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A Biologist in Nigeria

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Dr. Oyekanmi Nashiru is a busy individual who exudes enthusiasm, embraces optimism, and covets high expectations. Then again, as the principle organizer of a somewhat curious scientific program, he would have to be all that and more – some would even say that his good intentions place him squarely in the category of certified nutbar. Nash (as he prefers to be called) has spent the better part of his scientific career developing and implementing the West African Biotechnology Workshops, a focused attempt to bring scientific expertise and potential research collaborations to his homeland, Nigeria. Which is to say, he is intent on bringing the realm of high technology into an otherwise struggling country.

Ironically, I was thrown into this mix by virtue of my reputation as a university instructor, the lure of traveling to an altogether foreign place, and the somewhat naïve notion that this challenge could bring some merit into the developing world. Ironic because part of the appeal stemmed from my being guilty of harboring the same preconceptions about Africa that every other non-African seems to have. That is, the whole romantic ‘Out of Africa’ thing, where the nations that hold the continent together live in natural but primitive splendor. “Which,” as Nash would often say “is all nonsense.” Nash is an animated speaker - his continuous gestures and movements betray his scientific patience. “You can’t think of Africa as one place, one culture. It is distinction within distinction. Every place is separate and special from the other. We are not going to Africa, David, we are going to Nigeria.” And in retrospect, he couldn’t have been more correct.

Nigeria is a country of unfathomable extremes, the kind that Meryl Streep and Robert Redford would take little comfort in. It has a population of over 100

million individuals crammed into a small wedge of land that is the coastal armpit of West Africa. Its growth rate is such that the population is expected to rise to about 300 million individuals by 2025 - a figure that would mirror that of the United States, except that it would be squished into an area half the size of Alaska. Such numbers also give rise to extreme cultural diversity, which is well exemplified by the more than 250 different ethnic groups, of which three stand out and comprise 65% of the population: Hausa in the Muslim north; Igbo in the agricultural lands of the south-east; and Yoruba in the urban south-west

In spite of this dominance, the remaining groups certainly do not want to be ignored. Each has its own language; each has its own way of life; and each has its own fiery brand of pride. In short, Nigeria is as close as it gets to a real cultural melting pot, African or otherwise. Quite simply, it is distinction within distinction within distinction.

It is also not a very nice place to visit. The travel advisories within the Canadian Department of Foreign Affairs and International Trade say it all rather succinctly:

The official language is English. Tourist facilities are limited. Power shortages and low water pressure are common. Telecommunications are unreliable. Those attempting to contact the police may have difficulty getting through. Violence and unrest sparked by tensions between ethnic and religious communities occur in various parts of the country and have resulted in numerous deaths. The military may intervene and curfews may be imposed. Canadians should always maintain a high level of security awareness and inquire about local conditions when travelling in the country.

To be more specific, our final destination was actually Lagos, a crowded and polluted city of some

13 million inhabitants, and a city with the dreadful reputation of having one of the highest crime rates in the world. In fact, the lonely planet guide I picked up heartily recommends it for the “truly masochistic voyager.” And upon reading through several sources of information, it really seemed like it would be wise to avoid, by all counts, practically everything.

To these information nuggets, Nash would quickly rebuttal. “This is all nonsense. Do not worry about such propaganda. Nigeria is the West African superpower. We have one of the most highly educated workforces in the continent ...” And then in the middle of the blur that is his hand gesturing, he would pause and smile, “and we are going to win the World Cup.”

Still, as an educator who teaches pupils and the public alike in the nuances of biological subjects and tools, I wasn’t necessarily swayed by his arguments. A country’s soccer prowess holds little weight in teaching scientists the practical and theoretical aspects of molecular genetics (for instance, I have yet to witness an offside penalty in my lab). But things like reliable power and water sources do matter and, as Kate my wife would so ardently point out, it’s also nice to not worry about things like violence and riots.

The morning I left for Nigeria was a somber affair in my homestead. I would be away from my wife and my baby daughter for two and a half long weeks, the first time I was to be away from them as a new parent. This wasn’t how it was supposed to unfold. Originally, this teaching assignment was scheduled to be held in a previous year, where Hannah would be but a twinkle in our eyes or at the very least, safe in a second trimester haven - both situations that wouldn’t have yet revealed the emotional enormity of fatherhood. It was originally to be an adventure. Even Kate had toyed with the possibility of joining me. However, adventure would now take a secondary role to family life and Kate would join me only in spirit and kind words via a bundle of letters - one for each day of my trip. It seemed that she took to heart the warnings about unreliable telecommunications.

Thankfully, I was not traveling alone. I enlisted the help of Dr. Samantha Greunheid, a post-doctorate and colleague at the University of British Columbia. Sam was a specialist in infectious diseases, which seemed to be a good fit given our destination. She was also knee deep in proteomics, a burgeoning research field that looks at proteins (what the DNA genes code for,) and, for lack of a better description, tries to look at all of them in any given circumstance. For instance, Sam was primarily interested in looking at proteins present in her bacteria, and in particular trying to observe differences between samples that were docile, and samples that were actively involved in an infection.

In this respect, proteomics is a newer breed of science that relies heavily on high technology, high throughput and almost steamroller-like tendencies, all the while generating massive amounts of data such that mathematicians and statisticians are being courted into the process. This part of her research would be completely novel to the current state of Nigerian science. It was to be a compelling and interesting mix. Most important, however, Sam was down to earth and had an easy low maintenance attitude, which I feared was going to be necessary for this trip.

Before we had even departed on our flight, it became clear that our itinerary was a focal point of some intrigue. I remember the conversation we had in Seattle with one of the immigration officers who examined our visas. It began innocently enough:

“Where are you going?”

“Nigeria.”

Then came a short pause. “Nigeria eh? Why are you going there? Are you missionaries?”

“No, actually, we’re university teachers. We’ll be teaching a science course there.”

Another pause. “Well,.. better you than me.” A sideways glance, “You know, you may as well say goodbye to your luggage now. Those folks down there, they just take whatever they want.”

How Lagos, and Nigeria in general came into these troubled circumstances is rather neatly if not bluntly explained in the book “The World’s Most Dangerous Places,” a Christmas gift given to me by my not so subtle parents. In it, Robert Young Pelton - who could give the Crocodile Hunter a run for his money for pure bravado - provides descriptions and anecdotes for destinations you would best avoid. My worried mother had actually folded down the pages on Nigeria, such that its 3 out of 4 ‘peril rating’ was immediately evident.

In short, Nigeria had for the better part of its 40 year history been subjected to the whims and follies of various military rules. Which together with its diverse cultural mix and its lucrative oil deposits, exacerbated into an unwieldy recipe for political chaos, ethnic tension, and rampant crime. However, even the casual follower of world politics knows that what makes Nigeria especially infamous is its almost legendary propensity for corrupt practices. In fact, Nigeria has consistently ranked as one of the worst offenders in various Corruption Perception Indexes, and it would probably surprise no-one if its unclean borders were shown under thesaurus entries next to words like corruption, profiteering, racketeering and venality. In general, the whole messy predicament had turned Nigeria into an economic mess that to this day precariously teeters on the strength and weakness of oil prices. From this viewpoint, it is no wonder why the country has had the

reputation it garners.

And yet, Nash would consistently reassure us that things were now different – that the country, and even detestable Lagos had its merits, its civility, and its comforts. That since 1999, the country had been mending albeit slowly with the first elected president residing over democratic government. He would tell us that the time was now ripe for science to return to his troubled homeland. However, truth be told, I wasn't sure what or who to believe anymore. Frankly, my mind was now more preoccupied with evaluating the worth of my small science workshop. Nigeria, it seemed, had problems that were much bigger than biotechnology.

Murtala Mohammed International Airport in Lagos seemed to be as good a place as any to feel out the current truths on Nigeria's reputation. This place was to be our testing ground, a microcosm of sorts, and would provide us with a visceral sense of things to come. In this respect, the airport would be a focal point of a number of things. First up was the task of transporting scientific supplies from Canada into Nigeria. Part of my responsibilities entailed the delivery of some special chemicals that were not readily available in Nigeria. An innocent enough endeavour as these chemicals included relatively obtuse things like ultra pure varieties of water and salt; as well as some more sophisticated reagents like antibodies, DNA molecules, and even live but attenuated bacteria. A few of the tubes even contained samples of fake data which were a teaching lab's last resort should the experiments go completely awry. All of which were harmless and worthless of course, given that my work centered round educational goals rather than specific research goals. Unfortunately, all of the reagents needed to be kept cold in order to stay happy, which meant packing everything in copious amounts of dry-ice, a problematic venture given dry ice's hazardous reputation in the transport business. This nuance caused no end of frustration especially since the reason for it being labeled dangerous wasn't clear to me or, for that matter, to any of my chemistry colleagues.

Nevertheless, it was imperative that these supplies make it to Nigeria. For advice, I contacted Dr. Terry Pearson, a noted parasitologist at the University of Victoria, whom Nash had invited as the keynote speaker for our workshop. Terry, who specializes in *Trypanosoma* research, the causative agent of sleeping sickness, has long had collaborations with various institutes in Kenya and was the person in my neck of the woods to consult on the ins and outs of transporting scientific goods to Africa. Although, we would later formally meet in Nigeria, he was a veritable wealth of information - a Yoda-like antidote to my ignorance.

"Don't even bother with a courier." he would tell

me, in a gruff friendly manner that perfectly imbues someone equally at home in a state of the art biochemistry lab and in the safaris of southern Kenya. "They're too damn expensive, and in my opinion, you'll never see your package again." He added, "You can try the air cargo route, but I've never had much luck with that myself."

He then went on to explain that the only way to guarantee getting the materials over to Africa would be to simply bring the icebox to the airport and carry it on the airplane myself. "You've got to go to the airline agent and suck up big time, hope that they trust you, and let you bring it on. That's really the best way to do it. The only way to guarantee that you actually get it to your destination. If you want, you can bring all your fancy credentials - it certainly can't hurt. But at the end of day, it all depends on whose manning the desk, and whether they like the look of you or not."

It boggled my mind that my best chance in all of this chaos would be to bring the reagents onto the plane myself. Reagents that included among other things, an assortment of scary sounding chemicals, kilos of dry ice, and (get this) live bacterial samples. I shuddered at the thought of trying to explain to airline staff on the harmlessness of the bacteria in the security intense world of post September 11.

From this information, I thought it pertinent to also give the airmail route a go using either a courier or cargo service. Terry was not kidding. Although the reagent package itself was no bigger than say a stack of 5 compact discs, the process of transport itself due to flight connections, and navigation through various custom ports, meant that the trip would take a minimum of 4 days. Which translated to an awful lot of dry ice to keep things frosty throughout the whole venture. This now heavy package would subsequently amount to a small fortune in shipping costs - to the tune of about US\$450 via a company like Federal Express. or a more reasonable but still expensive US\$200 using an air cargo service. Still, it was an alternative worth using, and approximately a week before the workshop, I arranged to send package number one into the unknown.

Package number two was safely bundled in one of those squishy ice bags, and packaged with enough dry ice to last for a 16 hour flight. It also came with a wad of paper, large enough to look like a novella, but which actually contained MSDS or materials and safety data sheets for each and every item in the package, as well as photocopies of every official letter of intent. The MSDS sheets were considered to be both advantageous and detrimental in our efforts to board the plane. They were the documents required to state the relative hazard level of each chemical, but in reality they often depicted the most harmless of things as

being dangerous themselves - after all, even water has a lethal dose. As I approached the airline desk with Sam, it suddenly dawned on me that my chances of getting the package on board the plane would have increased significantly if I had my baby Hannah as a token gesture of innocence. However, in one of those surreal moments where one's expectations are flogged and hung, we experienced no problems, no lines of questioning, not even a customary look of concern. Neither Canada nor the United States seemed to care about my icebag and my package number two was therefore on its way.

The actual arrival at the airport in Lagos was our second task, and was also an exercise in tension for both Sam and I. Tense, because according to all accounts, personal and otherwise, the airport was the place for peril and quite simply, it was the one part of the trip that we were most worried about. We were repeatedly warned not to converse with anyone that we didn't recognize, and to not take any mode of transportation without directions from someone we knew. Taxi drivers were notorious for partnering with any number of robbers and bandits, and it was reputed to be a calculated risk to interact with any stranger at the airport. Definitely not the most tourist friendly location I've been to. Basically, we were focused on thoughts of getting through without being detained or being robbed. In other words, we were under the uneasy impression that our lives depended on Nash showing up at the airport to be our personal escort.

Surprisingly, customs at Murtala Mohammed International Airport was brief, and my package number two caused no curiosity. In truth, the airport itself, seemed to be relatively quiet, no doubt a consequence of the armada of severe looking armed guards that manned all the key entrances. I could see through the main doors that the roadway outside was populated by a throng of locals, tidily kept behind a number of security fences. This was presumably to clear the main road of congestion, and possibly the riff raff we were told to avoid. For a fleeting moment, we sensed our folly at believing all of the tall tales, which at this point, seemed to be grossly exaggerated. Everything was going smoothly and everything seemed relatively civil.

However, as soon as we picked up our remaining luggage, we were accosted by two persons - a man and a woman - who aggressively asserted themselves as our escorts, and forcibly directed our cart towards the airport exit. Of course, this scared us out of our wits, as the very thing we had been warned about seemed to be happening before our very eyes. Even with our protestations, our new escorts were adamant on leading us into the outside throng.

Thankfully, before we ended up causing a minor

scene, and likely one with the participation of armed guards, Nash appeared from the chaos to save us. It would be an understatement of monumental proportions to say that it was a relief to see him in person. We were suddenly empowered with the one criteria required for travel in Lagos - that is, a friendly face.

Boarding a van, we soon found out that our two headstrong escorts were indeed official members of our host institution, the University of Lagos. In no small way, the whole incident clearly showed us the destructive power of heresay. Looking back, it's still hard for me to pinpoint whether our feelings of panic were attributed to information we had been given, or to the situation itself. As we began to move, I immediately sensed a grimness in Nash's demeanor. He was not as animated as usual. When confronted he said, "The lab is below my expectations. The Local Organizing Committee has done a very poor job of this."

I, ever the optimist, bounced back, "Well, at least package number two made it through." I clutched the ice bag as if it was the most important thing in the world. "How did package number one fare?" I asked.

"It is here." he replied curtly, "but I cannot get it without paying a customs fee." When I explained to him that I explicitly made it clear in all the documentation that the materials were not of any worth, he just smiled at me and said, "Welcome to Nigeria."

Bribery, or dashing, as it is affectionately called in Nigeria, is a national pastime second only perhaps to soccer. Nash would explain to me that the airport authority controlling our cargo had asked for a flat fee of 30,000 Naira, which was roughly equivalent to US\$300. A tidy sum of money that is no less than a small personal fortune in Nigerian standards. Of course, Nash, ever the pragmatic individual, flatly refused to pay. Over the next two weeks, we received daily updates on the current amount of dash needed to relinquish the package. On the last day, the bid fell to 5,000 Naira - to which Nash responded, "Send it back to Canada."

As predicted, our rendezvous at the airport provided a window to Nigerian life in the here and now. Sam and I both agreed that in hindsight, a lot of the apprehension we carried was a consequence of distorted information. What we saw instead, was a nation in transition, going from bad to not-so-bad (albeit slowly), and a culture that was as foreign as any other to the serious traveler.

It was when our van took us through the harrowed and crowded streets of downtown Lagos, that the full brunt of culture shock finally hit. Peering through the windows of our vehicle, we saw a completely different way of life - simple, at times decrepid, and altogether frightening. The heat of the night seemed to mix well

with the incessant dust and ramshackle nature of each and every building we saw. These sights made us instinctively think of home and so our first order of business was to look for an internet cafe. This was to quell the fears of our loved ones with a friendly and reassuring message of “I’m in Lagos and go figure, I’m safe and sound.” Then a welcome stop for food. I think Nash was trying his best to make us feel comfortable since he took us to a ‘Mr. Biggs’, which was more or less a clone of the MacDonald’s variety, except with burly armed guards. As I ate, I found it decidedly ironic that the first meal I had on this exotic adventure was a hamburger and fries.

Nash then took us to our accommodations. We were staying at the University of Lagos Guest House which was more a hotel than a student residence and was considered luxurious at a cost of about US\$40 a night. Although my own room was fairly large, this did little to obscure its general disheveled state. Despite this first impression, I counted my blessings since the room actually had reliable power in the form of a back-up generator, working air conditioning, a toilet (sort of), and a television with 5 channels (curiously, three of which were set to MTV). It even had malarial pest control in the form of staff spraying the room each night with a can of Raid, and it also came with a comforting set of door locks. In any event, it would more than suffice and I gladly dropped off my backpack, and then queried Nash for a good place to stash the contents of my ice bag.

Although we were very tired, Nash said that the best place would be in a scientific freezer, and that we should see the lab facilities immediately. The sense of urgency and the fact that he continued to look sullen was troubling to say the least. Here was the eternal optimist reduced to a stoic figure. I was thinking, “How bad could it be?” We had, after all, been corresponding with the Local Organizing Committee for several months, and according to all the pertinent check lists everything appeared to be sound. Everything should have been ready and waiting, and the only possible shortfalls we had to worry about, were the chemicals and reagents in my package number two.

The Local Organizing Committee (LOC for short) was a group of scientists and university representatives who were responsible for providing us the necessary facilities and equipment required for the laboratory workshop. However, it was clear upon first glance of our adopted lab space that the LOC really had no apparent skill in organizing anything. To begin with, our allotted space was not even in the university campus but was instead situated several kilometres away at the Nigerian Institute of Medical Research (N.I.M.R.). Although this distance itself didn’t sound so bad, the ad-

ditional need to travel by car was very awkward given that the streets of Lagos consistently imbued a state of pandemonium. There was even a colloquial term for the act of driving - a very appropriate “go slow.”

When we approached the iron gates of the N.I.M.R. compound, it was evident that the entire area was caught in the grips of a power outage. In the somber light of our vehicle’s headlights, we drove further into the maze of buildings and stopped in front of a rather unassuming looking wall. Then following flashlight beams, we were guided like airplanes up a flight of stairs and into a room that looked gutted, disorderly, and plain filthy. “This is our space,” Nash said matter of factly.

In short, the space was horrendous, and dirty to the point that sterility would be pure fiction. In addition, the emergency generator backing our area was ranked somewhere between sub-par and non-existent, which meant that loss of power was a real consideration. However, this concern was soon countered with the realization that we were given next to no equipment to run our experiments anyway.

As we blew off the dust from the one solitary bench in the room, I was drawn to one of three conclusions. One, that Nigerian science had deteriorated to such an extreme that even a campus that boasted a student population of 30,000 students and connections with over 100 other Nigerian Universities, could not muster up enough basic equipment for 12 experimental stations. Two, perhaps Nash had been misleading us all along with respect to his country’s resources. Or three, maybe all of those tall tales were not so tall after all.

The following morning was spent contemplating the Guest House breakfast menu, which basically consisted of eggs and toast, toast and eggs, eggs alone, or toast alone. The poor selection of items mirrored our facility and equipment status. Consequently, our second day in Nigeria would primarily concern itself with sorting these problems out and we would try to do this at the opening ceremony. Here, we would have the opportunity to meet face to face with some of the members of the LOC and voice our concerns. Unfortunately, it soon became very clear that the LOC were largely indifferent. Instead, most of the members were more interested in garnering attention by using the ceremony as a chance to exhibit their skills in speech making. We did, however, have a few sympathetic ears - individuals who were quite apologetic about the whole situation and tried to explain that the lack of resources was a pressing reflection of the financial hardships within the research community. Not so much that the equipment didn’t exist, but rather that the equipment was such a precious commodity that the distinction between the haves and the have nots was zealously guarded. In

Nigeria, the notion of collaboration was swept under rugs, in favour of concealment and selfishness.

In retrospect, this reality was already evident, given our experience with transporting reagents. If securing a small shipment of chemicals had cost me several hundred dollars in transportation and “custom” fees, then what hope was there for the average Nigerian biologist. This was beginning to look less and less like a workshop on molecular techniques, and more and more like a Survivor episode for science geeks.

Fortunately, due to my background as a Boy Scout and an inbred predisposition to being prepared, I had taken every tall tale I heard in Canada to heart and had pretty much prepared for any and all contingencies. So after the opening ceremony, Sam and I immediately went to work assessing the general status of the workshop. To begin with, the sparse supply of equipment necessitated a change in how the students would work together. Nash had originally arranged for enough chemicals so that a class of 24 students could be split into 12 working pairs. However, the equipment that was given to us by the LOC would limit us to only 3 working groups - each with 8 students, which was hardly optimal.

Even the equipment we did have was suspect at best. For example, the lab was supplied with one centrifuge that worked in a quirky fashion. To the uninitiated, this machine is a device that contains a rotor capable of spinning around at high speeds. The net effect of this action is the creation of centrifugal force - the type of force that makes water stay inside a swinging bucket. In essence, this machine speeds up the ability to separate constituents within a mixture according to density. For instance, a mixture of sand and water would result in a sand pellet at the bottom of a tube with the fluid on top. Anyhow, our centrifuge worked like a charm except that the lid wouldn't open unless you turned the machine upside down, which was a really aggravating feature since our separated samples would simply become mixed up again.

We were also in dire need of a Polymerase Chain Reaction machine or PCR machine for short. This device essentially allows an experimenter to amplify DNA molecules such that you can have a billion fold increase of material to work with. In short, this makes it easier to observe and characterize DNA molecules, especially when the initial amount is very small. To the layman, PCR was the token technique described in Jurassic Park. Although not actually powerful enough to clone dinosaurs, its overall utility is such that this is the machine of choice for a number of key experiments such as DNA fingerprinting, DNA sequencing and any technique devised to look for specific genes. All in all, about a quarter of the procedures in the workshop syllabus would rely on this one piece of machinery.

Frustratingly, the LOC had actually provided us with a machine to use, but only after politely telling us that it was broken. We had heard through the grapevine that the N.I.M.R. compound actually had a brand new PCR machine, and soon found out that the device itself was only a few hundred feet away from our own disordered facilities. This adjacent building turned out to be a newly built structure with the explicit purpose of conducting research on the human immunodeficiency virus, the causative agent of AIDS. Funded by the Bill Gates Foundation, it was exactly the sort of space that our workshop should've been offered in that it was clean, it was fully equipped, it had reliable power, and from first sight, it even appeared to be underutilized. I immediately cursed my luck for it being a centre for HIV research since this would imply strict procedural rules that would make it next to impossible to borrow the entire facility itself - HIV is after all a hazardous organism. However, I saw no problem with the use of its PCR machine given that our samples were essentially benign and had no chance of jeopardizing any of the HIV work.

So all in all, pressing on with the workshop presented itself as a formidable task, and it was decided that clear objectives needed to be tackled. I would begin by assessing a general flowchart of how the lab would run, taking into account all of the possible shortfalls along the way. Sam would visit working the Internet to see if she could find information on ways we could cheat or MacGyver our way through certain procedures - essentially finding procedural tricks that would enable us to perform the experiments without the luxury of certain scientific supplies. And Nash would see about getting us permission and access to the Bill Gates' PCR apparatus. Taken together, it was clear that we would need some extra time before the lab was ready, so in order to stall, we announced that the first day of the workshop would be limited to a full day of lectures.

Meeting the students changed everything. In contrast to the wallowing apathy of the organizing committee, these young faces were a breath of fresh air. Although, it was a grueling first day of work where my time was spent rooted in front of a small blackboard, it was enlightening due to the enthusiasm of the young crowd. In light of all the hardships that this country faced, it was evident that the Nigerian youth took its education seriously. This was further espoused by the country's willingness to grant access to university level education based on free will alone. Despite this positive outlook, it was discouraging to ponder the future of bright individuals who appeared focused, willing to learn, and yet realistic in what outcome this workshop could bring. You also had students who naively embraced the hope that the workshop would literally

change their views on science, and unquestionably lead to a better life. And of course, in a society such as this, we were not surprised by personalities who were desperate to leave the country, and simply viewed Sam and I with the ambitious and tenacious intent of a possible ticket out. I paid careful attention to each of the student's attributes, because Nash had vested in me the responsibility of selecting the four most promising individuals. These four would then benefit from Nash's personal attention in mentoring and guidance. I took this decision very seriously because I really felt that being one of the chosen would result in a dramatic improvement in life itself.

All told, the practical sessions ran for two weeks and constituted a flash pan of memories. It was a session like no other, where each day brought a different obstacle to the mix, and like any challenge, there were notable ups and downs. The lab began in an interesting enough fashion with a brief visit from Dr. Emmanuel Denenu - the Personal Assistant to the Science and Technology Minister and an unfortunate scapegoat for the frustration that must greet these students day in and day out. Although he came to discuss the future, opinions about the present took centre stage and the fire in the student's voices during this confrontation would continue to ring in my ears for the rest of the workshop. On many occasions, my heart sank as I began to second guess the value of the workshop. Sometimes, it seemed all too silly to be coming to a place such as this, to teach something as absurd as molecular biology. These pangs of doubt were constantly highlighted by the looks of disappointment on the student's faces whenever it became all too clear that the chemicals and reagents that I lectured about, were simply not feasible in a country with corrupt shipping practices and freezers that were forcibly useless. How could one talk of delicate molecules, when we even had difficulty getting something as benign as chalk! (At one point, Nash would have to purchase some himself since the LOC would refuse to help).

There was also a disturbing sense of innocence and a dangerous level of ignorance about the science in general. The students were often unrealistic in their assessment on what these genetic techniques could accomplish and how fast they could be performed. There were many instances where the idea of genetic modification was nonchalantly chosen as the be all and end all to experimental design. Many of the student presentations we heard would conclude with a simple "I would make this and that better by genetically modifying it." This eagerness to so readily adopt the use of molecular biology was troubling to say the least. In our own developed society, there is a general theme of caution applied to any scientific endeavour, and it was important that these students understood the possible

ramifications and considered the ethical arguments behind the use of such technology.

We spent a fair amount of time deliberating these issues, and it was interesting to hear the musings and opinions of Nigerian students. Suffice to say, opinion was mixed in that whilst all agreed with the general intention of being ethically sound, several suggested that the barrage of ethical polemic was a western luxury - that wasting valuable time and money arguing over the pros and cons of a technology was only acceptable for rich countries like Canada or the United States. This was certainly food for thought.

As a whole, teaching conditions remained pretty challenging in that the equipment and facility dilemma never really sorted itself out. Still, we could boast a few tangible victories. For instance, we were able to secure access to the Bill Gates PCR machine, although this achievement took a little maneuvering and involved a fortuitous meeting with the director of the N.I.M.R. facility over coffee, crackers, and (presumably for public relation reasons) several photographs. We were extremely lucky with our power situation, in that it never directly affected our experimental procedures. Rather, the loss of power tended to conveniently coincide with the lecture components of the course - it was almost uncanny. Most astonishingly, we managed to tease success from about two thirds of our experiments, an almost unbelievable statistic that hopefully reflected our skills as instructors, our knowledge of the material, and of course, searing blind luck. In truth, we did have to resort to our "fake" data stash, but only once. It's also safe to assume that there are now 24 Nigerian students who are quietly pondering the identity of this MacGyver fellow that Sam and I kept talking about.

The intangible victories were a little harder to ascertain. Apart from the empirical act of teaching new material, I hope we were able to leave the students with a strong sense of what we thought was wrong with Nigerian science. That is the prevailing acceptance of the harsh but understandable 'every man for himself' attitude. For us, this philosophy was painfully evident from the very beginning in the effort required to get any help whatsoever. In our minds, this selfishness was shattering any hope of allowing Nigerian science to flourish. In simple terms, here we had a well educated society that was stifling under limited resources - it simply made more sense to us to foster collaboration, to rely and build on each other strengths, and to share valuable resources. We also left behind a small legacy of embarrassment. Our negative experience with the Local Organizing Committee and with the University of Lagos, in general, bequeathed a lasting impression on the Federal Ministry of Science and Technology. Dr. Denenu was obviously disappointed with the behaviour

of the LOC. In the interim, it seemed that more than a few eyebrows were raised during our workshop, and Nash consequently earned the right to formally interact with the government in all future programs. One can only hope that this will lead to better things.

Fittingly, the last day presented itself with two dominant and opposing memories. In an amusing turn of events, Nash and I were presented with a bill for various charges. It was stunning to us that the LOC would have the audacity to ply us for even more money. The bill itself was a mockery with money attributed to items like “extrinencies,” which, to this day, is one of the great mysteries of the workshop. To be perfectly honest, no-one was even sure what the word meant. Nash took care of the bill in his own special way, which is to say that he probably threw it away.

The other memory was that of the students huddled together in a welcoming circle, holding hands and saying a small prayer:

“Thank you lord for your generosity in life, that you hold together our faith in you, and that you provide what you can in our lives. Thank you for the opportunity in allowing us to attend this molecular biology workshop, that we might take what we have learnt to help our people and country in need, that we use it responsibly and with respect to our land. We ask that you guide us in shaping a better future, that you guide us in the spirit of collaboration, that you help us all of us stay true to this aim and to deny the spirit of selfishness. We asked this in the name of the Father, the Son and the Holy Spirit, Amen.”

This is going to sound cliched but the workshop, and I suppose the whole experience itself, made me reflect on my own lot in life. I would be fooling everyone if I didn't comment that during each day of our laboratory and lecturing sessions, I felt a strong sense of relief and gratitude. Relief in that at the end of it all, I actually had the option of leaving it all behind. Gratitude because through some cosmic roll of the die, I was born in a country where food, shelter, and indeed a decent way of life were readily available. We really take too much for granted.

Today, Nigeria like most of my memories is slowly fading from my mind, in this case buried by the security of my own family and kept alive only in souvenir status by the occasion headlines that skim my consciousness. Where indeed does science fit in a country that is on the one hand dogged by controversy over Amina Lawal, a woman sentenced to lethal stoning by a Sharia judge; whilst on the other hand deals with the hubris of the now defunct Miss World pageant? Next time I talk to Nash, I'm going to have to ask him. Turns out, Nigeria didn't win the World Cup that year, but then again I suppose there's always next time.