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A Telescope in the Smog

Sam Walder '13

Illinois Mathematics and Science Academy

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A Telescope in the Smog

Clostridium acetobutylicum is a tricky little bacterium which can eat almost anything with carbohydrates and produce a fuel similar to ethanol. Recently, a researcher inserted its ability to make fuel into *E. coli*, a much more celebrated bacterium. Imagine how little *Clostridium* must have felt, having its only unique trait copied by the popular kid.

I have heard stories of scientists becoming so obsessed with their research they start to resemble it. Usually, this applies to field biologists, but as I found out over the course of a six-day trip to China, *Clostridium* and I share more than our ability to digest sugars. In my sophomore year of high school, I began researching and experimenting with *Clostridium*. I did not choose the topic, but I spent a good amount of time in the lab, trying to make its digestive and fuel-making powers more efficient. I was supposedly collaborating with some students from a school in Beijing, though I didn't know the name of a single person there.¹ So, when I went to Beijing in the winter of 2011 for research purposes, I was excited to meet the students there.²

All expats in China will agree: there's nothing like the first time. Interesting sights struck me from the moment I left the Beijing airport. On the way from the airport to the high school I was going to be staying at, I noticed that every building along the road had some sort of neon sign on it. This city was a rave and nobody wanted to be the guy who forgot his glowstick. The air was saturated with this gaudy, attention-grabbing mélange of colors that shone even when I closed my eyes.

Arriving at the school was laborious. The massive bus we took, which could have seated an entire dormitory's worth of people from my school³, got stuck making a sharp left turn, and blocked an entire street. The school itself had a large front gate which was manned eighteen

¹ After months of serious detective work during my first year of research, I was able to determine with some statistical certainty that my 'collaborators' did, in fact, exist. I never saw an email from them, discussed our procedures, or even made a mutual contact for the first few months. Then, my advisor scheduled a videoconference. At this innovative, collaborative apex of twenty-first century technology, we spent twenty minutes saying hi, smiling, and waving our hands. The next five minutes were spent awkwardly looking at each other through a screen^{1a}, nobody knowing what to say. Luckily, that soon ended as we began waving and smiling again, this time to say goodbye.

Everyone agreed that it was an outstanding success and that the State Department should be contacted immediately.

^{1a} The resolution was so bad that I could only make out vague human figures, adding to my skepticism of their true existence.

² Perhaps just to validate my *Waiting for Godot*-like obsession with the existence (or lack thereof) of these collaborators.

³ and was thus completely unnecessary for our small party

hours a day by a guard whose sole job was to open the gate for visitors and, in general, look official.⁴

The bus was stuck in the street because the guard, for some unclear but aggravating reason, refused to open the gate. A heated argument followed between the bus driver and the guard, and finally when it seemed that the collective honking broadsiding the bus would knock the bus backwards and clear the lane, the gate opened and we passed into the school.

The school's name is The High School Affiliated With The People's University of China (abbreviated RDFZ). This name was spelled out in large gold letters (thank god, not neon) above the gate, and I'm sure the letters would have been larger and more impressive if the name was not so long.

The campus itself is huge. Five thousand students between ages ten and eighteen study there, and the facilities are top-of-the-line. There are four eight-story buildings, two large athletic centers, a seven-story dormitory (half of which is used exclusively for guests like us), and about five other smaller buildings. On one of the buildings is a gigantic observatory, complete with an eighty-foot telescope.⁵ Add to that a garden, about thirty basketball courts,⁶ and a full 400 meter track.⁷

The track is the center of the school, and every Monday morning, weather permitting, the entire school converges upon it, all five thousand troops wearing identical bright white uniforms, for Morning Exercises⁸. After everyone stands at proud attention for the raising of the flag⁹, they

⁴ The guards always wore communist-looking winter coats and hats and stood in the stark North China cold for long shifts. During the day, the gate was always kept open, so I was confused as to why the school even bothered supporting a guard, who obviously made his living from simply wearing PLA clothes and looking sharp.

⁵ This was absolutely the weirdest thing I saw in Beijing. In the city, the smog was so bad that sometimes I could not see a building at the end of a block. In the five cumulative weeks I have spent in Beijing since that first trip, I have seen three stars. I asked when the telescope was built, assuming that it was built sometime in the good ol' days when it was healthier to live in Beijing than to smoke a pack a day.^{5a} I was thus confused and dismayed when I learned that the telescope was built only two years before. Neither students nor teachers are allowed in the observatory; I think the door is permanently locked.

^{5a} Sadly, this is no longer true. Beijing is an asthma attack with a population of 20 million.

⁶ And yet nobody at RDFZ is good at basketball, somehow.

⁷ And this is a public school. RDFZ is the bratty trust-fund kid of the Chinese Department of Education who gets anything he asks for.

⁸ This phrase deserves capitalization, as will become apparent soon.

⁹ The flag in question was posted on the largest flagpole I've ever seen at a school. It was at least three stories tall. The flag itself was a behemoth, and I secretly wondered whether people from RDFZ would

move together in the most coordinated mass exercise I have seen apart from Youtube videos of North Korean mass rallies. I don't know how much time was spent on choreographing and perfecting the routine, but its smooth celerity was astounding. Perhaps, I thought (and hoped, since I was feeling slightly inadequate after the flag ceremony), that everyone only *seemed* to move together; that individuals were out of line, but it didn't change the overall outcome. In fact, to me that was a perfect metaphor for society. We live by the little mistakes, those small breaches of law or social contract (such as driving over the speed limit) that don't affect us as a whole. However, the metaphor was horribly smashed as I searched in vain for *one damn student that did not move perfectly*.

Back to our arrival. We arrived at about ten at night after a fourteen hour flight. I was at that stage of fatigue and hunger where one isn't even hungry anymore, just in pain. So when a young administrative woman met us outside the dormitory and said in cheerful tones, "Hello, guests. No talking. Let's eat!" I felt like kissing her feet.¹⁰ I would have been happy to eat anything. But what awaited us was the most lavish banquet I had ever seen in my life.¹¹ There was even an ice sculpture and a watermelon carved into a 14th century exploratory Chinese junk, the type that Zheng He would have sailed on. How much had this all cost? Did RDFZ students ever get to eat this way?

I hardly started eating when into the dining room streamed about forty people dressed in suits. Now, our party was fourteen¹², of which only one (our school president, who wears suits like skin) was suited up. We were outmanned and outdressed; I felt oddly threatened. Several impeccably dressed, older men made speeches. We smiled, and nervously eyed our food.

Then, two RDFZ students strode out nervously in front of us and began to play a violin duet. I wanted nothing more than to talk to them after they had finished playing beautifully, but as soon as they finished, they rushed out of the room. I did not see them again.

judge my school in some perverse phallic flag-measuring contest if they visited us and saw our meager one-story tall flagpole with a normal-sized flag.

¹⁰ Though that would have been quite the awkward feat, since I am 6'2" and it would be generous to say she was above five feet. In fact (and this is something I still haven't figured out), most of the high-level administrators, not just at RDFZ but at every school in China that I have visited, are short curt women with bobbed hair. It's rather remarkable.

¹¹ It was the type of spread I imagine ancient warlords would feast on after a victory.

¹² Twelve students and two adults, only one of whom spoke passable conversational Mandarin. In fact, except for that one kid, none of us knew more than how to mispronounce 'thank you' and 'hi'. A great boon to our culturally-unaware party was that the Mandarin-speaking kid was 6'4" and fiercely redheaded, meaning that people (especially the local Beijingers) naturally flocked towards him and his radiant crown.

That was the first time that I noticed something was wrong. The flag and exercise ceremony would come later, but at the moment, I realized that there was some odd power, some unexplained force that was shaping my China experience. It was foreboding.

This sense of unease heightened as the trip progressed. The official purpose of this trip was to meet students and teachers, and to generally get a sense of what going to school here was like. Of course, I was also supposed to meet with my collaborators. However, over the course of six days in Beijing, I had no more than three brief encounters with students, and only once was that encounter unsupervised by a horde of RDFZ teachers and administrators¹³.

What was the RDFZ administration afraid of? My mind whirled back to something I had read before the trip: after Mao's death in 1976, China began reinstating its higher education system. It also began attracting foreign students to come to its top universities and interact with native students. This was an experiment to see if bourgeois imperialist scum would infect the Chinese students with their diseased ideas. The infection spread rampant, and the program was quickly shut down.

However, RDFZ was renowned across not just Beijing but all of China for its innovation. Its classes were the best in the country; its teachers were Confucian ideals. Its headmaster enjoyed a demigod-status on and off campus.¹⁴ So again I thought to myself: what are they afraid of?

Two days before the end of my trip, I had an hour break between a visit to the Forbidden City and dinner.¹⁵ I looked out my fifth-floor window from my dormitory¹⁶, and saw some kids playing soccer on the track below.

¹³ There was no such supervision from my school. The two adults took a laissez-faire attitude to our behavior. This was either due to trust or laziness.

¹⁴ Of all the short curt women with bobbed hair, Liu Pengzi the headmaster was the shortest, curtest, and most bobbed. Our group sat through a thirty-five minute video produced by the school which detailed just how much she could challenge Zeus. I was reminded of old Maoist propaganda. I do not doubt that she was one of the former Little Red Guards who could, if woken up in the early morning just for scientific purposes, still rattle off the entire Little Red Book. Not only was this shameless video excruciatingly long, but Liu Pengzi was in the room the whole time, watching with us. I travelled to RDFZ three times, and to my horror, they played the video every time.

¹⁵ Most of our time was spent touring famous spots and eating -- in fact, I spent more time holding chopsticks than a notebook or pencil.

¹⁶ Ah yes, the dorms. Each dormitory was unnecessarily large and obviously constructed to impress. However, like everything else at that school, it was a combination of the impressive and the odd. Each room had its own bathroom, a TV larger than I see at my rich friends' houses, floor-to-ceiling armoires, and a balcony. Twice a day, some mysterious entity who I could never quite catch in the act would clean

In broken mandarin gleaned from a pocket dictionary, I did my best to convey my wishes of playing. I was happily accepted into the group, and a few kids emerged who could speak decent English. After playing for a while, I mentioned to one of them that I was impressed with RDFZ. I asked them what it took to get in. They exchanged nervous smiles and did not give me a straight response.

I could not talk to students even when I was with them? Where was the collaborative ideal that I was looking forward to? Suddenly, videoconference PTSD struck, almost knocking me d-

I lie on my back on a large, flat surface. It is warm, and comfortably humid. Uh-oh. I'm stuck. I look up. I see a bright light above me. I look to my sides. I am surrounded by capsules.

"What is my name? Do I have any family?"

I realize I said this out loud just as a voice right behind me pipes up.

"Acetobutylicum of family Clostridiaceae. Welcome to the dish, kid."

I spend some time with my new friend and learn that in a short while, we're going to be put into a cellulose broth. Yum! I'm starving, and this is what I excel at. Nobody turns cellulose to fuel as well as I do.

"Check out the new dish."

Who is that scum in the dish next to me? Oh no, not him. He's the popular kid. I hear that he gets to infect anyone he wants. E. coli. Bastard. Well, at least I have my power. Nobody can take that away from me.

But I learn over the next few days the horrible truth: I've been made obsolete. My only purpose is to be studied and prodded until I give up my power. I was the pioneer of fuel conversion, but that doesn't matter. This is the twenty-first century. I might have been the first, but I certainly won't be the last. My only power has been given to E. coli.

The only reason I am here is so others can say they supported me first.

I'm being used. I'm just another reference at the end of a research paper.

I came back.

My research didn't matter. I was not the researcher; I was the subject. My researching capabilities were being used as another self-glorifying stunt by RDFZ. I was just another picture

our rooms. The amount they must have spent on these rooms, must have been enormous. The interesting part was that of the seven floors, four were constantly empty, awaiting guests that never came.

on the wall. Suddenly, I began to empathize with poor *Clostridium*. RDFZ was going to take all of my hard work and use it for their own purposes. Sure, they would tell other schools about this collaborative success, but I would not gain anything.

I later learned that the average bribe required to get admission to RDFZ is between \$50,000 and \$130,000. I realized that the gold letters and massive buildings with HDTVs were built with dirty money. Then, my confusion heightened as I remembered that the soccer ball we were playing with was a scrap of leather; the pitch we were playing on was similarly bad. The bathrooms were in states of disrepair, and classrooms were dirty and drafty, with no heat on in the winter. Everything suddenly made sense. The gaudy neon signs throughout Beijing were like the night-lights I used to combat the evil forces of darkness when I was young; they stole my focus from any problems and replaced them with something stable. Beijing, and RDFZ as a microcosm, were playing a serious game of deception.

I was not the only one with these thoughts. Soon after my trip, the crusade against RDFZ began. Chinese state media¹⁷ reported that many of the awards that RDFZ students won were facilitated by generous bribes. 'Star students' were often the kids rich enough to pay their teachers off. The gaudiness of RDFZ was a symptom of a much larger problem. It was their harsh attempts to *appear* incredible that stopped them from *being* incredible. By wasting money on the dormitories and a telescope that would never see through the smog, RDFZ inhibited its students from enjoying a game of soccer and forced underpaid teachers to bribe math competitions instead of teach math.

Over the last days of my visit, I was doted on with expensive dinners and lavish gifts. I heard speeches about how formidable the partnership between my school and RDFZ was going to be, and how we were truly going to advance the human condition.

And I smiled and ate and accepted gifts and wondered exactly which humans they were talking about. It didn't matter what speeches they made, or what progress they were claiming to make. Little *Clostridium* was going to continue converting cellulose to fuel, like it always has.

* * *

Epilogue

Two years after that first trip, I took it upon myself to make personal connections with students at RDFZ. They realize the problems as much as I do, and some people are trying to change the system. In the meantime, I work to advance the human condition on my own terms, continuing my research -- this time with real collaborators. We realized that *Clostridium* was a

¹⁷ State media reported it, not an outside source -- the corruption was such a problem that the omnicontrolling government was okay with letting people know about RDFZ's corruption, and even personally acting as town crier.

bust¹⁸ and instead developed ways for plants to efficiently remove wastes from soil and water. The only way this worked, I found out, was by ditching the administration and secretly researching together. I continue to talk nightly with RDFZ students, and we all hope the day will come when we are school administrators and can inhibit our students from advancing the human condition. After all, if you inhibit a bacterium's growth potential, it will eventually work around the difficulties and flourish greater than before.

¹⁸ I found out that it was chosen for me to research since nearly everything was already known about it. It was safe and uncontroversial.