BOOK REVIEW

African American Chemists: Academia, Industry, and Social Entrepreneurship. Sibrina N. Collins, PhD, Ed. ACS Symposium Series 1381. Ebook American Chemical Society: Washington, DC, 2021; to be distributed in print by Oxford University Press. ISBN13: 9780841298385, eISBN: 9780841298378.

This book chronicles the lives of eleven chemists who represent eleven different perspectives and eleven different sets of experiences along their journey. Yet, in the differences, lies a unifying thread stitched throughout each of their stories. The strong impact of parental influence and mentoring is a common theme that can be drawn in each chapter. Though most of their parents were not formally educated as scientists, their support, sacrifices and encouragement were instrumental in the successes achieved by each of the chemists.

The dedication to the memory of Dr. William Moore is befitting on multiple levels. As so many can attest, Dr. Moore was a teacher. Yes, he taught chemistry to numerous students over the years, but Dr. Moore is widely known and admired for being a teacher of life. Regardless of their chosen career path, he encouraged his students and protegees to do their best in all things. His influence and encouragement were invaluable to countless African American students and professionals. Just like the parental influences of the chemists featured in this book, Dr. Moore was a father figure to many in the sciences and is likened in the parents of the eleven scientists in this book. (On a personal note, Dr. Moore was the first African American to earn a PhD in Chemistry from Purdue in 1967. I was the fourth African American woman to obtain a PhD in Chemistry from Purdue and the first to do so in the Organic division in 2001. In this span of 34 years, there are only thirteen (13) people that separate us.)

The editor, Dr. Sibrina Collins, sets the tone and expectation for reader by explaining the importance of these biographical narratives given the current climate in the United States caused by decades of institutional racism and societal unrest. The expressed desire of organizations to become not only more diverse, but also inclusive and equitable rings especially true for those in the field of chemistry. Whether in the K-12 classroom, lecturing in a university, or holding senior level management positions at top industry and governmental agencies, the dearth of representation of African American chemists holding these positions continues to remain significantly disproportionate to the US population of African Americans.

While social media has allowed more exposure to budding and active practicing chemists, there remain countless others who have made significant impact in advancing inclusion in chemistry for African Americans. This book documents the journey and career path of eleven (to leverage the phrase) hidden chemists who are in plain sight. To further ensure that these scientists are introduced to all students, each chapter ends with an assignment that can be included into the curricula of STEM educators. This serves as a practical approach to expose students of all genders and races to the lives and scientific contributions of African American chemists.

Dr. Collins provides an excellent comprehensive summary of lessons learned from each of the scientists' stories in Chapter 12. The stories are a short and quick read, yet each chapter is packed with its wisdom, knowledge, and inspiration. Therefore, in my review, I have chosen to highlight key points that stood out to me as I reflected on their narratives.

Each of the scientists featured experienced some level of challenge during their formative years, yet because of the support and encouragement of their family

and support systems, they rose to that challenge and thrived. It is an important reminder that even if a student does not understand the subject matter, positive affirmation, praise, and support will help them get through the rigor and demands of STEM undergraduate and graduate degrees.

The essays represent a cross section of industry, academia, governmental labs, and entrepreneurship. The narratives address all career levels and includes a mix of both gender and generations. The stories provide just the right balance of the human aspect to their careers and the technical prowess that got them there. This is by far one of the strengths to the book. These authors allow the reader to see the humanness of their journey. It is relatable and real.

The first scientist featured is **Dr. Bettye Washington Greene**, a graduate of a Historically Black College or University (HBCU) who received her chemistry degree in the mid 1950s. Like many in that era, she found the love of her life during her college years, married shortly after graduation, and began a family. Her drive and desire to pursue a doctorate degree and enjoy a successful career as a chemist in corporate America is a testament to the power of role models for young girls to pursue STEM degrees. Her achievement was evidence and encouragement that led to her daughter, Dr. Willetta Greene-Johnson, not only having a love for science, but ultimately earning her PhD in theoretical physics. No truer example of the saying "like mother, like daughter."

Dr. Nodie Monroe Washington, also attended an HBCU in the segregated South and had the unyielding support of her parents. Her parents instilled in each of their children the need to continue their education and ensured that she participated in science fairs and NSF-sponsored summer science programs during her high school years. She continued her scientific journey all the way to Ohio State University where she earned a PhD in Chemistry. After a brief time teaching at a local college while completing her doctoral studies, she decided to pursue a corporate industrial career as a research chemist. The highlight of Dr. Washington's chapter lies in the tips she shares for those considering a career in industry as a chemist. It is a blueprint that will guarantee a productive and rewarding career, filled with opportunities and advancement. This guidance and advice is only a snapshot of how she used her position and voice throughout her career to mentor and help others realize their full potential.

When you think of someone being the first at something, you tend to think it may have occurred hundreds or even thousands of years ago. So, imagine learning that the first African American to earn a PhD in Chemistry would serve as your advisor during your undergraduate studies. This was the experience of Dr. Richard A. Evans at Tougaloo College, an HBCU in Jackson, Mississippi, during the mid-1950s under the tutelage of **Dr. Saint Elmo Brady**. This chapter provides an insider's view of the commitment and mentorship of Dr. Brady's that has influenced the education of Black chemists for decades.

Physicist turned filmmaker **Dagmawi Abebe** was reading an article on the role of African Americans in the Westward expansion when he noted a minor mention of a photographer's granddaughter's groundbreaking scientific discovery. This chance finding eventually led to funding from the Alfred P. Sloan Foundation to write, direct and produce a short film about the scientific contributions of the woman responsible for the first effective treatment of Hansen's disease, better known as leprosy. *The Ball Method* is a historical account celebrating the life and achievements of Alice Augusta Ball, the first woman and African American to earn a master's degree in chemistry from the College of Hawaii.

Parental influences fueled the chemistry journey of **Dr. Darryl Boyd.** They instilled a continuous thirst for knowledge and ensured that he received exposure to science programs at an early age. Furthermore, the community service that he witnessed his father perform and the sheer strength and perseverance of his mother to then provide for the family after the untimely death of his father shaped not only his pursuit of a doctorate in chemistry but also his becoming more attuned to the importance of women mentors. Through his company, Science Made Simple LLC, Dr. Boyd pursues entrepreneurial interests while living out his passion for science communication and outreach.

A challenging life experience as an undergraduate student at an R1 institution is the impetus for the STEM advocacy work of **Dr. Pamela Leggett Robinson.** She is a technically trained PhD chemist who has a passion for educating students who look like her in STEM. At each step along her journey from an undergraduate chemistry degree at Georgia State University to the professoriate at HBCU Tuskegee University, she acknowledges challenges and exemplifies the importance of shifting from a deficit mindset to a growth mindset to strategically grow…and address equity in STEM. Dr. Robinson's chapter includes a chart in which she creatively likens

her career journey from organic chemist to consultant to that of the lifecycle of a butterfly.

Not all roads will lead to a PhD in chemistry, but the 20-year career of **LaVetta Appleby** as a chemistry educator has been filled with unexpected adventures and celebrity. Though she pursued and obtained a master's degree in chemistry, she realized that her preference for teaching far outweighed her interest in research and decided to join the faculty at Lawrence Technological University. As a science teacher, Ms. Appleby understands the value of experiential learning and meeting students where they are. As an educator, she has learned that pedagogy has significant impact on learning outcomes. She, along with colleagues at LTU have used Vibranium, the most recognizable element to hit the big screen in Marvel Studios' *Black Panther*, to spark a newfound interest in the periodic table of elements in science classrooms ranging from kindergarten to college.

Dr. Angela Peters comes from a family of educators who lived by the principle that "education is the vaccine for poverty." Even though she experienced early challenges in chemistry, it was a teacher/tutor who had a true love for the sciences that poured into her and helped Angela turn an F grade into a B by the end of the semester. This was an early example of mentoring in her career, but not the last. At each stage of her industry and academic career, she has relied on mentors to guide and develop her management and leadership skills. In this chapter, Dr. Peters allows the reader to listen in to informal conversations held with three women chemists who have been influential in her career. Now, the product of an HBCU serves as the Provost and Vice President of Academic Affairs at Albany State University, an HBCU in Georgia. Dr. Peters has expanded her visibility and serves as a role model to women in STEM in academic leadership positions.

When your first experience with the concept of mentoring is within your immediate family, it is likely to have a lasting impression. For **Dr. Renã A. S. Robinson** the early positive affirmations that she was smart and praise for doing well is a reminder that this is an important part of mentoring for all students, and especially for underrepresented students in STEM. An accomplished scientist whose research was born out of personal interests and experiences, Dr. Robinson is also a leader in STEM advocacy. As the 2021-2023 national president of NOBCChE, she will have an even greater voice and platform to mentor students of color who are interested in STEM. There are several examples and nuggets of wisdom on mentoring shared in this chapter. One of the simplest yet profound statements surrounding mentoring is that the role of a mentor is not to create carbon copies, but instead meet the student where they are and help them thrive.

Dr. Leyte Winfield's narrative sheds light on what it means to "see the invisible scientist." Her penchant for STEM can possibly be traced to her mother teaching her multiplication facts at the age of four years old. From there, her scientific curiosity propelled a desire to pursue a chemistry degree at Dillard University, an HBCU in New Orleans, Louisiana, followed by a PhD in organic chemistry from the University of New Orleans. Dr. Winfield learned to master the art of work-life integration early in her graduate career as the mom of a young child and a productive researcher. This may be one of the main reasons that she emphasizes cultivating one's STEM identity through role modeling and mentoring.

As the final scientist featured in this book, her closing thoughts on broadening participation are perfectly situated and summarize the importance of highlighting the stories and raising the visibility of academically mobile African American and other women of color in STEM. She has a particularly unique vantage point, as a professor and researcher at Spelman College, an all-women's HBCU in Atlanta, Georgia. She closes out her chapter by sharing online and web-enhanced pedagogies that have been used to influence the learning and behaviors of women of color at a small liberal arts college.

I have had the pleasure of meeting or interacting with several of the scientists featured in this book. I have walked the campuses of each institution where they were trained. Yet reading each of their stories in this book has given a new perspective on their journeys. I have learned something new about each of them and gained a greater sense of respect for their accomplishments. They are truly inspirational and trailblazing African American Chemists.

Marquita M. Qualls, PhD, Entropia Consulting, Nashville, TN, USA, mqualls@entropiaconsulting.com