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Modifying Culture

For most of us living comfortable lives in the United States, the global phenomenon of culture loss seems distant and irrelevant. “Oh, that’s something that only affects American Indians as their native languages die out,” we think to ourselves, “There are so many other problems to ponder in the twenty first century; what about poverty? Or global warming?”

These are the issues I find myself ruminating on one sunny Sunday afternoon as I shovel microwave popcorn into my mouth and follow it up with a long sip of cola. Here I sit consuming the fruits of six hundred years of human cultural collaboration--popcorn, corn-sweetened beverages, the ethanol that fuels my car--while two thousand miles to the southwest, the cultures that gave us corn to begin with are struggling amidst economic, social, and even biological changes that threaten to erase a way of life ten thousand years in the making. Here, westernization and associated culture loss march symbolically as tiny genetically modified corn kernels from the United States--unwanted and unstoppable.

This instance of culture loss, though it might seem irrelevant and far-off, is deeply tied to our lives and to many of today’s greatest controversies; corn is all around us as food, fuel, and fiber. If you care about today’s greatest problems, from poverty to global warming; if you care about tradition, language, equality, and the future of agriculture--or the future of human cultural life--you should care about the story of genetically modified corn in Mexico.

“Without corn, we cannot live”

Right at the tip of Mexico’s geographic triangle, where the country tapers and curves to meet Central America, the state of Oaxaca lies along the pacific ocean. Here in Oaxaca

the Eastern Sierra Madre meets the Southern Sierra Madre, creating a landscape that varies from sea level along the coast up to thousands of feet in the state's extensive mountain ranges; an incredible diversity of people, language, and tradition is sandwiched everywhere in between (Schmal). Oaxaca, Mexico's most ethnically diverse state, is home to sixteen distinct indigenous ethnolinguistic groups, including the renowned Zapotec people (and many others) whose agricultural, city-dwelling civilization stretches far back into early Mesoamerican history (Schmal).

But agriculture here stretches back even further. Ten thousand years ago--at roughly the time when early Europeans were first discovering agriculture--the people of Oaxaca Mexico developed corn by hybridizing a primitive variety of popcorn and teosinte, a native grass (Fussell 84). This initial cross (deemed difficult even by modern standards) has resulted in literally thousands of different varieties of corn; corn specialized for a global diversity of climates, for color, for kernel size, for starch content, for cornmeal, popping, and fresh eating.

Since its initial cultivation ten thousand years ago, indigenous people throughout the United States and Mexico (not just in Oaxaca, the birthplace of corn) have had an important agricultural and cultural relationship with the crop. Corn is an important source of food, yes, but it is also a way a life--a gift from God and a source of pious celebration and gratitude. Corn, unlike many crops, is entirely dependent on humans for its survival; a corn-cob, wrapped tightly in layers of husk, cannot germinate and grow successfully should it simply fall to the ground. Humans must intervene to plant individual kernels in carefully spaced patterns (Todd). And so, by mutually depending on each other for survival, corn and humans came to be inexorably linked.

The Nahuatl Indians of southwest Mexico (many of whom continue to live in Oaxaca) exemplify this relationship. In the 1970's and 80's, despite an influx of capital from increased tourism in the region, many Nahuatl people continued to plant and grow corn according to traditional, labor-intensive methods (Good). Corn, along with beans and squash, not only gives these people food security, it also links them with thousands of years of tradition. When one merchant suggested that his family stop planting their two

corn fields every year, his wife and mother refused, citing how expensive it would be to purchase enough corn (along with the squash, beans, and melons they also grew) and to feed their livestock. In addition, the man's mother claimed, "We have to grow corn because God gave it to us." (Good). This family practices agriculture not only to feed themselves, but also because their crops have deep spiritual significance. In the words of one Nahuatl man:

> Totatzitzihuan [our gods, saints, forebears] gave us tonacayotl to eat, and it gives us its strength. For this reason we respect it, because it is our life force [chicauhualiztli]. Without corn we cannot live; even an animal cannot live without corn. But we must work. Here everyone plants because that is the work [tequitl] that was taught us, and from that we sustain ourselves. Here we still respect Totatzitzihuan, because we know and remember what we were given (Qtd. in Good).

This symbiosis of agricultural and spiritual meaning recurs in corn-cultures throughout the Americas. The Maya performed (now infamous) rituals of human sacrifice and used the blood of victims to fertilize kernels of corn--corn both symbolizes and makes possible their cycle of death and life (Fussell 30). When the Papago men of southern Arizona drop four kernels of corn into a hole, they speak to each kernel, telling it to grow tall so that they may feed their families (Fussell 114). The Hopi creation myth describes the beginning of the Fourth world (in which we are now living) when ancient Hopi ancestors were offered corn by Masaw (a mythical soil-tilling giant); instead of choosing the biggest ear of corn, they chose the small, humble blue ear, and by so doing, committed to living a difficult life without excess or ease. And so corn justifies and explains the harsh circumstances of Hopi existence (Todd 472). For these cultures, corn isn't just a crop, it is a spiritual element of human life, given to them by God.

For one thousand years in the high deserts of northeastern Arizona, the Hopi have grown (and continue to grow) corn despite a short growing season and limited water resources. These farmers grow not just one variety of corn, but from two to eleven, and many of those are Hopi heritage varieties (Soleri and Cleveland). According to one Hopi woman, "'It is not a good habit to be too picky . . . we have been given this corn, small

seeds, fat seeds, misshapen seeds, all of them. It would show that we are not thankful for what we have received if we plant just certain ones and not the others'" (qtd. in Todd). For this woman, corn is tied up in religion and her agricultural practices are based on corn's religious significance as a gift from God. For her, corn is more than food, corn is a fundamental element of her religion, heritage, and identity.

"Our mother is being corrupted by scientists and corporations"

In 2001, two UC Berkley scientists published a controversial article in *Nature* claiming to have found evidence of genetically modified (GM) corn crossbreeding in Oaxaca, despite Mexico's moratorium on GM corn (Quist and Chapela). Oaxaca, the origin place of all corn where nearly 40% of people still speak an indigenous language, had been contaminated by GM corn--was growing GM corn alongside thousand-year-old heritage varieties, and these varieties were interbreeding.

Genetic modification (or genetic engineering) is the process by which a section of DNA from one organism is inserted into the DNA of a different organism. For example, DNA from one corn variety could be inserted into the DNA of a different corn variety to improve yield, sugar content, or any number of other things. This kind of genetic engineering could occur in nature-- and indeed it has for thousands of years as people crossbred different strains of corn to create new varieties. But, through the process of genetic engineering in a laboratory, scientists can take DNA from bacteria, say a bacteria that lives in the soil and happens to produce a natural toxic pesticide, and insert it into corn DNA.

This is exactly what happened in the 1990's when scientists inserted DNA from B. thuringiensis (BT) into a variety of yellow corn. The resulting BT corn plants produced the same natural insecticide as B. thuringiensis, which makes them resistant to the devastating European corn borer--a leaf-eating caterpillar that causes billions of dollars to corn crops worldwide. BT corn was approved for the market in 1996 and has since revolutionized pest control in many countries (Hellmich).

Techniques of genetic engineering have also been used to produce the "Roundup Ready" variety of corn, which is resistant to the herbicide Roundup. When farmers purchase Roundup Ready corn from Monsanto, they can then spray the entirety of their fields with the herbicide Roundup (which they must also purchase from Monsanto), thereby killing (most) weeds and leaving valuable corn plants undamaged. Genetic engineering makes possible a technologically advanced, large-scale system of agriculture wherein individual farmers are subordinate to, indeed dependent on, larger systems of chemical production, equipment manufacturing, and seed distribution.

Because seed companies like Monsanto retain patents on their genetically modified seed, individual farmers are legally prohibited from saving seed to replant in following years. In fact, farmers can face legal action if they are discovered to have undocumented GM seeds in their fields. In 2001, Monsanto successfully sued Canadian canola farmer Percy Schmeiser, who claimed GM canola seeds ended up on his property after being blown from neighboring fields (Charles). Backlash against Monsanto was far reaching; organic and small scale farmers feared possible inadvertent contamination and subsequent lawsuits, which would be expensive and time consuming. Mr. Schmeiser did not want to grow GM canola--these seeds were accidentally blown into his fields. Similarly, rural Mexican and American Indian farmers do not want to grow GM corn among their heritage plants and risk GM contamination of their crops.

In the United States, corn makes ethanol, animal fodder, and plastic--in fact, less than 1% of all the corn grown in the US is intended for human consumption (Fussell 7). But 90% of all US corn is genetically modified ("USDA"). Here, GM corn is tied to billion-dollar chemical companies (like Monsanto and DuPont, who distribute GM seeds), politics, and our complicated legal system. There is no spiritual connection or profound cultural significance. For Americans corn's value is only in dollars and cents.

Indigenous groups throughout the United States and Mexico have objected to this genetic modification of their sacred cultural heritage and the danger GM seeds might pose to traditional folk varieties. Clayton Brascoupe of the Tesuque Pueblo laments genetic modification:

> When I first heard about the corruption of the genes of our Corn Mother, it frightened me because corn is at the heart of our survival as Indigenous peoples of North, South and Central America... It is our first medicine, and our people and corn are one in the same. Our mother is being corrupted by scientists and corporations, and if we don't stop it, she won't have the ability to heal us any longer (qtd. in Todd).

For indigenous people, corn is more than DNA--it is an element of cultural and spiritual life.

"We indians knew that corn can travel"

In modern Oaxaca Mexico (and in many other parts of Mexico and the United States), indians struggle to maintain their traditional agricultural methods, which might require traveling long distances to arable land, strenuous manual labor under hot, dry conditions in mountainous terrain, and all of this with an uncertain outcome due to frequent droughts (Good). Poverty also affects indigenous groups whose traditional way of life offers no capitalist reward.

Disconsa supermarkets located in poor and rural regions and operated by the Mexican government are meant to help alleviate some of this poverty by providing discount groceries (Santini). After NAFTA, Disconsas began selling corn imported from the United States, which, despite a moratorium on GM corn, contained a mixture of GM seeds. And so Disconsas began unwittingly distributing GM corn--a function of the US's commodified agricultural tradition--to the very people whose heritage and culture is most linked to the crop (Cummings). Prior to 2006, the Mexican government found 37% contamination of GM corn within the Disconsa network (Santini). From here, it is likely that Oaxaca farmers purchased corn for seed (unaware of the contamination) and introduced GM plants to their fields. Growing alongside traditional heritage varieties, these strains--representing two different systems of agriculture--interbred, introducing GM transgenes into thousand-year-old Mexican folk varieties of corn.

Scientists argue that introduced GM corn strains will not cause any damage to the "environment or human health," (Joyce). Indeed, scientists are still unclear as to the

extent and permanence of GM DNA introgression into native varieties, although evidence of some interbreeding is clear (Stewart, Halfhill, and Warwick). The US government and the biotech industry have scoffed at reports suggesting Mexico limit corn imports or require labeling of potential GM corn and deny that any additional research is needed (Joyce). Environmental groups and indigenous farmers, however, worry about the effect GM corn might have on crop biodiversity: what if these transgenes affect the ability of folk varieties to adapt to their climate or cause undesirable traits?

According to the UN Food and Agriculture Organization, 75% of crop biodiversity has already been lost in the last century (Cummings). Biodiversity is important for many reasons; monoculture (the cultivation of only one crop strain) means crops are more susceptible to disease or environmental changes--an important issue as the world enters a period of man-made climate change (Guerrero). In addition to potential biological dangers, GM corn in Mexico could have other repercussions. Corn is a staple of Mexican diet, and as corn cultivation changes, so too does diet. Whereas one hundred years ago non-GM corn was used in homemade nixtamalized tortillas, today imported yellow GM corn is used to make nutritionally inferior corn flour tortillas sold in supermarkets (Fitting 16).

Traditionally, corn cultures were concerned not with breeding the most productive, largest varieties possible, but with the purity of their crop. Different varieties of corn might have different religious or cultural meaning, and it was (and is) important for them to prevent cross breeding to ensure the integrity of each unique strain. In 1839, a Hidatsa woman living North Dakota wrote in her memoir, “We Indians knew that corn can travel” (Fussell 65). This woman inherited thousands of years of agricultural tradition and knew how to carefully select her seed and manage her crop so as to prevent hybridization. By doing so, she was able to ensure not only the genetic purity of her corn varieties, but the maintenance of important religious, cultural, and ancestral traditions. The meaning of heritage corn transcends simple science, and the problem of encroaching GM strains (and the westernized, commodified agricultural tradition they

represent) is more complicated than governments and seed purveyors have made it out to be.

“Some of us grow corn because there is no other work.”

Since GM corn was first discovered to be crossbreeding with heritage folk varieties of corn in Oaxaca, advocacy groups and environmental organizations have protested alongside indigenous people citing the potential biological and cultural harm GM corn might do. But corn cultures have already been under relentless attack for five hundred years--GM corn is just the most recent symbol of western cultural hegemony.

Today, in the Tehuacan Valley, which borders Oaxaca to the south, farmers struggle to grow corn in accordance with tradition. Elote, a popular fresh-eating variety of corn, requires irrigation, but water rights in this arid region have been embroiled in controversy since the haciendas and sugar mills of previous generations usurped water access from small farmers (Fitting 137). In addition, not all households can afford to have small fields for agriculture, called milpas (Fitting 156). In previous decades, a barter system of labor or strong community ties might have allowed otherwise cash-poor farmers to get help harvesting or planting; however, today’s generation of young men, accustomed to receiving hourly wages as migrants in the US, expects to be paid for labor (Fitting 156). In addition, the promise of factory work in urban areas draws young Tehuacan people away from the fields of their ancestors (Fitting 157). As a result, many farmers grow corn “because there is no other work”--as a back-up plan when they cannot find wage-jobs (Fitting 155).

Traditional folk varieties of corn are certainly threatened by encroaching agricultural westernization, but they are also threatened by encroaching economic and cultural westernization. To protect corn-cultures and their traditions, we must protect the corn, yes, but we must also pay attention to the people and the circumstances of culture loss, economic inequality, and uncontrollable westernization that allowed GM corn to take root in the first place.