



Washington History in the Classroom

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“Washington History magazine is an essential teaching tool,” says Bill Stevens, a D.C. public charter school teacher. “In the 19 years I’ve been teaching D.C. history to high school students, my scholars have used *Washington History* to investigate their neighborhoods, compete in National History Day, and write plays based on historical characters. They’ve grappled with concepts such as compensated emancipation, the 1919 riots, school integration, and the evolution of the built environment of Washington, D.C. **I could not teach courses on Washington, D.C. history without *Washington History*.”**



Bill Stevens engages with his SEED Public Charter School students in the Historical Society’s Kiplinger Research Library, 2016.

Washington History is the only scholarly journal devoted exclusively to the history of our nation’s capital. It succeeds the *Records of the Columbia Historical Society*, first published in 1897. *Washington History* is filled with scholarly articles, reviews, and a rich array of images and is written and edited by distinguished historians and journalists. **Washington History** authors explore D.C. from the earliest days of the city to 20 years ago, covering neighborhoods, heroes and she-roes, businesses, health, arts and culture, architecture, immigration, city planning, and compelling issues that unite us and divide us.

The full runs of *Washington History* (1989-present) and its predecessor publication the *Records of the Columbia Historical Society* (1897-1988) are available through JSTOR, an online archive to which many institutions subscribe. It’s easy to [set up a personal JSTOR account](#), which allows for free online reading of six articles per month in any of their journals, or join the Historical Society at the [Membership Plus](#) level for unlimited free access to our publications.



World War I soldiers prepare to test the efficiency of gas masks and other protective gear in a trench dug at the American University Experiment Station. The wires lining the trench were used to trigger test explosions by remote control. This facility occupied what is today Spring Valley, American University, and portions of the Dalecarlia Reservoir grounds in upper Northwest. The January 1993 discovery of remnants of the station's tests on chemical and incendiary weapons launched a new historical and environmental study. Courtesy, U.S. Army Corps of Engineers.

Chemical Testing in the Great War

The American University Experiment Station

by Martin K. Gordon, Barry R. Sude, and Ruth Ann Overbeck¹

This article is adapted from a slide lecture presented to The Historical Society of Washington, D.C., November 9, 1993.

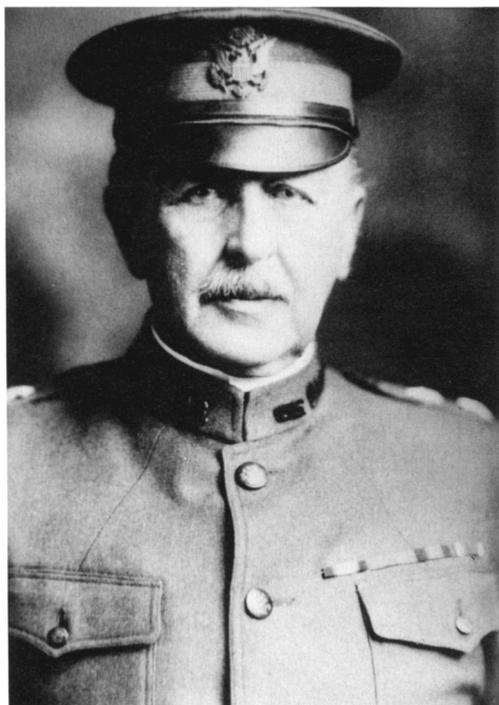
On January 5, 1993, construction workers laying sewer pipe in the last undeveloped section of Northwest Washington's Spring Valley neighborhood unearthed a large number of World War I chemical munitions containers. Almost immediately both workers and residents were evacuated, while city hazardous materials experts were called in to assess the potential threat to the community. The evaluation required historical research, chemical analysis, and engineering surveys, and it disrupted the neighborhood for four weeks. Collaborating on the effort were members of the District of Columbia Office of Emergency Preparedness, the Army's Service Response Force, the Environmental Protection Agency, the Bal-

timore District of the U.S. Army Corps of Engineers, and other federal, state, and local agencies.

The experts found that the remains of the testing of chemicals and ordnance by the Bureau of Mines and the U.S. military during World War I at the nearby American University Experiment Station posed no immediate danger to Spring Valley residents. As of this writing, residents have resumed their regular activities while the Army Corps of Engineers completes "Operation Safe Removal," investigating whether any potential contaminants remain.

The discovery of the remains of weapons testing in an area downhill to the north of American University is not surprising in light of the long history of the city's use as a logistics, manufacturing, and research center during periods of war. Washington's role as test center began with the War of 1812, when Henry Foxall's cannon factory above Georgetown and the Washington Navy Yard near the Capitol served as centers of war production. In addition to

Notes begin on page 106.



Shortly after the outbreak of World War I, Major General William M. Black, the Army's chief of engineers, accepted the offer of the fledgling American University campus for use as an engineer training facility. Courtesy, USACE.

being the political capital, the city's military productivity made it a logical target for British attack. Likewise during the Civil War, the Washington Arsenal produced ammunition, and the Navy Yard was a center of ordnance research.

History repeated itself during World War I when the federal government established the American University Experiment Station in 1917.

In the 1890s the General Conference of the Methodist Episcopal Church bought 90 acres on the crest of a wide hill at the intersection of Nebraska and Massachusetts avenues, N.W., and began construction of American University. By the time the United States entered World War I in April

1917, American University was still struggling to become a full-fledged university and, in fact, held its first graduation ceremony that year.²

Also during the 1890s, part of the federally owned Dalecarlia Reservoir land, located downhill to the west of the American University site, was set aside for the National Training School for Girls, a reform school initially for African Americans. The school's buildings occupied the site where Sibley Hospital now stands, but its farmland, cultivated by the young women residents, extended above Little Falls Road well into the reservoir area. During World War I, the first white girls were admitted to the institution, but its dominant population remained girls of African-American descent.³

Bordering these establishments were the rolling pastures and fields of working farms and a scattering of larger, suburban style homes.

On August 1, 1914, World War I broke out in Europe. As fall became winter, the assault formations became locked into place at what became the Western Front. The various nations involved then began experimenting with different ways of breaking that deadlock.

French military chemists who had developed nontoxic tear gases as early as 1912 quickly began experimenting with deadly gases. The German High Command, alarmed at the news of France's experiments and thwarted by the stalemate, also turned to gas warfare. With their highly developed dye industry, the Germans were able easily to begin a new form of chemical research. On April 22, 1915, the Germans used toxic chlorine gas against the unsuspecting French at Ypres, and the age of modern gas warfare began.⁴

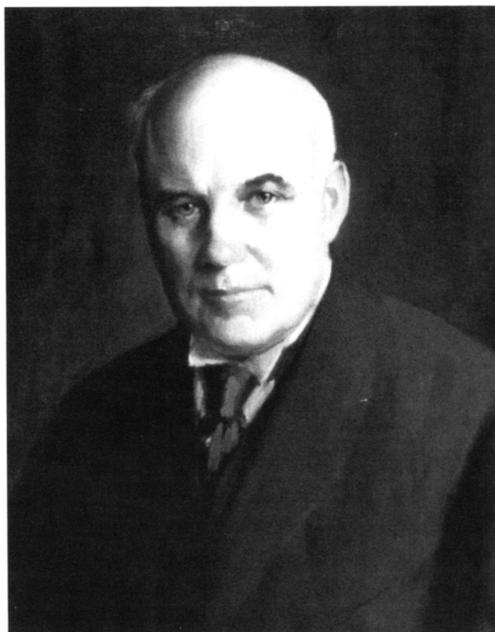
During World War I chemists on both sides of the conflict investigated more than 3,000 chemical substances for potential use

as weapons, although only 30 were used in combat. Of the 30, only about a dozen were considered successful. The chemists grouped war gases according to their effects on the human body, and the United States government conducted research in all of the different categories of chemicals at its American University Experiment Station.

The categories tested at the facility included "lachrymators," or tear gases such as xylol bromide, that also damage the respiratory system. "Asphyxiators," such as phosgene, chloropicrin, and chlorine, cause fluid to enter the lungs, thereby preventing oxygen from reaching the blood. "Toxic gases" pass through the lungs to the blood, preventing the circulation and release of oxygen throughout the body. "Sternutators," such as diphenylchlorarsine, are, according to Charles Heller's *Chemical Warfare in World War I*, a "type of respiratory irritant composed of a very fine dust that caused sneezing, nausea, and vomiting. Some sternutators were systemic poisons that had a delayed toxic effect on the body." The deadliest category is the vesicant, or blister agent, that came to be known as "mustard gas" because of its peculiar odor.⁵

By the fall of 1915, our Army was monitoring chemical warfare developments on the Western Front, sending medical officers to the British and French forces in the field. Yet because of the efficiency of contemporary anti-gas protection, the War Department was not greatly concerned about the new gas warfare. That complacency changed in July 1917, however, when Germany introduced dichloroethyl sulfide, a mustard gas that caused severe casualties and widened the scope of chemical warfare.⁶

As chemical warfare was about to change the course of the conflict, the land bordering the American University campus and north of Loughborough Road became the locus of the District of Co-



The Department of the Interior, under Secretary Franklin K. Lane, operated the Bureau of Mines, which had extensive experience studying noxious mine gases and developing protective equipment. The Bureau of Mines undertook chemical warfare testing at other facilities, before moving to a portion of American University. Secretary Franklin K. Lane, by Ivan G. Olinsky, courtesy, Department of the Interior.

lumbia's latest wartime support activity. Both administrative and logistical research and development activities were carried out in the vicinity during and immediately after the United States entry into the war.

On April 30, 1917, shortly after the United States April 6 declaration of war, American University's board of trustees offered President Woodrow Wilson the use of its campus and buildings in support of the country's war effort. Major General William M. Black, the Army's chief of engineers, recommended that the offer be accepted. Secretary of War Newton D. Baker agreed and gave the Corps of Engi-

neers exclusive control over the university's grounds and buildings.⁷

American University then consisted of the College of History Building and the uncompleted McKinley Memorial Ohio College of Government on 91 relatively isolated acres, accessible via a local macadamized road, Massachusetts Avenue, and the avenue's electric car line. The acreage had access to city water and sewer lines and was surrounded by largely undeveloped properties.⁸

On May 28 the Corps of Engineers established Camp American University on a portion of the property as the site for the organization and training of the 6th Engineer Regiment. Almost immediately thereafter, Camp American University was also designated a training school for engineer officers. The College of History Building was converted into a dormitory and offices.⁹ In the following months numerous engineer units were organized and trained at Camp American University, among them the 30th Engineer Regiment, which was later to become the 1st Gas and Flame Regiment.

Meanwhile in early 1917, Secretary of the Interior Franklin K. Lane had directed the Bureau of Mines to consider its potential role if the nation joined the war in Europe. At a meeting on February 7, Director of the Bureau of Mines Van H. Manning and his principal assistants concluded that the bureau, with its extensive experience with noxious and explosive mine gases, rescue equipment, gas masks, and treatment of gas exposure, should turn its expertise to war preparedness. They outlined a large-scale investigation into the discovery, manufacture, and use of noxious gases in warfare as well as the development of effective gas masks. It was the Bureau of Mines, a civilian branch of the government, and not the War Department that took the first step in preparation for the employment of toxic agents in warfare.¹⁰

Later that month, Manning offered the War Department his bureau's facilities and staff, and the department accepted. Under the authority of the Noxious Gases Subcommittee of the Military Committee of the National Research Council, the bureau

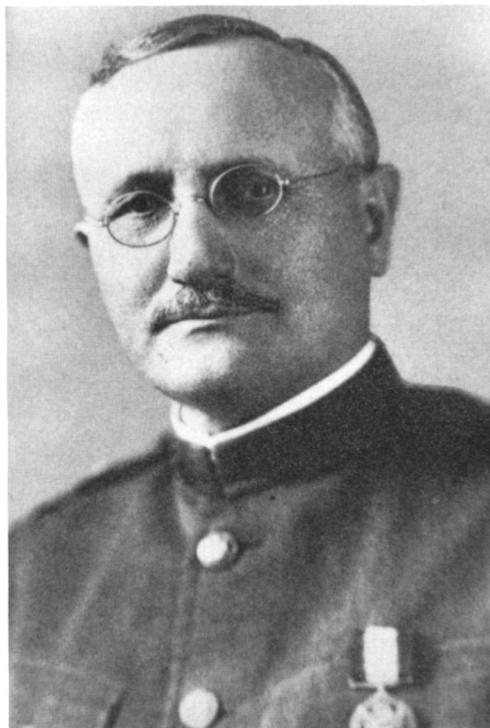


researched methods for producing more efficient gas masks, as well as other, then-classified projects related to the development, testing, and manufacture of toxic gases, toxic and incendiary munitions, and defensive and offensive smoke mixtures and signal flares.¹¹

The Bureau of Mines carried out its initial research at its own limited local facilities and at various university and industrial laboratories throughout the country. But after the U.S. declaration of war, Manning and his colleagues needed a large, centrally located laboratory where, among other essential work, it could undertake secret gas warfare investigations for the Army and Navy. After reviewing sites in metropolitan Washington, Delaware, and New Jersey, they settled on those facilities and grounds at American University not then being used by the Corps of Engineers.¹²

The bureau aimed to establish a large-scale chemical warfare research center at American University with laboratories, test sites, and other facilities for studying the various chemical, physiological, and mechanical aspects of gas warfare.¹³ To facilitate the chemical research, the Departments of the Army and Navy agreed in June 1917 to allocate \$175,000 to convert classrooms in the McKinley Memorial Ohio College of Government into laboratories and to hire additional chemists. On July 21, 1917, the Bureau of Mines officially established the American University Experiment Station under the direction of George A. Burrell. (By 1918 Camp American University was renamed Camp Leach

Trainees of the Army Corps of Engineers, lower right, stand in formation on the American University campus. Flanking the massive and ornate McKinley Memorial Ohio College of Government are the temporary structures of the American University Experiment Station. Courtesy, USACE.



In June 1918, Major General William L. Sibert, director of the War Department's Gas Service, accepted the transfer of chemical warfare activities from the Bureau of Mines. Courtesy, USACE.

to eliminate the growing confusion with the similarly named American University Experiment Station.)

The first few months of the Experiment Station were filled with feverish construction activity. The Bureau of Mines research program was too urgent, however, to wait for completion of the required facilities. By September bureau chemists had set up their equipment in half-finished laboratories and begun their work.¹⁴

In their respective capacities as director of the Bureau of Mines and chief of the American University Experiment Station, Manning and Burrell organized and over-

saw the approximately 600 Experiment Station chemists, chemical engineers, and mechanical engineers who were responsible for investigating the various chemical, manufacturing, pyrotechnic, mechanical, pathological, pharmacological, and other aspects of gas warfare. The Chemical Research Division (Offense) worked on the development of new toxic substances, developed manufacturing methods for toxic substances of proven efficiency, developed materials for use in incendiary and smoke weapons, and engaged in research on inorganic chemical problems. The Chemical Research Division (Defense) concentrated on four main problem areas: the absorption of toxic gases, the removal of toxic and irritating smokes from the air, defensive smoke production, and gas mask vision problems.

The Small-Scale Manufacturing Division (Offense) was responsible for developing methods and procedures for the production of toxic gases and chemicals, while the Manufacturing Development Division developed protective equipment against poisonous gases. The Pyrotechnic Division developed and field tested various classes of gas shells, smoke clouds and equipment, mortars and Liven's projectiles, hand grenades, incendiary and flaming liquid weapons, and signal lights. The Mechanical Research Division designed and developed various types of defensive equipment for use in the event of an enemy gas attack, while the Gas Mask Research Division designed, developed, and tested various types of gas masks.¹⁵

On October 16, 1917, Secretary of War Baker authorized the establishment of a Gas Service, but left to President Wilson the issue of transferring the Experiment Station from civilian to military control. After much argument between the War and Interior departments, on June 25, 1918, President Wilson directed the transfer of the American University Experiment Station from the Bureau of Mines to the

War Department's eight-month-old Gas Service under the direction of Major General William L. Sibert. By the fall of 1918, there were twelve research sections: Defense, Offense, Pharmacological, Catalytic, Defense Chemical, Offense Chemical, Gas Mask, Pyrotechnic, Dispersoid, Small-Scale Manufacturing, Mechanical Research and Development, and Explosives.¹⁶

In July 1918, 1,155 civilian and military researchers across the nation labored on chemical warfare. They worked under the direction of the Bureau of Mines and the Army Ordnance Corps, Corps of Engineers, Sanitary Corps, Signal Corps, Aviation Section, and Chemical Service Section. Of the total, 554 were civilian scientists, technicians, and administrative employees; 114 were commissioned military officers; and 487 were enlisted men. The majority were stationed at the American University Experiment Station, with the remainder working at branch laboratories throughout the country.

As contractors worked throughout the summer of 1917 to convert university buildings into laboratories, it soon became apparent that additional facilities would be needed. In response, 124 temporary, mostly wooden structures were erected, but planners recognized that the field testing of gases and weapons clearly posed a threat not only to those conducting tests, but also to the surrounding community.¹⁷ In many cases, the lightly constructed, typical World War I temporary structures clearly were not of sufficient size or strength to contain those threats. Consequently, the Bureau of Mines built underground concrete pits for bomb testing, both on university grounds and on property leased from adjacent land holders.¹⁸

Field tests to determine the effectiveness of toxic chemicals and substances, incendiaries, smoke mixtures, and the like

soon were conducted at various sites on the American University campus and adjoining properties. In addition to the several bomb pits, researchers used specially constructed gun pits and trenches similar to those on the Western Front in France, as well as fields and other open areas. The northern trench system was dug approximately on the site of today's 52nd Court, N.W., where the containers were recently unearthed. In those trenches, engineers used a system of remote control wires to explode incendiaries and then observe the results. Eventually, the trenches were filled in, burying some test remnants.¹⁹

Contemporary accounts show that except for some adjustments to accommodate the rigors of wartime, civilian lifestyles near the Army camps continued much as before the war. For example, the National Training School for Girls intensified its farming activities, increasing both the amount of crops produced and food canned and preserved. Records show few reports of complaints from the neighbors of the testing station, either for disturbances or concern about the goings-on at the laboratories.²⁰

One potentially serious incident does stand out, however. On August 3, 1918, former U.S. Senator Nathan B. Scott of West Virginia, his wife Agnes Cowgell Scott, and his sister were "gassed" by a "cloud" that escaped from the Experiment Station. The cloud resulted from an explosion of lab apparatus in a station manufacturing shack; it traveled in a southeasterly direction.²¹

At the time of the incident, the Scotts were occupying their "sometime residence" on Ridge Road across Nebraska Avenue from the Experiment Station. While the senator's wife made light of the incident, stating to the press that the trio was "slightly gassed," the senator complained vigorously. Both he and his sister received medical treatment by the Experiment Station's doctor and at a local hospi-



A cloud of gas, released from the experiment station on August 3, 1918, drifted to the Ridge Road country home of former Senator Nathan B. Scott and his wife Agnes. The elegant Agnes, seen here in a formal portrait, told the press that the residents were "slightly gassed." Agnes was unaffected, but Scott and his sister received medical treatment. The incident led the District Commissioners to ask the secretary of war to move the tests elsewhere. Courtesy, Library of Congress.

tal. Others in the vicinity reported that they had noted the presence of the gas, but had suffered no ill affects. Local press coverage, however, reflected the senator's alarm. The following day's *Times* headlined its story: "Family Is Gassed in D.C. Home When Tear Bomb Breaks."²²

On October 30, 1918, the D.C. Board of

Commissioners requested that tests be moved away from the Experiment Station. The commissioners cited both the fact that the senator had been “disagreeably affected” and that an unidentified party of motorists in the area had noticed that the air was tainted by gases. Secretary of War Baker replied that work at the American University Experiment Station was confined to research problems and that the bulk of chemical production was taking place at other proving grounds.²³

A little more than one week later, on November 9, 1918, the German government officially accepted President Woodrow Wilson’s terms for an armistice, and on November 11, the fighting in Europe ceased. Camp Leach demobilized. Existing agreements with American University and the individual property owners required that the grounds be restored as completely as possible to their pre-war condition. To that end, the chief of engineers directed the immediate filling of trenches, pits, dugouts, and similar works.²⁴

The post-war mission of the American University Experiment Station proved much more difficult to define. Chemical Warfare Service officers believed that the research conducted at the Experiment Station was important enough to warrant permanent retention of the installation, arguing that the substantial investment already made in the station’s facilities was in itself sufficient justification for such a decision.²⁵ In fact, as early as September 1918, the Chemical Warfare Service had discussed the possibility of purchasing the entire American University for that purpose.

The university’s board of trustees had been receptive, but War Department appraisers ruled that the trustees’ offer to grant the government permanent possession of the university for \$2 million far exceeded the property’s actual value and recommended that the purchase be

*Soldiers in a mortar unit demonstrate how a mortar battery is set up at the training facility, Camp Leach, circa 1918.
Courtesy, USACE.*

disapproved.²⁶ Adding his weight to those recommending disapproval, Chief of Engineers William Black strongly criticized continued use of American University for chemical warfare research. He argued that such investigations might prove dangerous to the growing number of residents of one of the District of Columbia’s most beautiful and healthful suburbs and would certainly prove detrimental to the area’s property values and future development.²⁷ Others within the War Department maintained that the upcoming conclusion of hostilities greatly lessened the need for such research.²⁸

On November 16, the Chemical Warfare Service was directed to look for other, more isolated accommodations for its research program. The American University Experiment Station would close.²⁹ Faced with the fact that the War Department General Order establishing the Chemical Warfare Service also provided for its demise within six months of the cessation of hostilities, Major General William L. Sibert abandoned efforts to retain the American University Experiment Station, ordering work there stopped as of December 31, 1918. After having moved downtown during the war, American University finally resumed operations at the original “uptown campus” in 1924. The Chemical Warfare Service’s remaining work would be carried out at Edgewood Arsenal, Maryland, its current home.³⁰

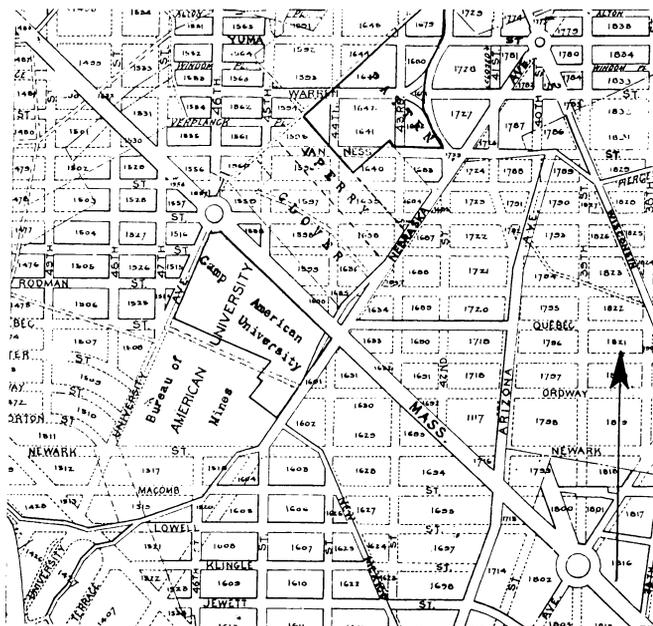
Today the Army Corps of Engineers is cleaning up the ghosts of the American University Experiment Station on a 616-acre study area north and west of American University. In January 1993, during the first phase of Operation Safe Removal, teams under the direction of the Army Ser-



vice Response Force recovered 141 items, both underground and on the surface. Of those items, 97 were found to be high explosives and were sent to Fort A.P. Hill, Virginia, to be destroyed. Another 44 contained suspect chemicals and were sent to other Army installations for testing and storage. The second phase of Operation Safe Removal continues as of this writing and is scheduled for completion by October 1994.³¹

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and president, White Mane Publishing Co. His last contribution to the Records of the Columbia Historical Society was "The Black Militia in the District of Columbia, 1867-1898," in 1973. Barry Sude is an independent historian specializing in the study of former military sites. Ruth Ann Overbeck is president of Washington Perspectives, a public history firm with particular expertise in land use research. She contributed chapters on Deanwood and Capitol Hill to Smith, ed., Washington at Home: An Illustrated History of Neighborhoods in the Nation's Capital (Windsor Publications, 1988).

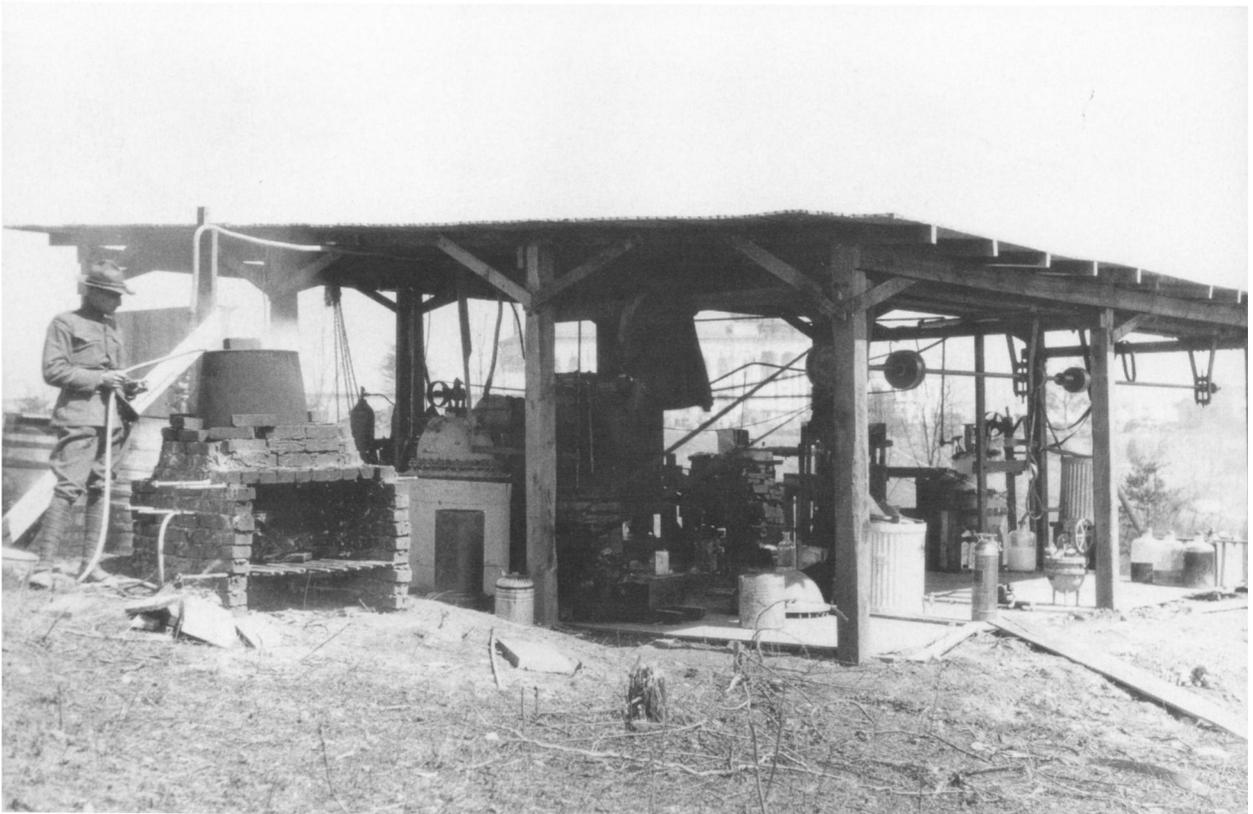


This view looking northwest from atop the McKinley Building at American University shows the wooden temporaries housing laboratories and other test facilities. Beyond the range, the rolling hills of today's Spring Valley provided more testing ranges. The American University Experiment Station, operated first by the Bureau of Mines and then by the Chemical Warfare Service, occupied the western half of the campus and outlying acreage as delineated at left. The eastern half and adjacent land, known as Camp American University and later Camp Leach, housed training activities of Army Corps of Engineers units destined for service in Europe. Courtesy, USACE.

Chemical Testing in the Great War



The northern trench system was dug at what is now 52nd Court, N.W., and the rings seen here roughly correspond to today's cul-de-sac. These test trenches, modeled on those along the Western Front, helped scientists evaluate the behavior of a variety of chemical munitions and the efficiency of protective gear. Courtesy, USACE.



This open-air, still-like apparatus manufactured "G-78," an experimental gas developed to induce vertigo and to irritate the lungs of enemy troops. Courtesy, USACE.



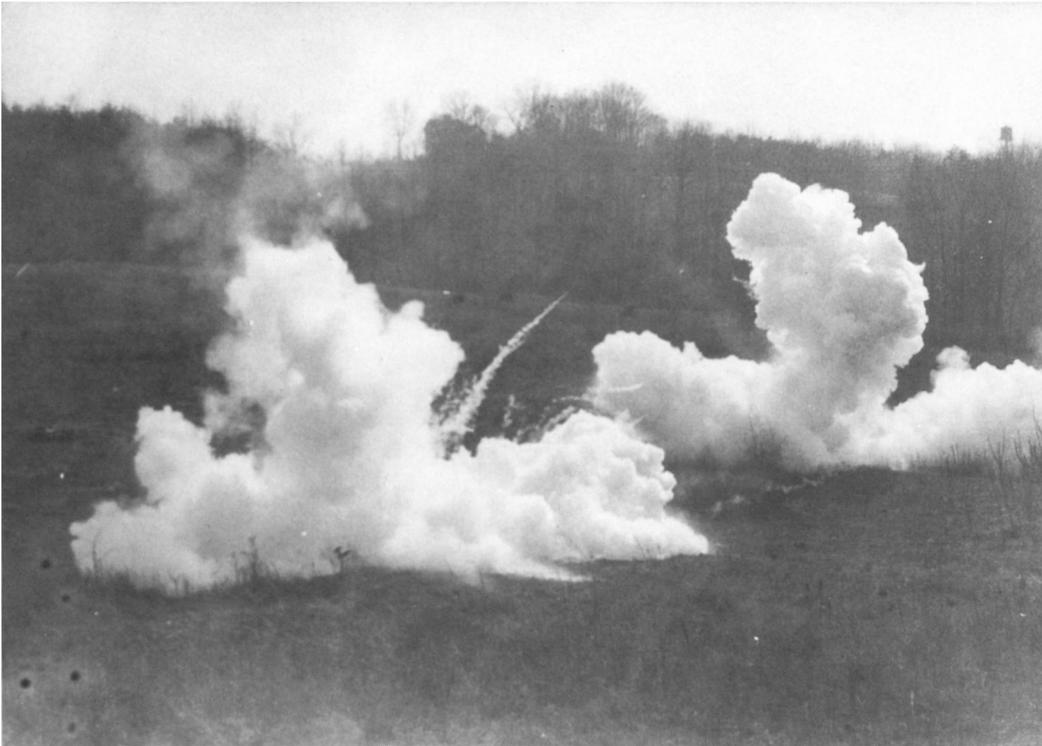
Some test structures, like the one above, were deliberately flimsy, designed to blow out rather than contain the pressure of an accidental explosion; otherwise, explosions might be fatal to test personnel. Inside this primitive wooden structure (below) chemists evaluated "G-49," a war gas designed to induce choking. Courtesy, USACE.





An unprotected technician observes the burning remnants of an exploded incendiary shell that has just landed on the ground. Courtesy, USACE.

Chemical Testing in the Great War



This picture (above) records the on-ground detonation by remote control of two chemical munitions and the dispersion of their gases in an open field adjoining the experiment station. Another method used to observe the effects of the explosion of gas shells and other bombs was the concrete test pit (below). A "lid" was constructed to cover the pit during the actual test. Courtesy, USACE.





Contractors and military personnel work on the 52nd Court, N.W., excavation site in January 1993, where a variety of World War I ordnance was uncovered during the construction of new houses. For four weeks nearby residents evacuated the neighborhood during working hours as experts searched for potentially dangerous remnants of the American University Experiment Station. Courtesy, U.S. Army Chemical and Biological Defense Command.



A contractor wearing protective clothing displays a Liven's projectile recovered in January 1993 from what was once the northern trench system. This projectile was designed to carry explosives, incendiary material, or gas. It was recovered during phase I of "Operation Safe Removal." Courtesy, U.S. Army Chemical and Biological Defense Command.



Chemical Testing in the Great War

Martin Gordon, et al., pp. 28–45

1. The views expressed herein are strictly the authors' and in no way represent the Army Corps of Engineers, Department of the Army, or any other government agency.
2. *The American University and the General Conference of the Methodist Episcopal Church, Omaha, Nebraska, May, 1892* (Omaha: Rees Printing, 1892), 59; *Evening Star*, Mar. 4, 1895, 10; William J. Mayer, "The Rise of American U.," *The Washington Star Pictorial Magazine*, Feb. 15, 1953, 1–4.

Gordon, continued

3. U.S. Congress, Senate, *Reform School for White Girls in the District of Columbia*, S. Doc. 979, 62d Cong., 3d sess., 1912.; National Training School for Girls clippings file, Washingtoniana Collection, D.C. Public Library.
4. Charles E. Heller, *Chemical Warfare in World War I: The American Experience, 1917–1918* (Ft. Leavenworth, Kans.: Combat Studies Institute, 1984), 3–8.
5. *Ibid.*, 13.
6. Leo P. Brophy and George J. B. Fisher, *The Chemical Warfare Service: Organizing for War* (Washington: GPO, 1959), 4.
7. Major General W. M. Black, "Memorandum on the Use of the American University Grounds by the United States, Oct. 25, 1918," Records of the Office of the Chief of Engineers, Camps and Posts, Record Group 77, National Archives.
8. John V. Van De Mark to Major J. S. Holden, Sept. 18, 1918, Real Estate Records, Records of the Office of the Quartermaster General, RG 92, NA.
9. Black, "Use of the American University Grounds," RG 77, NA.
10. Brophy and Fisher, *The Chemical Warfare Service*, 4.
11. Van H. Manning, "Report to the Secretary of the Interior on the Research Work of the Bureau of Mines On Gases Used in Warfare, Feb. 1, 1917 to Mar. 1, 1918," Records of the Adjutant General's Office, RG 407, NA.
12. Leo P. Brophy, Wyndham D. Miles, and Rexmond C. Cochrane, *The Chemical Warfare Service: From Laboratory to Field* (Washington: Office of the Chief of Military History, 1959), 2–5.
13. Van H. Manning, "Report to the Secretary of the Interior on the Research Work of the Bureau of Mines on War Gas Investigations, July 1, 1917 to May 15, 1918," Records of the Bureau of Mines, RG 70, NA.
14. Brophy, et al., *The Chemical Warfare Service*, 6.
15. Manning, "Report on War Gas Investigations," RG 70, NA.
16. Lt. Col. W. D. Bancroft, "History of the Chemical Warfare Service in the United States," May 31, 1919, Research Collections, Office of History, Headquarters, U.S. Army Corps of Engineers, Fort Belvoir, Va.
17. The number of temporary structures on the American University campus is based on subtracting the College of History and College of Government Buildings and the permanent structures constructed in 1917 and 1918 from the total number of buildings there when the American University Experiment Station was discontinued. Black, "Use of the American University Grounds," RG 77, NA.
18. William L. Sibert to Director of Operations, War Department, Oct. 27, 1918, RG 407, NA.
19. "Pyrotechnic Division, Status of Problems in the Gas Shell Unit," n.d.; "Gas Shells—Firing a Live's Projectile Loaded with CG," n.d.; "Main Report, Pyrotechnic Division," n.d., RG 70, NA.
20. "Reports of the National Training School for Girls," *Commissioners Reports, 1916–1919*, Records of the District of Columbia, Record Group 351, NA. The reports mentioned no adverse effects from the nearby military camps. Perhaps even more important, no complaints about the treatment of the young women (13–21 years of age) were lodged with the Board of Commissioners of the Board of Charities, to whom relatives and others lodged complaints when inmates of charitable institutions were mistreated. See also Minutes of the Board of Commissioners in vols. 3 and 4, item 159, RG 351, NA.
21. Maj. Gen. W. L. Sibert to Maj. Gen. W. M. Black, Sept. 12, 1918; G. A. Burrill to Director of Chemical Warfare Service, Sept. 5, 1918, Records of War Department General and Special Staff, Record Group 165, National Archives.
22. *Ibid.*; *Washington Post*, Aug. 4, 1918; *Washington Times*, Aug. 4, 1918.
23. D.C. Board of Commissioners to Secretary of War, Oct. 30, 1918, Records of the Chemical Warfare Service, RG 175, NA. See also Commissioners of the District of Columbia to Secretary of War, Oct. 30, 1918, Records of the District of Columbia Department of Public Works, District of Columbia Archives; Secretary of War to Board of Commissioners of the District of Columbia, Nov. 8, 1918, RG 351, NA.
24. Chief of Engineers to the Commanding Officer, Camp Leach, Nov. 30, 1918, RG 77, NA.
25. Col. R. E. Wyllie to Director of Chemical Warfare Service, Sept. 30, 1918; 1st Indorsement to memorandum from Colonel R. E. Wyllie to Director of Chemical Warfare Service, Sept. 30, 1918, Real Estate Records, RG 92, NA.
26. Adjutant General to Director of Chemical Warfare Service, Nov. 16, 1918; Director of Operations, General Staff to Assistant Secretary of War, Nov. 4, 1918; Brigadier General Hugh S. Johnson to Director of Operations, General Staff, Sept. 13, 1918, RG 92, NA.
27. Black, "Use of the American University Grounds," RG 77, NA.
28. Maj. Gen. Henry Jervey to Assistant Secretary of War, Nov. 4, 1918, RG 394, NA.
29. Adjutant General to Director of the Chemical Warfare Service, Nov. 16, 1918, RG 394, NA.
30. William L. Sibert to Adjutant General, U.S. Army, Dec. 4, 1918, RG 394, NA.
31. Briefing book, Lt. Col. Craig Crotteau, Spring Valley Resident Office, U.S. Army Corps of Engineers, Baltimore District, Jan. 1994.