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Insect Protein Final Paper

While most people are repulsed by bugs, I found myself fascinated as I stood over the writhing, undulating mass of mealworms before me. Their oddly supple bodies tumbled through my fingers as I listened to the insect farmer fondly chronicle the start of his farm, the insect industry, and his plans for the future. Edible insects might be the protein of tomorrow, but for now one must seek this strange world out for themselves.

Following the recommendations of a defunct cricket farm I found through Facebook, I reached out to Bob Simpson, the owner of the Vermont Mealworm Farm, over the phone. Between pauses while tinkering with his truck, Bob told me to come visit at 9 am on Saturday so he could show me around. He sounded happy to help me out, but was definitely surprised that I was willing to drive to such a remote part of Vermont. Later that week as I drove further from Middlebury I began to understand the tone of his voice. I saw just two other cars on the craggy dirt road that led me through the mountains, and with no cellular service or radio signal I was left with my thoughts and the unrelenting pop of gravel beneath my tires.

It wasn't always the case that insects and our food remained strictly separated. In fact, there is a wealth of historical and contemporary evidence that suggests the contrary. Pliny the Elder wrote of eating beetle larvae and Aristotle outlined the best times to harvest cicadas. Countries such as Ghana, China, Japan, New Guinea, and Mexico all have traditional insect

dishes that are enjoyed to this day. Why is it, then, that Western culture seems to abhor the notion of eating bugs? And, perhaps more pressingly, why should we care?

Nearly two hours after I departed, the mountainous landscape was shattered by brilliant and regular fields of gold and green. A weather-beaten, rust-colored farmhouse presented itself as my car kicked up dust from the country road. Unsure if this was the right place, I slowly approached the side of the farm before I saw a sturdy man fussing with some farming equipment. “Hello, I’m Bob!” burst the man before I could even open my mouth. I smiled and shook his work-worn hand as he led me past another well-used barn with maybe thirty cows inside. Bob ran his thick fingers through his peppery hair and led me to the former milking room: a large, desolate chamber that he told me was soon to be home to thousands of trays of mealworms. We then walked down a steep staircase that revealed an insect metropolis, with trays full of mealworms stacked to shoulder height on either side of the musty, narrow basement. Among the modular towers was a small table, where Bob’s gecko, Winnie, resided in a homey glass tank. Bob gazed at the tank with a soft smile and explained what led to this impressive operation.

“With cattle you can expect to lose between 30,000 and 40,000 dollars a month,” he offered, “but the mealworms never talk back to me.” As a Braintree native in his sixties, Bob is no stranger to the farmhand lifestyle. He has degrees in both dairy farm management and agricultural marketing, and since the mealworm farm began a year and a half ago, he has needed to draw heavily from his past experience. Bob has managed to neatly contain at least 300 trays within his small basement, with each housing nearly 5,000 mealworms. With plans to expand into the milking room, Bob seemed both excited yet apprehensive. “Marketing is currently our biggest challenge,” he divulged, as not only are people culturally averse to eating insects, but

international competition with massive farms in China makes it very difficult to break into the insect market. That might soon change, however, as the environmental implications of insect protein become more apparent. According to the Food and Agriculture Organization of the United Nations (FAO), one fourth of the world's land mass is dedicated to livestock grazing, with an additional third being used for crops that will serve as livestock feed. Consider this statistic with the fact that insects require astronomically less food, water, and space than cattle do for the same amount of protein, and Bob's basement operation begins to take shape as the ingenious epicenter of a product that could capture the attention of the environmentally conscious consumer and turn our culinary concepts on their heads.

Rearing his mealworms on local potatoes and wheat bran, Bob believes his product is far superior to anything that comes from China. They come "dried, broken, and hollow," he explains, "and who knows what they feed them over there?" With full faith in his product, Bob openly advertises his mealworms as safe and healthy for humans and animals alike. When the mealworms are cooked they are around 50% protein by weight and offer healthy, unsaturated fats like the ones present in fish. Relishing in his design, Bob pulled out a large, white, plastic bucket full of a light-brown powder. "We are totally waste free," he said with pride, explaining how the frass (mealworm excrement) in the bucket is an excellent fertilizer for hemp, vegetables, flowers, and essentially anything that grows in the dirt. The frass was dry and odorless, and a tray of mealworms, wheat bran, and frass could be easily separated by the series of sieves propped up against the wall to our left. It was refreshing to see how Bob had clearly thought about the impact his original industry has had on the environment and what he could do to foster progress.

Perhaps most importantly, Bob has bestowed his environmental stewardship upon his children, ensuring that his actions go far beyond the basement of the milking room. He joyfully described his daughter's passion for insects, admitting to me his jealousy that she writes an insect-based food blog and travels the world to gain insight into the world of edible bugs. When she is home, Bob explains, the mealworms are incorporated much more into their diets. They'll be cooked and tossed in cinnamon sugar, fried up with spinach and garlic, or simply sprinkled into a given meal for a boost of protein content. With a family motivated by environmental issues and sustainability, it comes as no surprise that Bob truly believes his business has opened at the right time. If we can overcome the stigma against eating insects and embrace it as the wonderfully concise solution it is, he argues, Bob will have succeeded as a businessman and as an ambassador for positive change.

Bob is fighting a unique battle, however, attempting to alter the way we think about food and the world we live in. His openness and honesty were touching in a way, showing a complete stranger the way his livelihood functioned and the risks he was taking to secure a better future. He recommended that I look for some inspiration from his daughter's blog as he generously packed me a free container of about 400 mealworms, wishing me luck in my insect journey and thanking me for listening. We then ascended the stairs and I shook his rugged hand once more before he told me he had better get back to work. After all, he had well over a million mouths to feed.

As I digested my time spent with Bob on the uneventful drive back to Middlebury, I thought about how in some ways Bob's mission seems to be an insurmountable task. Researching outside of rural Vermont, however, certainly provided me with a great deal of hope.

On the opposite side of the globe, many countries find the consumption of pork, shrimp, and lobster to be repulsive as a product of local culture, just as we swiftly dismiss the humble insect as nothing more than an agrarian pest. This is not to say that changing a cultural paradigm is a simple task, but it's certainly within the realm of possibility when one considers that the country directly south of the USA indulges in grasshoppers as a national delicacy. While I lacked the resources to make a trip down to Mexico, unfortunately, I decided to strive for the next best thing: a new, unique restaurant in New York City called The Black Ant. After making reservations and clearing a weekend, I decided to make the trek to a world diametrically opposite that of the pastoral scenery of the Green Mountains. It was time to see what our buggy future might look like.

Golden fields and roadside cows gave way to endless highway, where skyscrapers began to peek out from the horizon. A six-hour journey crawled to an end in Manhattan, immersed in the smells of fryer oil, city sewage, and the tireless exhaust of a honking, mechanical procession. I had finally made it, and as my keys jingled into the hands of the valet driver I gazed across the street to see a group of people swarming around a jet-black awning. To a casual onlooker this restaurant would hardly raise any eyebrows. As I swung the doors open I watched candle flames flicker and dance to the booming bass of Latin music. Enveloped by the incessant chatter of table-side conversation, I found my way to a small table where I sat down and began reviewing my options.

Silhouettes of ants and grasshoppers speckled the menu, showing which dishes contained insects. I quickly decided to try a couple of appetizers featuring our six-legged friends, settling on the Black Ant Guacamole and some spicy Chapulines (the term for grasshoppers used in

Mexico). While ants in your guacamole would normally warrant a complaint, I was delighted to see little black legs poking out from my bowl of avocado. Rich with cilantro, spiced salt, pumpkin seeds, and black ants, their signature guacamole could pass as an excellent starter just about anywhere. In fact, I don't think I would have even noticed the little creatures if the restaurant wasn't themed so appropriately.

A repeating white ant pattern spanned the entirety of one wall, and at the far end of the long, narrow room a mural depicted a large ant with colorful antennae and Aztec-style designs: a constant reminder of what was on your plate. Aside from this burst of color, the rest of the restaurant was checkered with modular, black-and-white tiles and serviced by black-clad employees.

Unfortunately, the restaurant was so overrun with customers I was unable to get into the kitchen. As my Chapulines came, however, I decided to ask my waiter, Gerard, a few questions. He told me that the concept of serving bugs has always been a part of The Black Ant's vision, and that thus far there have been no failed creations regarding bugs. Most people come in expecting the insect-laden menu, but every so often there are some surprised customers that thought the "Ant" in their name was simply aesthetic. Despite the occasional unsuspecting consumer, Gerard reported that about half of the orders he takes involve some insect component. While they don't take long to prepare, insects do require an appreciable level of knowledge and skill in order to make them tasty. Having tried some of their popular bug dishes, I can now say with confidence that whoever is in the back of the house at The Black Ant certainly knows what they are dealing with.

As Gerard walked to his next table in the midst of the buzzing chaos, I was faced with a most peculiar sight: a bright smear of avocado decorated with slices of jalapeño and dozens of golden, crispy abdomens. I scooped a collection of plump bodies and spindly legs onto a tortilla before accepting my fate and plunging in for a crunchy bite of the unknown. I was greeted with a flavor that harmonized perfectly with my surroundings thus far: different, funky, and a little spicy. I searched for another food to compare them to but decided that grasshoppers are in a league of their own. Their abdomens are delightfully tangy and a little sour, taking on the kick of the peppers and the zest of the citrus they were prepared in. Gerard came over and a smile spread across his face as the last few grasshoppers vanished. He soon came back with a small cup containing more, sensing my excitement and wonderment as I indulged in such an alien yet comforting experience.

As I finished up my meal I wondered how long it would be before other restaurants began mimicking places like The Black Ant. If nobody else decides to emulate such an aesthetic and menu I will be shocked. A restaurant without vegan options seems rare these days. Perhaps it won't be long before grasshoppers and ants join the ranks of sustainable alternatives that one would see in a restaurant or grocery store. What struck me most about The Black Ant was the happy medium that so gracefully existed within: agreeable music, drinks, and food accompanied by an attentive staff made the insect options blend into the background in a way that could make even the most bug-fearing person comfortable.

So, why should we care? The FAO reports that by 2050 the world population may grow to a staggering 9 billion people. Our current reliance on cattle accounts for 14.5% of all anthropogenic greenhouse gas emissions. However, throughout my journey thus far, I have found

that the future of sustainable insect protein doesn't lie in the preachy voice of a vocal consumer or the condescending tone of an idealistic scientist. Rather, it lies in a restaurant that could survive with or without insects. It lies in the basement of a weather-beaten farm. And most importantly, it lies within our ability to change. Those who want nothing to do with the insect revolution may continue their business as usual, but the possibility of a totally new culinary world may soon be apparent.

Sources

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Glossary and Pictures

Mealworm - The larval form of the mealworm beetle, *Tenebrio molitor*; a species of darkling beetle. They go through four life stages: egg, larva, pupa, and adult. Larvae typically measure about 2.5 cm in length.

Frass - The excrement of the mealworm. It is a dry, granule-like sand useful as an effective, odor-free fertilizer.

Chapulines - Grasshoppers of the genus *Sphenarium* that are commonly eaten in certain areas of Mexico.

FAO - Food and Agriculture Organization of the United Nations.



Bob standing next to his mealworm operation in the basement.



A tray containing about 5,000 mealworms.



A bag of mealworm frass produced at Bob's farm.



The mealworms Bob gave me, prepared with garlic and rosemary.



The menu at The Black Ant featuring insect options.



Guacamole from The Black Ant, prepared with “black ants salt.”



An order of Chapulines from The Black Ant.



The mural art in The Black Ant.