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Bettye Washington Greene: An Industrial Chemist and Inventor Who Lit a Path for Innovation

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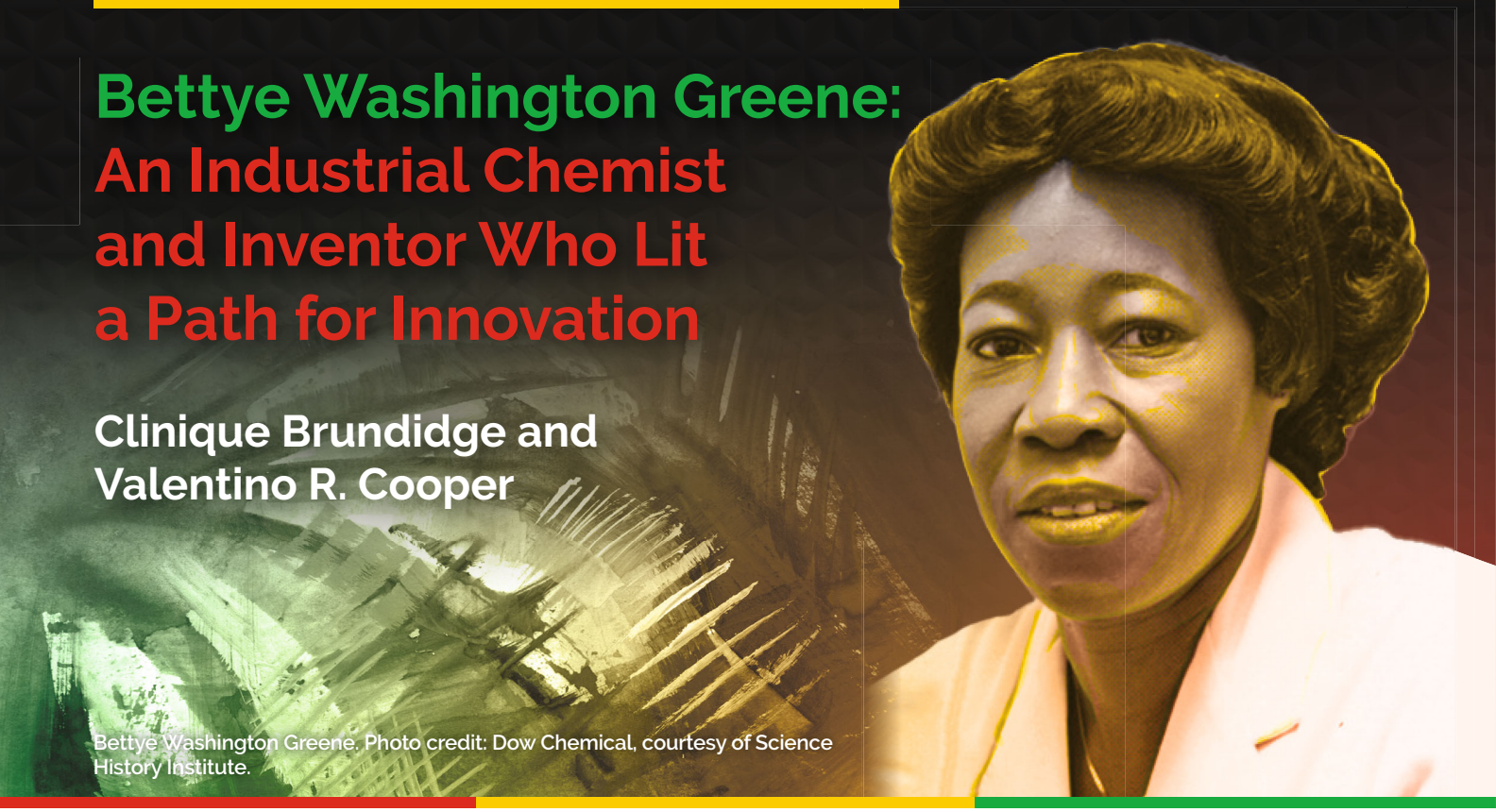

Bettye Washington Greene. Photo credit: Dow Chemical, courtesy of Science History Institute.

American civil rights pioneer John Lewis once wrote: "You are a light...Never let anyone—any person or any force—dampen, dim or diminish your light." At a time when the civil rights movement was shedding light on inequalities faced by African Americans, Bettye Washington Greene (March 20, 1935–June 16, 1995) was forging a path that would light the way—figuratively and literally—for generations to come. She was one of the first few African American women to earn a Ph.D. in chemistry in the 1960s, an era marked by the passing of the Voting Rights Act of 1965. Washington Greene's doctoral thesis evaluated light-scattering methods to determine the size of particles, which influence molecular effectiveness, activity, and stability. The fundamental knowledge she provided critically aided the pharmaceutical, catalyst, and cosmetics industries.[1] Following her doctoral defense, Washington Greene went on to become the first African American female employed in a scientific research role at the Dow Chemical Company, where her innovations were awarded three patents.

Washington Greene was born on March 20, 1935, to George Washington and Kian Criss, in Palestine, Texas, where she attended Our Lady of Mercy Elementary School and James E. Guinn Junior High School. She later attended I.M. Terrell High School in Fort Worth, Texas.[2] All were segregated public schools. After high school, with the encouragement of a teacher, Washington Greene enrolled at the Tuskegee Institute (now known as Tuskegee University) in Alabama to pursue a B.S. in chemistry, which she received in 1955.

In the aftermath of *Brown v. Board of Education*, Washington Greene believed that she had the opportunity to continue her education and applied for graduate study at both Wayne State University and the Massachusetts Institute of Technology. She was accepted into both graduate programs and selected Wayne State, which was nationally known for its premier research department in chemical sciences.[3] Wayne State also provided full financial support, supplemented with research funding from the Office of Naval Research. As a doctoral student, she taught undergraduate chemistry at the university while balancing duties at home as a wife and mother of three children. Washington Greene broke barriers culturally and scientifically when she earned her Ph.D. from Wayne State University in 1965.[4] Her successful defense of her doctoral thesis in physical chemistry, titled "Determination of Particle Size Distributions in Emulsions by Light Scattering," put her in a select club of a handful of African American women with doctoral degrees in chemistry.[4] Light scattering is now an established technique for determining the diameter of particles in colloidal suspensions and solutions. Her doctoral research set the foundation for establishing the necessary techniques and analyses to accurately measure colloidal particle size across a variety of applications including the development of drugs and catalysts.[5] In latex colloidal paints, small particles result in water-resistant, clear coatings that more easily penetrate the coated surface.

Washington Greene continued her career at Dow Chemical Company in Midland, Michigan, where she was hired as a research chemist in its Edgar C. Britton Research Laboratory. She published vital research in peer-reviewed journals that established her expertise in polymer materials including latex, a water emulsion of synthetic rubber or plastic that is used in paints, other coatings, and adhesives. She was tasked to research colloid and latex chemistry, including interactions between latex and paper.[6] Moreover, she served as a consultant on polymer materials challenges in Dow's Saran Research Laboratory. Additionally, the Styrene Butadiene Latex Group often utilized her expertise.[6]

Consistently exceeding expectations, Washington Greene was promoted to senior research chemist in 1970. She published several papers evaluating various properties that result in the adsorption of latex particles in an aqueous solution; a process necessary for the creation and coloring of latex paint.[7] She also made important progress in the development of methodologies for determining surface tension of liquids and solutions.[8] Subsequently, in 1973 she joined the Designed Polymers Research Division. Due to her outstanding technical leadership and notable contributions, Washington Greene was promoted to senior research specialist. She presented novel research findings explaining the interaction between styrene/butadiene latexes and cellulose fibers at professional research meetings including the Fourth International Conference on Surface and Colloid Science at Hebrew University, Jerusalem, Israel, on July 7, 1981.[9]

Among the many accomplishments throughout her career, Washington Greene was issued several patents. In 1985, her patent, "Stable Latexes Containing Phosphorus Surface Groups," described a method of preparing a paper coating composition by adding 2 to 30% of a modified latex containing phosphorus surface groups.[10] In 1986, she received a follow-on patent, "Composite Sheet Prepared with Stable Latexes Containing Phosphorus Surface Groups," which employed emulsion polymerization techniques for preparing modified latex.[11] The patent, "Latex Based Adhesive Prepared by Emulsion Polymerization," was issued to Washington Greene, and centered on the invention of a latex-based, pressure-sensitive adhesive for coating conventional substrates to form an adhesive tape.[12]

Washington Greene's persistence in improving the fundamental properties of latex has been pivotal to the polymeric materials science community. Her career success, however, did not come without struggle. At Dow, Washington Greene faced challenges that were directly tied to discrimination as a person of color. "She went up the [company] ranks, but she was frustrated towards the end of her career," remarked her daughter, Willetta Greene-Johnson, a theoretical physicist.[1] This aggravation stemmed from her duteous training of employees with lesser credentials that were being promoted over her.[13] After making significant contributions to the industry for a quarter century, she retired in 1990.

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Composite image of Dow Chemical microscope (left; photo coutesy of Science History Institute) and depiction of chemical analysis laboratory at Dow Chemical Company (background; photo courtesy of Science History Institute).

Washington Greene was dedicated to community empowerment. Her passion for service and resilient leadership led her to become a founding member of the Midland, Michigan, Alumnae Chapter of Delta Sigma Theta Sorority Inc., a national public service group promoting the work of African American women.[1] She was also elected to Sigma Xi, the Scientific Research Honor Society.[8]

Washington Greene dedicated her entire career to scientific research. In doing so, she lit the path for African American women in the field. She is a pioneer of polymer materials who overcame countless challenges of discrimination. Her professional accomplishments in the corporate and academic worlds were impressive and impactful by any measure. She reached one of the highest technical levels at a company regarded as a global leader in materials science. After decades of contributions to science, she passed away in Midland on June 16, 1995.[9] Her legacy continues through the valuable citations of her research, her impact on the materials and chemistry communities, and her status as a role model for the many who have and will follow after her example.

"...she lit the path for African American women in the field."

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