Engineers Without Borders/Ethiopia – Andrew Lapetina

The opportunity afforded to me by the Class of 1978 Foundation was by far the most mind-blowing of my college career. As project manager for Engineers Without Borders-Princeton's trip to Ethiopia this past summer, I became a better engineer, a more humble person, and comfortable with myself as a citizen of the world. Originally, our plan in Ethiopia was to construct a diversion dam, which would impound water, and power a ram pump to move water up and out of a 90-foot gorge to a tank, where it would go out to fields. Unfortunately, the hydraulic conditions in the river we worked in are not what we had been told, and the river is highly susceptible to massive flooding. We found this out in a tragic fashion, as our temporary diversion dam was washed away right after we had finished it.

Luckily, there were many good engineers on the trip, and as a group we were able to come up with a new solution, an overland siphon that delivers water without utilizing fossil fuels or other non-renewable resources. We did not bring every tool necessary to get the siphon primed properly, and will be going back to the community in either December or March to finish the system we put in place.

The education I received as an engineer on this trip was priceless. Working every day with my hands, and finding real physical solutions to problems in front of me was an experience all engineers should enjoy. At the beginning of the trip, I knew how to mix concrete and pour it, but I felt like I had to ask Clay McEldowney, the P.E. who came with us, to check everything. By the end of the trip, I was making entire sections of the system myself. An example of my growth as an engineer was my construction technique for the cap of the intake cistern of the siphon.

We knew we wanted a big, flat, square piece of concrete to sit on top of the vertically protruding hollow cylinder. This cap had to be big, so as not to be stolen, but also manageable, so people could get it off when needed. Thus, I wanted rebar handles to protrude out of the concrete, and also have rebar in the concrete to increase its strength. First, I took five pieces of rebar and bent them such that the middle 6 inches were offset from the rest of the rebar, so they were shaped like horseshoes with the ends bent out. I dug a pit in the ground, and embedded the middle, offset part of three of the handles in the ground, casting the entire cap upside down. The embedded handles would serve as grips for taking it off the top in the future. After smoothing out the earth, I poured in 6 inches of concrete, and embedded two more pieces of rebar so that the handles were sticking up and out, and we could use them for pulling it out of the ground. Finally, we took a cylinder of the same dimensions as the cistern, and dunked it into the half cured concrete. This left an impression into which the top of the cistern fit. After letting the concrete cure for two days, we pulled it out of the ground, and it fit just right onto the top of the cistern. It fulfilled all the needs for it, in that it was heavy, manageable, and covered the cistern so that flies and mosquitoes would not be problematic.

In addition to becoming a better engineer, I made a lot of friends within the community of Gorbi Arbaa. Every day a group of committed men from the village would come work with us, and we would laugh, tell jokes, trade stories, and talk about the World Cup. They were great men, and we became very close friends with them. They would bring us washing water and eggs, and we left them with our boots, extra clothes, and some camping supplies.

Another incredible aspect of my experience was my interaction with Ethiopian culture. I went to a coffee ceremony, where the hosts roasted beans in front of us, ground them up, and served the best coffee I had ever had. The only way to describe it is that it tasted like good coffee smells, if that makes any sense. We went to a wedding, which was quite the event. Gross misogyny was present during the entire affair. I, the leader of the group, was offered the choice of the community's young ladies, and some of the females on our trip felt quite uncomfortable with the treatment they received from guests from far away towns. The mistreatment of women came to a crescendo when the bride, wrapped up in a blanket, was hauled away to her husband's home by being thrown up like a sack of potatoes on a horse by her brother, who was holding a spear to her throat. The Africans watched and explained how this was not an uncommon way for a wedding to end.

There were other, more lighthearted, day-to-day occurrences that illustrated the differences in American and Ethiopian culture. One morning, I got dust in my eye, and our driver, a good man name Esayese, came over to me when I was blinking strongly to try and work it out of my eye. He put his face very close to mine, and blew strongly right in my eyes, expelling some saliva with his breath. I yelled and cursed, as I was not expecting him to spit in my face, and he apologized, citing "Ethiopian Culture". I forgave him, as I was obviously in the wrong, and the group still corresponds with him.

All in all, the trip was an incredible way to spend half of my summer, and I feel happy about what was done, and what will be done in the future. Once the siphon is running, the community will certainly have more agency, and a solid source of water for its community garden. Already though, the men in the community feel better about themselves, and realize they have a good work ethic, and with a little ingenuity, can change things around them for the better. Personally, it was a very fulfilling trip. I read selections from an Emerson reader, and feel much more self-reliant. I plan on applying to the Peace Corp this year, as I do not think I am ready to accept the job offer I received from the engineering consulting firm I worked at after my Ethiopian experience. There is a lot more work to be done in the world, and I am prepared to do my part.