven

Railway Artillery Men Get Rousing Send-off on Departure for Franc

Other things than guns are proved at the Aberdeen Proving Ground. And other stuff than ammunition is winning this war. These words might well have composed a cablegram to Kaiser Willie from the Railway Artillery and the Ordnance Engineering Schools last Thursday night.

During the afternoon preceding this Thursday evening, citizens of our shell-shaken community were gratified

when a banquet like that was in prep
nation and progress.

Order Received to Go Across.

It was about noon, by the Aberde
City Hall clock, when the wires fro
Washington dotted off the long-e
pected yet awe-inspiring messag
Meaning was breathed into the pa
and belts and overseas equipmen
which the Railway Artillery has
late spirited off on their dusty a

PART III

BETWEEN THE WARS

ABERDEEN PROVING GROUND

Top Right
1920s—Aerial View
The World War I troop barracks on Plum Point have been replaced by tents around the water tower. The Main Front across the upper right was the primary focus of the testing program.

Middle Right
1920s—Vehicle Testing
The testing of tracked and wheeled vehicles in all types of terrain became a specialty of APG. Munson Test Area was started in 1933 and included a mud course, circular cobblestone course, a loop and a washboard.

Bottom Right
1935—Tschappat Hall
Building 305 was completed in 1935 as a barracks for the 44th Ordnance Company. It included a mess hall, pistol range, a store and handball courts. In 1941, four bowling lanes were added in the east wing. It was named after Maj. Gen. W. H. Tschappat, APG Commander from 1922 to 1925.

After World War I, a major demobilization reduced APG's military personnel to 377. The Ordnance Engineering School and Railway Artillery School were discontinued. Despite this reduction, the testing work continued, and the post constructed new facilities in the 1920s. Additions included a sea coast battery and a small–arms range. A new mission, the Aberdeen Ordnance Reserve Depot, was created in 1921 to store ammunition and equipment.

One major addition in 1922 was the assignment of a large Army dirigible to conduct bombing missions. This new mission lasted only a few years, and in 1926, fixed–wing aircraft replaced the dirigible.

Some items tested during the 1920s included 4,300–pound bombs (witnessed by Brig. Gen. Billy Mitchell), .50 caliber machine guns and semi–automatic rifles.

During the 1930s, another growing mission was the testing of vehicles and tanks. APG demonstrated the importance of caterpillar tracks for mechanized vehicles by 1931, which led to significant modernization of the Army's armor vehicles. APG also tested the 1/4–ton utility truck, nicknamed the Jeep. In 1933, APG constructed a water course, mud course, circular track and rough terrain course to test vehicles.

APG's mission again grew when the Ordnance School headquarters moved to APG from Watertown Arsenal, Mass., in 1932. In 1938, construction started on three Ordnance School buildings for barracks and classrooms (Buildings 3071, 3072, 3073). In 1940, elements of the Ordnance School were consolidated at APG and moved into the new buildings even though they were not completed. Five noncommissioned officer quarters (Buildings 2020–2021, 2025–2027) were constructed across the main road from the school buildings.

Following the start of the Great Depression, APG received funding in 1933 from the Federal Emergency Works Administration to construct new officer (Buildings 25–58) and NCO (Buildings 100–119) quarters at Plum Point. Additional construction included a firehouse (Building 300), guardhouse (Building 150), explosive magazines, barracks for the 44th Ordnance Company (Building 305), officers club (Building 30), a hospital (Building 45) and improvements to the airfield. A unit of the Civilian Conservation Corps also provided ground improvement projects from 1935 to 1938.

The creation of a new Research Division in 1935 led to the start of construction of a large three–story laboratory building (Building 328)

in 1940. This facility focused on the study of ballistics, which was eventually called Ballistics Research Laboratory.

With the outbreak of World War II in Europe in 1939, the Army expanded the size and workload of APG. To meet the demand for more ordnance soldiers, the Army approved an ordnance training center at APG. To create space for this new organization, APG purchased 924 acres between APG and the railroad line near Aberdeen in 1940. The new Ordnance Training Center was established in January 1941, adding 167 barracks and 235 other buildings. APG purchased 4,780 acres south of Perryman for a new airfield and training areas in July 1941.

EDGEWOOD ARSENAL

Above Left
The Gas Mask Factory
Edgewood Arsenal made most of the Army's gas masks in the Gas Mask Factory until World War II.

Above Right
1932—Post Theater
The Post Theater was built in the Fort Hoyle area of Gunpowder Neck, and it was shared by Fort Hoyle and Edgewood Arsenal. It is now the Conference Center

After World War I, the Chemical Warfare School mission was centralized at Edgewood Arsenal. Edgewood received the research, development and training missions. The filling and agent production plants were placed on standby. A chemical agent storage yard on the Bush River was established in 1931 to hold the existing stockpile of chemical weapons.

For research, the World War I chemical laboratory was designated Laboratory No. 1. A similar building used as a guardhouse (Building E5183) was converted to Laboratory No. 2. A medical research complex was built southwest of Laboratory No. 1.

Development projects focused on weapons and defensive equipment. The key weapon development during this time was the 4.2–inch chemical mortar, which became the main ground weapon of the CWS for the next 20 years. A grass airfield was completed for bomb and spray–tank development. The key defensive work was the improvement of protective masks. A portion of the World War I chlorine plant was converted to the Gas Mask Factory. Most of the Army's gas masks were assembled in this facility until after World War II.

The chemical training mission was conducted by the CWS in a new complex near the Edgewood gate. A portion of its field training occurred on nearby land that is now a golf course.

Despite these new missions, budget cuts significantly reduced the number of personnel assigned to Edgewood. Because of the reductions, a portion of Edgewood Arsenal was turned over to the Field Artillery in 1922 and designated as Fort Hoyle. Fort Hoyle

headquarters was located in a World War I troop barracks (Building E4405). Fort Hoyle added horse stables to the area just east of the permanent troop barracks for the Sixth Field Artillery Regiment, the horse–drawn artillery unit assigned to the fort. In 1938, the post also constructed a large stone riding hall (Building E4210) for training horses. Fort Hoyle remained a separate facility until 1940 when the land was returned to Edgewood Arsenal. The riding hall was later converted to a gym during World War II and designated Hoyle Gymnasium. A monument to the Sixth Field Artillery Regiment stands next to the gymnasium.

While Fort Hoyle was in existence, the headquarters of Edgewood Arsenal was the former hospital administration building (Building E1675). One of the adjacent hospital wards (Building E1677) was converted to the Officers Club. During the 1920s, the Army constructed new officer housing for Edgewood Arsenal and Fort Hoyle near their respective headquarters. There were also improvements to the living conditions of the enlisted troops. A movie theater (Building E4810) was completed in 1932. After several drownings in the Bush and Gunpowder rivers, a swimming pool was added halfway between Edgewood Arsenal and Fort Hoyle headquarters. Individual NCO houses were built during the 1930s near the northeast end of the airfield.

Top
1920s—Edgewood Arsenal Headquarters
The World War I hospital administration building became the Edgewood Arsenal Headquarters after the war. It remained the post headquarters until 1963.

Bottom
Fort Hoyle: 1922–1940
The headquarters and riding hall of Fort Hoyle are still standing. Troop barracks replaced the horse stables in the 1960s.

1920–1939: EARLY AVIATION

Top
Launched as ZR–1 from Lakehurst, N.J., the rigid airship made its first flight Sept. 4, 1923. The 682–foot–long dirigible, later given the Algonquin Indian name Shenandoah, made a 1924 cross–country demonstration flight lasting 235 hours.

Bottom
JN–4 Jenny biplane at Phillips Field

Although established as a research, development and testing center, APG was also a base for the fledgling U.S. Army Air Service, which was organized during World War I. Units at APG shortly after World War I were involved in recruiting, publicity, testing and relief missions.

Shortly after the establishment of APG in 1917, an air detachment arrived and set up a base for airplanes and dirigibles. By the summer of 1918, the post had built a landing field, hangers and shops and designated a bombing field. The mission of the new airfield was to operate aircraft supporting the creation of bombing tables that were used to improve aerial bombing accuracy.

The 1920 amendment to the National Defense Act of 1916 provided for the legislative sanction of the Air Service organization and the establishment of nine multi–state organizations for the administration, training and tactical control of the Army. The Third Corps Area, headquartered in Baltimore, comprised Maryland, Pennsylvania, Virginia and Washington. Air Service units assigned to the Third Corps Area and stationed at the airfield on APG included the 29th Balloon Company (1919), the 258th Heavy Bombardment Squadron (1920), No. 18 Balloon Company (1920), 49th Bombardment Squadron (1922 / 1925) and the 18th Airship Company (1924 / 1925).

Starting in 1919, the Air Service began to replace the personnel losses because of demobilization following the end of World War I. The future of aviation promised new, interesting and lucrative professions, so an Air Service recruiting campaign was launched nationally. A recruiting party from APG attracted 34 applicants in a week for the School of Aerial Photography.

To assist in the recruiting campaign, the Air Service turned to publicity. Air shows, cross–country flights and aerial contests attempted to create interest in aviation, win public support and collect information to further develop military and civil aeronautics. The parade welcoming President Wilson home from the Paris Peace Conference in February 1919 provided a publicity opportunity for the Air Service. There was an air parade, which included a bomber that took motion pictures. APG provided a balloon with a cameraman from the 29th Balloon Company.

In early 1919, the Army and Navy began the testing process to ascertain the effect of aerial bombing on surface ships. Brig. Gen. William "Billy" Mitchell was a strong advocate of the

supremacy of aviation over surface ships. By early 1921, preparations for bombing captured World War I German warships (off Cape Charles) were under way.

Special aerial bombs were developed at APG and aircraft prepared. The 258th Heavy Bombardment Squadron, based at the APG airfield, assisted Mitchell in testing bombs, fuses, releases, flares, machine guns and other equipment. Mitchell made at least three visits to APG. Additionally, bombing instruction was provided.

The Air Service started humanitarian flights in 1919. APG aircraft participated in alleviating two winter emergencies. In March 1923, planes bombed an ice jam on the Delaware River. Three years later, planes bombed an ice jam on the Susquehanna River.

APG also conducted weather research. Planes and pilots worked with Harvard University in the early 1920s on dispersing fog by dropping electrically charged sand on clouds.

APG continued to contribute to aviation technology in the 1930s. Dive bombing, which was important in World War II, was first attempted at APG. Additionally, a 75mm aircraft cannon on a bomber was tested in 1939.

1922–1940: FORT HOYLE

Shortly after the end of World War I, the War Department initiated a demobilization policy to reduce troop numbers and return the Army to a peacetime status. This demobilization plan severely affected Edgewood Arsenal, a Chemical Warfare Service post covering most of Gunpowder Neck in Maryland. Edgewood Arsenal began in 1918 and consisted of chemical–agent production plants, shell–filling plants, troop barracks and artillery ranges. The reductions resulted in many buildings being underutilized.

A War Department directive on April 7, 1921, selected Gunpowder Neck as the site for a new Field Artillery post. Many in the CWS were unhappy with the plan. However, the protests went unheeded, and General Orders No. 40 on Oct. 7, 1922, created Fort Hoyle. The fort was named after the late Brig. Gen. Eli D. Hoyle, a former commander of the Sixth Field Artillery Regiment, who died July 27, 1921.

Field Orders No. 4, dated Sept. 22, 1922, assigned the Sixth Field Artillery Regiment to the new post. The regiment was part of the 1st Artillery Brigade of the 1st Infantry Division and had served in Europe during World War I. The regiment, a horse–mounted unit, left Camp Dix, N.J., Oct. 11 and arrived at Fort Hoyle Oct. 18.

The artillerymen quickly discovered that the fort consisted of empty fields, some troop barracks, two old farmhouses, three wartime warehouses and not much else. There was no officers' housing, stables, gun sheds or recreation center. The other Field Artillery units soon referred to them as "mud hens."

Although the commander of Fort Hoyle wanted to create a self–sufficient post, lack of funding prohibited a large expansion and forced Fort Hoyle to work closely with Edgewood Arsenal. This meant Fort Hoyle and Edgewood had to share facilities and personnel assignments. This awkward relationship caused numerous petty disputes between the posts.

The artillerymen spent much of their time upgrading the firing ranges and training. The training often consisted of marches up to 135 miles that lasted six days. They worked closely with the CWS on experimentation, tactics and training for the use of chemical warfare.

During the 1920s and 1930s, Fort Hoyle started a limited construction program that added housing, a club, theater, gymnasium, chapel, stables and gun sheds. In 1938, Fort Hoyle added a riding hall used to train officers in the management of horses. In addition, the artillerymen cleared many firing ranges and

built observation towers and a new road to the Magnolia gate that allowed them to bypass Edgewood Arsenal.

In 1939, problems with the jurisdiction of the firing ranges resulted in ill feelings between Edgewood Arsenal, Fort Hoyle and APG, which also used the ranges. These disagreements intensified as the United States began emergency planning as war seemed imminent in Europe. On June 7, 1939, the original range agreements were rescinded. The new directive gave APG the highest priority for use of the ranges. The next priority went to the CWS. Fort Hoyle came last.

With World War II on the horizon on Aug. 21, 1939, Maj. Gen. Walter C. Baker, chief of the CWS, called for the removal of Fort Hoyle from the former Edgewood Arsenal land because the space was needed to expand the CWS. With the outbreak of war in Europe, the War Department soon responded to the CWS request.

General Orders No. 8, dated Sept. 16, 1940, disestablished Fort Hoyle and returned the land to Edgewood Arsenal.

Although little remains as visual evidence of the existence of Fort Hoyle, several buildings constructed during the Fort Hoyle period exist today. In 1942, the CWS converted Fort Hoyle's riding hall (Building E4210) to a gymnasium and recreation hall and renamed it Hoyle Gymnasium in 1962. Adjacent to the gym is the Sixth Field Artillery Monument. Fort Hoyle's headquarters (Building E4405) was in one of the original 1918 troop barracks and still has the decorative columns on the front of the building. Fort Hoyle's Post Theater (Building E4810) was built in 1932 and remodeled into a conference center in 1985. The Fort Hoyle officers' houses built in the 1920s near the Gunpowder River are still used as officers' quarters. All of Fort Hoyle's horse stables were removed, and the site was used for additional troop barracks in the 1960s.

PART IV

WORLD WAR II

ABERDEEN PROVING GROUND

Above Left
World War II—Women's Army Corps
The WAC arrived at APG in 1943 and quickly demonstrated their capabilities. They assisted with many tasks, including weapon testing and conducting complicated mathematical calculations.

Above Right
World War II—Munson Test Area
The Munson Test Area was named after Lt. Max Leroy Munson, who was killed in November 1941 while conducting a test. Across the top is Spesutie Island, which was leased to the Army during World War II for testing.

Right
World War II—Ordnance Training Center
The Ordnance Training Center was constructed on newly acquired land. About 167 troop barracks were completed in a short time. A new Phillips Airfield (top left) was completed in 1943. It was named after Lt. Wendell K. Phillips, who was killed in a plane crash in 1922.

Following entry in World War II in December 1941, APG again became the Army's main testing facility for ordnance and vehicles. This led to the need for more space. An additional 1,189 acres along Swan Creek were purchased in 1942. The same year, APG purchased 244 acres near Churchville for a combat–vehicle development course. APG leased privatly owned Spesuite Island for rocket testing in 1942. The post constructed a bridge connecting the island and mainland in 1943. The Army purchased the 1,854–acre island in 1945.

In addition to the purchases, several off–post sites in Harford, Cecil and Kent counties were temporarily leased for training during the war. These areas included Camp Howell (across the Chesapeake Bay), Camp Osborn (near Havre de Grace), Bata Shoe Company area (near Belcamp), Schanz Bivouac Area (near Carsins Run) and Elk Neck State Park (Cecil County).

The major construction program started in 1940 continued during the war. In 1941, APG added a second hospital that increased the normal patient capacity to 570 and four new wooden chapels. In 1942, the post added Ordnance School classrooms, barracks and other support buildings. A speed course for testing the cooling systems of vehicles was completed near Perryman. The original Phillips Airfield was too small for the war effort and was replaced in 1943 by a new one on recently purchased farms. The United States' first supersonic wind tunnel (Building 120) was completed in 1943 for testing bombs, rockets and artillery projectiles. To help with traffic control for workers driving to post, Boothby Hill Road was connected to Route 40 by a new road named Access Road (later changed to Maryland Boulevard).

To provide civilian housing for APG workers, Government War Housing projects were completed off post in the Aberdeen and Havre

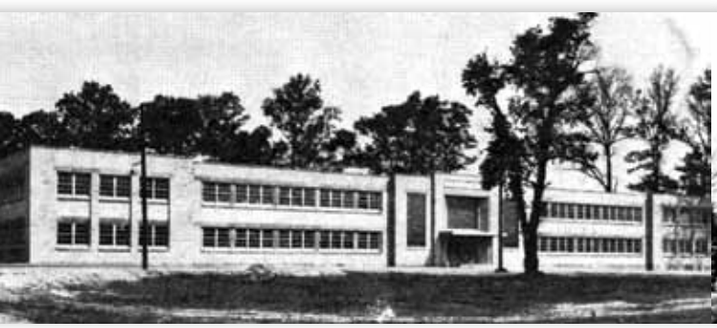
de Grace areas. These included Baldwin Manor (dormitories and apartments), Concord Fields (family units), Swan Meadows (family units), Poplar Park (dormitories and trailer–type family units) and Swan Creek Park (trailer–type family units).

In April 1943, the first Women's Army Corps (WAC) detachment arrived at APG. By June, the WAC had grown to two companies of 495 military personnel. They assisted with testing ordnance, research, support operations and administrative work.

APG tested many of the key weapons and vehicles used during World War II. These included: M1 Carbine, M3 submachine gun, M1 2.36–inch bazooka, M4 Sherman Tank, M26 Pershing Tank, M1 "Long Tom" 155mm gun, M1 120mm antiaircraft gun, 36–inch mortar (Little David) and Norden bombsight. APG test fired about 14 million rounds and dropped 115,000 bombs during the war. APG also tested protective equipment like flak jackets for aircrews.

Reflective of their contributions, APG received the Army–Navy "E" Awards five times during the war for outstanding achievement in the production of ordnance and equipment.

EDGEWOOD ARSENAL



Above Left
World War II—Arsenal Operations
Completed as an arsenal operations building during World War II, it became the post headquarters in 1963. After 1971, it became the headquarters of several tenant organizations.

Above Right
World War II—Technical Command Laboratory and Office Building
This facility had a wing added to the north during the Korean War. Behind it were test chambers and research buildings.

With the beginning of World War II in Europe in 1939, Edgewood Arsenal prepared for another chemical war. By then, all World War I filling plants were gone, and the agent production plants were outdated and in poor condition. New construction corrected the situation. Edgewood built a new phosgene plant, renovated the existing mustard plant, added three new filling plants (Buildings E5185, E5604 and E5188), paved the airfield, added numerous warehouses in the Bush River area and created a new chemical agent storage yard next to the existing one. To oversee arsenal operations, the post added a two–story office building (Building E5101). A separate organization called the Ordnance Assembly Plant also built warehouses and assembly plants on the west side of Canal Creek.

For research and development, the Chemical Warfare Service's Technical Command constructed a large, two–story laboratory and office building (Building E3330) southeast of the airfield to replace Laboratories No. 1 and No. 2. An adjacent new two–story laboratory and office building was assigned to the Medical Research Division (Building E3220) to replace the 1920s complex.

The Chemical Warfare School (Building E1570) expanded its facility by connecting two small school buildings with a new central portion. The field behind the new school building (now the golf course) continued as a training field. The school also set up a live–agent gas obstacle course west of Reardon Inlet for realistic chemical warfare training. During the war, the school trained more than 21,600 military personnel in all aspects of chemical warfare.

To handle the enormous influx of military personnel during the war, Edgewood constructed several two–story wooden troop barracks in the area south and east of the existing World War I barracks. Several of these barracks were used to house about 600 German prisoners

who helped with administrative and manual jobs. To ease traffic problems for civilian commuters, an underpass was added to the Edgewood gate and an overpass built for a new Magnolia gate.

Early in the war, President Franklin D. Roosevelt established a no–first–use policy for chemical weapons. Since Germany and Japan chose not to initiate chemical warfare against the United States, the enormous production of defensive equipment and chemical weapons went into storage. However, Edgewood still made a tremendous contribution to the war effort. For example, the Edgewood produced incendiary bombs dropped by Lt. Col. James H. Doolittle during his famous 1942 raid on Tokyo. Other contributions included protective masks carried by troops landing in France on D Day, smoke generators used to screen troops at Anzio, flamethrowers used to attack concrete bunkers throughout the Pacific and in Europe and the highly acclaimed 4.2–inch chemical mortar, designed for chemical shells, but used successfully with smoke, incendiary and high–explosive rounds.

In 1942, the installation changed its name to Chemical Warfare Center to better reflect Edgewood's mission. The peak civilian strength of the post during the war was 8,800 in 1943. Chemical Warfare Center contributed to the success of the war and received several national awards.

Right Top
Walt Disney visited Edgewood Arsenal during World War II to help design a gas mask that a child would be willing to wear. The Mickey Mouse Gas Mask is a collector's item today.

Right Bottom
World War II—Chemical Warfare School
The taller central portion of this building was completed during World War II. The Chemical School moved to Fort McClellan, Ala., in 1951, and the building was used for offices.

1940: THE STONES—RDECOM HEADQUARTERS

The construction of Buildings 3071, 3072 and 3073 on APG–North fulfilled multiple requirements at a critical point in the history of the U.S. Army Ordnance School. In 1936, after 34 years of officer training at Sandy Hook Proving Ground, N.J. and Watertown Arsenal, Mass., and 17 years of enlisted training at Raritan Arsenal, N.J., the secretary of War directed the ordnance chief to consolidate the two ordnance schools at APG.

Buildings 3071, 3072 and 3073, nicknamed the Stones, Lt. Col. George W. Outland first conceived in 1936. Outland, then serving as a department director in the Ordnance Field Service School at Raritan Arsenal, had majored in architecture at Ohio State University. However, because of the increasing pressure in executing the consolidation of the officer and enlisted schools at APG, Outland's unique plans were dropped to save time.

Outland, assisted by two draftsmen, used plans of standard Army barracks. Three permanent buildings and a central heating plant (Building 3062) were approved to fill the requirements for shops, offices, classrooms, billeting and a mess hall in a compact college campus–like setting at Long's Corner Gate on the APG boundary line. Construction funds were allocated from the Public Works Administration and Works Projects Administration, two government organizations created following the Great Depression. Buildings 3072 and 3073 would remain relatively unchanged as planned, housing school cadre and students. The administrative building (Building 3071) needed general repartitioning to support classrooms, offices, storage areas and the school printing shop for correspondence courses.

Construction began Dec. 19, 1938. The two–story buildings were constructed with reinforced concrete foundation and floors and exterior walls of stone backed by hollow terra cotta tile. Granite was procured from nearby Port Deposit. The roofs were slate. Building 3072 contained a bowling alley in the basement and a mess hall that could feed 350 people. This building quartered 164 men, and Building 3073 quartered 141 men. Although still incomplete, the buildings were occupied in July 1940 on the establishment of the new, consolidated Ordnance School. The buildings were officially turned over to the garrison Jan. 15, 1941. Construction costs totaled about $544,600.

Left
Building 3071 (administrative)

Right
The Stones (from left): Buildings 3072, 3071 and 3073.

The original construction plans did not include sufficient space for shops. In March 1940, as the occupation of the Stones neared, planning began for the construction of a new school shop facility and theater adjacent to the Stones. Construction of Building 3074 began July 29, 1940, and was completed April 18, 1941. The building originally included a machine shop, a portion of the artillery section and a theater.

By the end of 1943, about 310 buildings were constructed around the Stones. The combined square footage totaled 12.5 million, housing 11,000 men.

Over the years, the Stones were officially memorialized in the names of influential members of the ordnance family. Building 3071 was memorialized in 1962 for Brig. Gen. Bethel Wood Simpson (1888–1958), assistant commandant, Ordnance School from 1928 to 1934. Building 3072 was memorialized in 1963 for Maj. Gen. Everett Strait Hughes (1885–1957), chief of ordnance from 1946 to 1949. Building 3073 was memorialized in 1956 for Brig. Gen. Thomas Kenneth Vincent (1895–1956), APG deputy commander from 1948 to 1952.

The U.S. Army Ordnance Center and School had been the primary occupant of the buildings since construction. However, other organizations also occupied them. These included: U.S. Army Test and Evaluation Command, U.S. Army Material Command Board, PS Magazine, Army and Air Force Exchange Service, U.S. Army Cadet Command and Trial Defense Service. Building 3074 formerly held machinist training, utilized by the U.S. Army Baltimore Engineer District, and is currently used as a conference center and storage facility. The Ordnance Center and School moved to Fort Lee, Va. in 2010. Today, the Stones are occupied by the Headquarters of the U.S. Army Research, Development and Engineering Command.

1940: THE FLAMETHROWER

Top Right
An experimental flamethrower tested at Edgewood Arsenal in 1941.

Bottom Right
M3A1 STUART Satan

Although employed by European armies during World War I, the flamethrower was not considered to be a successful piece of equipment by the American Expeditionary Forces. This philosophy kept the Chemical Warfare Service from conducting research and development until July 1940 when the U.S. Army Corps of Engineers requested a portable flamethrower be developed. After the initial model was produced, a redesigned model was tested at Edgewood Arsenal in March 1941. Concurrently, the development of thickened fuel (napalm) in 1940 improved the weapon's characteristics. All flamethrower models consisted of four main components: a storage system for fuel, a storage system for compressed gas, a flame gun and an igniter. The system weighed about 32 pounds empty or 70 pounds full.

Besides developing and testing the flamethrower, Edgewood Arsenal was also the focal point for exploitation of captured enemy equipment. The first examination of a foreign flamethrower occurred in February 1942 after U.S. forces captured Japanese flamethrowers on Bataan Peninsula, Philippines.

Improvements to the flamethrower led to a model (M1) being standardized in March 1942. An improvement, the M1A1, which used thickened fuel that increased the range of the flamethrower, followed later that year. Other improvements resulted in the M2–2 version, which was standardized in March 1944. By war's end, approximately 14,000 M1A1 and 24,500 M2–2 flamethrowers were produced. First combat use of the flamethrower occurred near Buna Village on Papua, New Guinea, in December 1942.

Flamethrower training during World War II began in earnest in mid–1943 as a result of increased manufacturing and distribution. New troops received 10 hours of operation and maintenance training at Camp Sibert, Ala.

After the flamethrower reached the troops in the Pacific, they quickly realized the flamethrower's capabilities could be enhanced and flamethrower operators better protected by mounting a flamethrower in an armored vehicle. The CWS had difficulties in obtaining tanks for testing, and it was spring 1945 before four obsolete lights tanks mounted with flame guns were shipped from the United States to the Pacific. In the meantime, a cooperative effort among CWS, Ordnance Department, Navy and civilian personnel on Hawaii modified M3A1 STUART light (nicknamed Satan) and M4 SHERMAN medium tanks with flame guns. A new unit, the 713th Tank Battalion, Armored Flame Thrower, Provisional, had 54 of the M4s when they landed on Okinawa.

Flamethrowers were used against Japanese fortifications in the Central Pacific, South Pacific and Southwest Pacific. Italy and North Africa were less conducive environments for the flamethrower. Northwestern France was the first opportunity to employ the weapon in Europe. As opposed to the Pacific, where Japanese troops preferred death to capture, German troops quickly surrendered if they saw flamethrowers arrayed against them.

Flamethrowers remained in the Army inventory after World War II, with the M2–2 used in the Korean Conflict and the M2A1–7 and M9A1–7 models used in Vietnam.

1942: THE DOOLITTLE RAID

"The third red light flickered, and, since we were now over a flimsy area in the southern part of the city, the fourth light blinked. That was the incendiary, which I knew would separate as soon as it hit the wind and that dozens of small fire bombs would molt from it. The moment the fourth red light showed

Top Right
A Doolittle raider takes off from the USS Hornet

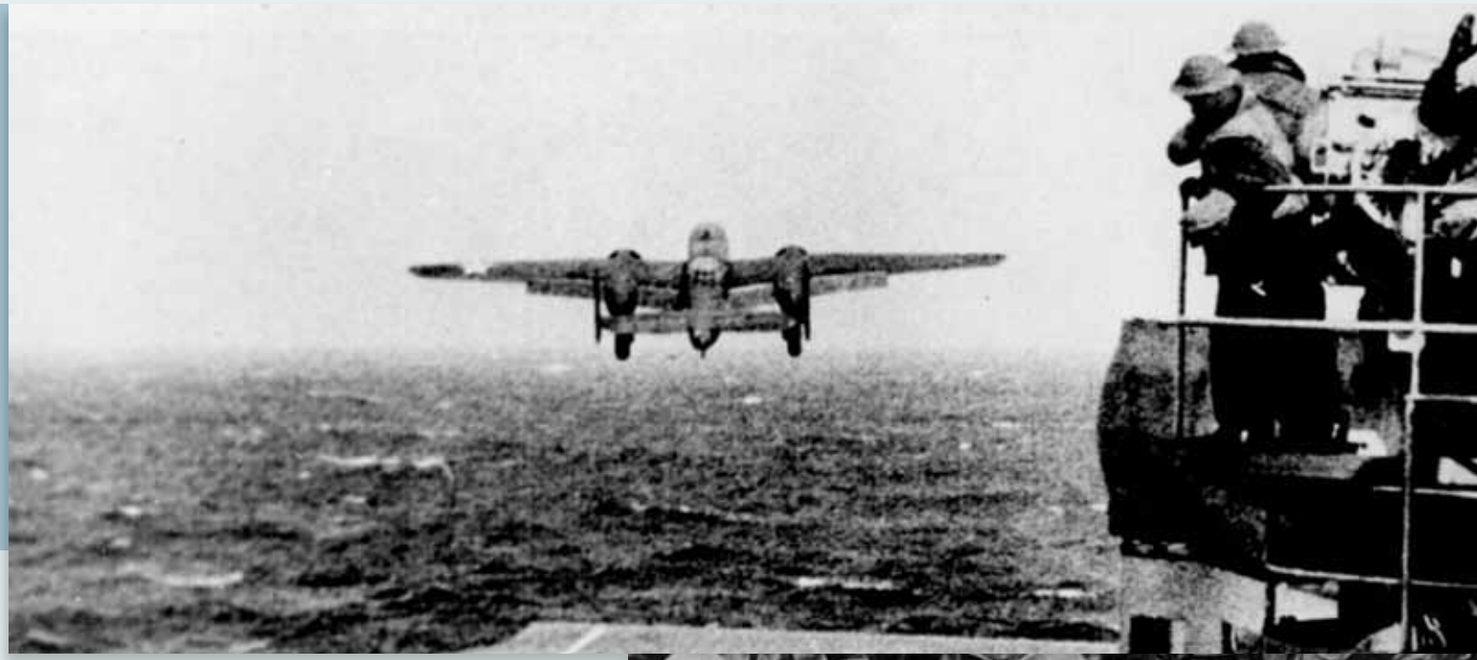
Bottom Right
Lt. Col. James H. Doolittle tags a bomb for his mission over Japan

Building E5265 at Edgewood Arsenal was utilized as an incendiary–munitions filling pilot plant in early 1942. Filling an order from the Air Staff of the Chemical Warfare Service, the arsenal's higher headquarters, the plant produced 50 500–pound clusters of incendiary bombs. The M54 4–pound Incendiary Bomb was manufactured with a steel case rather than magnesium, which was in short supply at that time. The M54 was a hollow steel tube with a diameter of 1.56 inches and a length of about 21.5 inches. Each was filled with powdered material similar to thermite. The bombs were shipped to Benicia Arsenal in San Francisco for a secret mission, which would alter the course of World War II in the Pacific.

Following the Japanese attack on Pearl Harbor Dec. 7, 1941, President Roosevelt tasked his military chiefs to strike Japan. He wanted to raise U.S. morale, while showing the Japanese that they were vulnerable to attack. A plan was devised in which U.S. Army North American B–25 twin–engine medium bombers would fly from a U.S. Navy aircraft carrier and attack Tokyo and other cities. An Army bomber would have the range when launched to keep the U.S. ships far enough away from Japan while enabling the planes to land in China and reinforce U.S. forces there.

On April 18, 1942, 16 B–25s, under the command of Lt. Col. James H. Doolittle, launched from the deck of the USS Hornet. The raid started farther from Japan than planned because Japanese picket boats spotted the Americans. The surprise attack was still achieved over Tokyo and other cities. Each bomber carried 2,000 pounds of incendiary and high–explosive bombs. The 16 bombers completed their missions without a loss. After dropping the bombs, most of the bombers flew toward China, where they ran out of fuel and crashed. Most of the 80 Doolittle Raiders linked up with friendly Chinese troops.

The initial news reports about the bomb attack originated from Radio Tokyo. The United States remained silent about the mission until April 21 when President Roosevelt confirmed that U.S. bombers had attacked Japan.



When pressed for the name of the base used by the bombers, Roosevelt replied, "They came from our new secret base at Shangri–La." Shangri–La was a remote, mysterious Himalayan mountain in the fantasy novel "Lost Horizon." The Japanese immediately began searching for the base and realized that U.S.–held Midway Island may have been the location. The Japanese sent an invasion force toward Midway Island, resulting in the Battle of Midway in June 1942. It was a devastating defeat for Japan, losing four of its best aircraft carriers and turning the tide of war against them.

An after–action conference between newly promoted Doolittle and the chief of the CWS Incendiaries Branch on May 20, 1942, revealed that the incendiaries manufactured at Edgewood Arsenal worked perfectly, setting fire to oil tanks, warehouses and factories. It was the first use of incendiaries dropped from U.S. planes.

I put the nose of the RUPTURED DUCK into a deep dive. I had changed the course somewhat for the short run leading up to the dropping of the incendiary. Now, as I dived, I looked back and out I got a quick, indelible vision of one of our 500–pounders as it hit our steel–smelter target. The plant seemed to puff out its walls and then subside and dissolve in a black–and–red cloud... Our actual bombing operation, from the time the first one went until the dive, consumed not more than thirty seconds. "

Ted Lawson, Thirty Seconds Over Tokyo

1942: THE BAZOOKA

Top Right
The original M1 2.36–inch Bazooka and an improved verision, the M9 Bazooka.

Bottom Right
A nighttime demonstration of the Bazooka at APG

The technologies of rocket–powered weapons and shaped–charge projectiles met at APG Nov. 6, 1918. Robert H. Goddard successfully demonstrated his 1–inch, 2–inch and 3–inch recoilless guns, or rocket guns, to the U.S. Army Ordnance Department. Reports concluded that these weapons could be developed to operate successfully against tanks. However, the war's end shelved the project.

Although the Army created a rocket unit in 1933, no progress was made until 1940. A high–explosive, shaped–charge, anti–tank rifle grenade was standardized, but the search continued for a launcher. Experiments were conducted in 1941 to convert the grenade to a rocket. The next year, Lt. Edward G. Uhl discovered the answer for a rocket launcher—a simple, hollow tube approximately 5 feet long and 2.36 inches in diameter. Weapon testing began in May 1942 at APG. The shoulder fired weapon was quickly nicknamed the Bazooka, after the tubular musical instrument of the same name, invented and popularized in the 1930s by comedian Bob Burns. Days later, a formal demonstration resulted in immediate requests for the equipment by the British and Soviet militaries. On June 30, 1942, the Ordnance Department standardized the launcher as the M1 and the 2.36 antitank rocket as the M6.

"Most impressive small arms development of the year was the 'bazooka'– a rocket– launching device operated by two men. Armed with this weapon, the individual foot soldier possessed, for the first time, the means whereby he could, single–handedly, do battle with a tank."

Chief of Ordnance, 1943

The Bazooka could be a case study in weapon development. The weapon was an innovation; met a particular need; and was co–operatively designed, developed, produced and fielded in a short time and the system combined fire power with simplicity.

About 490,000 Bazookas were produced during World War II with numerous modifications. It could penetrate 3 inches of steel armor plate with a maximum range of 650 yards. The weapon was also effective against masonry and heavy timber (bunkers), girders and hedgerows (in Normandy). It could also fire a smoke rocket.

The Bazooka first saw combat with Soviet forces in late 1942. The technology was then compromised when the Germans captured a Bazooka in the Soviet Union. The Germans copied the design and developed a larger weapon, the 88 mm (approximately 3.5 inches

Panzerschreck (tank terror). Follow–on to this design was the one–shot, throw–away, rocket–propelled grenade Panzerfaust (tank fist).

U.S. forces first used the Bazooka in Tunisia in 1943. Because of limited training and malfunctions, the War Department temporarily suspended issue of the new weapon. After in–theater modifications, the Bazooka was used later that year in Sicily, knocking out German medium tanks. The Bazooka was used successfully in Western Europe, but it was not powerful enough to knock out the heavier German tanks.

The Bazooka received its highest accolade from the Allied Supreme Commander, Gen. Dwight Eisenhower, when he hailed it as one of four "tools of victory" that won World War II. (The other three were the C–47 transport aircraft, the Jeep and the atomic bomb.)

8/30/42

4/28/43

ATKISSON DAM
EDGEWOOD ARSENAL WATER SUPPLY
U. S. ENGINEER DEPARTMENT
BALTIMORE DISTRICT
WAR DEPARTMENT
MAJ. GENERAL EUGENE REYBOLD CHIEF OF ENGINEERS
COLONEL THOMAS E. FARRELL DIVISION ENGINEER
COLONEL CONRAD P. HARDY DISTRICT ENGINEER
MAJOR GEORGE A. MEIDLING AREA ENGINEER
1942

1942: ATKISSON DAM

Atkisson Dam was constructed in 1942 on Winters Run to provide additional water for Edgewood Arsenal. The dam was named after Col. E. J. Atkisson, commander of the First Gas Regiment during World War I and Edgewood Arsenal from 1920 to 1923.

The Army investigated 18 sites for the dam. These extended from the World War I Van Bibber water plant near the junction of modern Routes 40 and 755, to the upper reaches of Winters Run. The site selected, just upriver from where Singer Road crossed Winters Run, was chosen because of the right rock formations and the relatively small area of farm land lost to production. Just more than 392 acres of land was acquired for the site. A Harford County road that paralleled Winters Run was relocated to higher terrain.

The plans for a dam were formulated Feb. 1, 1942, by Whitman, Requardt & Smith of Baltimore. Ground was broken June 8, 1942. Cummins Construction Corporation of Baltimore, under the supervision of the Corps of Engineers, built the dam. The cost was $550,000.

The completed dam was 396 feet long, including abutments. The height of the spillway was 46 feet. The length of the spillway was 210 feet. The height of abutments was 60 feet. 15,391 cubic yards of concrete was used for the dam. The dam was designed to hold 375 million gallons of water in reserve, or about 128 acres of water with a maximum depth of 40 feet. In case of severe drought, this quantity would supply the arsenal with water for 30 to 35 days. At maximum flood stage, the flow over the spillway would be 247,000 gallons per second. At such a level, the storage capacity would be 675 million gallons.

The first water was released over the spillway Dec. 26, 1942. The dam was completed and accepted Dec. 31, 1942. A gatehouse was later added before the end of World War II for $1,941.

By 1946, the Chemical Corps School and Training Center used the Atkisson Dam area for map reading, reconnaissance, terrain appreciation, overnight camping and training. The arsenal considered selling excess land near the dam because of the difficulty of policing the area. Also, the arsenal had never used water from the reservoir. This was not from poor planning or an error in judgment but because a change in production schedules greatly reduced the requirements. The land was also in demand for non–military uses, as several people had approached the post commander to purchase the land.

In 1947, 245 acres were transferred to the Corps of Engineers as surplus. This left 147 acres remaining under post control.

Today, the reservoir is silted in after several hurricanes, and the area is overgrown with vegetation.

Top Left
Site of Atkisson Dam on Winters Run

Top Middle
Construction of Atkisson Dam

Bottom Left
The Completed Dam

Bottom Right
The Atkisson Dam Plaque

1943: TESTING THE JEEP

The storm clouds of war were slowly approaching the United States in June 1940 when the U.S. Army Quartermaster Corps began the search for a light reconnaissance vehicle to replace the Army's aging motorcycles and Model T trucks. Three vehicle manufacturers submitted bids: American Bantam Car Manufacturing Company, Willys–Overland Motor Company and Ford Motor Company. Willys–Overland and Ford eventually manufactured the majority of new vehicles, which were standardized with interchangeable parts.

The new vehicle received the nomenclature, Truck, 1/4 ton, 4x4, but it was better known as the Jeep. The source of the nickname is debated, but there are three theories. The Army's designation of certain equipment as "General Purpose" was abbreviated "GP." When slurred, "GP" sounds like "Jeep." The term "Jeep" was also used since World War I in vehicle mechanic jargon as any new vehicle received for testing. Finally, the nickname could have been adopted from the comic strip character Eugene the Jeep in the Popeye cartoon strip created by E.C. Segar.

The initial models were delivered for testing to Camp Holabird, Md., the Army's wheeled–vehicle testing center with its "Tank Hill" and three test grades. During World War II, Jeeps were tested at APG. On Sept. 12, 1943, a standard Jeep was tested at APG with modified tires. Also in 1943, a comparison test was conducted between Jeeps and a German Army Volkswagen Kübelwagen, captured in North Africa from the Afrika Korps. The Jeep outperformed the German vehicle in power and rough–terrain handling.

The U.S. Army's Truck, 1/4 ton, 4x4 was an icon of the war. Gen. Dwight D. Eisenhower named it as one of the four most important U.S. weapons in World War II, along with the Bazooka, C–47 Skytrain and atomic bomb.

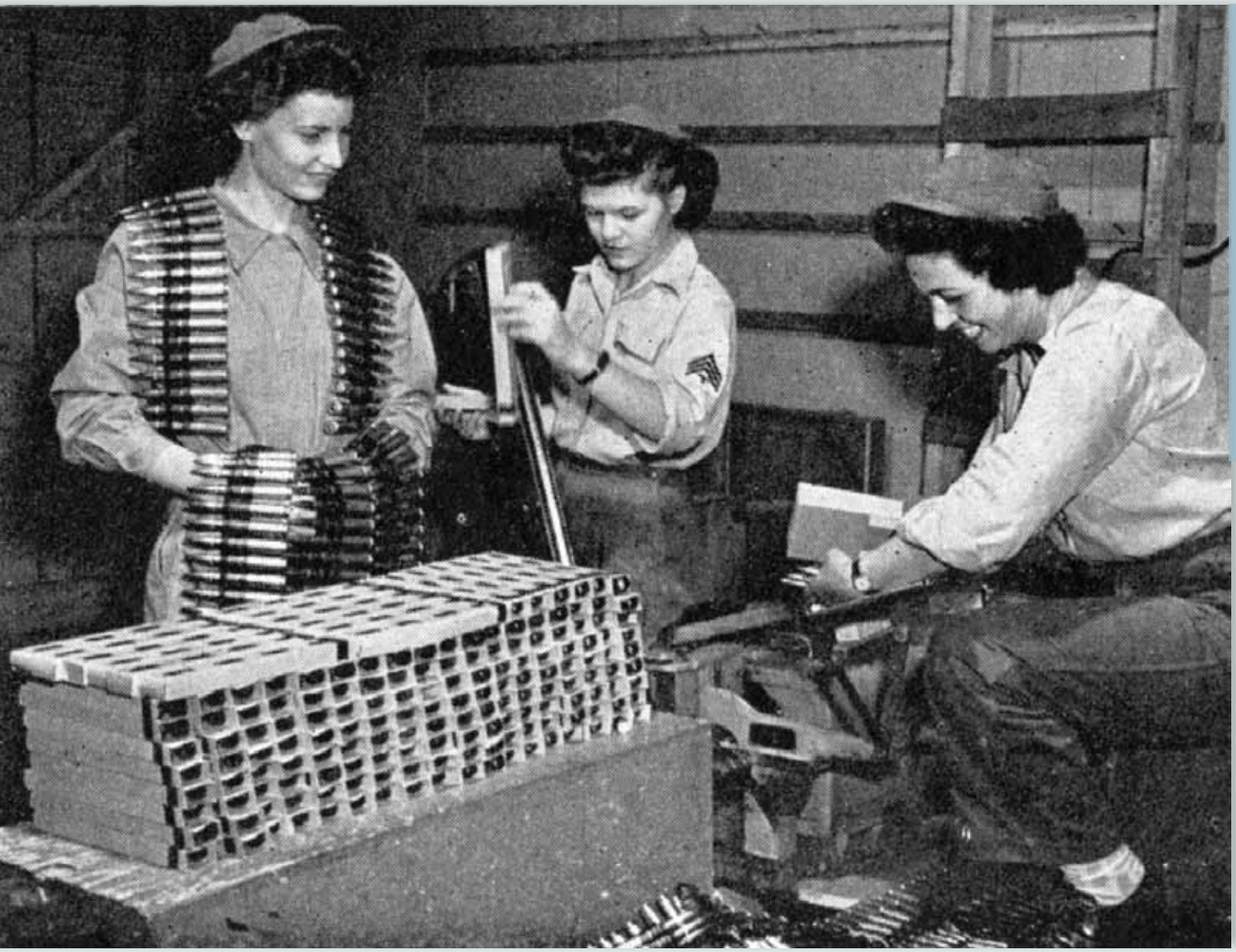
America produced about 648,000 Jeeps during World War II. American Bantam Car Manufacturing Company produced about 3,000 vehicles for the Soviet Union and United Kingdom under the Lend–Lease Act. Willys–Overland produced about 368,000, and Ford produced about 277,000 Jeeps in variants found in all theaters of the war.

"Even without the tremendously widespread public interest that has been shown in the jeep from the very first, it still would be easily one of the outstanding automotive developments of this war."

Maj. Gen. L. H. Campbell Jr., Chief of Ordnance, Nov. 20, 1943

Improved models appeared for the Korean War. On Aug. 21, 1952, Willys–Overland publicly showed its new M38A1 with a more powerful engine at APG. A picture from Ordnance Magazine showed the new model, displaying "Aberdeen Proving Ground" on its front bumper, being driven on an APG test course.

Ford designed the M151 series Jeep to replace the World War II/Korean War–era M38 and M38A1. First placed into service during the Vietnam War, the M151 series played an active part in U.S. military operations throughout the world, well into the 1980s, when it was replaced by the M998 Series High Mobility Multi–Purpose Wheeled Vehicle (Humvee).



1943: THE WOMEN'S ARMY CORPS

On May 14, 1942, Congress approved the creation of a Women's Army Auxiliary Corps. U.S. Rep. Edith Nourse Rogers, of Massachusetts, introduced the first bill to establish a women's auxiliary in May 1941. Following its creation, Oveta Culp Hobby was appointed the first director of WAAC. However, WAAC had no military status as an auxiliary of the Army. In 1943, a bill was introduced in Congress to enlist and appoint women to the Army. President Roosevelt signed the bill July 1, and the Women's Army Corps was born.

APG welcomed its first team of WACs May 12, 1943. Within 15 days of the first team's arrival, APG had received 400 WACs. Some of the women assigned to the Ordnance Department (later part of the Women's Ordnance Corps) computed the velocity of bullets, measured bomb fragments, mixed gunpowder, tested weapons and loaded shells. WACs also served as clerks, nurses, truck drivers and ferried bombers and other aircraft across the country and overseas. Others field–tested equipment such as walkie–talkies and surveying and meteorological instruments. Mechanically inclined women repaired and maintained tanks and other tracked and wheeled vehicles. WACs assigned to the Chemical Warfare Service at Edgewood Arsenal worked in laboratories and the field. Some women were trained as glass blowers and made test tubes for the laboratories.

The Army provided its auxiliaries with food, uniforms, living quarters, pay and medical care. WACs assigned to APG initially lived together and had their own city in Aberdeen called WAC Village, which they ran. WACs had their own beauty shop, barracks and warehouse. They also had an infirmary, recreation hall and pool.

More than 150,000 American women served in the WAC during World War II. The Army and American public had difficulty accepting women in uniform. Military leaders, faced with supplying men and materiel for the war realized that women could supply the additional resources that were greatly needed. Given the chance to make a major contribution to the war effort, women seized the opportunity. By the end of the war, their contributions would be widely heralded.

Left
Some of APG's WACs loading gun belts during World war II

1944: PRISONERS OF WAR

Right
A German prisoner of war camp was established at Edgewood Arsenal in 1944

More than 425,000 enemy prisoners of war were incarcerated in the United States during World War II. Germans, Italians, Japanese and soldiers from Axis allies were held in more than 500 camps in America.

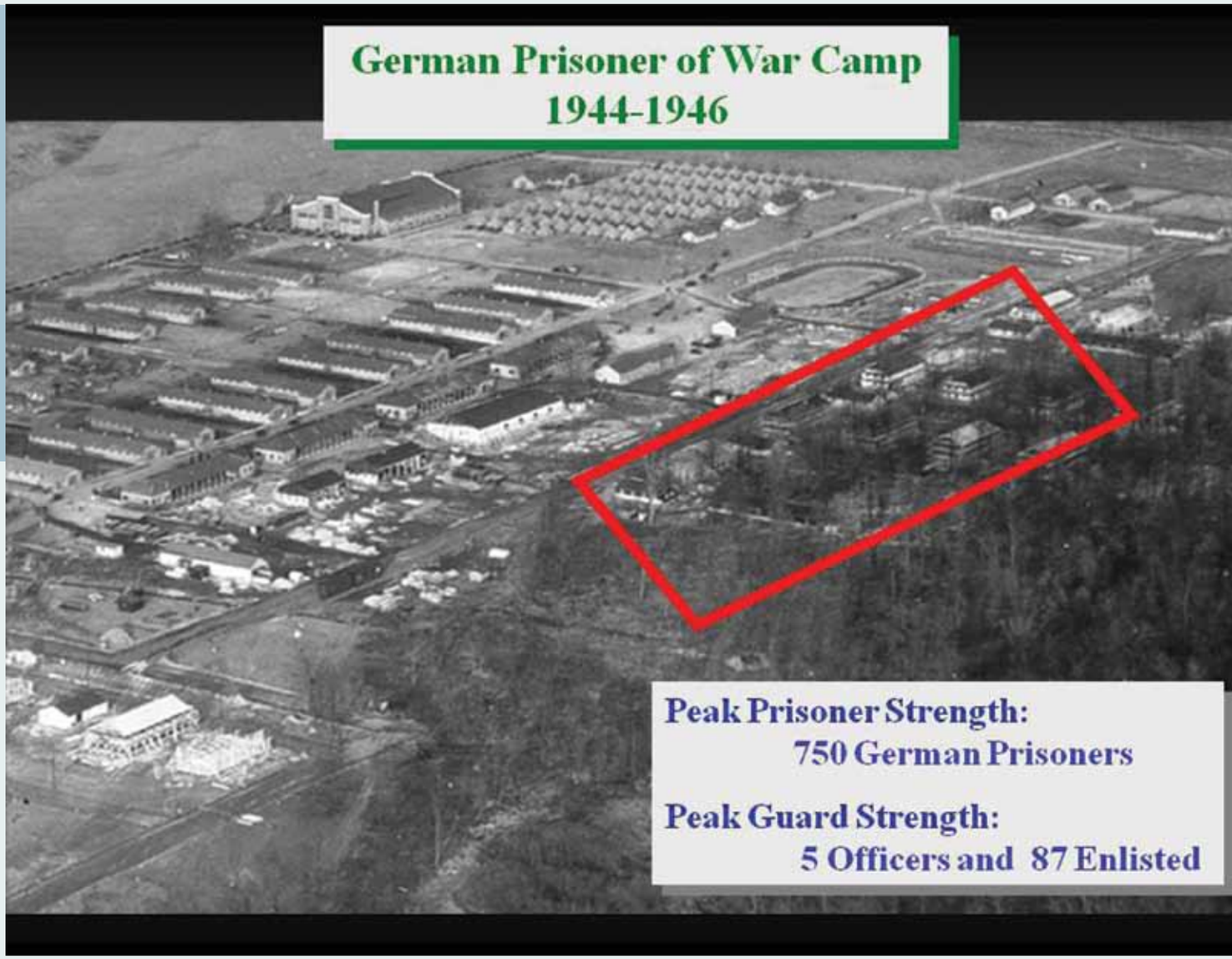
The first POWs to arrive in America in 1942 had been captured by British forces and transferred to U.S. custody. Following the surrender of the German Afrika Korps in North Africa, the stream of POWs captured by U.S. forces increased. After North Africa, U.S. forces captured enemy soldiers in Sicily, mainland Italy, France and Germany. Relatively few Japanese were taken prisoner in the Pacific Theater.

Camps were located based on guidelines from the Provost Marshal General, the U.S. Army agency responsible for the POW program. They were away from cities and industrial areas for security reasons, in regions with mild climates to minimize camp construction costs and where POWs could alleviate labor shortages.

Base camps were configured and erected using standard plans prepared by the U.S. Army Corps of Engineers. Each camp contained barracks, latrines and dining facilities to accommodate 1,000. The number of prisoners determined the number of base camps. Support facilities included a hospital, fire station, officer and enlisted quarters, administrative buildings, warehouses, clubs and theaters.

Between 1942 and 1944, there was one POW camp in Maryland at Fort George G. Meade. By 1944, Maryland farmers, manufacturers and businessmen were exerting pressure on the War Department to erect additional camps in Maryland to exploit POW labor to alleviate the critical civilian labor shortage. After February 1944, 18 camps were built in the state, including a German POW camp at Edgewood Arsenal (the only location in Harford County), which opened Aug. 4, 1944. The camp was in the area of Douglas and Leitzan roads and comprised a headquarters, guard house, guard barracks, eight POW barracks, two POW dining facilities, two day rooms and a store house. Some POWs were quartered in winterized tents. The camp population increased from 300 in August 1944 to about 750 in September 1945.

Under the Geneva Convention of 1929, POWs of enlisted rank could be forced to work any job that was not demeaning, degrading or directly related to the war effort. Although most POWs in Maryland worked for farmers, canners or pulpwood operators, the majority of POWs at Edgewood Arsenal worked in military–related jobs. These included Service Command Activities (about 300), Technical



Service Activities Chemical Warfare Service (about 300), Technical Service Activities Ordnance (about 10) and farm contract work (about 70).

Although many POWs were transported to work outside the barbed wire enclosures of the camps, there were relatively few escape attempts. Only 2,222 POWs from all camps attempted to escape. Three POWs at Edgewood Arsenal escaped March 10, 1945, but were quickly recaptured. At the end of the war, there were 17 POWs still at large in America.

POW repatriation planning began after V–E Day (Victory in Europe) May 8, 1945. From the summer of 1945 until the spring of 1946, POWs gradually departed America. By August, only a handful remained, who were confined to hospitals or stockades.

1946: ANZIO ANNIE

World War II was in its fifth year when the Allies decided that an end–around invasion was necessary to resume offensive operations on the Italian peninsula. On Jan. 22, 1944, U.S. and British divisions landed at Anzio, 36 miles south of Rome, to pressure German forces behind the Gustav Line. The line was a series of defensive fortifications extending across Italy used to delay the Allied advance. The invasion, named Operation Shingle, was a surprise. However, instead of a swift advance, the U.S. commander chose to consolidate the beachhead. The Germans quickly deployed units from France and northern Italy to Anzio. Two units were railroad batteries with 28–centimeter (about 11–inch) guns that had the range to shell the entire beachhead. The Germans nicknamed these guns Leopold and Robert; one became well known as Anzio Annie.

The 28 cm Kanone K5 (E) was developed by arms maker Krupp from 1934 to 1936, tested starting in 1936 and fielded in 1940. Twenty–five guns were built during the war. Each gun was on a carriage supported by two six–axle train cars. The guns had a maximum range of about 36 miles. Each gun was transported by two trains, which included ammunition, equipment, fire control and air defense cars.

The guns were positioned in the Alban Hills, about 18 miles from the beachhead. They were parked in railroad tunnels, rolled out to shoot and then moved back into the tunnels. Both railroad guns were eventually captured and damaged by their crews. Destroyed railroad lines prevented their redeployment. U.S. forces used parts from Robert to repair Leopold. Leopold, nicknamed Anzio Annie by the Americans, was transported to APG in 1946 for testing. It eventually went on display. After about 65 years at APG, Anzio Annie was moved to Fort Lee, Va., in late 2010.

PART V

POST WORLD WAR II

ABERDEEN PROVING GROUND—NORTH

Right Top
Davy Crockett 120mm atomic weapon system testing at APG in 1962

Right Bottom
The hypersonic wind tunnel at APG in 1966

The end of World War II resulted in another major demobilization of the post. Research projects were concluded, and personnel released. The WACs were demobilized in November 1945.

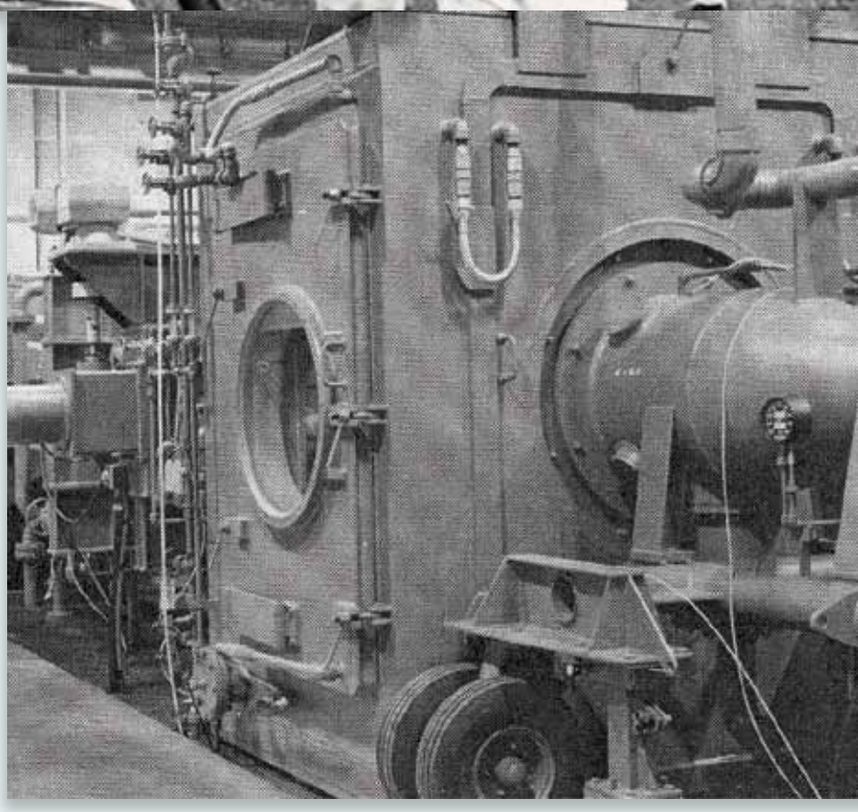
Although demobilized following the war, testing and training at APG continued. Some of the most important development projects occurred at APG in the years after the war. The Ballistics Research Laboratory led the way in ordnance research and development. BRL completed a new wing on Building 328 for the Electronic Numerical Integrator and Computer in 1947. Considered the first modern–day computer, the ENIAC weighed more than 30 tons, consisted of 18,000 electronic tubes and was operated by a 100–foot panel. Its primary purpose was to compute the velocity of projectiles. The ENIAC functioned until 1955 when it was replaced by the next–generation computer.

In 1948, BRL completed its second supersonic wind tunnel in Building 120. This new version added a flexible nozzle that allowed greater testing of bombs and projectiles at higher wind speeds.

Vehicle testing also remained important. On Aug. 2, 1948, 14 Army vehicles traveled from APG to the Mojave Desert. Their mission was to test experimental lubricants and tires in extreme climates. In seven months, four officers and 24 enlisted men traveled more than 24,000 miles across the country to the hot deserts of the Southwest and to the cold reaches of Alaska. The tires and lubricants were tested in temperatures as low as –65° F to as high as 125° F. Designated Operation Greaseball, the testing ended when the vehicles returned to APG March 14, 1949.

The beginning of the Korean War in 1950 and the ongoing Cold War with the Soviet Union led to reorganizations and new construction. In September 1950, the Ordnance Training Center was reestablished, and the Ordnance Replacement Training Center was established to assist in the training of ordnance personnel at Aberdeen. The next month, the Ordnance Training Command was created and included the Ordnance School. The same year, the Human Engineering Laboratory was established under the jurisdiction of the Ordnance Corps. HEL became one of the premier military organizations in charge of researching the relationship between humans and the machines that they create through scientific and psychological analysis collected at its new facility in APG. Another new organization was the Coating and Chemical laboratory, established in 1956 from the existing Development and Proof Services.

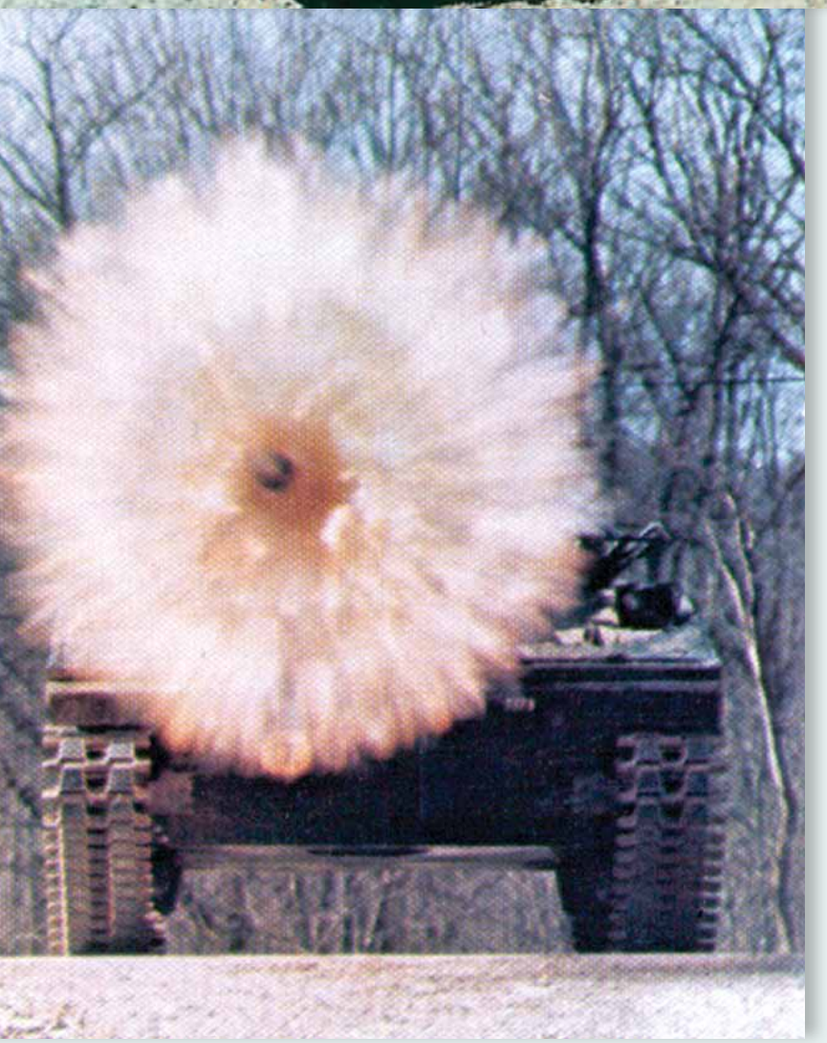
New construction at APG during the 1950s was extensive. The Ordnance School added to classroom buildings (Buildings 3147 and 3148).



A new post theater (Building 3245) that seated more than 1,000 was completed in 1950. For additional living quarters, 670 Wherry housing units were added from 1951 to 1952, two three–story barracks in 1955 and 1957, three bachelor officers quarters units from 1958 to 1961 and a two–story noncommissioned officers quarters in 1957. For recreation, the post added a new gym (Building 3330) in 1952 and an eight–lane bowling alley in a converted WWII temporary building in 1954.

The 1960s was a time of change at APG, with the start of the Vietnam War and a major Army–wide reorganization. In 1962, the Army eliminated Technical Services as separate headquarters and replaced them with Army Materiel Command. At APG, this removed the Ordnance Training Command and designated the Ordnance School as the Ordnance Center and School. A new organization called the Test and Evaluation Command took control of the Army's test programs. Initially, the new headquarters was in Building 3071 until Building 314 was converted from a warehouse to an office building in 1969.

The limited warfare laboratory also organized at APG in 1962. The LWL had the responsibility of creating rapid response strategies to urgent military requirements in remote areas.



All APG organizations provided extensive support to the Vietnam War during the 1960s and early 1970s. The Ordnance School operated three shifts per day of training during the war.

1968 also had a major reorganization. In order to consolidate several Army laboratories and research organizations at APG, the Army created the Aberdeen Research and Development Center. This new organization consolidated BRL, HEL, C&CL, Nuclear Defense Laboratory (located at Edgewood Arsenal), and, briefly, the new Army Materials Systems Analysis Activity. The same year, APG's Development and Proof Services was renamed the Material Testing Directorate.

Four new barracks and two mess halls were added to APG from 1960 to 1962 to accommodate Ordnance School students. Building 120 added another wind tunnel in 1961. This new wind tunnel was hypersonic and could reach wind speeds of Mach 6. AMSAA completed a new laboratory building (Building 392) in 1968. A new test facility for testing radioactive materials against equipment was completed in 1968. A new recreation center (Building 3326) was completed in 1966.

Perhaps the most important construction project in the 1960s was a new hospital. In 1964, construction of a three–story medical facility at APG was completed. The new hospital offered patient care for Warfighters, with equipment such as patient–to–nurse intercom systems, piped–in oxygen capabilities, 75 self–positioning electronic beds and a 16–chair dental clinic. It was named Kirk Army Hospital in honor of Maj. Gen. Norman T. Kirk, Surgeon General of the Army (1943–47), who had died in 1960.

In the 1970s, economic conditions, political changes and the end of the Vietnam War reduced government spending. One effect was the consolidation of APG and Edgewood Arsenal in 1971. The merger called for Edgewood Arsenal's commissary and post exchange to close, with their supplies moved to APG–North to "utilize more effectively the purchasing, storage, and retailing resources." Most of Edgewood's installation support missions were transferred to APG–North. These included civilian personnel offices, security and Military Police. APG's Material Testing Directorate took control of all range firings.

Following the consolidation, APG–North also saw organizational changes. In 1972, ARDC was disestablished and its laboratories abolished or relocated to different organizations. The Land Warfare Laboratory (formerly Limited Warfare Laboratory) was discontinued in 1974 and its mission transferred to HEL. C&CL was also disestablished that year.

As part of the changes, Kirk Army Hospital (APG's primary medical facility) was downgraded from a hospital to a health clinic. The designation that required the hospital be reduce personnel and the number of patients it could receive, as well as the types of surgeries and procedures that could be done.

One new construction project during the 1970s was the completion of a new Ordnance Museum (Building 2601) in 1973. The new facility, surrounded by tanks and artillery pieces, became one of the most popular public attractions in Harford County. The Ordnance School also added another training facility (Building 5043) in 1974. Other 1970s construction included additional bachelor officers' quarters in 1976, a new bowling center (Building 2342) in 1973 and a PX (Building 2401) in 1978.

Reorganization at APG–North continued in the 1980s. In 1984, the commanding general of TECOM became the senior mission commander at APG. He inherited the responsibilities of post commander. In addition, the APG Installation Support Activity was created to run the post's infrastructure operations. The same year, the Material Testing Directorate was designated the

Left Top
Artillery testing started at APG.

Left Bottom
Photographing the testing of vehicles and weapons at APG created many unique challenges and led to the development of new types of high–speed cameras.

Right Top
APG test vehicles for the Global War on Terror.

Right Bottom
The Underwater Explosion Facility provides shock testing for surface and submarine systems, weapons and structures.

Combat Systems Test Activity, a separate organization from the APG Garrison. This new activity became the primary Army testing agency for military weapons, equipment and vehicles at APG. About the same time, the consolidation of seven Army research laboratories into a new command called the Army Laboratory Command in 1985 affected several organizations at APG–North. HEL and BRL were transferred to LABCOM.

The 1980s saw the construction of several new buildings at APG–North. A new NCO club was completed in 1982. A new Military Intelligence complex (Buildings 4727 and 4728) was completed in 1987 for the 203rd Military Intelligence Battalion, activated at APG in 1982, and the foreign materiel exploitation mission." A new chapel was added in 1987. The quality of living for the Ordnance School students improved significantly with the completion of 18 troop barracks, mess halls and battalion headquarters between 1981 and 1990. The Ordnance School also added new three new training facilities (Buildings 5046, 5116 and 5016). APG–North added extensive military family housing near Harford Gate, the largest called Patriot Village in 1989.

The 1990s started with APG–North providing extensive support to Operation Desert Shield and Desert Storm in 1990. In 1992, LABCOM became Army Research Laboratory. As part of the reorganization, BRL became the Weapons and Materials Research Directorate, and HEL became the Human Research and Engineering Directorate. Other name changes during the 1990s included CSTA becoming the Aberdeen Test Center in 1995 and the new Aberdeen Acquisition Center being established in 1997.

New construction included a state–of–the–art laboratory complex (Building 4600) in 1997 for ARL. Other construction included a new MP headquarters (Building 2200) in 1996 and a fitness center (Building 3300) in 1997. With many buildings dating to World War I and II, APG–North began removing old buildings unnecessary and started a complete cleanup of the post.

Following Sept. 11, 2001, APG–North again mobilized for the Global War on Terror. Testing vehicles against improvised explosive devices became a critical new mission.

In 2002, APG–Garrison was realigned under a new, off–post organization designated as Installation Management Command. During the 2000s, the post moved the Maryland Gate farther in and opened Ruggles Golf Course for public access. Adjacent to the golf course, the Government and Technology Enterprise project provided land for commercial construction.

Under base realignment and closure, APG–North received several new organizations. Fort Monmouth, N.J., was designated for closure, and the movement of the Communications–Electronics Command and Communications–Electronics Research, Development and Engineering Center resulted in the construction of large research facilities on APG–North. The first became operational in 2010. The Army Test and Evaluation Command also moved to APG.

While the post gained new organizations under BRAC, it also lost several long–time organizations. The Ordnance Center and School began moving in 2010 to Fort Lee. This move resulted in the Ordnance Museum closing and joining the school. A new APG Museum began organizing to replace the Ordnance Museum. The U.S. Army Research, Development and Engineering Command moved from APG–South and took over the Ordnance School headquarters.

Despite many reorganizations and name changes since 1917, APG's mission has remained the same — to provide the best equipment and support in the world for the U.S. Warfighter.

ABERDEEN PROVING GROUND—SOUTH

The conclusion of World War II resulted in another major demobilization of the post. In 1946, the Chemical Warfare Service became the Chemical Corps, and the Chemical Warfare Center was renamed the Army Chemical Center. The center took on two new challenges after the war. The first was the radiological mission. The Chemical Corps organized a radiological division to concentrate on nuclear war. The division became Nuclear Defense Laboratories before moving to APG–North in the 1970s.

The second new challenge involved nerve agents, developed shortly before World War II by the Germans but not discovered by the Allies until after the war. These lethal agents required the development of a new generation of munitions, protective masks, protective clothing and detection systems. A World War II production plant was converted into a nerve–agent pilot plant, where the first large batch of nerve agent was produced in the early 1950s.

The Army Chemical Center supported the Korean War by providing flame and incendiary weapons. The 4.2–inch mortar also saw extensive use supporting infantry positions, although its success led to the weapon being transferred from the Chemical Corps to the Ordnance Corps.

Following the Korean War, the center focused on research and development of chemical–protective equipment and retaliatory chemical weapons. Projects included civilian protective masks, bombs for jet aircraft and chemical warheads for missiles and rockets. Wound Ballistic Laboratory (Building E3160), established in 1957, contributed to the design of body armor and analyzed Lee Harvey Oswald's rifle after President John F. Kennedy's assassination in 1963. The Chemical School moved to Fort McClellan, Ala., in 1951, and it returned briefly in the 1970s.

In 1962, the Chemical Corps was abolished as a separate headquarters and the center merged into AMC. A year later, the post changed its name back to Edgewood Arsenal. The post headquarters outgrew its building and moved to Building E5101.

The 1960s saw the construction of several new laboratories. The Amos A. Fries Laboratory (Building E3300) was built in 1963 for advanced studies of chemical compounds, radioactive materials and toxins. The U.S. Army Environmental Hygiene Agency Wesley C. Cox Laboratory (Building E2100) was constructed in 1967. The John R. Wood Laboratory (Building E3100) was finished in 1968 and replaced the World War II Medical Research facility. The Harry C. Gilbert Laboratory (Building E5100) was dedicated in 1969 as a quality assurance chemical testing laboratory.

Left Top
1950s– Pilot Plant for Nerve Agent
This World War II plant was converted to a nerve agent pilot plant in 1945. After serving as a pilot plant for many years, it was removed in 1999.

Left Bottom
1963—Edgewood Chapel
The World War II wooden chapel was completed in 1941 and removed in the 1960s. The current red brick chapel was completed in 1963.

Left Top
1968—Laboratory Research at Edgewood Arsenal
The research laboratories at Edgewood Arsenal changed names many times following World War II. Today, the Edgewood Chemical Biological Center (ECBC) is the Army's research, development and engineering center for chemical and biological defense.

Left Bottom
1966—The Edgewood Arsenal Mission
The mission of Edgewood Arsenal was extensive after it was declared the Chemical Commodity Management Center. In 1977, Edgewood Arsenal (the command) was broken into separate tenant organizations within APG.

The arsenal also began replacing its World War I and II troop barracks with newer units in 1962. These barracks were constructed on the site of Fort Hoyle's horse stables. A year later, the arsenal completed a new dispensary (Building E4110) across from the troop barracks.

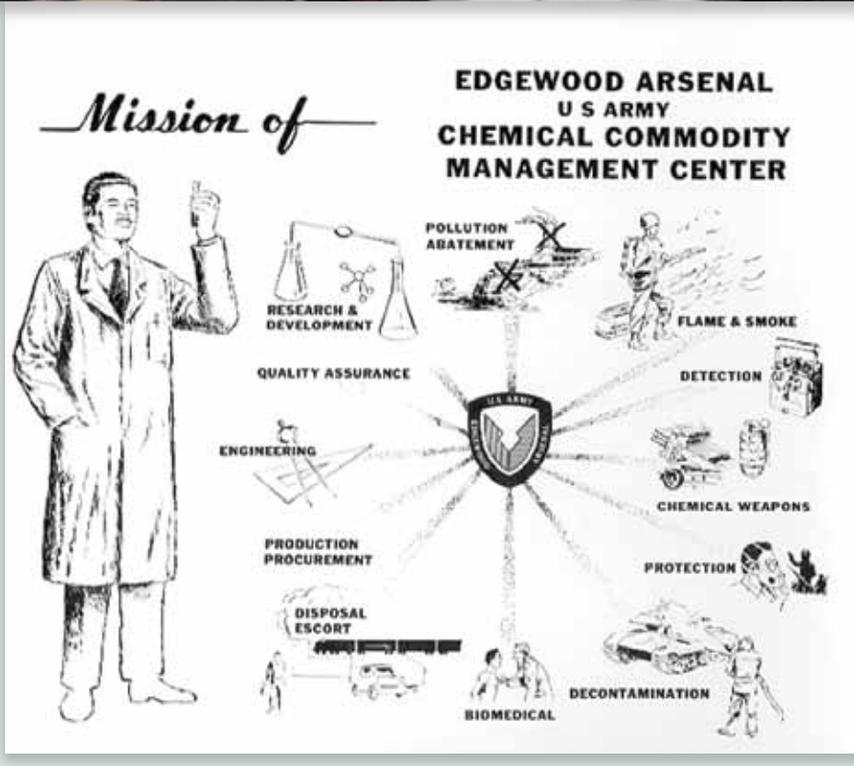
The small wooden frame World War II chapel built in 1941 was replaced by a new larger brick chapel (Building E4620) in 1963. The older chapel was later removed. The old enlisted men's service club was also replaced by the new Edgar D. Stark Recreation Center (Building E4140) in 1960.

Edgewood Arsenal provided extensive support to the Vietnam War. The arsenal provided many nonlethal–riot control devices and designed a new lightweight protective mask for the troops. Flame and incendiary research played a critical role in support of the war. The post also studied wound ballistics and contributed to the development of body armor. This support of the unpopular war drew protesters to the front gate.

The image of the Army's chemical warfare program was damaged in 1969 after a chemical testing incident at Dugway Proving Ground, Utah, and growing environmental concerns over the land movement and sea disposal of old chemical munitions. The resulting Congressional concern with the chemical program and public opposition was reflected in reduced budgets and personnel cutbacks. In 1969, President Richard Nixon shut down production of lethal chemical weapons at Edgewood.

In 1971, the post became a portion of APG. Edgewood Arsenal (the installation) became known as the Edgewood Area of APG. Edgewood Arsenal (the organization) existed until 1977 when its mission and personnel were assigned to new, smaller organizations. Although there was little new building construction in the 1970s, a new front gate with an overpass was added to alleviate traffic.

By the 1980s, Edgewood consisted of a number of tenant organizations. The former Chemical Corps Medical Research Division was assigned to the Army Surgeon General and became the Army Medical Research Institute of Chemical Defense. The Army Environmental Hygiene Agency continued its work on preventive medicine and all occupational and environmental health disciplines. The Toxic and Hazardous Materials Agency concentrated on installation and environmental restoration. The Chemical Research, Development and Engineering Center continued the original Edgewood Arsenal mission of developing chemical equipment for the Army. The Program Manager for Chemical Demilitarization


Mission of
EDGEWOOD ARSENAL
U S ARMY
CHEMICAL COMMODITY
MANAGEMENT CENTER
POLLUTION ABATEMENT
RESEARCH & DEVELOPMENT
FLAME & SMOKE
QUALITY ASSURANCE
DETECTION
ENGINEERING
CHEMICAL WEAPONS
PRODUCTION PROCUREMENT
PROTECTION
DISPOSAL ESCORT
DECONTAMINATION
BIOMEDICAL

received the challenging assignment to dispose of the aging chemical stockpiles. Other major tenants included the Army's Technical Escort Unit, elements of the Ordnance School and the Maryland National Guard.

The 1980s and 1990s saw the construction of several new facilities in the Edgewood Area. New troop barracks were constructed next to the original World War I barracks. The Warren D. Hodges Maryland National Guard Armory (Building E4305) was constructed on the site of the World War II POW camp. The Ordnance School built the Harry M. Downer training facility (Building E4301) just south of the National Guard Armory. The Bernard Berger Laboratory (Building E3549), completed in 1989, was designed for chemical–defense work. The new Skippers Point family housing also helped alleviate a shortage of appropriate housing for military families. The Process Engineering Facility (Building E3835), completed in 1991, provided laboratories for biotechnology research. A new Emergency Operations Center (Building E5240) was completed in 1995 to monitor the chemical–agent stockpiles at Edgewood and other storage sites around the country. The Bernard McNamara Life Sciences Building (Building E3150), completed in 1997, also included a Biosafety Level 3 laboratory added in 2001 for handling dangerous samples.

Although production of lethal chemical weapons at Edgewood ended in 1969, research on retaliatory chemical weapons continued. Because of growing concern of Soviet chemical–warfare capabilities, President Ronald Reagan authorized the production of binary chemical weapons in 1987. Binary chemical weapons were much safer to produce and store. Much of the design and testing were conducted at Edgewood. When the Soviets agreed to a treaty to end all chemical–weapon production, the binary program ended in 1990. In 1997, the United States ratified the Chemical Weapons Convention that prohibited the development, production, stockpiling and use of chemical weapons.

Edgewood still had a large stockpile of mustard agent from World War II. After much debate, Edgewood decided on neutralization to destroy this stockpile. Construction of the Aberdeen Chemical Agent Disposal Facility started. After Sept. 11, 2001, a shorter version of neutralization process was developed. The plant was rushed to completion, started neutralization in 2003 and finished the process in 2005. Edgewood was the first chemical–weapons storage site in the continental U.S. to finish destroying its stockpile.

In addition to eliminating the chemical weapons stockpile, Edgewood also constructed a new facility called the Munitions Assessment and Processing System (Building E1457) to eliminate recovered old chemical munitions in 2004. Edgewood constructed the Edward Poziomek Advanced Chemistry Laboratory (Building E3400) in 2005 to replace the Amos A. Fries laboratory. The adjacent Sample Receipt Facility was completed in 2008.

The largest Edgewood tenant organizations changed names often. The Chemical Research, Development and Engineering Center eventually became the Edgewood Chemical Biological Center, part of U.S. Army Research, Development and Engineering Command. The Toxic and Hazardous Materials Agency became the Army Environmental Command and was moved to Fort Sam Houston, Texas. The Army Environmental Hygiene Agency became the Center for Health Promotion and Preventive Medicine and then the Public Health Command. The Program Manager for Chemical Demilitarization became part of Chemical Materials Agency. The Technical Escort Unit was designated the 22nd Chemical Battalion and became part of the 20th Support Command (CBRNE).

Since 2001, the ongoing Global War on Terror has required the Edgewood Area, now known as APG–South, to deploy personnel, develop equipment and provide specialized training. As it has since World War I, APG–South continues to ensure U.S. military forces have the best equipment and support to accomplish their mission.

Left Top
2005—The Last Container of Mustard Agent
Following the end of World War II, there were 1,817 large containers of mustard agent stored in the Chemical Agent Storage Yard near the Bush River. The stockpile destruction lasted from 2003 to 2005.

Left Bottom
2001—Biosafety Level 3 Laboratory
The Biosafety Level 3 laboratory was established in Building E3150 in 2001 to identify, prepare and test microorganisms. It was established just before the anthrax–in–the–mail incidents in 2001.

1946: OPERATION PAPERCLIP

Right
German V–2 rocket taking off from Peenemünde

World War II in Europe had not ended when the Cold War began. In the closing days of conflict, the United States and United Kingdom realized the need to capture German civilian scientists, technicians and skilled personnel to enhance current and future projects. They wanted to see whether technology existed that could be used in the war against Japan and to prevent the Soviets from benefiting from such knowledge.

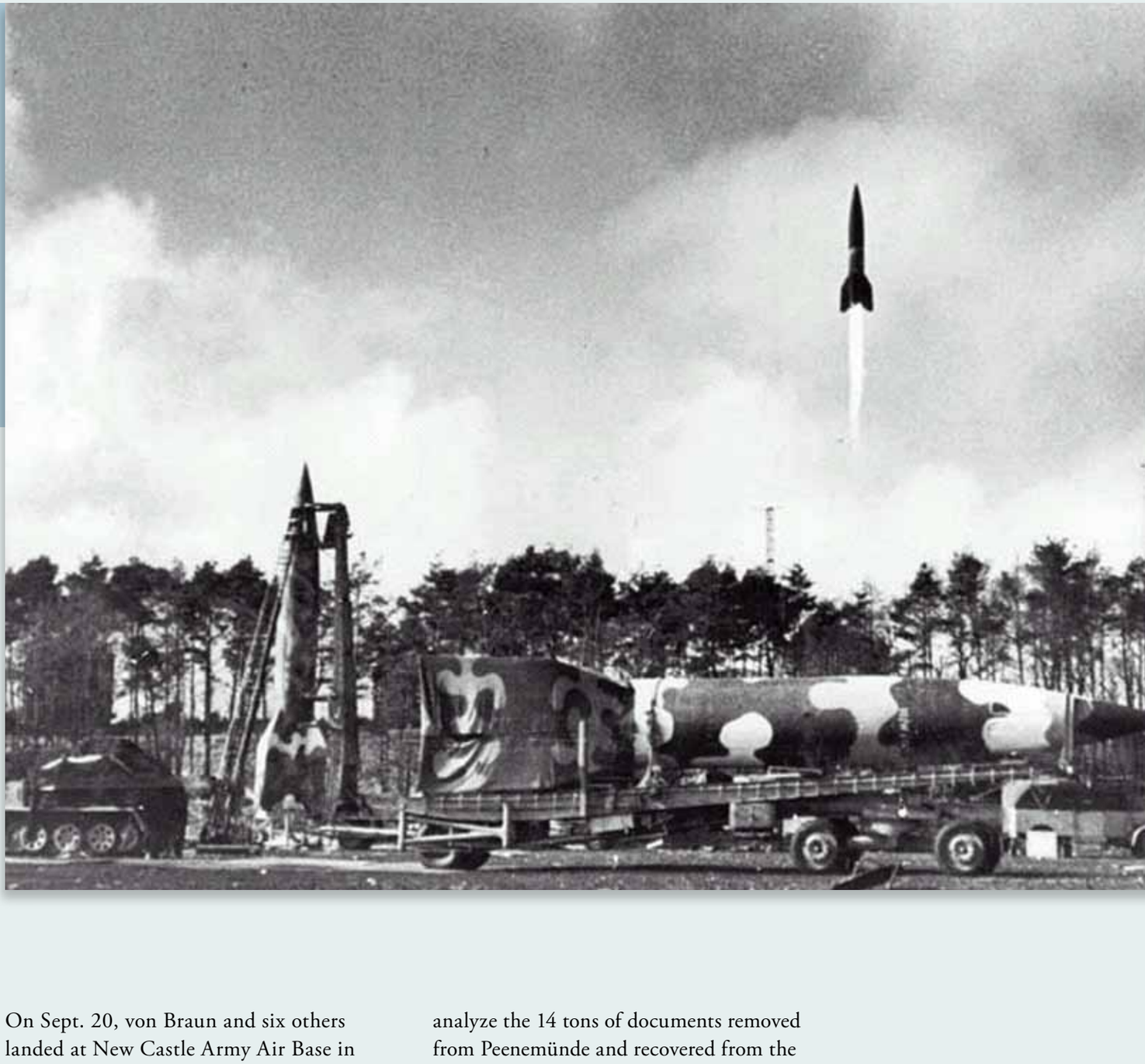
Operation Overcast was established July 19, 1945, to bring German specialists to work in America and to take care of their families while the husbands were gone. The operation was renamed March 16, 1946, to Operation PAPERCLIP.

APG's link to Operation Paper Clip began in mid–February 1945, when the technical director of the German Army Research Center Peenemünde, Wernher von Braun, decided to leave the center in the face of the advancing Soviet armies. Personnel, files and equipment related to the design and production of the V–2 rocket were sent south to the Harz Mountains, southwest of Nordhausen in Thuringia, to wait for capture by the Americans.

On April 1, 1945, the U.S. Army had advanced to about 12 miles from von Braun's location. The time had come to safeguard the reports and drawings belonging to Peenemünde projects. The documents represented 13 years of rocket research and engineering development and could serve as a bargaining chip. Three trucks and two trailers were loaded with the papers and driven to an abandoned mine about seven miles north of Goslar. By April 7, all the documents were stored inside a vault in the mine and the entrance blasted.

At the same time, on receipt of orders from the SS (Schutzstaffel or military arm of the Nazi Party), the personnel were moved farther south to the Oberammergau area, in southern Bavaria. On May 2, von Braun contacted the U.S. Army and placed himself and his immediate personnel in American custody.

Numerous U.S. and UK intelligence and technical organizations were interested in interrogating von Braun. They had been searching for skilled personnel, records, equipment and factories since landing in Normandy in June 1944. Noteworthy among these organizations was the "Special Mission V–2," organized by the chief of U.S. Army Ordnance Technical Intelligence in Europe. After securing enough V–2 rocket components to build 100 V–2s in the U.S., a team member located the treasure trove of documents through trickery. On May 26, United States forces cleared the mine entrance and 14 tons of documents were sent to APG.



On Sept. 20, von Braun and six others landed at New Castle Army Air Base in Wilmington, Del. The next two weeks were spent at Fort Strong in Boston for fingerprinting, photographs and interrogation. On Oct. 2, von Braun traveled to Fort Myers, Va., for meetings at the Pentagon, while his six team members arrived at APG.

The six men, Wilhelm Jungert (technician), Erich Neubert (production liaison manager), Theodor Poppel (chief of ground support equipment branch), Eberhard Rees (production), August Schulze (systems engineer) and Walter Schwidetsky (instrumentation engineer), were brought to the heavily guarded industrial area to analyze the 14 tons of documents removed from Peenemünde and recovered from the mine. About 3,500 reports and 510,010 engineering drawings were sorted by project (V–2, etc.) and subject matter (development, design, testing, etc.). An additional 130 captured German naval officers, held at Fort Hunt, Va., assisted with translations.

By the end of 1945, the six team members completed the sorting and translation work. Their work ensured the German scientists could continue their rocket development where they had left off earlier in the year. More importantly, on Jan. 11, 1946, the six team members traveled to El Paso, Texas, to rejoin von Braun at Fort Bliss and start working for the U.S. rocket program.

1947: ENIAC

Fifty years ago, the U.S. Army unveiled the Electronic Numerical Integrator and Computer, the world's first operational, general purpose, electronic digital computer, developed at the University of Pennsylvania's Moore School of Electrical Engineering. Of the scientific developments spurred by World War II, ENIAC ranks as one of the most influential.

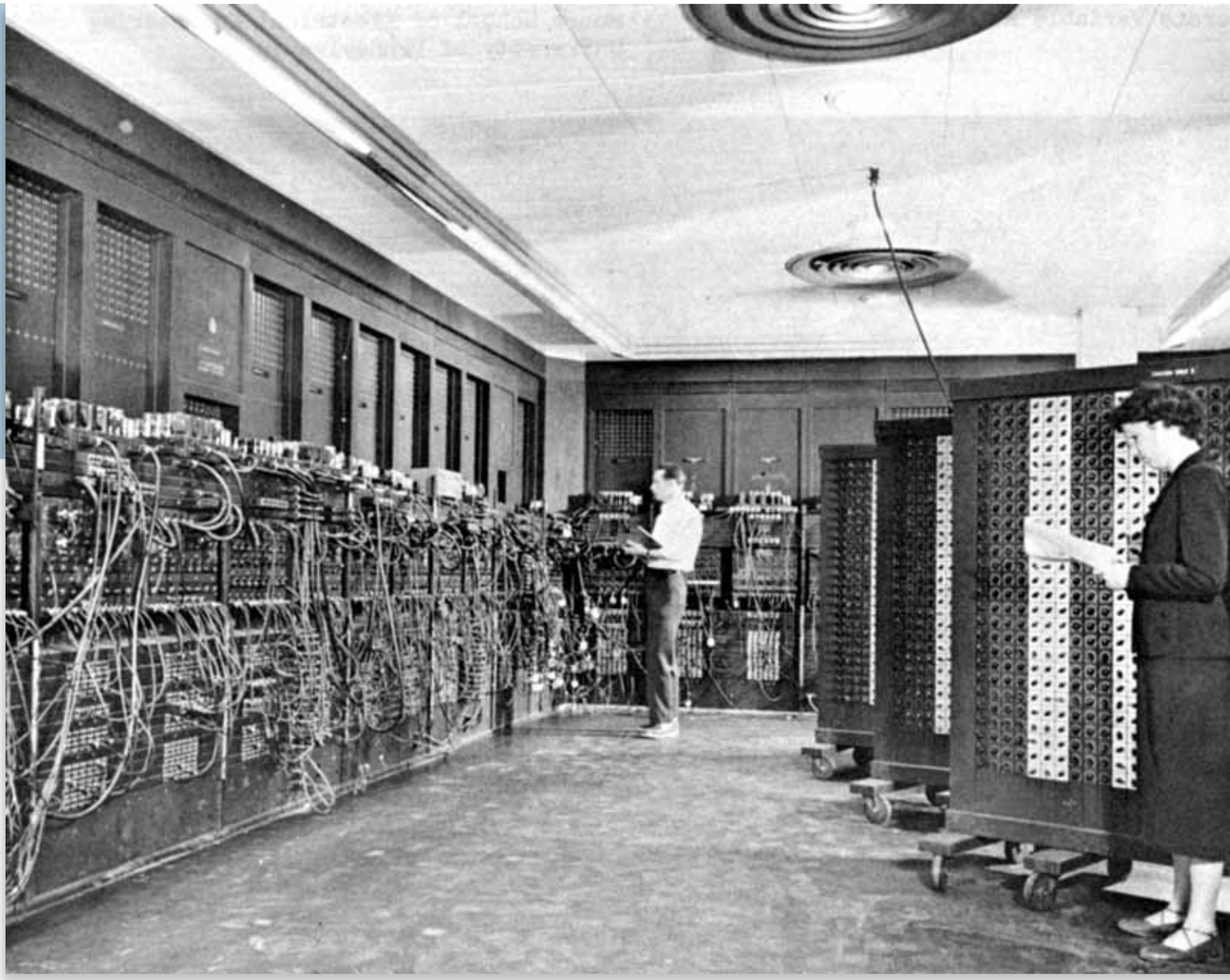
The origins of ENIAC, and by extension, the Ballistics Research Laboratory, date to World War I. However, it was not until 1938 that the activity, formerly known as the Research Division at APG, was renamed BRL.

The need to speed the calculation and improve the accuracy of the firing and bombing tables constantly pushed the ballisticians at APG. As early as 1932, personnel in the Ballistic Section had investigated the possible use of a Bush differential analyzer. Finally, arrangements were made for construction, and a machine was installed in 1935 as a Depression–era relief project. Leadership became interested in the possibility of using electrical calculating machines, and staff visited International Business Machines in 1938. Shortage of funds and other difficulties delayed acquisition until 1941, when a tabulator and multiplier were delivered.

With the outbreak of World War II, work began to pile up, and in June 1942, the Ordnance Department contracted with the Moore School to operate its faster Bush differential analyzer exclusively for the Army. Capt. Paul N. Gillon, then in charge of ballistic computations at BRL, requested that Lt. Herman H. Goldstine be assigned to duty at the Moore School as supervisor of the computational and training activities. This put Goldstine, who held a doctorate in mathematics, and BRL annex of firing table personnel in the middle of talented scientists and engineers, among them physicist John W. Mauchly and engineer J. Presper Eckert Jr.

Mauchly had come to Penn shortly after his 1941 visit with John Vincent Atanasoff at Iowa State College to discuss the latter's work on an electronic computer. In the fall of 1942, Mauchly wrote a memorandum, sketching his concept of an electronic computer, developed in consultation with Eckert. Ensuing discussions impressed Goldstine that higher speeds could be achieved than with mechanical devices.

Early in 1943, Goldstine and professor John Grist Brainerd, Moore School's director of war research, took to Gillon an outline of the technical concepts underlying the design of an electronic computer. Mauchly, Eckert, Brainerd, Harold Pender (dean of Moore School) and staff worked rapidly to develop a proposal presented to BRL Director Col. Leslie E. Simon in April and immediately submitted to the Chief of Ordnance. A



contract was signed in June. Project PX was placed under the supervision of Brainerd, with Eckert as chief engineer and Mauchly as principal consultant. Goldstine was the resident supervisor for the Ordnance Department and contributed greatly to the mathematical side as well. Three other designers worked closely on the project: Arthur W. Burks, Thomas Kite Sharpless and Robert F. Shaw. Gillon provided crucial support at department level.

The original agreement committed $61,700 in Ordnance funds. Supplements extended the work, increasing the amount to a total of $486,804.22, and assigning technical supervision to BRL. Construction began in June 1944, with final assembly in the fall of 1945 and the formal dedication in February 1946.

Aside from the IBM card reader for input, a card punch for output and the 1,500 associated relays, ENIAC was non–mechanical. By today's standards, ENIAC was a monster. It contained 17,468 vacuum tubes, 70,000 resistors, 10,000 capacitors, 1,500 relays, 6,000 manual switches and 5 million soldered joints. It covered 1,800 square feet, weighed 60,000 pounds and consumed 160 kilowatts of electrical power per hour. There was a rumor that the ENIAC caused the city of Philadelphia to experience brownouts when it was turned on. However, this is an urban legend that the Philadelphia Bulletin reported incorrectly in 1946.

A skilled person with a desk calculator could compute a 60–second trajectory in about 20 hours. The Bush differential analyzer produced the same result in 15 minutes, and the ENIAC required 30 seconds.

During World War II, a "computer" was a person who calculated artillery firing tables using a desk calculator. Six female "computers" were assigned to serve as ENIAC's original programming group. Although most were college graduates, the "girls" were told that only "men" could get professional ratings. Finally, in November 1946, many of the women received professional ratings.

ENIAC's first application was to solve an important problem for the Manhattan Project. Involved were Nicholas Metropolis and Stanley Frankel from the Los Alamos National Laboratory, who worked with Eckert, Mauchly and the female programmers. Goldstine and his wife, Adele, taught Metropolis and Frankel how to program the machine, and the women would set the switches according to the prepared program. The move of ENIAC to APG was delayed so the test could be completed before the machine was moved.

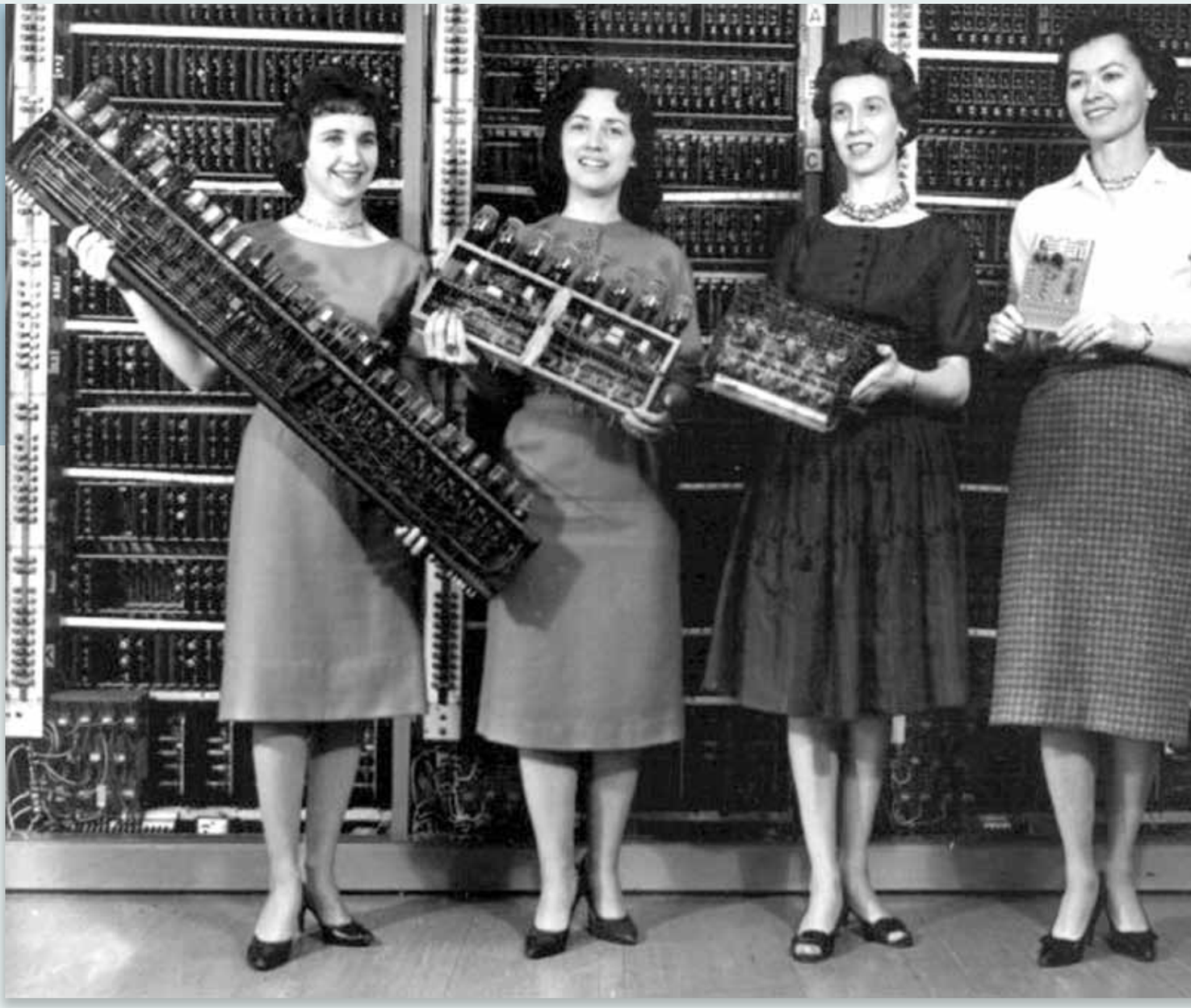
Late in 1946, ENIAC was dismantled, and it arrived at APG in January 1947. It was operational again in August 1947 and represented "the largest collection of interconnected electronic circuitry then in existence."

ENIAC, as built, was never copied, and its influence on the logic and circuitry of succeeding machines was not great. However, its development and the interactions among people associated with it critically affected future generations of computers. Indeed, two activities generated by the BRL/Moore School programs, a paper and a series of lectures, profoundly influenced the direction of computer development for the next several years.

From 1948 to 1955, ENIAC operated successfully for 80,223 hours. In addition to ballistics, fields of application included weather prediction, atomic energy calculations, cosmic ray studies, thermal ignition, random–number studies and wind–tunnel design.

The Army also made ENIAC available to universities free of charge, and a number of problems were run under this arrangement, including studies of compressible laminar boundary layer flow (Cambridge, 1946), zero–pressure properties of diatomic gases (Penn, 1946) and reflection and refraction of plane shock waves (Institute of Advanced Studies, Princeton, 1947).

At 11:45 p.m., Oct. 2, 1955, with the power off, ENIAC was retired. Portions of ENIAC were preserved and can be seen at sites including APG and the Smithsonian.



1954: NIKE MISSILE BATTERY

Right
From Left: Nike Ajax, Nike Hercules, Nike Zeus.

Following World War II, the United States started to consolidate its position as a world superpower. The nuclear monopoly that America had enjoyed since dropping two atomic bombs on Japan in August 1945 did not last long. By the end of the decade, the Soviet Union had tested its atom bomb, and an arms race between the two former allies began. With memories of the Pearl Harbor attack fresh in Americans' minds, all branches of the military worked to develop defenses against Soviet heavy bombers capable of delivering a large–scale nuclear attack against American cities. The U.S. Army's answer was the Nike missile battery, first deployed nationally in 1953. One Nike battery was constructed in the northeastern section of Edgewood Arsenal in 1954.

The Nike missile system utilized ground–based radars and cutting–edge computer technology to track enemy aircraft and guide the missiles to them. The urgency of the Soviet bomber threat dictated that the Nike project be constructed with as much existing technology as possible to expedite production. The most technical and expensive components would be ground–based, where they would benefit from regular maintenance, repairs and upgrades. Transponders to receive guidance commands from the ground would be installed on the missiles.

The Army's first Nike missile was the Nike Ajax, a guided two–stage supersonic surface–to–air missile capable of engaging and destroying Soviet bombers at a height of 65,000 feet 30 miles away. As point–defense systems, Nike missile batteries were constructed around strategic, industrial and metropolitan areas. If Soviet bombers penetrated American airspace and evaded U.S. fighter aircraft, Nike missile batteries were the last defense between Americans and nuclear annihilation. APG was home to one of the many Nike missile sites that defended the Washington–Baltimore area during the Cold War.

In 1958, the Army deployed a new missile, the Nike Hercules. It was a two–stage missile, like the Nike Ajax. While the Ajax was equipped with conventional explosives, the Hercules could be armed with a variable–yield nuclear warhead capable of destroying multiple enemy aircraft at once, along with the nuclear weapons they carried. Capable of reaching heights of 150,000 feet, the Nike Hercules could engage the highest–flying Soviet bombers at a range of 90 miles at Mach 2.65. Many installations utilized a combination of both missile types, while others, like APG, converted entirely to the Nike Hercules. The Nike Hercules underwent modifications and upgrades and was effective to a limited degree against Soviet intercontinental ballistic missiles.

Over time, the Soviets relied less on manned bomber forces and more on their arsenal of ballistic missiles. ICBMs travel much faster and at a much steeper angle than any long–range bomber. Although the Nike Hercules was fast, agile and, with a nuclear warhead, accurate enough in many cases to destroy an incoming ICBM, the Army wanted to develop an anti–ballistic missile specifically designed to counter the Soviet missile threat. In the late 1950s and early 1960s, the Nike Zeus was developed for this challenge. Larger, faster and with a more powerful nuclear warhead, the Nike Zeus was the product of an American anti–ballistic missile program in its infancy. Despite successful interceptions of long–range ballistic missiles during testing, the project was terminated because of technical problems and high costs.

As weapons technology and capabilities advanced, the Nike missile batteries became obsolete. The Soviet Union and United States relied almost exclusively on ICBMs to deliver their nuclear arsenals to enemy targets. In the early 1970s, Strategic Arms Limitation Talks between the countries ended anti–ballistic missile development. The 1972 Anti–ballistic Missile Treaty also included Nike Hercules missiles, even though they were not specifically designed to counter ICBMs. Production of these defensive weapons eventually ended, and their launch facilities were decommissioned. The Edgewood Arsenal Nike battery was shut down in 1973. The Nike missile battery is a precursor to modern American weapons like the Patriot surface–to–air missile.

1966: LUNAR ROVING VEHICLE TESTING

Because of the unique lunar environment, the creation of flexible wheels was the most challenging and time consuming aspect of the LRV development.

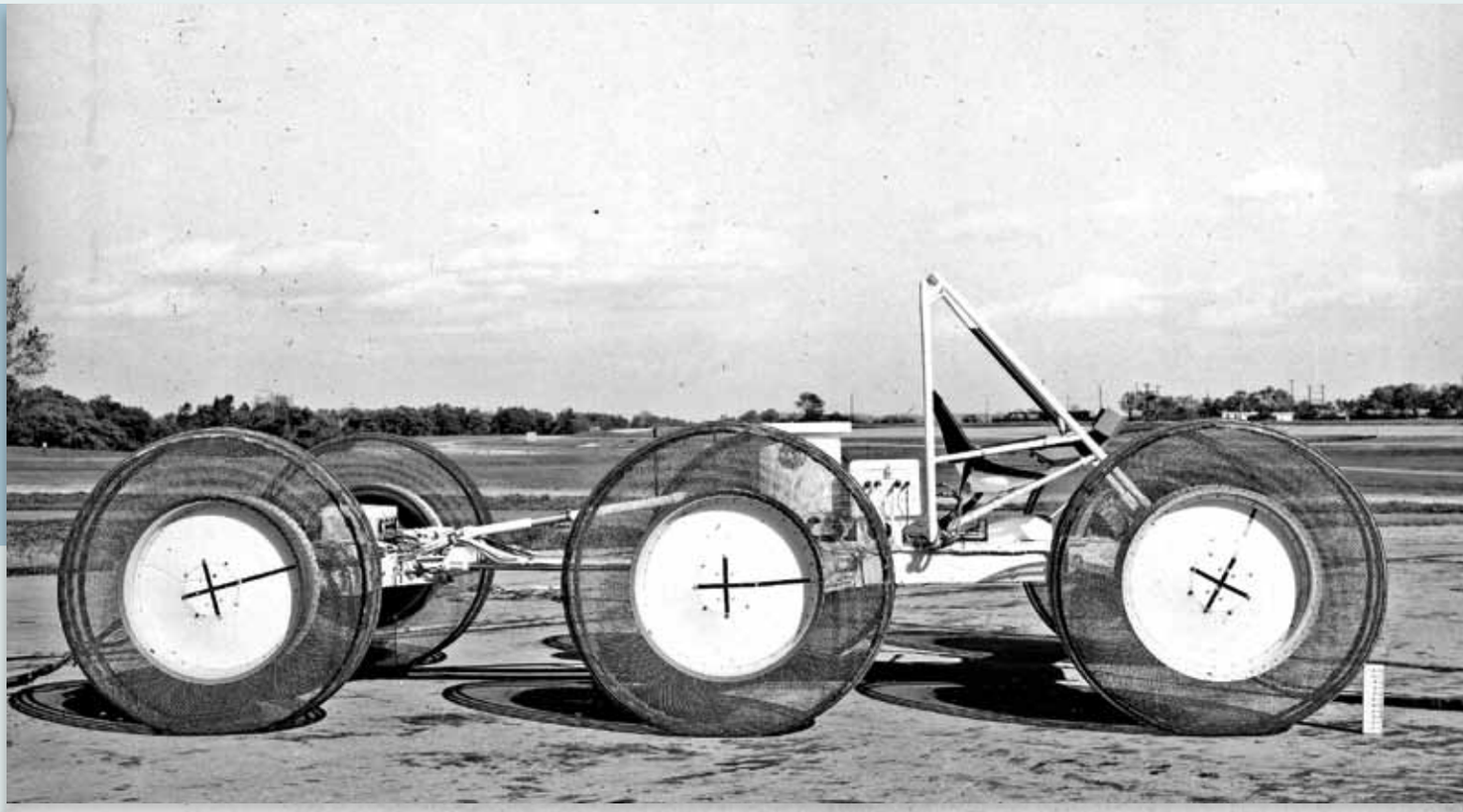
NASA Technical Memorandum 2009–215798

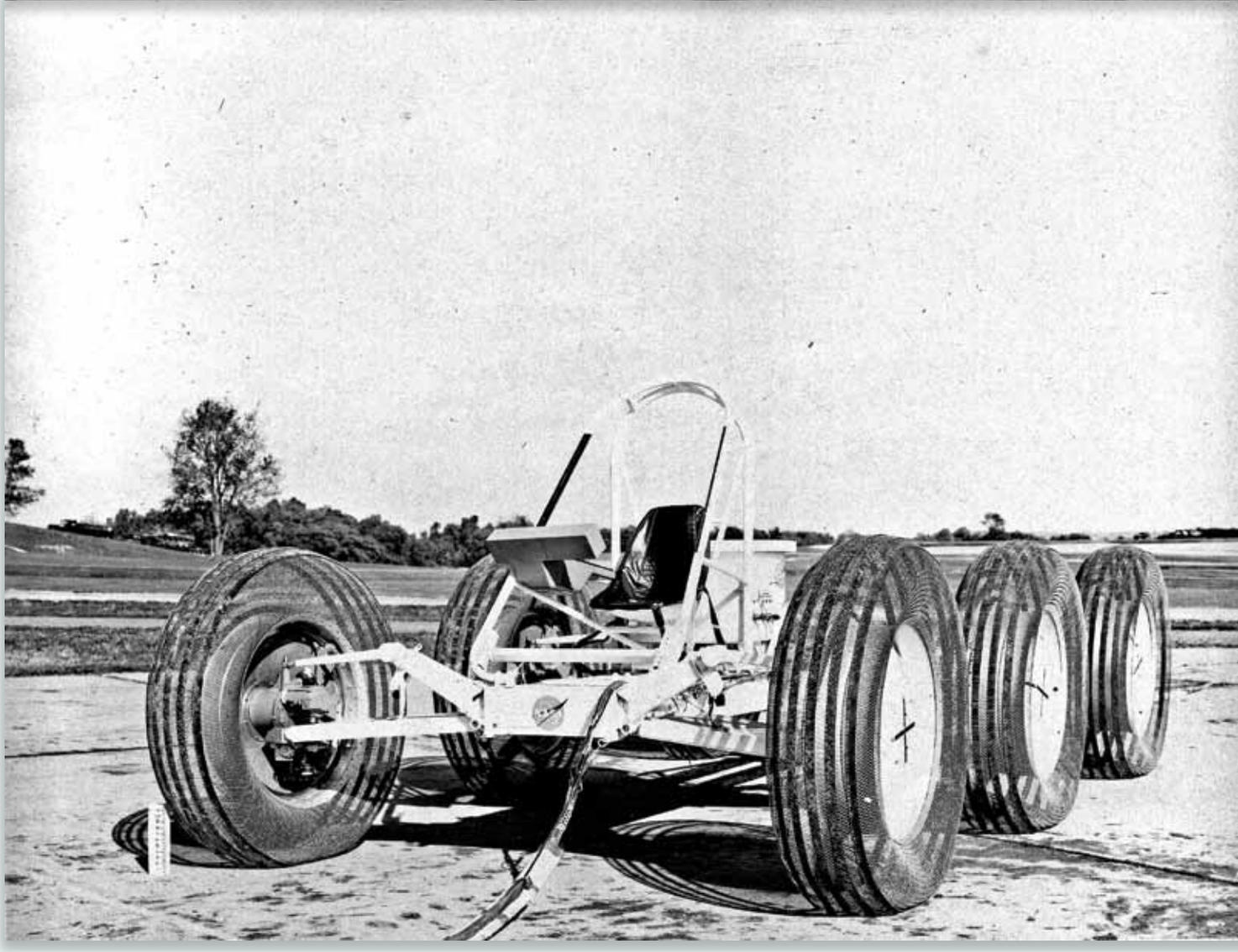
NASA Apollo Program's Lunar Roving Vehicle was developed to provide astronauts mobility on the lunar surface, to allow them to carry more instruments and to enable more soil and rock samples. The LRV deployed on the Apollo 15, 16 and 17 missions (1971–72).

Development of the LRV wheels began in 1963. During the third phase of development, NASA sponsored GM Defense Research Laboratories to build a vehicle to simulate the mobility of the future LRV. Some of the key considerations in the design of the wheels for the LRV were high temperature variations, rough lunar terrain and operations in hard vacuum/low gravity.

GM's test vehicle had large (approximately 5 feet diameter) wire mesh wheels, which were tested on hard surfaces at APG in 1966 and later on desert terrain at Yuma Proving Ground. The tests at APG were successful but not at Yuma, so the wheels were redesigned. APG can claim a part in the history of lunar exploration.

The final version of the LRV was a manned, joystick–steered vehicle with a maximum speed of 10 mph and a range of about 22 miles. It had an empty weight of about 450 pounds and could carry cargo weighing about 1,100 pounds. The LRV had a four–wheel drive configuration with wire mesh wheels equipped with stiff inner frames.





1971: MERGER OF APG AND EDGEWOOD ARSENAL

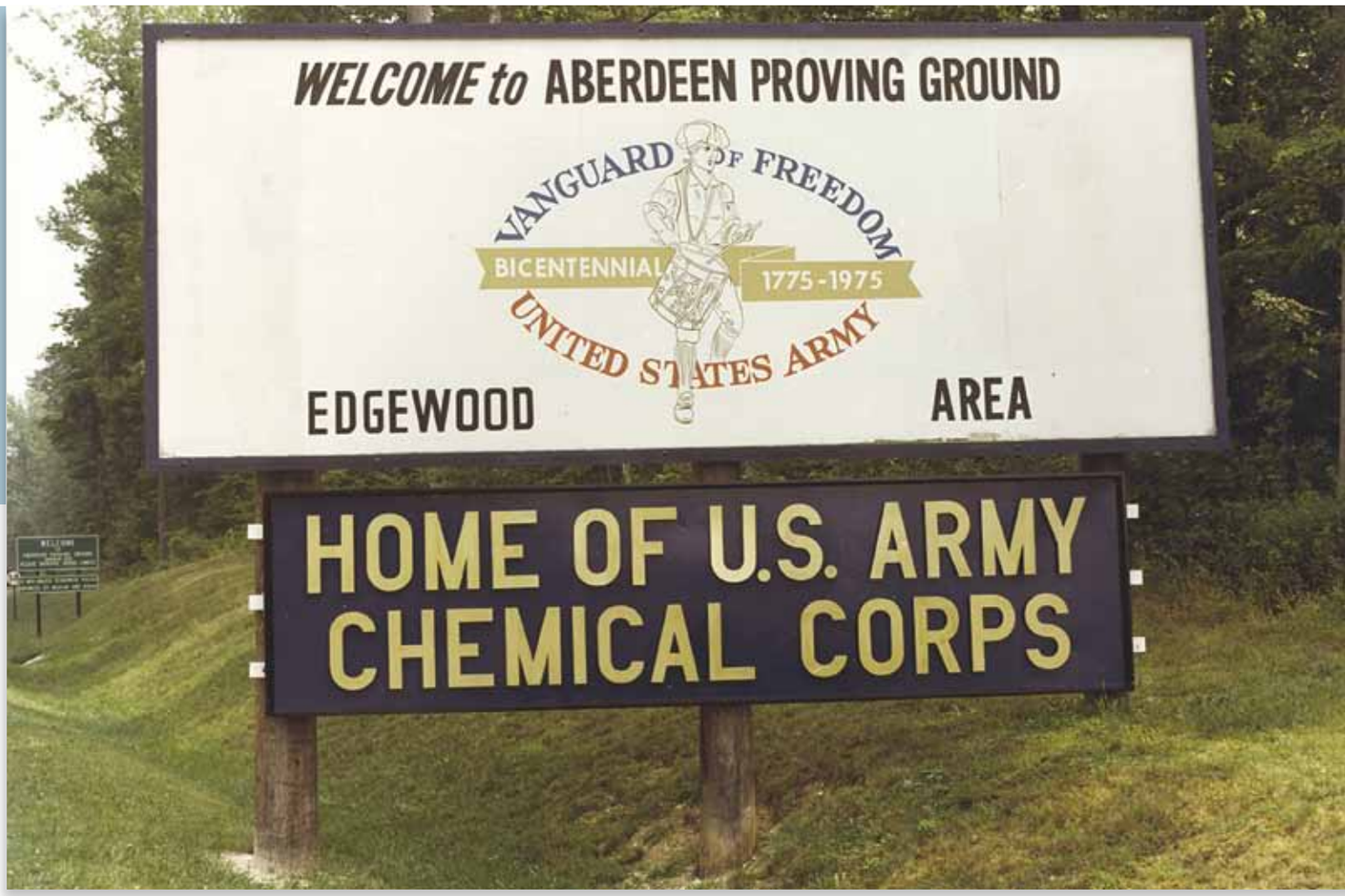
In the 1970s, economic conditions and political changes resulted in a reduced military. The two largest military installations in Maryland, APG (North) and Edgewood Arsenal (APG–South), consolidated. The idea of consolidating APG and Edgewood Arsenal had been considered several times since the creation of the installations during World War I because they are just miles apart and their similar mission objectives of research and development of weapon technologies and training. When the proposed union of the two installations in 1971 promised to save $1.9 million, the government could no longer justify the separation. In March 1971, AMC formally released a statement announcing the consolidation, effective July 1, 1971.

The merger included reducing 131 civilian and military personnel on both posts by the end of 1971. In addition, the merger relocated 946 civilian employees and 137 military personnel (mostly administrative) from APG–South to APG–North and another 66 civilian positions (mostly involving procurement functions) from APG–North to APG–South.

Several logistical functions also went through significant changes. For example, bus services and waste–disposal services were combined and rescheduled. The commissary and PX at APG–South closed. Control of housing at APG–South was given to APG–North to allow for more variety of quarters for soldiers and their families. Communication and maintenance personnel at APG–South and APG–North were pooled into one unit to operate more effectively and increase flexibility for receiving and transmitting teletype messages. In addition, purchases for logistical supplies were centralized. This allowed for a larger quantity of supplies to be purchased to increase savings. Civilian personnel offices, security and MP platoons at APG–South were merged with APG–North under the jurisdiction of the commanding officer, Col. Warren D. Hodges. A fleet of picket boats were commissioned into APG's new "navy." Assigned with the duty of patrolling the waters of the Gunpowder and Bush River areas, the Material Testing Directorate serviced these boats.

The only services not affected were medical and postal services. These had already been provided on a joint basis for several years.

The consolidation did not change the overall missions of either installation, as APG– North continued to focus on ordnance testing and training, and APG–South focused on chemical defense research and development. The expanded APG Garrison mission focused on the management, administration and post support functions at both parts of the installation to maximize the use of non–mission related funding and increasing efficiency in spending and communication. All real estate at



APG–South (between 8,000 to 13,000 acres and more than 1,100 buildings, structures, facilities, machineries and equipment valued at $122.8 million at the time) was placed under Hodges' jurisdiction. After the merger, he was now responsible for more than 21 tenant organizations, more than 82,000 acres of land and water and more than 16,000 civilian and military personnel. With APG–South's annual payroll of $51 million and APG–North's $105 million payroll, the combined installation's output made up more than 75% of the Harford County economy in the 1970s.

On July 1, 1971, Edgewood Arsenal officially merged with APG. While the installation called Edgewood Arsenal ceased to exist, the command called Edgewood Arsenal remained until 1977. After 54 years in existence as a separate installation, Edgewood Arsenal was designated Edgewood Area, APG, and later as APG–South.

"To some, this signaled the end of an era; they found it difficult to accept that Edgewood Arsenal, after over 50 years in existence, could be absorbed into her sister command APG. To others, this change in command was less than noticeable; it would seem more like when an old established business firm changes ownership (with everyone simply "referring to Edgewood by its original name through long–time habit")."

"Aberdeen Proving Ground Absorbs Edgewood Arsenal Function"
Army Research and Development News Magazine

2005: BASE REALIGNMENT AND CLOSURE

The Department of Defense uses base realignment and closure to reorganize its installation infrastructure to more efficiently support cantonment operations, increase operational readiness and facilitate new ways of doing business.

Congress created the 2005 BRAC Commission to maintain integrity of the process. The commission provided an objective, non–partisan and independent review and analysis of installation recommendations issued by the DoD on May 13, 2005. The final version of the BRAC Commission's report was submitted to President George W. Bush on Sept. 8, 2005. Bush accepted the commission's recommendations and signed the law Sept. 15.

BRAC 2005 affected about 800 installations and 123,000 military and civilian personnel. It was completed Sept. 15, 2011. At APG, BRAC's impact was far reaching. Aside from the purpose of realigning mission capabilities and resources to save money, it also strategically positioned APG to become more efficient and innovative.

BRAC closed out part of the historic mission of APG–North while reinforcing the historic mission of APG–South. It meant the relocation of the U.S. Army Ordnance Center and School from APG–North to Fort Lee, Va. Relocated from APG–South was the Army Environmental Command to Fort Sam Houston, Texas. Collateral losses because of BRAC at APG is the demolition of hundreds of World War I– and World War II–era buildings (about 188 facilities and 775 housing units) to make way for 17 new construction projects totaling more than $1 billion.

Major BRAC gains for the installation are the Team Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance and U.S. Army Test and Evaluation Command at APG–North and the Joint Program Executive Office for Chemical and Biological Defense at APG–South.

Team C4ISR (about 7,200 new arrivals) consists of the Communications–Electronics Command (commanded by a major general); the Communications–Electronic Research, Development and Engineering Center; the Program Executive Office Intelligence, Electronic Warfare and Sensors; and the PEO Command, Control, Communications Tactical. These organizations came from Fort Monmouth, N.J.; Fort Belvoir, Va.; and Redstone Arsenal, Ala respectively. The first elements of the Team C4ISR began arriving at APG in 2008.

ATEC (about 600 newcomers) is also commanded by a major general and was joined by the Army Evaluation Center. Both organizations will enhance APG's research and development and test and evaluation capabilities. ATEC came from Alexandria, Va.

JPEO–CBD greatly enhances APG's Joint Chemical/Biological Research and Development Center of Excellence. It moved to APG–South from Virginia.

In conjunction with BRAC, the APG 2012 initiative includes the necessary infrastructure changes to handle the expansion. These changes include road improvements and quality of life enhancements.

Also part of the changes at APG is the establishment of the Government and Technology Enterprise. This is a consortium of defense contractors on 416 acres with 11 land bays and up to 3 million square feet of development space inside and outside the secure perimeter of APG near the Maryland Route 715 Gate. The first companies to occupy the GATE were CACI, L–3 Communications and Raytheon.

...AND BEYOND

APG's transformation did not end with the completion of the Base Realignment and Closure process in 2011. Instead, APG continues to transform in other ways.

Having such a large number of research, development, engineering, testing and analysis professionals on one installation will create synergies that will pay off in ways no one can predict. The focus of many of the organizations at APG will define the cutting edge across the science and technology spectrum. Transformation will continue to be at the heart of what the new APG will accomplish. Organizations need a workforce with new abilities to push the leading edge of technology forward and facilities with new capabilities to support that mission. The installation will continue to transform as the missions conducted on it change.

While this technology transformation continues, the fundamental values that made APG unique will not change. The focus was always on supporting the Warfighter. At the same time, the installation became the caretaker for an impressive wildlife population that took refuge behind its gates as well as the cultural heritage sites left behind by those who came before. APG has also connected the surrounding communities to both the world and the future by working with local schools and communities to promote science, technology, engineering and math to help grow its own future workforce. This workforce will, in turn, be essential to the missions of many of the organizations on post that lead not only Army, but defense technology from their headquarters on APG. No one can predict what future this workforce will create at APG, but once there, it will define that future to help create a new force that is decisive in protecting our nation's interests.