



BIOMEDICAL SCIENCE IN AFRICA,
ON WALLOTSTRASSE
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I spend most of my time (when not at the Wissenschaftskolleg of course) in or with my laboratory, studying *Escherichia coli* bacteria. We are interested in how these bacteria colonize the intestines of humans and animals, as well as in the genetic basis for resistance to antimicrobial drugs. These two somewhat disparate properties are similar in that they are the consequence of evolutionary changes shaped by strong selection on bacteria. In the case of colonization, the selective pressure comes from the host organism; and for drug

resistance, from the application of the medicines we use to treat infectious disease. My laboratory has researched different questions over time but my focus on natural isolates (as opposed to the laboratory *E. coli* strains that scientists use as genetic factories) began when I was in graduate school. Our work helps to understand why the *E. coli* strains that cause childhood diarrhoeas are exceptional colonizers, an important issue in many developing countries where infantile diarrhoea remains a major cause of illness. We are also concerned with how *E. coli* and related organisms become resistant to antimicrobials, because this is compromising the management of many infectious diseases in the West African countries where I work. Both drug resistance and the ability to cause disease are acquired through similar mechanisms, so that our studies help to elucidate how bacterial genomes change. In the course of studying bacteria and the natural as well as anthropomorphic factors that influence selective pressure upon them, I have become increasingly captivated by those working alongside me. That is, my microbiologist colleagues, particularly those who work in Nigeria, Ghana and other African countries. Some are researchers like me and others are clinical scientists whose work helps to provide patient care or inform public health.

It is my interest in the practice of science in Africa that brought me to the Wiko. In the last decade, science studies have grown from a passing interest to a significant part of my scholarship. Since the tools of microbiology do not all readily map onto the study of human individuals, this growing interest has necessitated a cautious but enjoyable foray into other disciplines. Cautious because I am aware from my mastery of microbiology that it takes years to become competent in any given field – I lean heavily on friends and collaborators who have the necessary expertise. Enjoyable because I am always stimulated by new knowledge, be it a novel *E. coli* strain or gene that could be new to science or a classic book or method of analysis that is new only to me. While many of my interests have practical importance or societal relevance, they largely arise from my fascination, or what Co-Fellow Janis Antonovics refers to as “wonder” at microbial life and its connections to humans.

Only during two years of my post-doctoral training have I been ensconced within a Microbiology Department. Instead, I have lived out an enjoyable academic life largely working in multidisciplinary environments. The richness of my first scholarly environment almost slipped by unnoticed. As an undergraduate at Obafemi Awolowo University, Ile-Ife (then University of Ife), I spent almost all my time focused on the pharmaceutical sciences, in a bid to earn a Bachelor’s degree in Pharmacy at a school where a full quarter

of those admitted leave without qualifications. OAU was, at the time of my studentship, the workplace of writer and Nobel Laureate Wole Soyinka, Yoruba Studies expert Wande Abimbola, and renowned playwright Ola Rotimi. I am embarrassed to say that although I was in complete awe of Professor Segun, a zoologist who discovered and characterized no less than two dozen species and subspecies of earthworms, I only knew Abimbola as an administrator (he was our Vice Chancellor) and was unaware of Soyinka and Rotimi until graduation. At my graduation ceremony, which was Abimbola's last at Ife, he recited the most beautiful Yoruba poetry and I realized how remiss I had been never to have audited a single one of his classes. Thankfully, my science professors insisted on teaching some history, politics and literature; I wandered into stage productions of Rotimi's *The God's Are Not to Blame* and Soyinka's *Death and the King's Horseman*, and I was forced to take a few "general studies" courses. Today, I teach at a liberal arts college in the US, where students have to take multiple classes in the sciences, humanities and social sciences, learn a foreign language and develop their quantitative skills. By observing their own education, I have come to realize that the relatively minute introductions I received in history, the social sciences and the arts have been just as useful in my scholarly career as the years spent studying microbiology.

I don't claim to be anything but a microbiologist, although I will freely admit that I do have a bit of a broader perspective than most. However, I wasn't really looking for interdisciplinarity when I applied to Haverford College. I enjoyed excellent mentorship in my own training and was eager to work with undergraduates one-on-one and in small groups as they began their careers in science. I sought a professorship at a liberal arts college because it offered the opportunity to teach and do research, both at the highest levels of excellence. Not every microbiologist needs to have broader interests – indeed many of the leaders in my field drew strength and creativity from their intense specialization – but it is certainly helpful if one is teaching younger scientists. In return, they help me continue to appreciate the "cleverness" of fundamental and early discoveries in microbiology and to revisit those things that we think we know for sure about microbial life. It was only after I arrived at Haverford that I realized that this was the best environment for a scientist like myself who had very focused primary interests but is in essence an intellectual voyeur. I have thoroughly enjoyed attending seminars from all disciplines as a matter of course, sitting in history classes, lunching with physicists and planning symposia with anthropologists. My intellectual voyeurism did not come without its early-career risks and so it was with much gratitude that I received a Branco Weiss Fellowship from the

Society in Science programme, a young investigator award, which not only funded but also legitimized the connections between my science and society.

It was as a Branco Weiss Fellow that I made my first visit to the Wissenschaftskolleg in 2007, for our annual evaluative meeting. The Wiko has hosted three Branco Weiss Fellows before me – Harini Nagendra, Giuseppe Testa and Giovanni Frazzetto. From them, I learned that a Wiko Fellowship was the solution to the problem that all interdisciplinary scientists have, and which is accentuated for early career experimentalists: the difficulty in finding time to think, read and write. Thus the Wiko is a natural home for Branco Weiss Fellows who seek to bring extradisciplinary perspectives to their biology research. At the time, I did not seriously think that I would actually be granted the extreme privilege of being able to work at the Wiko, and if so, certainly not soon. And therefore, even though it had been preceded by a request for a CV and a proposal, my invitation was still very much surprise. My browsing of yearbooks confirms that I am the fourth Branco Weiss Fellow, and my father pointed out that I am also probably the first Nigerian Fellow of the Wissenschaftskolleg. In these respects, I am an atypical Fellow, but the diversity in age and nationality of my own Wiko Fellow “class” suggest that this may not be for long. Perhaps the greater surprise for me is that my appreciation of the value that comes from multi- and inter-disciplinarity was far from unique. Most of 2010/11 Fellows had engaged in post-baccalaureate scholarship in two or more disciplines, some with obvious connections such as history and anthropology, and one who was an accomplished historian, an engineer and a musician before he was thirty!

I could only afford to leave my lab for three months and so my stay at the Wiko was too short but incredibly valuable. The invitation to be part of a Focus Group on “Professional Dilemmas of Medical Practice in Africa” allowed me to pursue my work on science studies in Africa undisturbed, in the close company of experts in the fields of history, anthropology, medicine and economics who are familiar with the biomedical science landscape in various parts of Africa. Additionally, although my primary expertise is in Nigeria, and to some extent Ghana, it is important for me to compare situations and perspectives from other African countries and it was valuable to be able to interact with scholars with expertise in and familiarity with Botswana, the Democratic Republic of Congo, Tanzania and Uganda within my focus group and multiple parts of Africa outside the group. Unlike many Fellows who came to the Wiko to write up work that had begun earlier, I came to synthesize my thoughts and research the literature for a new project. In

this regard, it was incredibly valuable to have this wealth of expertise close by and so easy to draw upon.

Somewhat fortuitously, I found a second focus group at the Wiko, which was engaged in the study of the “Limits to Disease Control: Failures in Disease” that arise from the inevitability of evolution. This is of course an important backdrop for my laboratory research and I could not but engage in many of the discussions, ideas (and celebrations) of that group as well. In one sense, as I was told earlier on by one of the many Fellows without a focus group, I was in grave danger of becoming unfocused by my groups. In actual fact, that did not happen. The groups were so connected (in my mind anyway) that they helped me to knit my own scholarship more tightly. A few of us who audited both groups to some extent could see that the links were not only interesting, they were powerful. I no longer see my explorations in the social sciences as dabbling. They are essential components of addressing the questions that are important for my scholarship. In the Limits to Disease Control group, I also found biologist friends with similarly broad-based interests who, like me, were not as familiar with the terminology of more text-driven disciplines. This was interesting to see, particularly since science is often accused of being exclusionary because of its highly specialized and abstruse terminology. Other biologists and I spent many a dinner deconstructing words like “narrative”, “counterfactual” and “historicity”.

I have recently completed a project that closely examined the undervaluing of clinical microbiology in Africa and how this has contributed to a deep and pervasive problem that I refer to as “diagnostic insufficiency”. In the course of my research for this project, I made several notes of more systematic problems with the practice of science – in academia as well as health care – and this is something that I wanted to explore more intentionally at the Wiko. I had identified a number of structural problems that make it difficult for African scientists to work as true principal investigators, with the freedom to choose which problems to work on and how to connect their ideas and projects to lives around them if they so desire. It was important for me to study how far-reaching the problems I encountered in the field actually are, through close study of the literature and conversations with scientists and anthropologists who have worked in African countries with which I am less familiar. I am also interested in where these problems came from and am indebted to the historians in the Professional Dilemmas of Medical Practice group for tips on important things to read. After my colloquium, other Fellows pointed me in the direction of examples from non-African developing countries. In studying them, I am beginning to see what might, and still could be, a more optimal research climate for

African scientists. All in all, without my Wiko experience my continuing project would not have the rigor it is gaining.

I had of course heard that the Wiko provided everything so that each Fellow could focus uninterrupted on his or her project, but I was still pleasantly surprised by the full devotion of Wiko's staff to my goals and welfare. Even though I was a short-term Fellow, I never wanted for anything – in the dining room or in my study. My Co-Fellows and Reinhart Meyer-Kalkus went out of their way to suggest readings, connections and tours that were valuable to me professionally as well as personally. The thrill of hearing at the Berliner Lautarchiv Igbo and Yoruba spoken as they were a century ago, in perhaps the earliest recordings of these languages, is one that will remain with me for the rest of my life. Christine von Arnim, without batting an eyelid, easily organized meetings with my collaborators and me at the Wiko, which allowed me to establish collaborations with *E. coli* biologists in Berlin. She also helped, with equal care, to organize all the regular get-togethers that made our focus groups so rich. My stay at the Wiko afforded me the opportunity of added interactions with long-term mentors Helga Nowotny and Permanent Fellow Raghavendra Gadagkar, who I first encountered as a Branco Weiss Fellow. They and others, including Joachim Nettelbeck, Kathrin Biegger and some of my Co-Fellows, have encouraged me to begin to examine my work, goals and trajectory with a long-term perspective that is new but promising and exciting.

It was at the Wiko that I first found myself reflecting on my personal use of the laboratory. Unlike many scientists, I did not retire from the bench when I became a principal investigator. I spend less time there, being forced to move aside for my energetic students, but I always have a bit of bench space and two or three experiments in progress. While I am often engaged in specialized and complex tasks, a considerable proportion of my time there is spent on mindless repetitive tasks that could readily be delegated. It turns out that I use the lab to think. I read and write at my desk, but when I encounter a particularly complex problem, a tangle in my argument or even a new idea that needs to be stretched and toyed with, I wander into the lab. There, although most of my work requires careful organization and concentration, there are always a few repetitive tasks that I can perform while my mind dwells on other things. Thus, it was only at the Wiko, not having a lab bench for the longest stretch of time in my life since I was 17, that I discovered why I insist on spending at least a few hours a week streaking bacteria or pipetting liquids. Some of my thoughts can only coalesce when the rest of me is in motion. After an awkward first week spent wondering how to replace my laboratory in a bedsit,

I began to take long walks in Grunewald, around Berlin and in Wannsee and Potsdam. I have always loved to walk and my maiden walk in any each new district was an authentic stroll. My subsequent repetitions of that walk soon became my thinking-in-motion-and-staying-in-shape-in-spite-of-all-that-wonderful-food ritual, which made it possible to organize so many ideas and to conceive a life that I probably will live at some point later on, without a lab.

I returned to Haverford from the Wiko at the beginning of January 2011. In one sense, it was a pity to have accepted to stay at the Wiko for only three months, but at the same time my laboratory, largely staffed by undergraduates, was beckoning rather fiercely. I was pleased to be back but even more delighted by the opportunity to return to the Wiko for just a week in May. The Professional Dilemmas of Medical Practice group had organized a conference of ethnographers and African physicians. It was wonderful to be able to sample Berlin in springtime – something I had not anticipated would be possible. The conference itself was an amazing and undoubtedly unique opportunity to interact with medical practitioners who have worked extensively in at least twelve countries – eight in Africa – and ethnographers who have studied health and medicine in Africa for decades. The central purpose of the meeting was to use a collection of case studies from the medical practitioners to draw out themes from the dilemmas they face. This we accomplished very well. However, the meeting also provided a platform for additional questioning, which will inform my research and writing in years to come. Perhaps the most important aspect of the conference, which indeed was the most important part of being in residence at the Wiko, was the chance to make firm friends whose intellectual interests and expertise, while being distinct, dovetail so well with my own. This will make my on-going inquiries into biomedical science studies in Africa not only more productive, but also more pleasurable.