

## Benjamin Franklin Scott (1922-2000)

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Born in Florence, South Carolina, October 19, 1922, Benjamin Franklin Scott was an African-American chemist who worked on the Manhattan Project in World War II. The son of Benny and Viola Scott, Benjamin had two older sisters, Mary and Rosa.

Scott earned his Bachelor of Arts degree in 1942 from Morehouse College, a Historically Black College and University (HBCU) located in Atlanta, Georgia. Scott continued his education at the University of Chicago where he earned a Master of Science degree in 1950.

Between the years of 1943-1946, Scott worked as a chemist on the Manhattan Project at the University of Chicago's Metallurgical Laboratory. The Manhattan Project, one of the most important scientific projects of the 20th century, led to the development of the atomic bomb, which ended World War II. Other notable African-American scientists who worked with Scott at the Chicago laboratory include Harold Delaney, Moddie Taylor, and Jasper Brown Jeffries. Scott – like both Jeffries and Taylor – earned a graduate degree from the University of Chicago, but his came after World War II and his involvement on the Manhattan Project.

Scott held numerous positions after his appointment as a chemist on the Manhattan Project, including working as a subcontractor and manufacturer of Geiger counters from 1946-50. This is important because Geiger counters are instruments that are used to detect radiation. Scott worked as a Radiochemist and later Chief Chemist for the Nuclear Instrument Company (1949-63). The Nuclear Instrument Company was renamed the Nuclear-Chicago Corporation (Chicago, Illinois) in 1954.

In 1963, Scott began working as a Technical Director for the New England Nuclear (NEN) Assay Corporation (Boston, MA). While working at NEN, Scott co-authored an article in the peer-reviewed journal *Analytical Chemistry*, which is a top-tier journal in the chemistry field. In addition, Scott published his research efforts in the *Journal of Radioanalytical Chemistry* and several reports published by the Atomic Energy Commission in 1952, 1959, and 1961 focusing on radiometric methods and emission by uranium-235.

Scott married Bessie Joyce Sampson who was also a native of South Carolina. Their son was born in 1950. Scott died on October 16, 2000 in Sumter, South Carolina at the age of 77.

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## Edwin Roberts Russell (1913-1996)



*Image courtesy of the South Carolina African American Calendar*

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Born in Columbia, South Carolina on June 19, 1913, Edwin Roberts Russell was an African American chemist who worked on the Manhattan Project in World War II which produced the first atomic bombs and initiated the Nuclear Era. The middle child of Nathan and Mary Russell, Edwin had one older brother, Nathan and three sisters, Henrietta, Marguerite, and Vivian.

Russell earned his B.S. degree in 1935 from Benedict College, an Historically Black College and University (HBCU) located in Columbia, South Carolina. Russell continued his education at Howard University where he earned an M.S. degree in chemistry in 1937. Russell worked as an instructor in the Chemistry Department at Howard University from 1936 to 1942 before entering the University of Chicago to pursue a Ph.D. in surface chemistry.

Edwin Russell arrived at the moment the University became the center for Manhattan Project research. For the next five years (1942-1947), Russell worked as a chemist on the top secret Project at the University of Chicago's Metallurgical Laboratory. Russell became one of the scientists directly involved in the production of atomic energy. His efforts focused on isolating plutonium from uranium, a painstakingly slow process which was necessary to build the atomic bomb. Other African American scientists who worked with Russell at the Chicago laboratory included Harold Delaney, Moddie Taylor, Jasper Brown Jeffries, and Benjamin F. Scott. Russell later obtained eleven U.S. patents including two focused on the processes of isolating plutonium from uranium (U.S. Patent 2,855,629, Oct. 7, 1958; U.S. Patent 2,992,249, July 11, 1961).

After World War II, Russell served as Chair and Professor of the Division of Science at Allen University in Columbia South Carolina from 1947 to 1953. He then was employed as a Research Chemist at E.I. DuPont's Savannah River Nuclear Laboratory in Aiken, South Carolina from 1953 to 1976. While working at DuPont, Russell focused on a number of projects including the treatment of radioactive waste and wrote several classified publications in the field of nuclear energy. He also served as a contributing editor to the National Nuclear Energy Series. Russell retired from the DuPont Nuclear Laboratory in 1976.

Edwin Russell was a member of the American Association for the Advancement of Science (AAAS) and the American Chemical Society (ACS). In 1974, he received an honorary doctorate from Benedict College. He married Dorothy (Nance) Russell. The couple had a daughter, Vivian Eleanor Russell Baker.

Edwin Roberts Russell died on Easter Sunday, April 7, 1996 in Columbia, South Carolina. He was 82. Shortly after his death, the South Carolina Legislature honored his memory by introducing a resolution which celebrated his achievements and stated that Edwin Roberts Russell was "one of South Carolina's ablest and most distinguished leaders."

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## George Sherman Carter (1911-1998)

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George Sherman Carter, research chemist, was born on May 10, 1911 in Gloucester County, Virginia. Carter, called Sherman, was one of four boys and one girl born to George Peter and Emily Maude Carter. Not much is known of Carter's childhood or of his move north but in 1936 Carter began his studies at Lincoln University in Pennsylvania where he majored in biology. Carter was very active in the school community, joining Alpha Phi Alpha fraternity, the track team, the New York Club and Wissenschaft Verein (Science Club). After graduation in 1940 Carter attended Columbia University's Teachers College as well as the College of the City of New York.

Carter married Kathleen Francis and the two of them had a daughter, Beverly Kathleen. In 1943 Carter was hired at Columbia University in New York to work in tandem with the University of Chicago studying nuclear fission. This project was set up by the Army Corps of Engineers as part of the famed Manhattan Project that produced the first atomic bomb. While at Columbia, Carter worked for Isidor Isaac Rabi, who led the Columbia group of scientists. That group included William and Lawrence Knox.

After the end of the Manhattan Project, Carter and his family remained in Harlem. Carter became an integral part of the community. He was an active member of the Abyssinian Baptist Church but later joined the Unity Church, both in Harlem. Although little is known about his work history after the Manhattan Project, he did join the American Association of Scientific Workers.

George Sherman Carter died in his home in Harlem, New York on November 13, 1998 after a long illness. He was 87.

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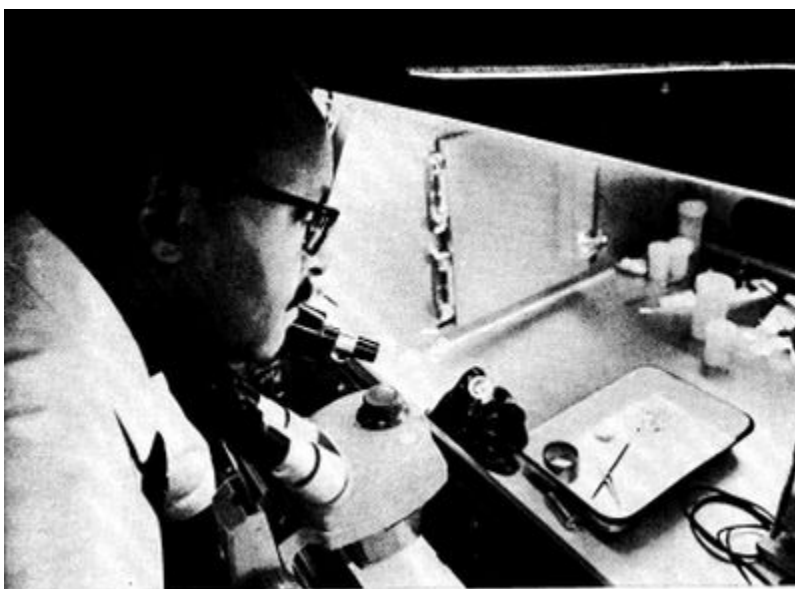
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## George Warren Reed, Jr. (1920 – )



*George W. Reed examining lunar rocks in 1970 at the Argonne National Laboratory (Argonne National Laboratory).  
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Although he was one of many scientists recruited for the Manhattan Project, which produced the atom bomb during World War II, there is a clear paucity of literature on George W. Reed Jr. Like his fellow scientists, Reed was not at liberty to discuss, with any detail, his involvement in the project.

Born in Washington D.C on September 25, 1920, Reed spent his entire career as a chemist specializing in a variety of fields within the discipline. In 1942 he received a BS degree from Howard University and two years later an M.S. Both degrees were in chemistry. He then completed his PhD at the University of Chicago in 1952, after his work with the Manhattan Project.

Reed's training as both a nuclear and geo-chemist would play equally important parts in his long research career. During World War II Reed and a number of other black chemists worked at the University of Chicago Metallurgical Laboratory. Metallurgy chemists—those who study the physical and chemical properties of metallic elements—were crucial members of the Manhattan project namely because the two primary fuels for the atomic bombs were the metals uranium and plutonium. Reed worked on obtaining enough fissionable uranium to produce and sustain a nuclear reaction. His post-Manhattan project research continued in this area where he examined distinct patterns in radiation produced from uranium and plutonium at various stages. Reed's work in uranium radiation, however, had immediate impact on the construction of the atomic bomb.

After World War II, Reed held a number of positions and worked, for some time, outside of nuclear chemistry, most notably during his tenure with the Meteoritical Society from 1970 to 1972. He was also

on the lunar sample planning team with the National Aeronautics and Space Administration (NASA) from 1972 to 1980. After the first moon landing Reed was given the opportunity to analyze the sample of moon rock in a nuclear reactor; he eventually concluded that the rock contained minerals not found on earth.

Reed never strayed too far from the University of Chicago however, as he held positions in the chemistry division with the Argonne National Laboratory; a scientific research subsidiary of the university, first as an associate chemist from 1952 to 1968 and eventually as a senior scientist beginning in 1968.

Reed married Selina Edwards and their union yielded four children: Mark, Philip, Carole and Lauren.

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## Harold Bethuel Evans (1907-1995)

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Harold Bethuel Evans, research chemist, was born on October 31, 1907 in Brazil, Indiana. Evans attended Michigan State University for his undergraduate degree beginning in 1927; he majored in applied science and graduated in 1931. In 1932 he received his master's degree in science from Michigan State, with his thesis on the Benzoylation of Thymol, a chemical process. That same year he married and later had one child. After graduating, Evans sought a teaching position at an all-black college, as many educated blacks did at this time. He taught chemistry at Georgia State Normal College (now Georgia College) for the 1935-1936 school year.

Evans held a series of odd jobs between 1936 and 1941 when he moved to Illinois and was hired by the federal government's Kankakee Ordnance Works (otherwise known as Illinois Ordnance Works). He stayed there until 1943 working as a chemist on projects designed to support Great Britain until the U.S. officially entered World War II on December 8, 1941. From 1941 to 1943 he worked on U.S. military projects.

In 1943 Evans was hired as an associate chemist at the University of Chicago's Metallurgical Lab, which after World War II evolved into the Argonne National Laboratory. It later relocated west of Chicago. While with the Met Lab, Evans worked on nuclear fission projects as part of a 400-man team of scientists for the Manhattan Project, which produced the world's first atomic bombs.

Evans continued to work at Argonne well after the end of World War II, researching chemical reactions and relations including those specifically pertaining to radioactive elements. Evans eventually became a member of both the American Chemical Society and the Science Research Society of America. He remained with Argonne until his retirement when he and his wife moved to Macclenny, Florida. Evans died on July 28, 1995. He was 88 years old.

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## Harold Delaney (1919-1994)



*Harold Delaney.*

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Born in Philadelphia, Pennsylvania on August 24, 1919, Harold Delaney was one of several African American scientists to work on the Manhattan Project in World War II. The eldest child of William and Henriette Delaney, Harold had four sisters, Mildred, Gertrude, Laura, and Ethel, and a brother, William.

Delaney studied chemistry at Howard University in Washington, D.C. and earned his B.S. and M.A. degrees in 1941 and 1943, respectively. In March 1943, Delaney co-authored an article with his graduate adviser, Dr. Robert Percy Barnes, and with Dr. Victor Julius Tulane and Dr. Stewart Rochester Cooper in the *Journal of Organic Chemistry*, a prestigious peer-reviewed journal. Tulane and Cooper were also faculty members in the Department of Chemistry at Howard University. In November 1943, Delaney published a second article with Barnes in the *Journal of the American Chemistry Society*, another prestigious peer-reviewed journal. Publication of these two articles completed the requirements for Delaney's M.A. degree. In addition, Barnes, Tulane, and Rochester were highly productive chemistry researchers publishing several peer-reviewed journal articles. Barnes authored approximately 40 scientific articles during his career. This is significant because peer-reviewed scientific articles are considered the "currency of science."

After completing his M.A. degree, Delaney worked as a chemist on the Manhattan Project between 1943 and 1945 at the University of Chicago. The Manhattan Project, one of the most important scientific projects of the 20th century, led to the development of the atomic bomb which ended World War II.

After his appointment at the University of Chicago ended in 1945, Delaney worked as an assistant professor of chemistry at North Carolina Agricultural & Technical University in Greensboro, North Carolina from 1945 to 1948. He later returned to Howard University to complete his doctoral degree and became one of the first two graduate students to earn a Ph.D. in chemistry in 1958 from Howard. Delaney held several academic and industrial positions over his career, including serving as a faculty member at Morgan State University in Baltimore for 21 years (1948-1969) and working as a research chemist at E.I. Dupont de Nemours & Co for three years (1966-1969).

In 1974 Delaney became the first male president of Manhattanville College, a woman's college in Purchase, New York. He later served as vice president of the American Association of State Colleges and Universities headquartered in Washington, D.C. He retired from that post in 1987.

Delaney married Geraldine East, a native of North Carolina, in 1946. East earned a degree from North Carolina A&T where she met Delaney, and later taught in the Baltimore public schools from 1953 until 1968. The couple had two sons, Doyle and Milton.

Delaney and his wife died on August 2, 1994 at their home in Pilot Mountain, North Carolina. He was 74.

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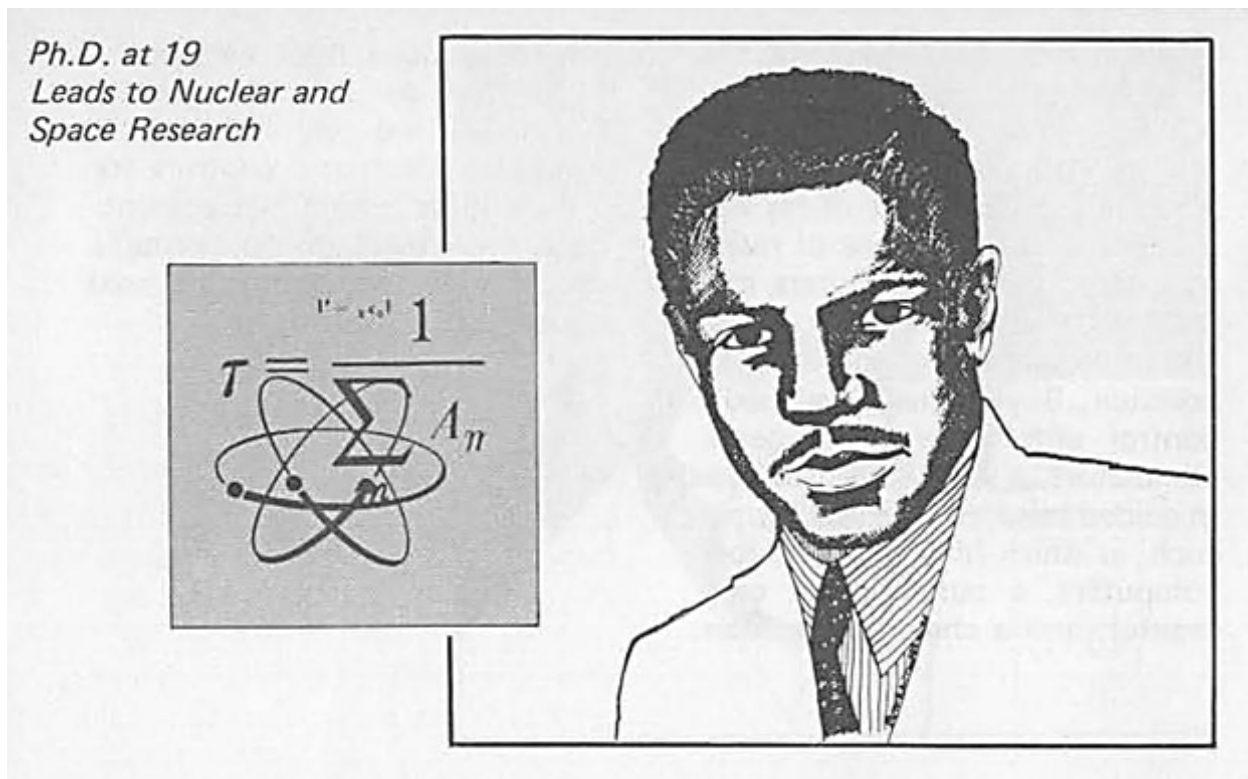
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## J. Ernest Wilkins (1923-2011)



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Jesse Ernest Wilkins, Jr. is often described as one of America's most important contemporary mathematicians. At 13, he became the University of Chicago's youngest student. Wilkins continued his studies there, earning bachelor, master, and doctorate degrees in mathematics. When he finished his Ph.D. at 19, he was hailed by the national press as a "negro genius."

Wilkins was born in Chicago, Illinois on November 27, 1923 to Lucile Beatrice Robinson Wilkins who held a master's degree and taught in the Chicago Public School system. His father, J. Ernest Wilkins, a prominent attorney, was assistant Secretary of Labor during the Dwight D. Eisenhower administration.

After completing his Ph.D., Wilkins taught mathematics for one year at Tuskegee Institute (1943-1944) before being recruited to work at the Metallurgical Laboratory at the University of Chicago where he contributed to the Manhattan Project. Wilkins worked there between 1944 and 1946. In 1946 Wilkins then worked in private industry, first at the American Optical Company (1946-1950), then United Nuclear Corporation, which later became General Dynamics (1950-1960), and finally General Atomic Company (1960-1970). He also earned bachelor and master degrees in mechanical engineering from New York University in 1957 and 1960 respectively. In 1970, Wilkins became the Distinguished Professor of Applied Mathematical Physics at Howard University. He was noted as being inspirational to his students and for starting Howard's Ph.D. program in mathematics.

Wilkins returned to nuclear engineering by working at the firm of EG & G, Inc., a scientific technology firm, from 1977 to 1984 and then serving as a fellow at the Department of Energy's Argonne National Laboratory from 1984 to 1985. He retired in 1985 but that retirement lasted only five years. In 1990 he became the Distinguished Professor of Applied Mathematics and Mathematical Physics at Clark Atlanta University, a position he held until his death.

J. Ernest Wilkins was a member of numerous professional societies and has been awarded many honors in his distinguished career including: he has served as President of the American Nuclear Society (1974-1975), Council Member of the American Mathematical Society (1975-1977), and in 1980 he received the Outstanding Civilian Service Medal by the US Army. He published numerous papers in the fields of mathematics, optics, and nuclear engineering. His greatest contribution to scholarship was the development of mathematical models to explain gamma radiation and his subsequent work on developing a shielding against gamma radiation.

J. Ernest Wilkins died at his home in Fountain Hills, Arizona, on May 1, 2011.

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## Jasper Brown Jeffries (1912-1994)

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Born in Winston-Salem, North Carolina on April 15, 1912, Jasper Brown Jeffries was an African American physicist and mathematician who worked on the Manhattan Project in World War II. The eldest child of Brown and Edna Jeffries, Jasper had three younger brothers, Carl, Hubert, and Robert.

Jeffries earned his B.S. degree in 1933 from West Virginia State College (WVSC), an Historically Black College and University (HBCU) located in Institute, West Virginia. While attending West Virginia State College, Jeffries enrolled in classes taught by Dr. Angie Turner King, also a 1927 graduate of the institution. King earned a masters degree in mathematics and chemistry in 1931 from Cornell University and later earned a doctoral degree in mathematics and chemistry in 1955 from the University of Pittsburgh. This is very significant because King represented the small numbers of African American women earning graduate degrees in the STEM (science, technology, engineering, mathematics) fields during this time period. It is highly plausible that King encouraged Jeffries to further his education and pursue a graduate degree. After earning his B.S. degree from West Virginia State College, Jeffries briefly attended the University of Illinois (1933-35). He later earned his M.S. degree in physical sciences from the University of Chicago in 1940.

After completing his M.S. degree, Jeffries worked as a physicist on the Manhattan Project (Metallurgical Laboratory) between 1943 and 1946 at the University of Chicago. Other African American scientists hired at the Chicago laboratory included Harold Delaney, Moddie Taylor, and Benjamin F. Scott. The Manhattan Project, one of the most important scientific projects of the 20th century, led to the development of the atomic bomb which ended World War II.

Jeffries held several academic and industrial positions after his appointment on the Manhattan Project. From 1946 to 1949, he served as a Professor and Chair in the Department of Physics at North Carolina Agricultural & Technical University in Greensboro, North Carolina, joining his colleague Delaney who was a faculty member in the Department of Chemistry at this time. For almost a decade, Jeffries worked as a Senior Engineer for the the Control Instrument Company (1951-59) located in New York. From 1963 to 1971, Jeffries worked as an Assistant Professor of Mathematics at Westchester Community College in Valhalla, N.Y. In 1971, Jeffries was promoted to Professor and became Chair of the department.

In 1937, Jeffries married Marguerite Diffay, a native of Birmingham, Alabama. Diffay earned a degree from Fisk University and a master of social work (M.S.W.) from the University of Chicago. The Jeffries had three daughters, Edna, Hazel, Marguerite, and a son, Jasper Brown, III.

Jasper Brown Jeffries died on July 16, 1994 in White Plains, New York. He was 82.

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## Lawrence Howland Knox (1906-1996)



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Dr. Lawrence Howland Knox, noted chemist, was born on September 30, 1906 in New Bedford, Massachusetts to William Jacob and Estella Knox. Knox was one of five children, two girls and three boys, and remarkably for that time, all of the boys earned PhDs; the oldest brother, William Jr. also earned a PhD in chemistry, and the younger brother, Clinton, earned a PhD in history.

Knox attended Bates College in Lewiston, Maine for his undergraduate schooling. He majored in chemistry and played on the school football team. He graduated in 1928 and began teaching chemistry at Morehouse College in Atlanta, Georgia. After teaching at Morehouse for two years Knox attended Stanford and in 1931 attained his Master's degree. That same year he married his wife, Hazel and the two had one son. After receiving his Master's degree, Knox began teaching at the Agriculture and Technical College of North Carolina in Greensboro, and in 1933 he transferred to North Carolina College for Negroes in Durham. In 1936 he took another break from teaching and began working for his doctorate at Harvard. In 1940 he achieved a PhD in organic Chemistry and went back to teaching at North Carolina College.

It was at America's entrance in to the Second World War that Knox's career path changed from teaching to research. In 1944 he left his job at North Carolina College to contribute to the research of quinine

(used today to treat malaria) for the Division of War Research. Knox's work on quinine was meant to be used in the Manhattan project for field research on the effects of atomic bomb explosions. Knox remained at Columbia University in New York until the end of the war in 1945.

With the end of his time at Columbia University Knox became a research chemist for Nopco Chemists in Harrison, New Jersey. In his three years there he was granted at least four patents. In 1948 became the Resident Director at the Hickrill Chemical Research Foundation in Katonah, New York and remained in that post until the foundation folded in the late 1950s. It was also at this time that his marriage to Hazel began to fall apart, resulting in divorce. He remarried a white woman, Anne Juren, and moved to Mexico.

Knox took a position with Laboratorios Syntex S.A. out of Mexico City, Mexico, and from 1960 to 1965 he received almost forty patents in the field of steroid chemistry. Knox and his wife stayed in Mexico when the company moved to Palo Alto, California because of Mexico's comparatively liberal attitude toward their mixed-race marriage. Their attachment to Mexico grew when the couple adopted a Mexican baby named Naomi. Lawrence Knox's life came abruptly to end in 1966 when he died from carbon monoxide poisoning caused by the kerosene heater he had in his home office.

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## Lloyd Albert Quarterman (1918-1982)



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Born May 31, 1918 in Philadelphia, Lloyd Albert Quarterman, a chemist, was one of the few African American scientists and technicians to work on the Manhattan Project, the top secret effort to design and build the atomic bomb during World War II.

Quarterman developed an interest in chemistry from a young age partly by using toy chemistry sets his parents gave him. He attended St. Augustine's College in Raleigh, North Carolina where he developed a reputation as a scholar and star football player. After receiving his bachelor's degree from St. Augustine's in 1943, he was quickly recruited by the War Department to work on the Manhattan Project. Though he was only a junior chemist on the project, Quarterman had the opportunity to work closely with Enrico Fermi at the University of Chicago and with Albert Einstein at Columbia University.

Quarterman was a member of the team of scientists who isolated the isotope of uranium (U 238) necessary for the fission process, which was essential to the creation of the atom bomb. Once the war ended, he continued to work at the University of Chicago's laboratory hidden beneath the campus football stadium during the war and later rebuilt in a Chicago suburb and renamed the Argonne National Laboratory. After the war, Quarterman returned to school and earned a master of science from Northwestern University in 1952. He would return to Argonne and remain at the national laboratory for the next thirty years.

Beyond his work on the bomb, Quarterman worked with fluoride solutions to create new chemical

compounds and new molecules. He was skilled at purifying hydrogen fluoride, a highly corrosive gas. In 1967 he developed a corrosive resistant "window" made of diamonds in order to better study hydrogen fluoride. His innovation was called the "diamond window." He also created a xenon compound which surprised the world of chemistry because it was believed that xenon was an "inert" gas and supposedly could not be combined with other atoms. At the time of his death, in 1982, Quarterman had initiated work on a project to develop "synthetic blood" but encountered ethical and political opposition to his research.

The atomic scientist was a member of Sigma Xi, the American Chemistry Society, the Society of Applied Spectroscopy, the American Association for the Advancement of Science, Scientific Research Society of America, and the Chicago branch of the National Association for the Advancement of Colored People (NAACP). He spoke often to young African Americans urging them to pursue careers in science.

Lloyd Quarterman died in Chicago, Illinois in July of 1982 at the age of 64. Before his death, he had instructed that his body be used for scientific research.

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## Moddie Daniel Taylor (1912-1976)



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<http://www.blackpast.org/aah/taylor-moddie-d-1912-1976>.*

Moddie Daniel Taylor, a chemist by training, was a member of the small, elite group of African American scientists who worked on the Manhattan Project, the code name for the top-secret effort to create an atomic bomb during World War II. Taylor was born in Nymph, Alabama on March 3, 1912, the son of Herbert L. Taylor and Celeste (Oliver) Taylor. The Taylors later moved to St. Louis where Herbert worked as a postal clerk. Moddie Taylor attended Charles H. Sumner High, graduating in 1931. He then attended Lincoln University in Jefferson City, Missouri where he majored in chemistry. Taylor graduated in 1935 as the valedictorian of his class.

Moddie Taylor began his teaching career at Lincoln University the same year, working as an instructor until 1939 and then as an assistant professor from 1939 to 1941 while enrolled in the University of Chicago graduate program in chemistry. He received an M.S. from the University in 1939 and a Ph.D. in 1943.

Taylor married Vivian Ellis in 1937. The couple had one son, Herbert Moddie Taylor.

Moddie Taylor went to work on the Manhattan Project in 1945 at the University of Chicago. His worked as an associate chemist for the project for the next two years, involved in analyzing rare earth metals, elements of which are the products of oxidized metals and have special properties and important industrial uses. His contributions to the project earned him a Certificate of Merit from Secretary of War Robert P. Patterson in 1946.

In 1946 Taylor returned to Lincoln University for two years before becoming a chemistry professor at Howard University and the chair of the department in 1969. His research at Howard included the study of the vapor phase of dissociation of some carboxylic acids, which resulted in a grant in 1956 from the American Academy of Arts and Science.

In 1960, Taylor's textbook, *First Principles of Chemistry*, was published. It soon became one of the major texts in use in colleges and universities throughout the United States. Also in 1960, he was selected by the Manufacturing Chemists Association as one of the nation's six top college chemistry professors. In 1972 Taylor was given the Honor Scroll from the Washington Institute of Chemists for his research and teaching.

Taylor was a member of the American Chemical Society, the American Association for the Advancement of Science, The New York Academy of Sciences, Sigma Xi, and Beta Kappa Chi. He was also a fellow of the American Institute of Chemists and the Washington Academy for the Advancement of Science.

Taylor retired as professor emeritus from Howard University on April 1, 1976, and died of cancer in Washington, DC on September 15, 1976. He was 64.

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## Ralph Gardner-Chavis (1922 – )



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Ralph Alexander Gardner, hard plastics pioneer and one of the scientists and technicians who worked on the Manhattan Project which developed the atomic bomb, was born December 3, 1922 in Cleveland, Ohio, son of Vivian and Clarence Gardner. Gardner developed an early love of chemistry, certain that he wanted to pursue a career in the sciences as early as ninth grade. He graduated from John Adams High School in Cleveland, Ohio and began college at the Case School of Applied Science in 1939 which later became part of Case Western Reserve University.

Gardner was unimpressed with the school and transferred to the University of California, Berkley before finally graduating from the University of Illinois with a degree in Chemistry in 1943. He then took a research position at the University of Chicago's Argonne National laboratory and worked for the next four years on the Manhattan project. He engaged in highly classified plutonium research which was crucial in the development of the atomic bomb. Gardner was one of several African American scientists employed on the Manhattan project. Others included Lloyd Albert Quarterman, Edward A. Russell, Moddie Taylor, Harold Delaney, Benjamin Scott, J. Ernest Wilkins, and Jaspar Jefferies. George Dewitt Turner, Cecil Goldsburg White, Sydney Oliver Thompson, William Jacob Knox, Robert Johnson Omohundro, and George Warren Reid, Jr. also participated in various phases of the project.

Even after holding such a prestigious research position in World War II, Gardner was unable to find academic or professional work after the conflict ended. From 1947 to 1949 he worked as a waiter before finding work as a chemist for Standard Oil Company in Cleveland. He returned to graduate school at Case Western Reserve in Cleveland, Ohio, earning a master's degree in 1952 and a Ph.D. in 1959.

In 1968 Gardner began teaching at Cleveland State University where he worked full-time until 1985. He then began employment at Molecular Technology Corporation where he eventually became Vice President of Research. Gardner is now a Professor emeritus at Cleveland State University, where he continues to research catalysis and molecular technology.

Ralph Gardner added "Chavis" to his surname later in life to honor John Chavis who in 1792 became the first African American to enroll in Princeton University.

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## Robert Johnson Omohundro (1921-2000)

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Born in Norfolk, VA in 1921, physicist Robert Johnson Omohundro was one of a select few black scientists and technicians to work on the Manhattan Project and thus contribute to the development of the atom bomb during World War II. The eldest child of Henry Omohundro and Brownie Pierce Omohundro, Robert had one sister, Gladys and four half-siblings, Joseph, Mildred, Annie Mae, and Dorothy from his father's first marriage.

Omohundro graduated from Booker T. Washington High School in Norfolk, Virginia and then earned a bachelor's degree in mathematics and a master's in physics from Howard University in Washington, DC. After graduation he worked as a radio tester with the Western Electric Company.

Omohundro's contribution to the atom bomb project was his work as a mass spectroscopist. Mass spectrometry (MS) is a common technique that scientists use to help identify particles in samples by their mass. During World War II Omohundro, who worked at a secret facility in Arizona, was also responsible for developing devices to locate and measure radiation emissions from atomic warheads. These devices were used long after World War II by the International Atomic Energy Agency in airports around the world to detect clandestine transfers of fissionable material and portable neutron detectors.

From 1948 to 1984, Omohundro applied the techniques of nuclear physics honed during his work on the Manhattan Project to developing technology at the Naval Research Laboratory in Washington, DC. He was noted for his development of devices that prevent the propagation of plutonium at airfields. In addition, he continued his World War II research by designing more advanced devices for radiation detection from nuclear warheads. In 1963 and 1971, he obtained two patents in the field of nuclear physics. Over the course of his career Omohundro authored and co-authored 40 scientific articles.

Omohundro was a member of the American Physical Society, the Research Society of America, and Alpha Phi Alpha Fraternity.

Robert Johnson Omohundro died of cardiac arrest at George Washington University Hospital on May 15, 2000 in Washington, DC. He was 78 years old.

### **Sources:**

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## Samuel Proctor Massie (1919-2005)



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Born in 1919 in North Little Rock, Arkansas, Samuel Proctor Massie was as one of the few African American scientists to work on the Manhattan Project during World War II. He later became a distinguished professor of chemistry.

Massie graduated from Dunbar High School in Little Rock at the age of 13. At age 18, he earned his bachelor's in science and was summa cum laude from the University of Arkansas at Pine Bluff in 1937. With a scholarship from the National Youth Administration he earned a master's degree in chemistry at Fisk University in 1940 when he was only 21 years old. Massie said his desire to find a cure for his father's asthma spurred him to become a chemist.

As he neared the completion of his doctorate in chemistry at Iowa State University in 1942, Massie lost his draft deferment. When he was about to be drafted in his home state of Arkansas, his major professor at Iowa State, Henry Gilman, who was already working on the Manhattan Project, assigned Massie to his research team. Massie performed his research at Iowa State University from 1942 to 1946 where he helped in the development of uranium isotopes for the atomic bomb.

In 1946 Massie completed his doctorate in organic chemistry at Iowa State University and accepted a one year position at Fisk before becoming a member of the faculty at Langston University in Oklahoma. While there he worked to transform his department and by 1953, he was not only a full professor and chair of his department, but also president of the Oklahoma Academy of Science. Massie was the first



African American to hold this distinguished post. In 1953 he returned to Fisk. While at Fisk, he convinced the American Chemical Society to hold their national meeting at the university. This was the first time a historically black institution had ever hosted a major scientific meeting.

By the early 1960s Massie had held leadership positions at the National Science Foundation in Washington, D.C. and at Howard University. From 1962 to 1966 Massie was President of North Carolina College at Durham. In 1966, President Lyndon Johnson appointed Massie to the Naval Academy in Annapolis, Maryland where he became the first African American professor at the institution. He engaged in some of the most significant work of his career while at the Naval Academy. Massie also created the Academy's black studies program. He retired from the Academy in 1993.

Samuel Proctor Massie is noted for his work on drugs to combat cancer, mental diseases, malaria, meningitis, and herpes. He received a patent for work he did combating gonorrhea.

In 1947, Massie married Gloria Bell Thompkins whom he had met while they were students at Fisk University. She later became a psychology professor. The couple had three sons.

In 1998, Massie was named one of the 75 greatest chemists of all time, alongside Marie Curie, George Washington Carver, Linus Pauling, and DNA pioneers James Watson and Francis Crick, by the journal *Chemical and Engineering News*.

Samuel Proctor Massie died in Laurel, Maryland on April 10, 2005.

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## William Jacob Knox (1904-1995)



*Image from Harvard University Archives*

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Born in New Bedford, Massachusetts on January 5, 1904, William Knox is remembered for two achievements. He was among a handful of black scientists to work on the top secret Manhattan Project, which produced the atom bomb during World War II, and following the war he held a key development position at the Kodak Corporation, a major manufacturer of camera equipment.

Knox was the oldest of three brothers born to William and Estelle Knox. The elder Knox was a clerk at the U.S. postal service in New Bedford. All of the brothers attended Harvard University as undergraduates with William graduating from the institution in 1925. All three Knox brothers would go on to earn Ph.D.s. The middle son, Everett, studied history. The youngest son, Lawrence, studied chemistry and, during World War II, joined his eldest brother on Manhattan Project research.

William Knox earned his Master's degree and his Ph.D. from the Massachusetts Institute of Technology (MIT) in 1929 and 1935 respectively. From 1935 to 1942, Knox was a professor in the chemistry department at North Carolina A&T College. He left in 1942 to become chair of the chemistry department at Talladega College. One year later, however, he joined a team of scientists at Columbia University who were devising a way to separate the two uranium isotopes using gaseous diffusion, a complex process that made use of uranium hexafluoride, an extremely corrosive material. Though he

did not know it at the time, his work was essential to the development of the atom bomb. Knox also holds the distinction of being the only black supervisor on the project.

Knox was one of the few black scientists who successfully transferred his wartime science expertise into private industry. Because of his work on corrosive substances, he was hired as a research scientist for Eastman Kodak in Rochester, New York in 1945. During his time at Kodak he received patents at a rate of nearly one per year, totaling 21 patents in 25 years. Knox retired from Kodak in 1970. Knox briefly returned to teaching at North Carolina A&T, remaining there until his permanent retirement in 1973.

Knox married Edna Knox (nee Jordan) and the couple had one daughter, Sandra. William Jacob Knox died on July 9, 1995 in Newton Massachusetts. He was 91.

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