As Eaten On TV

An Honors Thesis (HONR 499)

by

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Abstract

You are what you eat, from nourishing foods which strengthen the body and mind to meals which define a cultural group and facilitate social connection over the dinner table. In a world where more people are hungry and overweight than ever before, the free choice of what to eat is highly obscured. *As Eaten On TV* offers a historical investigation as to how food marketing emerged in the United States and around the world. This is a story which addresses the rise of agriculture, globalization, industrialization, and the power of corporations to simultaneously transform kitchen pantries and farm fields.

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I would like to thank my parents, my original teachers, for getting me to where I am and countless hours spent editing my excessively long papers since day one.

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Process Analysis Statement

As my years at Ball State progressed, I was increasingly drawn to the topic of food. I had long been a self-described environmentalist, yet I did not recognize the sheer impact that food choices have on the planet. Through my own reading and exploration, I came to grasp the vital role of food systems in carrying out environmental sustainability, and that the combined choices of many can shift demand in a more positive and regenerative direction for all life on Earth. If every person chooses only to eat fast food and processed items, they are essentially voting for animal exploitation, pollution, and greenhouse gas emissions on a massive scale, if they do not first pay through a declining physical health. The choice to cut out industrial animal products and support local, regenerative agriculture seemed like a choice between night and day.

Yet as I continued to take courses at the intersection of environmental science and economics, my understanding of how and why people make the food choices they do also expanded. As my thesis discusses, more people than ever before are overweight and obese while health systems struggle with increasing rates of diet-related chronic diseases, and hundreds of millions more are hungry or undernourished worldwide. It became clear to me that it cannot be every individual's fault for eating the food they do in often addictive ways. The modern day is defined by technology and advertisements and marketing which seek to catch one's attention at every corner to buy the brightest and newest products. In such a society, the concepts of free choice and a fully informed marketplace, tenets of economics courses and free market schools of thought, are nothing but fabrications and antiquated theories. Constant stimulation and the association of unhealthy foods with pleasure threaten the mind's inherent processing capability, and junk food becomes an escape from an increasingly stressful society. Advertisements from the moment one wakes up to the moment they fall asleep generate an artificial and ingenuine

demand for goods and certain foods, and once one develops a taste for processed foods high in sugar and unhealthy fats, an addiction forms which is difficult to break.

My research process was not limited to the work I performed during the semester of writing. The information I included in this thesis is the culmination of years in courses from many departments at Ball State, as well as a significant deal of personal reading. My two independent study courses, *Sustainable Business Management* and *Local Food Sustainability*, allowed me to dive deeper into the complex interplay between the food people eat, the incentives of food corporations, and agriculture on a global scale. My thesis, *As Eaten On TV*, synthesizes literature from many disciplines, bringing together concepts to explain how world history progressed in the direction of humans living further from the natural world, in turn eating a modern diet which bears little resemblance to that of our hunter-gatherer ancestors.

This paper topic was selected because I have not come across any source which makes the relevant connections between globalization, industrialization, and the rise of marketing, and how they relate to the most human of decisions in choosing what to eat each and every day. Food is integral to humanity, and the current path of environmental degradation and poor human health around the world raises questions as to how practical and viable a global food system designed to solely generate profit is for much longer.

Introduction: Planet of the Free

To the west, the light of the afternoon sun stretches across the sky as the length of an hour seems to expand. The clock strikes five with a soft ping and, in Pavlovian fashion, causes everyone's stomach in the household to lightly rumble and a single question to form in everyone's mind:

What's for dinner?

Depending on where one is located, this daily ritual will take on an unimaginable range of shapes and sizes, foods and flavors sourced from the furthest corners, highest peaks and lowest valleys of the Earth, contributing to an array of meals as unique as the billions of people who walk on this planet. Until roughly the last one hundred years of human history, this question did not lead to much debate. What would be put on the plate was what is immediately available in any given region at a certain time of the year, be it winter vegetables and canned meats or fresh fruit and breads. The ability to ask the family if they want Mexican or Chinese, to eat dine-in or take-out, or simply visit a drive-thru after work is a uniquely modern, and primarily western, phenomenon of eating. The average family grapples with what Michael Pollan calls the omnivore's dilemma every night. The fact that humans *can* eat a wide variety of foods, much more so than pure carnivores or herbivores, means that a decision must be made every time one is hungry between the thousands of options available at supermarkets, fast food restaurants, and more.[1]

The question of what is for dinner reveals a great deal in terms of larger health patterns across the planet. In 2016, more than 1.9 billion adults worldwide were overweight, of which

[1] *The Omnivore's Dilemma*, 2006.

650 million were obese, three times more than in 1975. Also from 1975 to 2016, the proportion of overweight children aged 5-19 rose from 4% to 18%, with more than 340 million children overweight and 124 million obese today.[2] At the same time, more than 820 million people were undernourished in 2017, lacking the caloric and nutritional requirements for optimal bodily function.[3] Over recent decades, the share of undernourished adults and children has generally decreased, yet the sheer prevalence of hunger still present in the modern day is cause for concern.

In the United States and other western ("developed") countries, the problem with food is much more one of having too many calories in one's diet, and namely calories from nutrient-poor foods, than a lack of calories. With this being said, food security, defined by the U.S. Department of Agriculture as "access by all people at all times to enough food for an active, healthy life,"[4] is something many households across the U.S struggle to attain or sustain. 14.3 million households experienced food insecurity at some time during 2018, comprising 37.2 million people and 6 million children.[5] For food insecure communities, the choice of what to eat may be even more limited than the options available to ancient bands of hunter-gatherers. Deliberate placement of supermarkets in areas which are only accessible by car immediately eliminate those without personal transportation and choke out local, small stores, often leaving residents of an unluckily situated neighborhood with only convenience store fare.

The modern omnivore's dilemma may affect primarily those in middle or upper class homes, yet for anyone who is fortunate enough to freely choose what goes on the dinner table, certain developments in the past hundred years have obscured that choice. For both consumer

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[2] World Health Organization. "Fact Sheet- Obesity and overweight."
[3] FAO, IFAD, UNICEF, WFP and WHO. "The State of Food Security and Nutrition in the World 2018."
[4] USDA. Food Insecurity in the U.S.
[5] Coleman-Jensen, Rabbitt, Gregory, and Singh, "Household Food Security in the United States in 2018."

products and foods, a massive advertising and marketing complex emerged from industrial manufacturing during the world wars. Through posters and billboards, radio ads and television commercials, modern marketing has been driven by the sole motive of increasing sales and profits by artificially creating demand and convincing shoppers to pursue wants rather than needs. This often involves connecting a certain product or meal with an emotional experience. In terms of food, buying a fast food meal is argued to relieve stress by saving a family time and money, even freeing a mother from the limiting gender role of a chef.

Food advertising directed toward children is particularly insidious. Many marketing agencies exist only to leverage the "pester power" kids possess, this being the power of children to nag their parents to purchase certain toys and foods. Children are widely accepted as a justifiable market segment for companies of all types, from fast food restaurants to energy companies and soda producers. Studies are conducted on the most vulnerable of our population to understand their likes, dislikes, desires and fears, and products are framed to suit their innermost thoughts and feelings.[6] Children are nearly unable to escape the torrent of advertisements directed to them, especially in an increasingly digital world. A 2019 study by Common Sense Media found that American children aged 8 to 12 spent 4 hours and 44 minutes on screen media every day, and teenagers spent 7 hours and 22 minutes. The vast majority of this time was spent on TV shows or online videos, video games, and social media, and did not include that spent on school or homework.[7] Even a decade ago, the amount of exposure children could have to advertising was much more limited due to the comparative lack of personal smartphones and laptops. Many financially struggling school districts have also turned to acquiring corporate sponsorships, placing soda and fast food ads (and restaurants) within their

[6] Schlosser, *Fast Food Nation*, 44.
[7] Rideout and Robb, "The Common Sense Census: Media use by tweens and teens."

schools in exchange for funding. Effectively, thousands of students each day are unwittingly subjected to junk food advertising to pay for their schooling.

Many of the items found in the average kitchen are purchased because of widespread marketing efforts. Processed foods high in sugar, fat, and calories, yet deficient in vitamins and minerals, are the stars of advertising campaigns in commercials, billboards, and magazines. Advertisements are ubiquitous in American society, and have even become commodified themselves (as in only watching the commercials during the Super Bowl). The American identity is defined by the food we eat, like burgers and fries, chili-laden hot dogs, cans of Coke and generous slices of apple pie. These are foods which, notably, were absent just over a century ago, and only rose to prominence through the calculated and deliberate efforts of large food companies to sell their products. The modern food system is built upon artificial demand and reliant on a rampant sense of consumerism. Increasingly, this model of consumption is being exported around the world, not only to economically comparable western countries, but also the poorest of nations. The advertising is simply adjusted to suit the local preferences, so long as profits can be made.

As Eaten On TV offers a historical investigation as to how food marketing emerged in the United States and around the world. This is a story which addresses the rise of agriculture, globalization, industrialization, and the power of corporations to simultaneously transform kitchen pantries and farm fields.

The first section, *A Brief History of Eating*, starts with the very dawn of agriculture itself. Human society changed dramatically from hunting and gathering tribes to sedentary communities of farmers which were fraught with hierarchy and characterized by a growing

importance of ritual. As the food humans ate changed, mankind was both biologically and culturally transformed.

Unnatural Selection: The Global Food System widens the scope, explaining how European exploration around the fifteenth century introduced new ways of living and brought together species which had never before met. A spirit of colonization led to the exploitation of human life in massive patterns of slavery, where certain ethnic groups were enlisted to labor on increasingly intensified farming operations. As the twentieth century approached, so too did an agricultural regime of chemical application, fossil fuel use, and commodity crops which hardly resembled whole, real foods.

Too Much of a Good Thing raises the story of consumerism, particularly the efforts of Edward Bernays and Earnest Elmo Calkins in creating public relations and marketing, the forerunners of the modern advertising machine. The 1900's combined industrial manufacturing and psychology to create advertising schemes designed to sell not only clothing and cars, but also the food people eat.

Commercializing Diet uses the evolution of bread to explain how processed foods rose to dominance. Food gradually came to look less and less like its natural constituents, and bread in particular needed to be sold through careful marketing campaigns. Once people took a bite of processed, sugar-heavy industrial loaves, however, they were hooked, despite the lack of nutritional value.

Freedom to Cook explains how simultaneous changes in modern society, such as suburbanization and car dependency, led fewer and fewer people to regularly engage in the act of cooking. Supermarkets were designed to convince consumers to buy more, often food they did not need. The American value of freedom stands out as a central issue, as the massive range of

choices available to anyone who steps in any large grocery store indicates a great freedom of choice. As cooking continues to fade into the distance, however, true freedom is arguably lost as humans are bereft of a skill central to our very evolution.

A Brief History of Eating

The grass rustles as the hunters slowly approach their target prey. Bare feet carefully stepping on the ground underneath and arms wielding archaic spears, the group is determined to make a catch without scaring the animal away. They begin to form an arc around the unsuspecting deer, who is unaware of the imminent threat and chews casually on a leaf. Once the circle is completed and there is no chance of the deer making an escape, the leader shouts to the group and the hunters charge, hurling their spears when they see a clear shot. The deer is quick on its feet, however, and notices a slight break in the group and sprints out across the field. The hunters were unsuccessful in this attack, and as the daylight is quickly running out, they must return to their tribe empty-handed.

For most of human history, indeed that of all life on Earth throughout recent eras, obtaining one's meal was not as simple as heading to the grocery store. The life of a hunter-gatherer was a dramatic one, moments of hunting and intensity mixed with walks of berry collecting across a landscape and generous amounts of rest. This life was not to remain for long, however, as cooking entered the scene and altered both our biology and social relations. 10,000 years ago, the dawn of agriculture further changed how humans survive and thrive, our influence over the planet steadily increasing as power dynamics replaced behavior focused on mutual gain. At the center of both of these significant transitions in human life is, of course, food. Food enabled civilizations to take root, cultures to develop, and a sense of collective identity beyond our biological role to flourish. To be human is to consume; to be a member of a community is to dine, or so the progression of society indicates.

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A key moment preceding the evolution of *homo sapiens* was the development of a significantly larger-than-average brain in our ancestors about 2.5 million years ago.[8] This evolutionary quirk, a large mind matching an upright, socially organizing and tool-using primate, allowed for future changes in humanity. In the wild, sharp senses are necessary for an omnivorous species such as humans to consume properly, maximizing nutrient intake while avoiding toxic plants. A larger-than-average mind served as a database for what berries and mushrooms to eat and which to reject, crucial information which was passed down from generation to generation. Keen senses were necessary to most effectively traverse one's environment and acquire desirable foods. Out of necessity, hunter-gatherers may have had superior olfactory abilities, capable of identifying and reacting to smells at a much higher accuracy than comparable individuals who do not hunt and gather.[9]

How food was obtained is but one piece of the story. Sight and scent and sound led humans to the most nutrient-rich and energy-dense foods while avoiding predation and danger. Once safe from harm with food in tow, early people could utilize taste and touch to create an end product which was rich not only in flavor and nutrition, but was also indelibly stamped with the culture in which it was created. The act of cooking, now thought to be impossible without a microwave or stovetop, is believed to have predated even the dawn of agriculture. The preparation of food transformed mankind both inside and out.

Archaeological research posits that around 1.9 million years ago, there was an increased role of cooking in our prehistoric cuisine, known as the "cooking hypothesis." Geologically speaking, this occurred shortly after early humans saw an increase in brain size and mass,

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[8] Manning, *Against The Grain: How Agriculture Has Hijacked Civilization,* 14.
[9] Majid and Kruspe, "Hunter-Gatherer Olfaction Is Special."

allowing for a more vivid and calculating experience of reality. Just shy of two million years ago, however, *homo erectus* skeletal remains indicate a "reduced digestive effort (e.g., smaller teeth) and increased supply of food energy (e.g., larger female body mass)" for these early humans.[10] These developments, as well as a smaller jaw, smaller gut, and the crucial larger brain, could only have been enabled through outsourcing the labor required in digestion, a metabolically-demanding activity.[11] What, other than the human gut, could soften food and process tough fibers and cellulose? As it turns out, fire stepped up as a prime, if accidental, candidate.

There were few foods which could not be improved by the application of heat from fire, as cooking greatly increased the available energy to the consumer. The hypothesis follows that cooking enabled the evolutionary changes listed above to take place, resulting in a large, complex mind which became hungry for more ways to maximize food energy, eager to star in primitive cooking shows. Over time, the primate gut designed to slowly break down raw foods came to favor cooked varieties, significant among them an increasing amount of meat.

Also important alongside the biological changes in early humans, the adoption and expansion of cooking began to change social structures and behavior. As with our nearest relatives, such as chimpanzees, success equaled social cohesion and cooperation, most often in terms of what's for dinner. After a successful hunt, a massive buffalo or mammoth could not be eaten by merely a few individuals. Rather, feasting as a large group became commonplace to maximize what could be eaten or used from the animal. Additionally, a sizable accumulation of food was vulnerable to theft when brought back to a community, namely males stealing from females. To minimize losses, females sought out protective relationships with males, sexual

[10] Wrangham, et al., "The Raw and the Stolen."
[11] Pollan, "Cooked."

attractiveness being a primary motivator for a male.[12] Pairing of individuals within a larger community for food security may thus be the historical precedent for our human social system of marriage and monogamy, an aberration of biology among our genetic relatives.

Cooking defined the progress of our species, leading to the social organizations we hold dear and the very shape of our bodies and minds. Hunting, gathering, and cooking set up a relatively peaceful and consistent way of life (not to discount that conflict and turmoil were very real parts of living naturally, as any nature documentary will indicate). Cooperation and egalitarianism were the unspoken values most important in maintaining the well-being of a community.[13] Millenia passed until this way of being was suddenly overturned by a new way of obtaining food: farming.

Agriculture Arrives

While *homo sapiens* migrated around the planet over hundreds of thousands of years, the earliest recognizable forms of relatively large-scale agriculture began at roughly the same time, occurring in several different foci across the Earth. Around 10,000 years ago, farming on a significant scale began in the Middle East, China, Africa, New Guinea, and areas throughout the Americas, regions which could not possibly have had much contact with one another. Several theories exist as to why humans took up agriculture at the time they did,[14] however most point to the end of the latest ice age. A more suitable climate for remaining in one place and actively growing food allowed some groups to gain a competitive advantage.

On a global scale, the end of glaciation was a disturbance of massive proportions. Over time, nature devised ways to manage catastrophe. Certain plant species evolved to grow in

[12] Wrangham, et al., "The Raw and the Stolen."
[13] Manning, *Against The Grain: How Agriculture Has Hijacked Civilization*, 18.
[14] Cohen, "Introduction: Rethinking the Origins of Agriculture."

disturbed areas as early colonizers, contributing organic matter and structure to the soil.[15] These are typically annuals, existing one year at a time until more permanent perennials take root, and are easily recognized now as our primary grains, including wheat, corn, and rice. It follows that our earliest forms of agriculture optimized these plants in particular, species which evolved to grow in areas of disturbance, which a farmed plot of land could easily be considered.

What we consider agriculture is far from a uniquely human endeavor. Many animals interact with their environments deliberately, purposefully shaping it in beneficial ways. Certain ants and termites grow fungi themselves for the colony to consume, coral fish guard specific patches of algae from competitors, and fruit bats and orangutans sow seeds of fruit trees by means of their waste.[16] What made human agriculture unique is the sheer scale of how much land was transformed in a relatively short time. Humans did not all of a sudden discover how to sow seed and manage land, as the skills of cultivation and domestication had been used for thousands of years prior, albeit on a much smaller scale. The incentive to shift more and more people to farming came gradually, as a community benefited from a slight advantage by having a marginal increase in their total supply of food. As land became farmed and the non-domesticated or cultivated species retreated, more farming was required as hunting and gathering opportunities dwindled.[17] A feedback loop occured, cementing the place of agriculture in the development of human civilization.

How humans obtained food and what they ate, activities central to social organization and individual health, were not radically transformed to agriculture without a fight. Hunting and gathering required that a community be more or less nomadic, with some examples of settlement

[15] Manning, *Against The Grain: How Agriculture Has Hijacked Civilization*, 28.
[16] Tudge, *Time Before History*, 264.
[17] ibid, 272.

occurring along rivers where fish carried nutrients from afar in their meat. In most cases, traveling around addressed the fact that "almost every locale's soil and water are deficient in one mineral or another,"[18] so eating across a wide swath of land resulted in, ideally, a balanced diet. Human bodies also evolved to suit a certain lifestyle, one of walking and performing movements required for this pre-agricultural way of being.

Skeletal records indicate the drastic change which occurred in the bodies of workers in the new agricultural paradigm. Theya Molleson from the Natural History Museum in London examined human remains from Abu Hureyra, a region now in northern Syria, to better understand the physical costs of farming, significantly different than the work required in hunting and gathering. Actions such as carrying heavy loads of grain, dehusking with a mortar and pestle, and the final grinding of grain on a saddle quern took many hours of repetitive, taxing effort. The 10,000 year-old skeletons of Abu Hureyra women, who primarily performed this labor, revealed that toes and legs were arthritic and bent, lower backs and vertebrae were often injured, and that the upper spine was deformed from carrying loads on the head.[19]

These laborers were not the only ones affected by the great shift in food. Processed grains, complex carbohydrates with little to offer in the way of vitamins or minerals, do not alone make a sufficient diet. Furthermore, the archaic means in which grains were pounded and ground was imperfect at best, the end product being a rough and abrasive meal which, when eaten, would swiftly wear down teeth and often lead to their loss.[20] Early on, a nutrient-poor, physically-taxing, and tooth-decaying diet was, as one can expect, not seen as an entirely positive change.

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[18] Manning, *Against The Grain: How Agriculture Has Hijacked Civilization*, 35
[19] Molleson, "The Eloquent Bones of Abu Hureyra."
[20] ibid.

Religions, ties which bind and divide humans since as long as most can remember, have their roots in food and how the relationship to sustenance has changed. The *Taittiriya Upanishad*, an ancient Hindu text, explains how food and Earth are one and the same, and that people are born from *anna* (food) and return to *anna* at the end of their human life.[21] In the Old Testament, the earliest form of sin regards a misdeed involving what fruit is allowed to be eaten in the Garden of Eden. Adam and Eve, giving into the temptations of the resident serpent, ate fruit from the single tree God commanded them not to eat from. Upon witnessing this disloyalty, the pair were condemned in the following manner:

> In the sweat of thy face shalt thou eat bread till thou return unto the ground, for out of it wast thou taken; for dust thou art, and unto dust shalt thou return.[22]

It is understood that the Garden of Eden was not one to be cultivated by human hands, rather it represents the lost paradise of hunting and gathering where all the food one needs is right at their disposal. The punishment for disobeying God was to labor in farming for the remainder of Adam's life, indeed that of all people to come. The early days of agriculture were exceedingly harsh and punishing, and the olden days were looked upon with a sense of nostalgia and yearning. Why, then, would great numbers of people accept a physically degrading, unnatural, and unpleasant way of obtaining and processing food?

Most, in fact, did not. The diversity of foods provided by hunting and gathering precluded any great risk from varying short-term weather conditions, and focus was placed on meeting immediate and present needs without wasting effort. Crucial to agriculture's ostensible success was the existence of *surplus*. As early farmers learned, working harder increased the

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[21] Sethumadhavan, "Taittiriya Upanishad: Transliterated Sanskrit Text."
[22] Genesis 3:19, "21st Century King James Version Bible."

productivity of a patch of land, and more expended energy meant more surplus. He (as, in most cases, it was a *he*) who could control and store this surplus found himself in a historically unprecedented role of power and control. This shift occurred primarily in communities where agriculture was based on cereals and grains. These foods were able to be processed and stored for year-round nutrition, whereas societies built on tubers or root crops did not undergo the same transformation at this time. For the former societies, most historians and economists point to this transition as the birth of hierarchy, states, and advanced civilization.[23]

Comparing home sizes in Eurasia to those in North America and Mesoamerica (data from 9000 BC to 1500 AD), researchers found a connection between the domestication of plants and animals and wealth inequality. The adoption of agriculture in Eurasia is associated with a number of larger-than-average homes and implies a wealth disparity which was absent in North and Mesoamerica, where agriculture (particularly with animal labor) did not massively redefine society.[24] In other words, skeletal remains of early agricultural workers "show a harsh life for the masses, [while] the wealthy were clearly better off and had access to resources, luxury, and security far beyond anything a hunter-gatherer ancestor could imagine."[25] Agriculture spread, not due to its inherent superiority over hunting and gathering, but through the force of comparatively powerful agricultural societies. Larger populations meant increased demand for space, leading farming populations to colonize hunter-gatherers, who, for the most part, "went as slaves… were dragged kicking and screaming, or just plain died."[26]

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[23] Mayshar, Joram; et al. "The Emergence of Hierarchies and States: Productivity vs. Appropriability."
[24] Kohler, Smith; et al., "Greater post-Neolithic wealth disparities in Eurasia than in North America and Mesoamerica."
[25] Manning, *Against The Grain: How Agriculture Has Hijacked Civilization*, 41.
[26] ibid.

Agriculturalists around the world gradually expanded their reach, seeking new lands to settle and cultivate. In certain areas, such as Italy and Greece, the "caucasian" wheat growers and cattle raisers (a cultural group with origins near the Caucasus mountains) were able to freely colonize these waterbound lands. These original European farmers expanded their reach across the continent with surprising homogeneity in culture and settlement patterns, however these were not all uninhabited areas. Cro-Magnon people, famous for their ancient cave paintings, were hunter gatherers who still remained in the area, and when the farmers arrived, it is believed that the interactions were anything but cordial. A minor amount of genetic mixing combined with the only trade between them being spear points suggests that these early relationships foreshadowed the violent meetings between European conquerors and Native Americans to come many years later.[27] Hierarchy and war, foundations to human society, were laid.

Another defining trait of human civilization is the concept of work. Since more labor put into land meant more productivity, output, and surplus, the experience of work was marked with an orientation toward the future which remains to this day. A society in which one can perform tasks *other* than acquiring and preparing food is, admittedly, only possible in concert with surplus. Individuals could be highly valued to the community without working in the fields, instead serving as "priests to pray for good rains, fighters to protect farmers from wild animals and rivals, [or] politicians to transform economic power into social capital."[28]

In time, humanity's relationship to its food gave way to culture itself. As van den Berghe writes, "food is not only shared in all cultures, but is *ceremoniously* shared in ways which differ but all have the same meaning and function: to establish, express, and consolidate social ties."[29]

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[27] Manning, *Against The Grain: How Agriculture Has Hijacked Civilization,* 49.
[28] Suzman, "How Neolithic farming sowed the seeds of modern inequality 10,000 years ago."
[29] van den Berghe, "Ethnic Cuisine: Culture in nature."

With roots in the food sharing practices of hunter-gatherers, more recent institutions retain a focus on the importance of sustenance and sociality. Religions utilize communion rituals as a means of defining one's belonging to a larger group. The sheer amount of effort required in killing and preparing an animal for consumption led to elaborate rituals, including the sprinkling of water on an animal's brow by Greek priests.[30] Ritual served to connect humans to the gods, establish humanity's place as somewhere below the powers that reign above, yet superior to the other species which inhabit the Earth. Those who served the demands of priests and leaders were promised not only a share of the community's food supply, but also eternal salvation and rewards beyond the tiring, unclean life in the fields. As memories of hunting and gathering began to fade, the paradise which many hoped for was believed to transcend human life itself, accessible only by playing along with the rules of those in power.

Aside from significant transformations in the social and spiritual aspects of food, the practices of agriculture itself remained fairly consistent for thousands of years. Humans cleared areas of land to plant certain crops suited to their respective locations, and what was not eaten was kept in various pre-refrigerated means of food storage. For instance, there is evidence of Middle Eastern and Asian cultures drying foods in the sun and wind as early as 12,000 B.C. Curing food with salt was common in dehydrating and keeping meats, and fermentation revolutionized our relationship with the smallest of microorganisms by turning sugars into alcohol and making fruits and vegetables more nutritious.[31]

Change arrived as the Eurasian continent was transformed into an agricultural landscape. By two thousand years ago, its reach went from Spain and the British Isles to China, Japan, and Indonesia. The growing agricultural societies in this band likely benefited from one another.

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[30] Pollan, *Cooked*.
[31] Nummer, Brian. "Historical Origins of Food Preservation."

Around the sixth century AD, wheat was adopted in China and the Chinese invention of the horse collar traveled into Europe, greatly increasing the energy available in farming and the size of farm fields.[32] Independently, the Americas remained home to thriving agriculturalists, still safe from the oncoming journeys of Europeans across the Atlantic. In the past two thousand years, various farming technologies led to increased yields and land productivity by maximizing the energy obtained from humans and their four-legged coworkers. Crop rotation, sturdier plows, improved hand tools and more enabled the land under cultivation to continually increase as 1000 AD passed by. Human genetics and lifestyles evolved in tandem with the biology of all species involved in early agriculture, not only the target crops grown themselves, but also a host of weeds, insects, rodents, and birds who saw an ecological niche in both the cultivated fields and stores of food. Life on Earth was deliberately and rapidly altered to serve the needs of upright, social humanoids who were hell-bent on expanding their reach.

Those civilizations which could not properly manage their land, either by exploiting the soil or cutting down vast swaths of forest, were sentenced to collapse. Survival as a community meant understanding natural limits and working in cooperation with nature. Inherent in this ecological fact is a certain limit on overall population and geographical reach. The Mesopotamians and Mayans were brought down by agricultural intensification, ultimately damaging their natural world beyond immediate repair. The people of Easter Island turned a vibrant paradise into a wasteland through deforestation.[33] History is doomed to repeat itself, and at this moment, the cost of not following nature's lessons is the viability of the entire Earth.

From gathering to farming to cooking, humanity's relationship with food both shaped us and led us to shape the world we live in, with very little space still untouched on this planet. We

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[32] Manning, *Against The Grain: How Agriculture Has Hijacked Civilization,* 53.
[33] Simms, Andrew. "Farming and energy: lessons from collapsed civilisations."

were transformed genetically as we discovered how to maximize the energy obtained from food, in turn transforming social relations and how we live with one another. "You are what you eat" is an adage known by all. To answer the question "*why* do we eat what we eat," particularly in the present day, requires digging deeper.

Unnatural Selection: The Global Food System

Travel by water fascinates us to this day. The chance to step onto a vessel capable of keeping us safe above unforgiving waters below is not only an incredible display of engineering prowess, but also invokes a sense of discovery. Lands which were once out of reach were now accessible and ready for exploration. Transcontinental trade in history began over land, in most cases to carry the treasures and exotic flavors of the East to Western Europe. In the 15th century, a number of political factors in Eurasia made trade across the supercontinent, as well as through the Mediterranean, less secure for Western kings and merchants. Discovering new trade routes was a captivating idea for those in the west, new ways to keep the riches of the east in easy access.

Motivations for venturing out across the sea in the early 15th century varied, though most had their eyes on the treasures of the eastern world, from gems and silk to spices and tea. Accessing this abundance in the typical way was made difficult, however, as the Ottoman Empire controlled overland trade routes to Asia, while Italian cities retained commercial dominance in the Mediterranean. Among the first Western Europeans to spur the Age of Discovery (notwithstanding Lief Erickson's journey to North America a few centuries prior) was the prince of Portugal, Henry the Navigator. New navigational technologies were his primary interests, and he sponsored early explorations down the West African coast, surrounding powers controlling North Africa and providing new access points for the gold and ivory trade. As the 1400's progressed, Portuguese navigators traveled further and further south down the continent in the pursuit of Indian riches. Bartolomeu Dias' ships successfully rounded the Cape of Good Hope in 1488, and in 1497 the fleet of Vasco da Gama reached Calicut on the west coast of India.

Portugal set up trading ports and bases along the African coast to solidify their position as world travelers and traders.[34]

Eventually, the idea befell Europeans that traveling due west could reach Cathay (a historical English name for what is now China). The most infamous of explorers to journey westward was Christopher Columbus, who set out in 1492 with support from King Ferdinand and Queen Isabella of Spain. After roughly two months of sailing, his ships arrived on the island of Guanahaní (soon to be renamed San Salvador) in the Bahamas, which he believed to be surely near the east coast of China. Convinced that the lands and riches of Kublai Khan were within arm's reach, further voyages were conducted in 1493, 1498, and 1502, discovering not islands off of Asia, but rather Haiti, Cuba, Trinidad, and on the fourth voyage much of Central America. [35] Having educated himself on the writings of Marco Polo, Columbus may have been confused by the lack of Khan's regal court, awash with spices, silk, and gold. Ferdinand and Isabella had directed him to "discover and acquire certain islands and mainland in the ocean sea" and to become "Admiral and Viceroy and Governor therein."[36] If the locals resisted the new leadership, force was justified by the Europeans' civilized ways and Christian ideals.

Columbus was not the only explorer to reach the Americas at this time. John Cabot, an Italian voyager with support from England, likely landed on Newfoundland in 1497, and Amerigo Vespucci of Florence traveled along the northern coast of South America in 1499, becoming the namesake of the new southern continent in 1507.[37] The impact that European exploration had on the Americas and the entire world can be well understood through Columbus' travels and actions. There was more likely than not a sense of superiority in the nations

[34] Mitchell, "European exploration."
[35] ibid.
[36] Morgan, "Columbus' Confusion About the New World."
[37] Mitchell, "European exploration."

supporting worldwide exploration, resulting from their ostensible and self-designated success as agriculturalists from millennia before. Columbus assumed the role of missionary during his voyages, equipped to rescue and convert the heathens he came across, in addition to his primary goal of obtaining mineral riches for Europe. In addition to the gift of Christianity, contemporary civilization, or civility, also justified the acquisition of material wealth. As Morgan writes,

> Civil people distinguished themselves by the pains they took to order their lives. They organized their society to produce the elaborate food, clothing, buildings and other equipment characteristic of their manner of living. They had strong governments to protect property, to protect good persons from evil ones, to protect the manners and customs that differentiated civil people from barbarians. The superior clothing, housing, food and protection that attached to civilization made it seem to the European a gift worth giving to the ill-clothed, ill-housed and ungoverned barbarians of the world.[38]

If the locals were to ignore the gifts of religion and society bestowed unto them, slavery could be used to help them see the error in their ways. As the Portuguese explored the coasts of Africa throughout the 15th century, they too offered civilization, and in exchange carried off barbarian populations to slave markets in Seville and Lisbon. As Columbus confidently stepped onto land in the Indies, he saw a population which would quickly adjust to Spanish leadership, himself manning the reins. The Arawak people, Native Americans of the Greater Antilles and South America, were the first that Columbus encountered upon his arrival on what he named Española (later called Hispaniola). He was mesmerized by the lush vegetation of the island and was

[38] Morgan, "Columbus' Confusion About the New World."

equally intrigued by the presence of a small amount of gold possessed by the Arawak. Here he learned of and on different islands encountered the Caribs (another indigenous people of the Lesser Antilles), enemies to the Arawak and much to the chagrin of Columbus, more "civil" with their superior dwellings and provisions of supplies. As his mission was to take wealth and assume dominion, he set out to deal with the people he described as having

> "no arms, and [being] without warlike instincts; they all go naked, and are so timid that a thousand would not stand before three of our men. So that they are good to be ordered about, to work and sow, and do all that may be necessary, and to build towns, and they should be taught to go about clothed and to adopt our customs."[39]

On his second voyage, Columbus captured and sent some of the Caribs back to Spain as slaves. The Caribs proved adamant foes, however, and seeking to avoid their poisoned arrows, the Spaniards decided to focus on civilizing the Arawaks. On his second journey as well as the first, the Arawaks were welcoming with offerings of gold to the hubristic Columbus and his crew. Forts and towns were constructed by the Spanish to help exploit the local riches. When the acquisition of gold began to slow down, the Europeans turned to genocide. In 1495, 500 Arawak were shipped to the slave markets in Seville. Columbus set up a tribute system where every adult Arawak must procure a certain amount of gold every three months, and if gold was not to be found, cotton could substitute. The island was only home to so much gold, however, and "those who sought to escape [the tribute] by fleeing to the mountains were hunted down with dogs to kill."[40] Was an individual not to meet his designated tribute, torture or murder would be

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[39] Columbus, Christopher. Quoted in Bourne, E.G. *The Northmen, Columbus, and Cabot, 958-1503: The Voyages of the Northmen*.
[40] Morgan, "Columbus' Confusion About the New World."

the recompense to Europe. Over time, forced labor, death from overworking and suicide diminished the Arawak population from an estimated 100,000 in 1492 to a mere 200 in 1542.[41] Columbus was ultimately overthrown by other Spanish settlers, who instituted a form of land occupation which would be modeled in the centuries to come. Despite revoking his title as governor, the Columbian Exchange, and globalization, had begun. Perhaps it is fitting that in 1522 and after a three-year journey, a meager portion of Ferdinand Magellan's crew successfully circumnavigated the planet.

Worldwide Trade

Recognizing that there was a finite amount of material wealth on the planet, the idea of mercantilism shaped European economic thought up to the late eighteenth century. Under mercantilism, nations must collect as much wealth as they can to ensure state viability. Fortunately, the new colonies across the sea offered much in the realm of wealth for their European hosts. The Americas provided raw materials, tobacco, and sugar, which would become the most important crop in the global economy. The islands ravaged by Columbus soon became hotspots for sugar production, with labor provided by increasing numbers of slaves from Africa. Clear records do not remain as to how many Africans were taken to the Caribbean as slaves in the early 1500's, though the numbers could reach in the thousands. Early accounts do describe enslaved people suffering under the brutal conditions which would exist for many centuries more, many dying from malnutrition on board or throwing themselves into the water.[42]

Where the Spanish and Portuguese began colonization in Africa and South and Central America, Britain looked slightly northward. In 1607, Jamestown was founded in what is now Virginia, serving as the first permanent English colony in modern-day America. Tobacco had

[41] ibid.
[42] Little, "Details of Brutal First Slave Voyages Discovered."

become a central cash crop to Europeans over the sixteenth century and grew into a global commodity. White plantation owners in Jamestown and elsewhere grew tobacco, using a steady supply of slave labor in monocultures to fill their pockets.[43] While tobacco was desirable, sugar was nearly indispensable in a country with a growing taste for tea. Tea leaves offered caffeine and flavor, and sugar provided carbohydrates and energy for people on all levels of British society. To satisfy growing thirst for this beverage, "imperial power was necessary, in India and China principally for tea, and in the Caribbean for sugar."[44] Fortunately, Europeans had control of both of these regions.

Many other goods played significant roles in the early global marketplace, among them fruits and coffee from the tropics, and grains and meats from settler colonies. The role of colonies, again, was providing wealth in whatever form it could create for its European parent. In every land Europeans colonized, there existed a native population with its own, unique political and social structures. Entire continents were divided artificially by European negotiations or more commonly war, splitting up the natural world and human societies for personal economic gain. This time is the source of the adage, "the sun never sets on the British Empire," with British colonies extending around the world until independence movements took root in the twentieth century. Crops were grown in sufficient quantities only through the exploitation of human life, a "triangular trade" model dominating global economics for years to come. Slavery had been a practice in civilizations for centuries (indeed, it is carried out too in the animal world as some species of ants take prisoners from rival colonies),[45] yet the world had

[43] Grolle, "How Discovering the Americas Transformed the World."
[44] Patel, *Stuffed and Starved*.
[45] Flannery, *Here on Earth: A Natural History of the Planet*.

never before seen the forced labor model employed on such a scale, commercialized, encoded into law, and purely based on race.

Sugar, in particular, required a massive chain of cheap labor to process sugarcane, only grown in tropical regions, into a product suitable for personal consumption in a growing number of foods and drinks (such as chocolate, jams and tea). The sheer amount of resources required for such a nutrient-lacking crop as sugarcane makes its profusion in European society an illogical outcome. Economic efficiency provides the answer, as the entire system of sugar production and the supplying of cheap calories to a British workforce meant more wealth and control for Britain itself. Revealing the extent reached by sugar, "annual per capita sugar consumption rose 2,500 percent in England during the 150 years preceding 1800… [and] by the beginning of the twentieth century, the average Briton was getting about one-sixth of his total nutrition from sugar."[46]

Sugar, now ubiquitous in modern diets around the world, reached its dominance on the dinner plate only through the systemic and deliberate control of human populations for slave labor, promoted by European nations seeking to increase their wealth and control over a steadily smaller planet. A truly global food system had been born, with colonization, the imposition of markets, and a disregard for human dignity serving as the predominant drivers. Slavery itself gradually fell apart in the 1800's, with Britain abolishing the slave trade in 1807 and the United States making slavery illegal following the Civil War. Despite these legislative measures, indentured servitude, tenant farming, and other contractual agreements perpetuated control over other populations and ethnic groups.[47] After all, there would need to be *some* workers to continue satisfying demand for global and exotic products and foodstuffs, and Europeans and

[46] Manning, *Against The Grain: How Agriculture Has Hijacked Civilization*, 56.
[47] Elliott and Hughes, "A Brief History of Slavery That You Didn't Learn in School."

(caucasian) Americans would not be quick to offer their time and energy. While progress in integration has eliminated many of the de jure separations of races in the United States, the legacy of slavery and segregation remains to this day in a global modern food system still reliant on exploitation.

The vast expanses of land in the United States which would be converted into corn and wheat fields as settlers expanded westward in years to come were not simply fallow, unprotected areas. Millions of indigenous peoples lived in every corner of the North American continent before European exploration. After the U.S. was formed, the new Americans were eager to expand their reach across what seemed like a land of unlimited potential. Migration to the west meant displacing natives from their land with various treaties, the sole goal being to take more land for the white man to carry out his lifestyle seen as superior to that of Native Americans.

By 1790, all Native American land east of the Mississippi was claimed, with tribal reservations created as land was sold to white settlers. Land was appropriated on a massive scale with the only justification being selfishness and force, and tensions increased throughout the nineteenth century. Leaders such as Thomas Jefferson, James Monroe, and of course, Andrew Jackson believed that Native Americans could not be assimilated into white American society, as evidenced by Jackson's Indian Relocation Act of 1830. As many as 100,000 Cherokee, Creek, Seminole, and more were relocated from their land around the Southeast and Appalachian regions to reservations west of the Mississippi, many in modern-day Oklahoma.[48] These tribes had lived for hundreds of years on agriculturally prime land, which, when combined with the discovery of gold in Cherokee land in Georgia, meant that mass relocation would open up treasure troves of resources for settlers. Removal agreements were signed throughout the 1830's,

[48] Pauls, "Trail of Tears."

transportation expenses and other meager compensation provided in exchange for land. Deliberately or not, thousands died along what would be called the "Trail of Tears" from malnutrition, exhaustion, and disease. As white Americans traveled west, Natives were further marginalized and pushed to the state of poverty which defines many tribes to this day. Appropriation of Native American land opened up boundless potential for the new country, and an entire culture of colonization would leave an indelible mark on the land from sea to shining sea.

Globalization and Biology

The human side of globalization follows the path described above. What mankind did not realize in their journeys for wealth and abundance, however, were the biological ramifications that free trade and travel around the globe would cause. Hundreds of millions of years ago, the Earth was home to the supercontinent of Pangaea, and life on the blue planet was dominated by a reign of massive reptiles who would meet their demise after (most likely) an asteroid strike near the modern-day Yucatan Peninsula in Mexico. The Earth had begun to separate into continents we would recognize by 65 million years ago, and the stage was set for new terrestrial species to dominate. On separate continents and islands, species migrated and evolved to thrive in their respective climates and terrains. The theory of natural selection seeks to describe which species will survive to pass down genes over thousands of years, with those best suited to their environment or who can discover an ecological niche more likely to last.[49] Relatively isolated continents with varying climates and geologies would *naturally* give rise to a great diversity of plants, animals, fungi and microorganisms unique to their region.

[49] Gildenhuys, "Natural Selection."

Barring any interstellar catastrophe or seismic disaster on Earth, evolution may result in a sort of biological homeostasis over time. When the borders separating individual landmasses are suddenly able to be crossed, either naturally through geologic shifts or artificially by a particular seafaring humanoid, any sort of pre-established peace is not likely to remain. Any species which is not native to an area and significantly disrupts an ecosystem upon its arrival is considered an invasive species. As an example, when the Isthmus of Panama was formed during the Pliocene Epoch (5.3 to 2.5 million years ago), North American mammals traveled into South America and likely displaced the native marsupials by out-competing them for food and resources.[50] Naturally occurring events of invasive species are fairly rare in geologic history. Nature's balance was heavily tilted, however, as mankind became hungry for exploration, perhaps becoming the world's most infamous invasive species itself.

While explorers such as Columbus actively engaged in the destruction of native communities, the greatest damage was inflicted by species invisible to the eye. Diseases such as smallpox, influenza, and malaria evolved in time with agriculture, part of a coalition of species described by Manning who were led by the plow across the entire planet.[51] Farmers would have to develop immunity to such infectious diseases which could be passed down genetically, though primarily strengthened in childhood. As the crops, pests, and bacteria of agriculture spread to native populations with no genetic resistance, "virgin soil epidemics" occur, wherein "nearly every person who falls sick dies. Infection rates are death rates… crops go unattended; no one hunts; food sources dry up."[52] Smallpox spread quickly through Native American trade routes when the first settlers arrived around the 16th century. Native populations were quickly reduced,

[50] Rafferty, John, "Invasive species."
[51] Manning, *Against The Grain: How Agriculture Has Hijacked Civilization*, 56.
[52] ibid, 57.

and mere traces of previously thriving societies were left by the time later explorers entered the New World.

The species deliberately brought by Europeans would wreak havoc, too. Horses introduced by the Spanish eagerly spread throughout the native grasslands and quickly grew in population, much more so than in Europe, offering an abundance of animal engines for farming and economic expansion. Cattle, too, exploded in population upon their introduction in the Americas, tearing up native grasslands and opening up room for European flora to take root. Effectively, conquistadors and colonizers introduced a whole biological team of invasive species to lands which had little to offer in defense. Native plants and animals (including humans) fell victim to the ecological impacts of pre-industrial globalization, and a new reign of agriculture spread across entire continents, infecting the land much as smallpox infected humans.

As the process of colonization was an exchange, crops and genetics from the Americas also found their way into the "Old World" of Europe. One of Europe's most characteristic crops is the potato, which conquistadors discovered in the Andes in the early 1500's. Adapted to a mountainous terrain near the equator, Andean potatoes did not immediately succeed in Europe. While they could thrive in certain areas around Britain and Ireland, it was a Chilean potato adapted by an American breeder which would take root across both continents. The dependence on this crop, one which requires bare minimum processing and became the food of the poor, would lead to the Irish Potato Famine which peaked in 1740 to 1741, killing 10 percent of Ireland's population.[53] Maize and sweet potatoes joined the expedition to the east, and grains were planted in profusion in the wake of Europeans in the Americas.

Evolution of Farming

[53] ibid, 76.

As colonies around the world dealt with ecological devastation and trade between lands multiplied, Europe itself gave a great deal of attention to increasing yields in its soon to be global model of farming. Roughly during the century from 1750 to 1850, agriculture in England gradually intensified. High-yielding crops such as wheat or barley replaced low-yielding grains, and pastures and fallow land were converted into arable farms. New four-field methods of crop rotation expanded on previous two- and three-field methods, allowing a greater amount of land to be cultivated at a single time. Crop rotation itself was practiced for many centuries before this British "agricultural revolution," as leaving some fields fallow was widely known as crucial in allowing soil health and nutrients to regenerate, even while the exact science remained unknown. Agricultural technologies such as Jethro Tull's improved seed drill and more effective plow designs ultimately increased the amount of food produced per worker. Rotating turnips and clover as well as growing legumes to fix nitrogen into the soil (the existence of which was not explicitly known) also contributed to overall increases in land productivity and cereal yields.

It can be argued that the most significant advance at this time was centered on the scientific study of fertilization. An "archetypal Victorian, scientist, entrepreneur and benefactor,"[54] John Bennet Lawes began experimenting with plant growth after inheriting the Rothamsted Estate north of London. Lawes collaborated with the chemist Joseph Henry Gilbert to create Rothamsted Research in 1843, one of the world's first agricultural research institutions, and built on small-scale projects Lawes had previously conducted. He had discovered that applying substances containing the element phosphorus on crops would increase yields, and the team's research would focus on perfecting and selling superphosphate fertilizers. Nitrogen and potassium were recognized as vital for plant growth as well, and world trade in fertilizers

[54] Rothamsted Research, "John Bennet Lawes 200 years."

included importing guano and nitrate deposits from South America. Chemistry began to replace traditional knowledge and attention on soil health as increasing yields and profits took the upper hand. The sum of new farming technologies meant that fewer hands were needed in any field, and as fewer and fewer people were required to work the land, all eyes turned to the city.

At the turn of the 19th century, the world was buzzing with the Industrial Revolution, a series of technological advancements which shifted a world still rooted in agriculture to one freed from the land by the promise of machinery. Resources were being transformed into products and delivered across countries and continents at breakneck speed, engines steaming along railroad tracks and powering devices in massive factories to create more goods. Workers in the early industrial countries labored as individual gears in the motor of mass production, moving their families into cities as agricultural work faded away. Never-before-seen populations were teeming out of larger and larger buildings in an entirely built environment while pollutants choked the air. The more humanity left the land and entered the city, the more business thrived, and modern society became entirely dependent on fossil fuels for all facets of life. The limits to human civilization previously set by nature were broken as energy sources hidden below the ground were burned in engines of all shapes and sizes. The revolutions would not cease, as an industrial and fossil fuel world culminated in the "Green Revolution" of the mid-1900's.

Around 1825, the world population passed one billion, doubling to two billion just one century later. A growing proportion of these people were moving into urban areas, which led many to continue arguing for increasing yields and land productivity worldwide. As the 1950's arrived, many pieces were in place for a world recovering from war to reinvent the entire process of growing, processing, and consuming food. Machinery entered the farm at the turn of the century with gasoline-powered tractors ploughing fields at speeds never before seen. Research

into chemical fertilizers catapulted industrial agriculture forward, with Carl Bosch and Fritz Haber discovering and commercializing a process of synthesizing ammonium nitrate, a substance high in nitrogen which forms the basis for many modern fertilizers.[55]

Bosch, Haber, and other chemists are credited with revolutionizing agriculture and allowing for yields which could support such a leap in human population as occurred in the twentieth century, with over seven billion walking on the Earth today. The story that these scientists and others manufactured chemicals which increased food supply and food security around the world is only one side of the coin. One of the founding fathers of industrial agriculture, if you will, Haber is equally known as the "Father of Chemical Warfare." The Haber-Bosch process of converting nitrogen was used by Germany in WWI for explosives, and Haber also helped develop chlorine gas for use in the trenches against Allied troops. For his efforts in agriculture, he received the Nobel Prize in Chemistry in 1918, yet most of his post-war work focused on developing chemical weapons for Germany while many countries declared him a war criminal. Today, half of the world's population eats food which could only have been grown in sufficient quantities through Haber's processes.[56]

The U.S. was quick to pick up on the potential of nitrogen, both for agriculture and war. In the National Defense Act of 1916, nitrogen research was appropriated a sum of twenty million dollars "for munitions plants that would be converted to factories to produce cheap fertilizers when peace returned."[57] The Fixed Nitrogen Research Laboratory (FNRL) was first housed in the War Department, yet was moved to the US Department of Agriculture to emphasize that the chemical industry was equally suited for the cultivation of life as it was for the destruction

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[55] International Fertilizer Industry Association, "A Historical Perspective."
[56] Smil, *Enriching the Earth: Fritz Haber, Carl Bosch, and the Transformation of World Food Production*.
[57] Johnson, "Nitrogen Nation: The Legacy of World War I and the Politics of Chemical Agriculture in the United States, 1916-1933."

thereof. As WWII emerged, nitrogen production rapidly increased to meet demand for explosives. Following the war, chemical companies were hungry to continue making money and saw great potential in adopting the narrative of increasing food supplies for the world, and who better to eradicate hunger than the very corporations who profited from killing millions? Chemical companies today now take ownership for increasing the human population, with nearly every dinner plate touched by those who would just as happily switch back to producing chemical weapons for whatever nation is willing to pay.

The post WWII narrative of greatly increasing food supplies for a hungry world would receive the namesake of Norman Borlaug. Borlaug, recipient of numerous accolades and awards, was steadfast in his belief that feeding the world could *only* be done through maximizing yields with modern production. Among the techniques Borlaug and the agricultural regime pushed forward were the further mechanization of farms, expanded use of artificial fertilizers and pesticides, and increased irrigation, all of which are entirely dependent on fossil fuels for raw material inputs and as energy sources. Farming equipment from irrigation pumps to harvesters require large amounts of gasoline, and most fertilizers nowadays are derived from oil, the manufacture of which requires even more fuel. Borlaug's research focused on creating high-yield varieties of wheat, which notably may only outperform traditional varieties in the presence of substantial amounts of irrigation and fertilizer and pesticide inputs.

In order for such inputs to properly work, entire swaths of land must be planted in the exact same crop in a monoculture system.[58] Given enough inputs, monocultures are more profitable the larger they grow, a sentiment cherished by former U.S. Secretary of Agriculture

[58] Igbozurike, Uzo. "Polyculture and monoculture: Contrast and analysis."

Earl Butz in saying farmers need to "get big or get out."[59] The methods of industrial agriculture would soon find their way into the developing world. Countries in South America, Africa, and Asia adopted (or were coerced to adopt) mechanical and chemical means of growing commodity crops, often for export directly back into western countries. The U.S. quickly became blanketed by rolling fields of corn, soybeans, wheat, and other commodities which are designated for processing and not, importantly, direct human consumption. Although Borlaug is credited with saving over one billion lives through his efforts, the gains in yield obtained during his lifetime have not continued to increase in accordance with a growing world population. The yields of many primary crops have levelled off or slightly decreased in recent decades as overall soil quality has been degraded through intensive monocultures and chemical applications.[60] Overall yields have, however, greatly increased in the past seventy years for a number of crops, pushing food costs in the U.S. and other western nations down and expanding the world's food supply in the short term. Greater food supplies means little, though, when one third of all food produced ends up as waste, as it does in the present day. If a primary goal is addressing world hunger, increasing production is not the end.

Beginning with early colonization and technological advances in farming, the past five hundred years of human history can be characterized by globalization and rapid changes in how we grow the food we eat. While the shrinking of our world has led to many gains in diversity and access to resources and experiences, globalization is deeply stained with a history of human exploitation and ecological disaster, stories which cannot be disregarded and necessitate rethinking how we operate as a single species in the modern day. For all people to eat,

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[59] Benjamin and Virkler, *Farm To Table: The Essential Guide to Sustainable Food Systems for Students, Professionals, and Consumers*.
[60] Tilman, Cassman, Matson et al., "Agricultural sustainability and intensive production practices."

industrialization of food production does not offer all the answers. Traditional knowledge and ways of interacting with nature provide invaluable lessons which can be integrated in our global existence.

In the 1900's, intensive farming resulted in a glut of certain commodity crops which, on their own, do not make a palatable nor complete diet. To maximize profits, large food companies would have to come up with ways to convince consumers to buy heavily processed goods which, to the average eye, did not resemble real foods. Fortunately, business was busy inventing means of understanding and controlling consumer behavior in the twentieth century, a serendipity of history which has transformed not only farm fields, but also the contents of kitchen pantries and refrigerators worldwide.

Too Much of a Good Thing: The Invention of Consumerism

From the earliest days of humanity, life was focused on the present moment. To do anything else in a prehistoric society would spell utter disaster, as sharp focus and awareness were necessary to avoid predation, seek out high-nutrient foods, and understand the increasingly complex workings of being a social animal. Attention was devoted to meeting *needs*, those of an individual and a community, and these needs were met through cooperation and sharing.

The rise of agriculture more or less overturned this millennia-old lifestyle of living in tune with the natural world. The ability to control and store the unprecedented agricultural surplus meant an imbalance of power within a community. Having food meant having wealth and power, whether it be vegetables, grains, cows, or sheep, plants and animals serving as the very first forms of currency. Food was no longer a universal right, rather a product one had to work to earn, and work hard at that. The gifts of free time and the chance to pursue *wants* were bestowed upon those who simply had more. Control over other people, indeed all other species on the planet through manipulating the land, laid the groundwork for a culture of human superiority over nature (implying a distinction between human and nature) and freedom to shape the planet, with all eyes toward a bigger and brighter future. As centuries passed, humanity became gradually more distant from the rhythms of the natural world.

The ability of humans to focus on satisfying their wants led to the growth of modern marketing many thousands of years later. As most of history has taken place in a world where resources are scarce, consumption began as a contentious area of study until economic systems of mass production prevailed thanks to developments in the Industrial Revolutions. At the turn of the 20th century, economics married the budding field of psychology, dedicated to the inner

workings of the human mind. Equipped with an albeit crude understanding of mankind's innermost desires and wishes (based on Freudian theory), economics and business ventured into manipulating and profiting off human desires and dreams, the new institution of marketing heralding what director Adam Curtis calls *The Century of the Self*.[61] In contrast to providing for one's immediate needs with products of the natural world (roughly the entirety of human history), the 1900's were defined by consumerism, a tool which seeks to solely benefit those with the reins in hand.

Theories of Consumption

Much of the progress in human civilization over the past several centuries has related to how we consume. All life must take in certain inputs and release outputs to perform basic maintenance, yet humanity's relationship with consumption reaches far beyond what we put in our mouths. The word consumption itself reveals a contentious history, derived from the Latin *consumere* (to use up, eat, waste), and as early as the 14th century meaning to "destroy the substance of, annihilate."[62] In a life where energy and resources must be optimized to their fullest extent, it follows that early thinkers came to associate the pursuit of things beyond survival and basic needs as negative and excessive. Plato proposed that the life of a wise person is one in which reason and logic, rather than appetite (the root of temptation) rules one's decisions. Stoic philosophers found desire itself as something to be avoided, and living in accordance with nature, meeting our needs for survival as all the planet's other species do, is the proper course in life.[63] Living out of alignment with our innermost selves would translate into chaos and disorder in civilizations themselves. To control the desires of the public and maintain

[61] Curtis, *The Century of the Self*.
[62] Online Etymology Dictionary. *Consume (v.)*
[63] Browning, "What Price, the Soul?: Examining Consumerism Through Plato, Aristotle, and the Stoics."

the viability of pre-modern governments, "most European states (and their American colonies) rolled out an ever-longer list of 'sumptuary' laws to try and stem the tide of fashion and fineries" between the 14th and 18th centuries.[64] From women donning cotton neckerchiefs in German states to extravagant cutlery given as wedding gifts in Venice, excessive and misguided consumption was historically viewed as a negative drain on wealth.

As European explorers charted new territories and discovered magnificent and colorful lands unlike their own, the elite developed a certain taste for the exotic and unique. Trade with lands in the east expanded what many considered the limits to existence, these being the resources immediately available in one's surroundings. For those at the top in particular, obtaining housewares, works of art, and delectable teas and coffees from afar meant a stronger and more rich civilization, the benefits of which would trickle down to the masses. A positive theory of consumption was nearly in sight, however economic thinkers in the late 18th century still did not recognize the oncoming wave of expanding consumer markets as highly significant or probable. Society was still limited by several natural constraints, and the concept of sustained growth could only be achieved through the destruction of nature. Studying consumption directly was, much as the act itself, avoided in economic discourse and pushed aside for many years, the consumer seen as a marginal character in the marketplace.

William Stanley Jevons was among the first to directly incorporate the role of the consumer into economic theory. He argued that the value of a good is not a function of the cost of the materials and labor which went into its production, but rather one of the consumer's desire to have it. This value, called utility, is also marginal, as one coat is valued very highly during a bitter winter, however possessing more coats becomes gradually less valued and desired.[65] For

[64] Trentmann, "How Humans Became 'Consumers': A History."
[65] Jevons, *Theory of Political Economy*.

the first time, human desires and satisfaction in the form of utility could be studied mathematically (which, to the modern reader, *should* sound curious and imperfect at best).

At the end of the 1800's, the United States cemented its place as an industrial superpower, manufacturing goods and, concurrently, a higher "standard of living." Inherent in this idea is that "the welfare and happiness of a household was determined by habits of spending, and not just earnings."[66] Workers during this period of imperial growth and globalization could consume a much wider variety of goods and foods than previous generations. The more workers purchased goods, fueling the expansion of the industrial machine, the greater the national strength. Consuming the products of global trade was no longer limited to the elites.

In the U.S., economist Simon Patten described the current state of affairs in declaring a "new order of consumption," wherein American society had (almost) entirely escaped the fears and requirements of day-to-day survival and instead enjoyed a surplus of wealth. Satisfying the urgent wants of American citizens would be the primary goal of expanding productive power. Patten argued that the U.S. had the potential to develop into a higher civilization than any other country, and through trade could educate other lands and appropriate a "commanding influence upon the development of the other nations."[67] Through manipulating the desires of the masses, American culture and development patterns could be exported worldwide. Spending more money and saving less would allow one to achieve not only moral growth and happiness, but also contribute to the power of the United States. Human needs faded into the background as wants took center stage.

Freud, Bernays, and Consumer Control

[66] Trentmann, "How Humans Became 'Consumers': A History."
[67] Patten, *Economic Basis of Protection*.

Controlling the behavior of a population required further insight deep into the human psyche, as utility itself was insufficient. Luckily, the "father of psychoanalysis" was performing his own research to complement the ideas brought forward by economists. Sigmund Freud was entranced with the mind and sought ways to treat mental illness and explain human behavior in its entirety. At the core of Freudian psychoanalysis is the idea of the unconscious mind, the home of unspoken and hidden desires and traumas which shape our thoughts and actions in the real world. Surface consciousness is but the tip of the iceberg of the mind, whereas the unconscious houses primitive urges, sexual desires, and wishes which manifest when not dealt with properly. Unconscious thoughts can be best accessed through dreams when the ego's defenses are lowered and the true self can be seen, if only for moments at a time. Freud's theories have been met with severe critique over the last century for both minimal empirical evidence and the unfalsifiable state of his concepts.[68] Modern hindsight may cringe, however the true impacts of Freudian theories were not due to Freud himself. Edward Bernays, Freud's nephew, would be the key player in applying his uncle's ideas to business, controlling entire populations through the manipulation of mankind's unspoken desires.

Originally a native of Vienna, Austria, Bernays worked in the U.S. during World War I as part of the Committee on Public Information. This agency was tasked with influencing public opinion regarding the war, effectively the propaganda machine of the U.S. at this time. Bernays was instrumental in promoting Woodrow Wilson's goal of bringing democracy to all of Europe as well as rallying patriotism and enthusiasm among American citizens. Following the war, Bernays was awestruck by how much Wilson could captivate an audience at the Paris Peace Conference, and he was determined that "if you could use propaganda for war you could

[68] McLeod, "What are the most interesting ideas of Sigmund Freud?"

certainly use it for peace."[69] Because of the stigma associated with the term "propaganda," Bernays came up with "public relations" as a prime substitute. He sought to manage the crowds of people in new industrial cities who, in his perspective, were dangerously driven by primal and irrational instincts, clearly inspired by the writings of his uncle. He managed to have Freud's works published in the United States to proliferate understanding of the unconscious mind inside every individual on the street. In time, Bernays came to wonder whether the unconscious mind could be deliberately manipulated in the pursuit of making money.

The First World War had a significant impact on production as a whole, as resources and labor shifted on a massive scale to support the conflict. The U.S. in particular benefitted greatly from the assembly line which had recently transformed the auto industry. This mass production model made supplying tanks, airplanes, and munitions significantly more efficient.[70] Mass production left the manufacturing sector hungry to continue producing and making profits, yet peacetime did not provide the same high demand for goods. While lacking the explicit incentives given to chemical producers (see Unnatural Selection: The Global Food System), the auto industry was quick to devise a solution to this issue. Originally intended to be a durable good, General Motors realized in the 1920's that consumers buying a car once every ten years would not result in nearly as much income as would buying a new car every one or two years. GM offered yearly models with fresh, new styles and technologies, what the current president, Arthur Sloan, labeled as "dynamic obsolescence," effectively designing a car to become socially obsolete.[71] What is now recognized as planned obsolescence was nothing short of the greatest

[69] Curtis, *The Century of The Self*. Quote by Edward Bernays.
[70] Reeg, "100 Years, 100 Legacies: Mass Production."
[71] Grattan, *Populism's Power: Radical Grassroots Democracy in America*.

marketing strategy the industry had yet seen, as upgrades and keeping up with trends replaced necessity for a car buyer.

As history would have it, Bernays entered the scene at just the right time. Businesses were eager to utilize mass production, and Bernays' public relations efforts matched their desire with a psychological understanding of the human mind. Unconscious desires implied that products and ideas could be sold through emotional appeals. Emotions and deeply buried hopes and fears could be targeted to sell nearly anything to consumers without them being aware of the manipulation,[72] even cigarettes.

In 1929, the president of the American Tobacco Company, George Washington Hill, asked Bernays to figure out a way to convince women to smoke. At the time, women smoking, especially in public, was highly taboo and the tobacco industry sought to change the social norm. Bernays was happy to oblige and prove the veracity of Freud's theories, and discussed the matter with A.A. Brille, a leading psychoanalyst in New York. Brille, after a payment from Bernays, explained to "Eddie" that "cigarettes were a symbol of the penis and of male sexual power… if he could find a way to connect cigarettes with the idea of challenging male power then women would smoke."[73] Heavily drawing on the psycho*sexual* component of Freudian psychoanalysis, Bernays began planning an event of such size and grandeur to completely overturn the prevailing taboo. The end result was the "Torches of Freedom" campaign. During New York City's annual Easter Parade on April 1st, 1929, a group of resident debutantes with cigarettes were directed by Bernays to join the parade on his signal, and all at once to light up and smoke. The spectacle was covered by local and national newspapers, and in a single moment the event associated women smoking with equality and independence. By linking smoking (thus, the purchase of

[72] Adams, "How Freud got under our skin."
[73] Curtis, *The Century of the Self*.

cigarettes) with emotions, especially with the combination of American ideals of liberty and freedom, people began to behave in irrational ways. Women were, of course, "no freer for having taken up smoking, but linking smoking to women's rights fostered a feeling of independence."[74]

While Bernays' role in profiting off the emotions of the masses was displayed on an enormous stage during this event, for years he had been quietly changing the way businesses and governments communicated with their customers and citizens. His message could be roughly summarized as 'manipulating the *wants* of the *self*,' shifting an economy from individuals buying only what they need when they need it, to buying what they want to express their innermost selves. Not only to make money for the corporation, Bernays believed that satisfying unconscious desires and urges was necessary for peace and stability in society. When consumers are made docile, political leadership can carry out its agenda without fear of revolt or disorder. Paul Mazer, an investment banker of Lehman Brothers, identified much more strongly with the former intent of public relations in saying

> "we must shift America from a needs to a desires culture. People must be trained to desire, to want new things even before the old had been entirely consumed. We must shape a new mentality in America. Man's desires must overshadow his needs."[75]

The key message Bernays repeated was that one should purchase goods as an act of self-expression, such as buying a new car to enhance one's manliness. Among the most significant shifts in consumer opinion occurred in the realm of clothing. New department stores selling mass-produced goods were rolled out in the 1920's, featuring marketing and advertising

[74] Held, "Psychoanalysis shapes consumer culture."
[75] Curtis, *The Century of the Self*.

techniques often directly created by Bernays himself. He linked film stars with products made by his clients in women's magazines and hired celebrities to repeat his essential message in fashion shows hosted in the new stores. A commercial featuring popular aviator Mrs. Stillman taught viewers that buying a hat or coat could enable an individual to share her best characteristics with others. Bernays even used movie stars to transform the public image of President Coolidge, a newspaper article in 1924 showcasing how the formerly dull and lifeless personality entertained a group of visiting actors and did have humor after all.[76]

Bernays became famous for his nearly magical way of persuading the public to buy products and fuel the economic engine of American superiority. He quickly joined the elite and lived in opulence and indulgence, himself profiting off the masses. Nonetheless, his unsustainable lifestyle came to a halt with the stock market collapse on October 29th, 1929. The Great Depression would require Americans to rethink the new mode of consumption and reconsider the roots of simplicity and necessity—for a few years, at least.

Across the Atlantic Ocean, Bernays' ideas later found a new home in a budding political party. While Bernays saw aggressive animal instincts as something to mitigate, Joseph Goebbels, the Minister of Propaganda of the National Socialists, believed that such instincts could be mastered and funneled into political power. Goebbels was reportedly inspired by Bernays' work in particular, and the Nazis hired an American PR firm, Carl Byoir & Associates, to shape American opinion on the country and party in a positive light. It is important to note that Bernays turned down work for Germany at this time,[77] perhaps recognizing early on that the marketing complex he helped to create was quickly spiraling out of control and outside of his intentions.

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[76] ibid.
[77] Torossian, "Hitler's Nazi Germany Used an American PR Agency."

A key example displaying the sheer might of Nazi power, the Colossus of Prora on the Baltic Sea island of Rügen stands today partly in ruins. This building complex was designed as a tourist destination, able to accommodate 20,000 people in 4.5 kilometers of housing blocks. The belief was that by providing such a top-notch vacation opportunity, the unconscious desires of the population could be somewhat assuaged, resulting in relaxed beachgoers more receptive to the propaganda messages scattered throughout the complex. World War II stopped the plans in their tracks, however, and the buildings were used for various war purposes over the years.[78] Today, the decaying brown-grey buildings designed to subdue the masses are being overtaken by plants and greenery. Some portions have been converted into modern uses, such as a youth hostel, allowing guests to experience the beach and learn the history of this colossus. The remains speak to the extreme application of propaganda which took place under Nazi rule.

Back in the U.S., the control of consumer behavior became the passion of a certain deaf advertising executive. Earnest Elmo Calkins was chiefly a designer, his work as a typesetter and copywriter leading to an understanding of typography and print design. Advertising in America up to the 1920's had not prioritized aesthetics in the design and packaging of products. Most goods and their promotion reflected the mass models of production and standardization. In Europe, on the other hand, the integration of modern art and culture with industry was underway, cultural critics serving as drivers of this change. In 1925, Calkins visited the International Exhibition of Modern Decorative and Industrial Arts, a World's Fair held in Paris. He was quickly inspired by how the abstract packages of products in Parisian department stores "were no longer mere utilitarian vessels for their contents, but rather represented the essence of what the product symbolized to the consumer."[79] Packaging and advertising did not need to solely house

[78] AFP. "Nazi Colossus Has New Owner."
[79] Lears, *Fables of Abundance: A Cultural History of Advertising in America*.

an object, rather they could express the feelings consumers would gain through their purchase. American industrialists soon took note, and the idea that contemporary art could aid in the marketing of products led to commercial modernism in the U.S. With his background in typesetting, Calkins pushed for new fonts and presenting products with abstract and contemporary designs, recognizing that advertisements with the same old still photographs would not capture an audience in the same way.

Calkins was quick to realize that if certain ads could spur consumers to buy more, then advertising is a fundamental engine of the economy and, in his mind, progress. As the cofounder of the Calkins and Holden advertising agency, he was clearly incentivized to use all the tools at his disposal to accelerate consumption. In 1930, he coined the term "consumption engineering," essentially creating sustained demand through "obsoletism" and identical to the planned obsolescence producers were beginning to explore. To engineer consumption was to design products and use advertising to signal when clothes or other goods are no longer attractive. Even if they are in perfectly good shape, one can't be seen outside in last year's wardrobe. A designer at heart, Calkins "fervently believed that Modernism equaled beauty, and that beauty was the key to economic health and well-being."[80] The pseudo-science he championed was highly attractive to business, and he is celebrated as the father of modern advertising.

The messages of Bernays and Calkins gave way to the study of marketing itself, as well as attempts to legitimize and make respectable the marketing industry. Business remained distinct from scientific study, the two disciplines overlapping perhaps only in the mathematics of finance, with advertising having a questionable reputation at best. Proponents of consumer manipulation to maximize profit wished to make the marketing profession a respectable one and

[80] Heller, "Father of Modern Advertising."

began "emphasizing scientific methodology and invoking engineering"[81] as a means to do so. In the 1940's and 1950's, marketing resembled any other field of research, with the American Marketing Association producing journals and publications, handbooks and bibliographies explaining marketing knowledge, and corporations increasingly relying on market research to make business decisions.[82] Businesses, now aware of means to artificially increase sales, were more interested than ever in how consumers think and the decisions they make.

Ethics and Consumer Behavior

Is obtaining information about consumers' desires and behaviors unethical when the sole motive is to maximize profit? This question was likely much easier to answer in the early twentieth century. The act of conducting surveys and obtaining responses, when participants are fully willing to do so, could not be considered unethical by any stretch of the imagination. Taking and using immeasurable amounts of data from a smartphone user without their full understanding is trickier territory. One could even argue that the satisfying of unspoken and innate human desires is a positive action, individuals made happier through expressing themselves and having possessions which give them security and pleasure.

The trouble is that modern-day consumption is far from natural human behavior. If advertising were not in the picture, market research would be as simple and benign as asking one's neighbor about his favorite color to wear. When advertising and marketing begin to pervade one's environment, is the decision to buy that new blue shirt truly an individual decision? Is the buyer genuinely satisfying an innate need to express himself, or is he completing the task assigned by the clothing manufacturer by repeated exposure?[83] Having been

[81] Logemann, "Consumer Engineering and the Rise of Marketing Knowledge."
[82] ibid.
[83] Beeson, *Persuasion: Theory and Applications*.

told countless times through advertising that blue is the best color to wear right now, if his neighbor were to ask the same query, what would his response indicate? Depending on how hungry the manufacturer is for more profit, how often could his response change, prompting yet another purchase?

The process of marketing research itself is an indifferent one. Such research can also have undeniable benefits in overall quality of life. Understanding what people desire can shape everything from building to kitchen product design, new construction and products raising living standards by matching manufacturing to true customer convenience and comfort. Consumerism allowed many to enjoy products from all over the world, owning more possessions than any generation previously. For those who recognized the price paid by many workers in factories around the world, however, consumer cooperatives served as a balancing factor against corporate greed and growth. Banded together, such groups provided a voice for the voiceless who could then demand better working conditions in sweatshops, minimum wages, and social welfare, such as the British Woman's Cooperative Guild in the early twentieth century.[84] Economists and social scientists continue to be fascinated by the consumer, seeking to understand human behavior through purchasing habits. Theoretically (as we are far from this reality), if all can be made happy, even if such happiness is deliberately engineered, can such engineering be justified?

The impacts of production must first be considered, in other words, the entire supply chain of a product from resource extraction to, in most cases, disposal in a landfill. The costs of an article of clothing go far beyond the money paid by a consumer. Globally, the average amount of water required to grow a kilogram of cotton can be as much as 22,500 liters (or 2,696 gallons per pound).[85] Cotton growers are often coerced into using chemical fertilizers and

[84] Trentmann, "How Humans Became 'Consumers': A History."
[85] Leahy, "World Water Day: the cost of cotton in water-challenged India."

pesticides on a field, toxins which are inevitably breathed in by farmers and lead to significant health issues. The crop must be transported elsewhere for processing, typically ending up in a factory in southeast Asia where workers are paid meager wages for many hours and little freedom. The article of clothing must be shipped to its retail outlet, destined to be purchased and thrown away at some time, even if it is first donated. This story could be told for any piece of clothing, product, electronic device, and especially for any item of food. Regardless of how "happy" an individual is with a purchase, there is often a supply chain of environmental and social harm in any industrial mass-produced good (e.g., most anything found outside of niche, fair-trade or locally sourced stores).

The price tag does not tell it all. Global environmental and social crises demand addressing the scope of the advertising engine which continues to push for greater and greater consumption. Showing that such an argument is not merely progressive whining against free trade and economic growth, the father of public relations himself acknowledged that the industry he helped create has grown somewhat out of proportion. In an interview at age 100, Bernays confessed that "it seems sort of like having discovered a medicine to cure a disease, and then finding out that so much of it is being administered that people are getting sick from the overdoses."[86]

Perhaps it was inevitable that the practices of advertising and marketing were soon applied to the food we eat. When the potential to shift demand of food to what large companies wish to sell is considered, this being industrial food which bears little resemblance to that which defines our identity, being told to wear red next month no longer seems like such a big deal.

[86] Bernays, quoted in Adams, "How Freud got under our skin."

Commercializing Diet

Compared to marketing other consumer goods such as clothes, hygiene products and cars, food posed a number of challenges in its early days. For the vast majority of human history, one simply did not need to make a big decision as to what they were going to eat for any given meal. Hunter-gatherers ate what was in their proximity, and agriculturalists ate what they could grow and store. In the absence of advanced food preservation and processing techniques, most people had no choice but to live the farm-to-table lifestyle now in vogue. While the first methods of keeping food cool in ice boxes, cellars, and early refrigerators enabled eating food which was not necessarily freshly grown or picked, people predominantly ate in tune with the seasons, and that which was grown relatively nearby.

In the nineteenth and twentieth centuries, growing urban populations in the western world led many to seek ways to feed these city dwellers. In the United States, settlement out west was met with little resistance, and in fact was encouraged by policy as railroads and farm fields expanded alongside one another with haste. The working industrial class grew ever distant from the land, and food which would typically spoil needed to be redesigned to meet their needs. The driving force behind such development in America was the culture of "Manifest Destiny," where individuals can work hard and make a name for themselves, with agriculture still celebrated as the bedrock of society. What was then done with the products of settlement farmers, however, would be taken up by food companies eager to sell profitable foods much as any other consumer product. A new era of food marketing required standardization and processing of foods to make them comparably durable to other consumer goods. In a modern, global world, dietary patterns

and their respective agricultural systems which evolved in the United States were soon exported to customers around the world.

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How the human diet became commercialized and how food became commodified can be well introduced through the story of bread. It is hard to imagine a world without bread, as the magic of a warm, baked loaf rising out of flour and water is celebrated by nearly every culture on the planet. That is, every cultural group which developed where grains could thrive. The flatbreads *chapati* and *naan* are ubiquitous across the Indian subcontinent, corn and flour tortillas are vital throughout Latin America, and Europe has long been proud of its large variety of breads and rolls, the debate continuing to this day about who has the superior loaves. Bread retains importance as a symbol in Christianity and Judaism, as the festival of Passover and ritual of the Eucharist utilize bread to connect practitioners with their history and a higher power. Bread's legacy can perhaps best be seen in the fact that in 2014, nearly two millennia after the Last Supper, bread contributed about one fifth of the total energy consumed by the average Briton, and likely provided up to eighty percent of the calories obtained by those in rural India.[87] Despite one's location or socioeconomic status, bread is sure to be found.

With bread's reputation as a delectable and staple food item, one would think this foodstuff must have been celebrated for all of humanity. As discussed in *A Brief History of Eating*, however, early agriculturalists did not immediately take to a lifestyle of farming and chewing processed grains. This is evidenced by aching backs, worn-down teeth, and the fact that early grain products—even if combined with water into a sort of gruel—were likely the subordinate foods compared to the multitude of a hunter-gatherer diet. What we recognize as the

[87] Shewry and Hey, "The contribution of wheat to human diet and health."

leavened, warm and slightly crunchy loaf of bread we hold near and dear did not appear until an inexplicable moment thousands of years following the dawn of agriculture. As Michael Pollan recounts in *Cooked*,

> Once upon a time somewhere in ancient Egypt, probably about six thousand years ago, something seemingly miraculous happened to one of these porridges (roughly processed wheat seeds boiled in water) ... Some observant Egyptian must have noticed that a bowl of porridge, perhaps one off in a corner that had been neglected for a couple of days, was no longer quite so inert. In fact, it was hatching bubbles from its surface and slowly expanding, as if it were alive.[88]

Of course, what was once a miracle we now understand as fermentation. Wheat was, for many years, just one of many cereal grains which were grown on the first farms around the world. Barley, millet, oats, rye, and more were all planted and consumed as staple foods—some of these are even more nutritious and grow faster than wheat. What wheat could do that the others could not, however, is trap gases and multiply in size due to the presence of gliadin and glutenin, precursors of gluten. A traditional sourdough loaf begins with fermentation, where the combination of flour, water, and time allows bacteria and yeasts to begin consuming certain parts of the grain. Each microorganism takes in specific carbohydrates (sugars) and puts out important chemicals, the yeast producing carbon dioxide and bacteria producing lactic acid, creating the slightly sour flavor in sourdough. The force of carbon dioxide inflates the dough, creating spaces and a sponge-like structure beneath the crust. Gluten is formed when its precursors are moistened, and this provides the strength necessary to hold a loaf together during kneading and

[88] *Cooked*, 207.

folding, as well as when the loaf rises during fermentation and in baking. Wheat, then, rose to its place as the dominant cereal crop because it contained the precise amounts of gliadin and glutenin which allowed for fermentation. Despite it being otherwise inferior, wheat, and bread, planted the roots for a cultural and edible revolution.

Bread, again, only rose to the top because of the adoption of agriculture and its necessary social structures and human effort. Entire societies are required for the transformation of inert flour and water into a living, breathing, flavorful and more healthful food than its ingredients alone, as fermentation opens up nutrients and consumes some of the sugars which we would otherwise eat. The first step in creating bread is the processing of cereal crops into flour. Human stomachs can only digest a certain part of all cereals, this being the grain, or seed of the crop. The grains are separated from their grasses through beating a dried stalk, a process called threshing, and are collected for some type of processing. Early grinding and milling were highly laborious and, by modern standards, ineffective in creating a suitable product for breads, as the entire grain was processed and included in a flour. All layers of the seed—the fiber-rich outer layer of bran, the nutrient- and mineral-full germ, and the predominantly carbohydrate endosperm—were turned into flour. The bran and germ are the most nutritious parts of a grain, yet because they contain living cells, whole-grain flour is more perishable and makes fermentation difficult to manage due to increased biological activity. If milling were to remove these parts and retain a flour made solely of the brightly colored endosperm, the process of making bread could be taken back under human control without microorganism cooperation.

Until the late nineteenth century, stone milling was the only processing option available, a water wheel or windmill rotating large stones to crush the grains, retaining all the life, nutrients, and complications present. The more flour was ground and sifted, however, the more

bran was removed, and therefore the flour became whiter and whiter. Removing the more bitter bran also resulted in sweeter flours and breads which could rise much higher.[89] Unsifted and once-ground flour had all the nutrition, yet wore down teeth much faster due to the coarseness of the product. In the absence of recent health science, white flour and bread were considered healthier and more desirable for much of history. The rich developed a taste for more processed and brighter grains, leading to a curious situation where those on top consumed the least healthy and sweetest breads, and the poor managed with darker and tougher loaves.

Roller mills began to replace stone mills as a more efficient means of processing grains. In 1865, the steam roller mill was invented in Hungary, the technology of which was combined with improved sifting and bran- and germ-removal techniques a decade later in the U.S. The multiple steps of roller milling allowed more grain to be processed and resulted in a much less perishable and a whiter product. Single, large mills replaced small-scale local milling as the last stores of nutrition were eradicated from the nation's bread.[90] Industrially-made flour enabled people to take full control over the creation of a crucially important food and allowed more to enjoy the sweet, white, airy loaves of the rich than ever before.

Bread was one of the most pivotal moments in processed foods. While agriculture continuously changed how we grew our food throughout history, by and large, the end products we consume only changed a handful of times. Our diet shifted first from the immediate foods in one's surroundings in hunting and gathering, then the items we selected in farming, and then, almost out of nowhere, the list of what one would consider food swelled at the turn of the twentieth century. Distinctions between the cuisine of the rich and that of the poor blurred as new means of processing foods obscured what many would even consider food items.

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[89] ibid, 256.
[90] Wight, "The History and Processes of Milling."

The Processed Pantry

Militaries in the early 1800's greatly increased demand for foods which would not perish over extended periods of time. This being said, methods to preserve food date back thousands of years, with Egyptians curing foods with salt as early as 2,000 B.C.[91] Many years later, large numbers of troops traveling across the sea required significant rations to keep all in good health, and nations expressed a desire for some type of advanced food preservation. In France, Nicolas Appert won an award from Napoleon Bonaparte for his innovation in this field, the steps of which were to "place food into a jar, boil it and stop the jar with a cork."[92] This process gave way to canning, vastly opening the potential for long-distance travel by greatly extending the lifespan of fruits, vegetables, meats and more. Soldiers would march out carrying the foodstuffs of their homes, more equipped to stay healthy and strong.

It was not long until canning companies such as Heinz, Libby, and Campbell's began to sell to all types of consumers. Concerns about the safety of canned foods led these companies to push forward health and sanitation measures, using new technologies such as steam-retorts and collaborating with scientists to prevent bacterial contamination in their products. Henry J. Heinz, founder and namesake of the Heinz Company would go on to lobby for the 1906 Pure Food and Drug Act, a consumer protection law against unsafe and adulterated food products, partially as a response to the conditions in meatpacking factories as publicized in Upton Sinclair's *The Jungle*.[93] Good business relies on safe products, and early efforts in food preservation appear to have followed this intent. For processed foods to take off, nature's own processes of decomposition

[91] Everts, "Processed: Food Science and the Modern Meal."
[92] Patel, *Stuffed and Starved*, 263.
[93] Petrick, "Feeding the masses: H.J. Heinz and the creation of industrial food."

and decay would need to be combated with full force, better shelf life and portability equating to more sales.

Above all else, new food products would also need to be made palatable and attractive to the average consumer. In their safety research, canning companies found that if food was cooked for longer and at higher temperatures, the likelihood of a spoiled can dropped dramatically. The issue was that more cooking meant less flavor, an initial solution to which was adding in salt, one of the industry's lasting food additives—as any nutrition label on a processed food product will indicate. Flavor and enjoyment of a food product then began to supersede nutrition and tradition. Pleasure from food has been a facet of cuisine since royalty were first served bunches of grapes, and this pursuit of pleasure is no inherent evil. The trouble stems from the realization in the food industry that the marketing of novel food products could be focused on the enjoyment the consumer gains while eating, and not the nutritional content or cultural value of the product.

Let us consider again the wonder of bread. In this case, I should say, *Wonder* Bread. Whereas bread was at one point a small-scale affair, each loaf unique and dependent on its environment and the attention of the baker, a new type of bread soon took market dominance, one fully integrated within the industrial system of production for all goods. Roller milling served well to produce large amounts of finely-ground white flour, and commercially made yeasts removed the need to fully ferment a loaf of bread. While a true sourdough bread is baked with the aid of a massive number of bacteria and yeasts, a single species of yeast, *Saccharomyces cerevisae*, is now used for nearly all industrial bread. This yeast is grown effectively as a monoculture, one species raised in a calculated way for a single end. Sourdough bread required upwards of a day for every step in the process, and now a loaf of white bread could be

manufactured in three or four hours, completely by machine.[94] Control over bread, as well as many other foods and consumer products, was gradually consolidated and concentrated in the hands of a few. The larger a firm can grow, the greater the price savings due to economies of scale, while small bakers and mills shut down in waves. This was and continues to be justified by the workings of the free market, albeit one that bears little resemblance to that fetishized by economists to this day.

The economically efficient outcome, in this case, is the one which funnels control and money up to a small handful of companies, displacing livelihoods and locally owned stores and making consumers reliant on distant powers and faceless entities for their sustenance. Such an outcome is also defended by the notion that "a rising tide will lift all boats," a common adage in mainstream economics. If the overall amount of wealth (GDP), or utility, in a country or population increases, *regardless* of how that wealth is distributed, the traditional viewpoint claims that all will benefit because the affluence will trickle down. Everyone in society will benefit when millionaires become billionaires and the players in the field dwindle in number. More often than not, large food companies also exert a tremendous amount of influence in the political field with overt lobbying efforts and backdoor deals, implying that what they claim to be a true free market is anything but.

Engineering Health

Attesting to what can happen in a modern "free market," Wonder Bread was first produced by the Taggart Company in 1921, quickly purchased by Continental Baking Company in 1925 and bought by Interstate Bakeries Corporation and Flower Foods in the decades to come. The brand has a history of unique advertising, including its inspiration from the International

[94] Pollan, *Cooked*, 219.

Balloon Race at the Indianapolis Speedway, using a quartet to glorify the baking process on national radio, and distributing sliced bread on a scale never before seen. Wonder Bread was made in pop-up bakeries at the Chicago and New York World's Fairs in 1934 and 1939, offering their contributions to the theme of technological innovation. Ironically, one of the most lasting advertising initiatives focused on "building strong bodies," the bread described as improving one's health in eight specific ways. Quoting the *Wonder Bread Cookbook*, these were "muscles, bones and teeth, body cells, blood, appetite, growth, brain, and energy."[95] This campaign soon added four "body and brain building properties" to its bread, these being "red cells, vitamin B_{12}, protein digestion, and tissue respiration."[96]

For having taken out the most nutritious parts of the grain, these are certainly bold claims to make, in addition to being an odd assortment of nutritional "benefits." Fortunately, we have history on our side to determine if these stood up. Predating the rise of Wonder Bread, a new collection of "Western diseases" began showing up in populations who relied on processed flour. Researchers in the beginning of the 1900's found that when regions of the world began consuming white flour and processed sugars, rates of nutritional deficiencies including beriberi and chronic diseases such as heart disease and diabetes skyrocketed. As Pollan writes, "the compelling industrial logic of white flour meshed beautifully with everything except human biology."[97] Much as Bernays realized that his model of public relations simply went too far, so too did the processed food industry. While fermentation in bread and cooking, arguably the first forms of food processing, opened up a whole range of nutrients and health benefits, a line was crossed at some point into "overprocessing." Processing flour too much made it a net negative to

[95] Wonder, *The Wonder Bread Cookbook*.
[96] ibid.
[97] Pollan, *Cooked*, 259.

consume, as the common loaf of white bread is immediately converted into sugar when consumed, with little more to offer in terms of nutrition. As bread became less and less healthy, the companies producing bread found themselves making more and more profit. Industrial flour and sugar are cheap, addictive, and easy to control, perfect for standardized manufacturing.

Attesting to the power and knowledge of consumers, the unhealthy nature of processed white bread was quickly recognized. In 1889, English doctor Thomas Allinson wrote a book titled *The Advantage of Wholemeal Bread* and dedicated himself to defining a truly healthy lifestyle for his patients and himself. Paramount to this life was consuming proper bread made with whole grains, while he also touted the importance of exercise and believed that cancer was related to smoking, at the time ideas on the fringes of medicine.[98] Decades later, the spread of nutritional deficiencies and chronic disease was mounted into a great public health crisis. Industrial bread makers were not eager to switch to using whole grains, however, as the entire business model relied on the predictability of white flour and commercial yeast. The solution that emerged? Fortification with individual nutrients.

As people were consuming too much sugar and too little vitamins and minerals due to eating white bread, the problem-focused solution would be to switch back to whole wheat, sourdough bread. Because of how entrenched industrial bread companies were, though, it was in their best interest to try to integrate a solution within their products and avoid overturning their entire models of production. In 1940, the Committee on Food and Nutrition (now known as the Food and Nutrition Board [FNB]) recognized the dangers of processed white flour, and "recommended the addition of thiamin, niacin, riboflavin and iron," resulting in what is called

[98] Oldways Whole Grains Council, "Thomas Allinson, Early Whole Grain Hero."

"enriched" flour.[99] The American Bakers Association worked with the FNB and the Food and Drug Administration (FDA) to create clear standards for what "enriched" meant, although in the 1940's the FDA declared that mandatory fortification of any food product would not be required, a policy which stands to this day. For any large bread manufacturer, however, consumer pressures and health issues meant that they would gladly take up fortifying their loaves, inserting specific vitamins and minerals as another ingredient. Instead of addressing the cause of the problem, this being that people are simply not eating a balanced diet with whole grains, bread could be processed even more to offer an efficient solution. Ironically, some breads even use substances derived from nutrient-rich parts of other grains, "oat hull fiber" an example of reinjecting the balanced products of nature in a processed item.

The engineering of bread did not stop with the addition of individual nutrients. The average ingredient list on any Wonder Bread item or similar industrial loaf reaches far beyond the flour, water, and touch of salt which defined bread for thousands of years. Chemistry caught up with capitalist desires to further control the baking of bread and optimization of production. Pick up any loaf in the grocery store, and you will typically be met with a variant of enriched flour, water, added sugars, commercial yeast, dough conditioners, and dozens of other preservatives and additives. As white flour results in an already sugar-rich bread, the addition of processed sugars from high fructose corn syrup or other derivatives is unnecessary and simply adding calories at the eater's expense. As a product which will likely be shipped hundreds or thousands of miles before reaching its destination, preservatives were necessary to prevent mold and spoilage. Certain additives have raised grave concerns about the ingredients in industrial

[99] U.S. Institute of Medicine, "Dietary Reference Intakes: Guiding Principles for Nutrition Labeling and Fortification."

bread, leading many nations to ban their use and consumption, yet some of these chemicals curiously still find their way into American breads. For instance,

> potassium bromate, a potent oxidizer that helps bread rise, has been linked to kidney and thyroid cancers in rodents. Azodicarbonamide (ADA), a chemical that forms bubbles in foams and plastics like vinyl, is used to bleach and leaven dough – but when baked, it, too, has been linked to cancer in lab animals.[100]

The European Union banned ADA more than ten years ago, while many countries outlawed potassium bromate in food going back to 1990 in the UK. As of now, the FDA considers these as "gras," or generally recognized as safe, and they continue to be found in a multitude of processed bread and frozen food products, although some companies have taken note and began to remove these from their ingredients. As history shows, however, in the absence of oversight and control from the FDA and similar organizations, new chemicals are likely to replace ones which consumers demand to be removed. This repeating process of engineering and redesigning food exemplifies the faith in science and technology purported by modern capitalism. Self-described as an optimistic viewpoint, a significant amount of current economic literature and teachings state "the idea that the economic problems of any country, region, or industry can be solved through a 'technological jump ahead,' or by getting closer to the technological frontier."[101] If a solution to an issue does not exist, the world must simply give it time and allow the free market to incentivize entrepreneurs to devise a profitable solution. An unlimited faith in technology and monetary incentives to solve all humanity's issues leads to such outcomes as overprocessing and engineering bread, the foundation of the diets of so many. As we approach

[100] Farah, "Banned bread: why does the US allow additives that Europe says are unsafe?"
[101] Evangelista, "Technology and Economic Development: The Schumpeterian Legacy.

several ecological limits and tipping points associated with climate change, the arguments of corporate leaders and economists is to wait it out and let the system solve itself.

In the mid-twentieth century, fortification reigned supreme, as Wonder Bread rolled out advertisements touting how strong and healthy one will become due to the addition of certain nutrients which were otherwise lacking in the average diet. Vitamins and minerals gained attention in the public eye as researchers praised the importance of specific supplements. The "building strong bodies" campaign, with its now twelve facets of health, rode the wave of vitamin-frenzy and marketed itself as the solution to the public health crises of the time. Targeted at anxious parents and hungry children, commercials and print advertisements showed that children would avoid getting sick and grow to be tall and fit when Wonder Bread was made a regular part of their diet. One commercial from 1968 touts that serving Wonder Bread will help children make the most of their "wonder" years, roughly the time of puberty.[102] Wonder is but one brand which has benefitted from marketing directly to children. Many processed and fast food companies deliberately target kids in their promotional efforts.

All in all, the fortification of processed breads to ensure that people consume all they need to thrive does not appear to be a terrible deal. Certainly, particular additives should be avoided when they pose true health risks, yet if people obtain what they need while eating airy, sugary bread, who can complain?

The problem is that, in general, fortification does not entirely work. While reductive science is desirable in theory, it does not solve everything when dealing with the products of nature. True health is not a simple equation reached when certain macro and micronutrients are combined in a food, rather it is the result of complicated synergies in real foods which we are

[102] Wonder Bread, "1968 Wonder Bread Commercial."

only beginning to understand. Research focused on grains indicates that the individual components we can name do not accrue the same health benefits when consumed in a processed package. Consuming whole grains, however, with all parts of the seed included, is associated with a clear decrease in the risk of various diet-related diseases.[103] Furthermore, the increased technologization of our food signals a growing distance between humanity and nature and a belief that we can produce items which are more healthful and accessible than real, whole foods. In the case of supplementation, overdosing certain vitamins and minerals can lead to real health risks and side effects.[104] In unprocessed foods, nutrients exist in the context of fiber and other substances which are crucial in digestion and absorption.

It has been said that the two great frontiers remaining for our species are outer space and the microscopic world. Much of nutrition research has focused on this latter frontier, yet the industry has only begun to make progress into understanding the chemical processes which occur when we eat certain foods, and what truly contributes to health. In light of widespread mental health concerns in the western world and a global disparity between obesity and hunger, there clearly remains work to be done. Much as birth remains a miracle even with more understanding of biology, so too does a seed possess a sense of true wonder, a single capsule of nutrients and materials which holds the capacity for life to take root. As Pollan writes, all that is contained within a seed "still exceeds science's powers of comprehension and technology's power of creation."[105]

Yet processed foods still rose to dominance throughout the twentieth century. In response to genuine concerns about consuming whole grain flour as opposed to white, Wonder Bread

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[103] Jacobs and Steffen, "Nutrients, foods, and dietary patterns as exposures in research: a framework for food synergy."
[104] Harvard Medical School, "Dietary supplements: Do they help or hurt?"
[105] *Cooked*, 262.

would release many iterations of its product, including 100% Whole Wheat and the curiously named Whole Grain White for its health-minded customers. For these loaves, processing of grains occurs to such an extent that even if all portions of the grain are included (as the bitter bran is often discarded without mention), ultrafine whole grain flour is absorbed by the body in the same way as traditional white flour, with the result that Wonder's "whole grain" bread has a nearly identical glycemic index as its other varieties, meaning that one's blood sugar is raised the same amount. True sourdough loaves take much longer to be metabolized by the body, even if white flour is used.[106] One could argue that the incentives of an industrial food producer simply do not align with public health, the profit motive driving companies to create and sell products regardless of greater social ramifications. No matter how much science and technology are enlisted, processed foods cannot match the synergistic collection of nutrients provided by real foods.

The fermentation which occurs in a proper sourdough loaf is an orchestration of chemistry, bacteria unlocking nutrients for consumption and amino acids browning the crust and providing a rich flavor. Fermentation is also highly important in light of rising incidences of gluten intolerance. Much as cooking allowed us to outsource some of the work of digestion to fire or heated water, the bacteria in sourdough bread break down some of the carbohydrates and protein in flour, gluten among these. A 2018 study in *Gastroenterology* found that for many people who self-reported non-celiac gluten intolerance, the substance they were sensitive to was actually fructan, a carbohydrate which is broken down during fermentation.[107] Consuming properly-fermented breads does not typically cause the same symptoms in people with alleged

[106] ibid, 270.
[107] Skodje; Sarna; Minelle; et al, "Fructan, Rather Than Gluten, Induces Symptoms in Patients With Self-Reported Non-Celiac Gluten Sensitivity."

gluten sensitivities. It stands to reason that as diets switched from fermented sourdough to industrially produced and quick-leavening bread, our guts were not equipped to digest the new loaves, as similar as they may have appeared to traditional bread.

Processed foods came to define consumer society far beyond industrial bread. Much as war spurred the invention of canning in the 1800's, the conflicts of the twentieth century created demand for more food products which could sustain millions of soldiers. The U.S. Army's Natick Soldier Systems Center in Massachusetts conducted research during World War II in food processing, with the goal of creating lightweight and long-lasting rations. Findings were then shared with food corporations, eager to sign lucrative contracts to produce a new breed of rations for the military. The army conducted the taxpayer-funded research and food companies adapted their factories. Among the most noteworthy innovations from World War II include instant coffee made with technology from blood plasma transport, the McRib, which "descended from military research into 'fabricated modules of meat,' and the finger-staining dust on Cheetos can be traced back to a dehydrated, compressed "jungle" cheese invented by government scientists in 1943."[108] Energy and granola bars date back to this time as well, first designed as semi-palatable meal-replacements which spun off into the wide array of bars which line grocery store shelves today. Pillsbury was enlisted in the 1970's to improve upon the existing energy bars and make them ready for consumers on a large scale.[109]

Food in the United States was transformed due to military incentives and companies took advantage of the situation to create cheap, portable, convenient and long-lasting items optimized more for the front lines than the dinner table. As discussed in *Unnatural Selection: The Global Food System*, agricultural companies used chemical research during wartime to convert nerve

[108] Twilley, "How Military R&D Created The Food We Eat."
[109] Marx de Salcedo, *Combat-Ready Kitchen: How The U.S. Military Shapes the Way You Eat*.

gas into pesticides and herbicides, further illustrating how intertwined the modern food system is with historically destructive ends.

For the system to succeed following war, consumers would need to become accomplices to food producers. Fortunately, the marketing industry had proven itself through the selling of mass-produced goods from shirts to cars to a nation of consumers. Advertising became the tool of choice for food companies to profit from their processed foods. TV dinners, fast food, soda cans and glasses of milk became integral parts of the American identity, as well as items which would outstrip the humble boundaries of the U.S. and be exported to an entire planet of eaters.

Freedom to Cook

All people want to think they are free. Americans' freedom to choose what they think, do and say are values codified in the Bill of Rights, legal rights which are often called upon when one is trying to argue for the freedom to eat, buy, and watch what they want. If someone wants to drive a gas-guzzling truck or eat at McDonald's for every meal, they are free to do so. Note, again, the focus here on "wants." One way the U.S. and other capitalist nations diverged from communist powers in the twentieth century is in the language of free choice. Instead of being coerced by the politburo to eat this or that loaf of bread, in America, one is simply subject to a marketing and advertising complex which has influence in every aspect of waking life, the net result being little more than an illusion of choice.

By the time one enters the store, his natural and innate understanding of what real, good, nutritious food is has been obscured by the efforts of companies to sell their products. While the integration of human psychology into marketing began with Bernays, Calkins and others, the second half of the twentieth century saw a simultaneous explosion in technological progress and the growth of an information society in the western world. More people than ever owned and drove cars as mankind stepped foot on the moon, and early computers gradually shrank in size while increasing in processing power and speed. Bright and flashy screens entered city streets and living rooms, mass media serving as a political and economic tool to shape citizen and consumer behavior.

How people *feel* when they buy certain consumer goods or foods became the passion of companies armed and ready to continue systems of mass production developed during wartime. People growing and cooking their own food using whole, real ingredients did not align with

companies' incentives to produce and sell more and more processed goods. The marketing of fast food restaurants, supermarkets, and frozen, pre-made meals would capitalize on the idea of convenience, that everyone is overworked and deserves to sit back, relax, and turn on the television while outsourcing the act of cooking to faceless corporations. All the while, they are subliminally and overtly told what to eat for their next meal while staring into the screen and downing a microwave dinner.

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The year is 1947. The world had stood at the brink of collapse throughout the largest war in history, tens of millions of lives lost and nearly no part of the globe left untouched. The U.S. dropped two atomic bombs on Hiroshima and Nagasaki in Japan as a final demand for surrender. The subsequent Russian adoption of nuclear technology led to a generation of schoolchildren trained to duck and cover beneath their desks for fear of an impending attack on the homefront. When an ostensible peace arrived, massive numbers of soldiers were able to return home. For many, the first thing on their mind was starting a family and living a normal, simple life, unknowingly giving birth to the infamous "baby boomer" generation.

American cities had to deal with acute housing shortages as legions of troops were demobilized. A lack of urban housing combined with a model of mass production ripe for whatever its machinery can create inspired William Levitt to imagine a new type of idyllic neighborhood. In 1947, the Levitt and Sons construction firm began building mass-produced and standardized homes on seven square miles of land on Long Island. Workers specialized in one certain task in the homebuilding process, essentially replicating the assembly line model for entire houses built from the ground up. At the peak of construction, one home could be built every 16 minutes, each nearly identical except for subtle changes in color and design. The

neighborhood of 2,000 homes was known as Levittown, and the homes were soon complemented by a variety of services such as schools, parks, and shopping centers. In the next few years, the firm built more Levittowns in New Jersey, Pennsylvania, and uniquely named developments in several other states. While the neighborhoods were celebrations of the potential of capitalism and increased wealth, expanded ownership of homes in Levittowns was only possible through a "rare act of American socialism."[110] This was the 1948 Housing Bill, in which the Federal Housing Authority began to allow thirty year mortgages, including those with only ten percent down. With these easy-to-access and comparatively cheap loans, many new families were able to own homes.

This model of standardized housing was completely reliant on automobile ownership, and neighborhoods such as Levittown became known as "bedroom communities," where workers commuted to the cities for their day jobs, returning to their suburban homes at night. The model of mass production employed at Levittown was due in great part to the car industry, and each industry supported one another as workers living in identical homes drove identical cars to an admitted variety of jobs. For those living in the suburbs, customized or not, automobile dependency became a fact of life. As single-family homes became the norm, greater amounts of land were required for both housing and roads in a settlement pattern defined by sprawl.

This epitome of the American dream, single homes with white picket fences and nuclear families (an inadvertent play on words), is not without significant human and environmental impacts. More often than not, the area on which a new development is built is not simply fallow land. Large tracts of farmland, forests, and prairie—the latter two indigenous to the U.S.—had to be converted and paved over. This was for homes themselves as well as the expanse of

[110] Marshall, "Levittown, the prototypical American suburb - a history of cities in 50 buildings, day 25."

roadways and interstates to connect suburbs to cities and one another. An upward cycle began as land uses grew further apart, more cars were used, and more roads were needed.

As time has shown, the transition to an auto-reliant society in the 1900's has coincided with increased greenhouse gas emissions, social inequality, and obesity. This being said, simply using cars and living in single family homes spread far apart are, by far, not the sole causes of these societal and environmental issues. To explain these problems, we must take a closer look inside a suburban home to see what is happening—or not happening—in its kitchen.

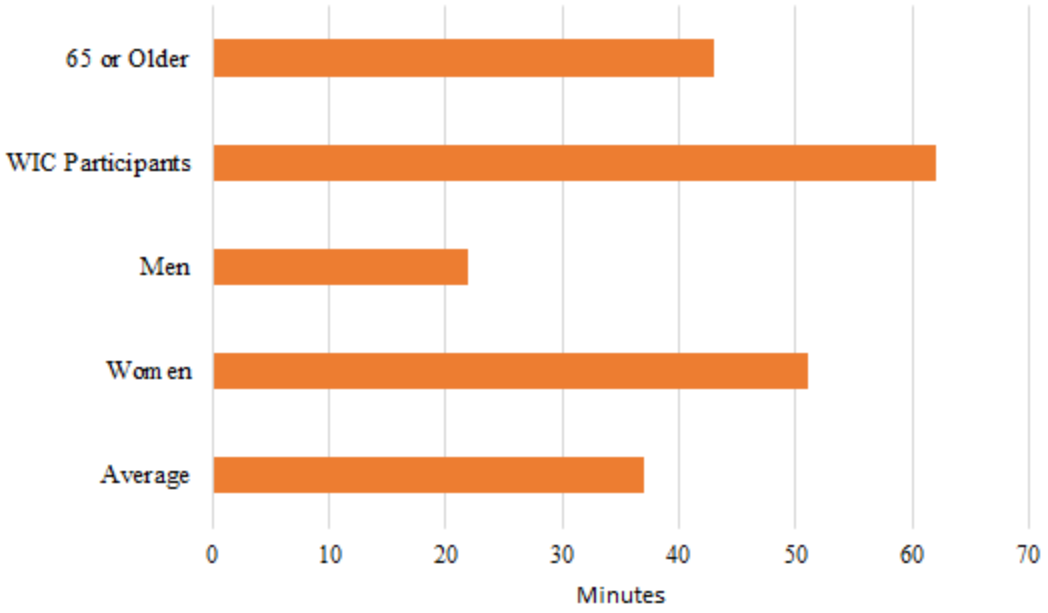
Value of Cooking

Cooking is much more than the chemical and physical changes occurring when food is placed under heat. It is a means of connection to the natural world, a reminder of how our species evolved into what it is today, and a facilitator for social bonding over a meal. The kitchen itself serves as a nexus for those living in a household, as well as the fortunate guests to a dinner party hosted by savvy cooks. The ritual associated with food preparation in the past is alluded to anytime one pulls out a piping hot casserole or freshly baked bread from the oven or serves spoons full of hearty and warming soup to family and friends. Holidays and celebrations are characterized by special meals, further strengthening ties and a sense of belonging while being nourished by culturally appropriate foods.

Cooking, almost magically, has a positive impact on our physical, mental, social, and spiritual well-being, impacts which can be felt simply through the act of dicing onions or, for the more intrepid, baking a loaf of bread from scratch (yeast culture included!). Spending more time preparing one’s own food is associated with a healthier diet and increased fruit and vegetable intake, and inversely, less time spent cooking is associated with greater intake of fat- and

sugar-laden fast food.[111] Simply eating out as opposed to at home often leads one to choose less healthful options.[112] Yet, the amount of time spent cooking in the U.S. has dropped precipitously since the 1960's. Figure 1 shows data on the time spent in food preparation among various demographic groups in the U.S. in 2014. Altogether, from 1965 to 2008, the time spent cooking among all population groups declined by 35 minutes per day. Less time cooking is inextricably linked with more time working about 167 hours more per year,[113] as well as more hours spent behind the wheel.

Figure 1. Time Spent Cooking Per Day in U.S. (2014)[114]



Why, then, did society shift from growing and cooking their own meals, with all of the health and social benefits available, to purchasing pre-made and processed options?

[111] Monsivais, Aggarwal, Drewnowski, "Time Spent on Home Food Preparation and Indicators of Healthy Eating."
[112] Todd, Mancino, Lin, "The Impact of Food Away from Home on Adult Diet Quality."
[113] Pollan, *Cooked*, 182.
[114] Hamrick and McClelland, "American's Eating Patterns and Time Spent on Food: The 2014 Eating and Health Module Data."

To begin, we must return to the marketplace. What began as humble rural fairs with farmers selling their excess crops turned into primary drivers of economies as trade became international. For thousands of years, trade took place in areas central to a city or region, merchants coming from far and wide to exchange a plethora of raw materials, animal hides, and hopefully exotic spices and flavors. Customers and sellers interacted directly with one another, bartering for fair prices and developing a lasting relationship. The "market" evolved, a set time and place where activities in commerce took place. In time, the role of a middleman evolved, where "growers no longer needed to travel to markets, but traded with merchants who then sold to the public."[115] Governments soon realized that a great deal of tax revenue could be made from markets and used architects and designers to construct permanent structures which both improved hygiene and catered to higher-class consumers. With the rise of cities and railways following industrialization, greater amounts of food could be brought in to burgeoning urban populations. Large wholesale markets accessible by many means of transportation, such as the Hunts Point Cooperative Market in the Bronx, New York City, came to define food trade in the twentieth century, with several more middlemen entering the growing divide between producer and consumer.

The Grocery Store

While today's supermarkets echo some of the social aspects of historical markets, namely running into your former elementary school teacher and elderly neighbors, the similarities stop there. Stores of any kind were obvious next steps from merchant booths at a market, as permanent buildings provided many benefits to draw in customers. Up to the early twentieth century, however, the experience of shopping at a grocery or general store remained essentially

[115] Friedman, "From roadside trading to hipster supermarkets, how we buy food reflects the state of the economy."

identical, with customers going up to a desk and asking the clerk for the products they desired. This set-up facilitated communication between the seller and the buyer, yet was limited in the net number of products which could be sold. Industrial manufacturing was producing never-before-seen quantities of goods, so much so that manufacturers worried "too much was being produced and that consumers couldn't afford to make purchases fast enough to soak up the flood of goods."[116] At the same time, the industrial marketing complex had not yet finessed the art of making consumers buy what they don't need. In order to keep the wheels of industry turning, food companies turned their attention to cutting prices wherever possible, which turned out to be within the store.

In the wake of the California Gold Rush, Albert and Hugh Gerrard developed a new type of grocery store in Pomona in the early 1900's. As Patel writes, the brothers "started tinkering with the notion that, rather than have grocery clerks do it for them, consumers themselves might pick their own groceries."[117] In this revolutionary idea, labor costs could be decreased while consumers were likely to buy more in the absence of an intermediary clerk. First stocking their goods in alphabetical format, the Alpha Beta grocery chain gave rise to the self-service concept and was ultimately absorbed by American Stores later in the century.

Many miles to the east, Clarence Saunders began devising his own self-service store for consumers in Memphis. Also recognizing the time and expenses required to run traditional stores, Saunders, inspired by the Gerrard's or not, opened the first Piggly Wiggly grocery store in 1916. What distinguished this store from the Alpha Beta prototype was the internal geography as soon as customers passed through the door. Instead of being met with a clerk to place one's order, a customer picked up a basket and stepped into a maze of shelves winding back and forth,

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[116] Patel, *Stuffed and Starved*, 222.
[117] ibid, 223.

ultimately arriving at a till to pay. There was, in fact, only one path which customers could follow in Saunders' 1917 patent for the "Self-Serving Store,"[118] a zig-zag absent of store attendants to aid customers through the shopping process. Signage and careful physical architecture were necessary to educate customers as to where goods were located and how to navigate the store on their own.

The self-service model was designed to goad consumers into making purchases they did not need, simply by being forced to physically view every product for sale in order to exit the store, perhaps a predecessor to the modern labyrinth of Ikea. Saunders, among other early grocery pioneers, was insistent that this model was of great benefit to both sellers, who benefitted from decreased labor costs, and customers, who were "free" to buy everything they wish. Additionally, Saunders was quick to realize that customers purchased much more when set off through the aisles on their own. Among the grocery industry "firsts" touted by Piggly Wiggly itself are providing checkout stands, giving shoppers more for their dollar through high volume/low profit margin retailing, and featuring a full line of nationally advertised brands.[119]

Upon closer glance, the "freedom" consumers gained in self-service stores is anything but. Patel recognizes an irony in that "shoppers' freedom of choice was born in a cage."[120] One's ability to casually stroll the aisles and select what looks desirable was little more than an experiment in controlling human behavior, one which required massive amounts of consumer education (through signage, store design, and so on) to succeed. Stamped with offering convenience and autonomy to customers, self-service stores and the grocery giants which evolved from them were centrally designed means of inventing consumerism. These techniques

[118] Saunders, "Self-Serving Store."
[119] Piggly Wiggly, "About Us."
[120] Patel, *Stuffed and Starved*, 226.

grew in tandem with a marketing complex which told consumers exactly which goods to buy on a certain day. From markets built on social interaction and mutual benefit emerged *super*markets equipped to sell the products of industrial agriculture and war, monumental stores part of nation- and world-wide chains, as scalable as corporate owners wish.

Increased consumption and access to cheap foods can be construed as an ultimately positive change, especially given that more illness and disease before the 1900's was caused by not eating enough food. If the shelves in early Piggly Wiggly and other grocery stores were stocked with whole fruits, vegetables, and sourdough loaves, then buying more, whether or not it is entirely one's own choice, would admittedly be a move in the right direction. As history shows, however, this was not the case. The new, independent experience of purchasing food must be understood in conjunction with the food industry advancements which drastically changed the very contents of our shopping baskets.

Mass Food Marketing

As discussed in *Commercializing Diet*, the massive array of processed food items which line grocery store shelves today have their roots in wartime production of rations. Effectively, the food industry offered to take on the job of cooking for an entire country, and soon to be world. Designed for quick energy and profitability rather than health, packaged goods could be labeled, marketed and sold just like any consumer product. At the time, this was in stark contrast to what could be done for fruits and vegetables, where the marketing remained little more than touting the nutrition and quality of an item, typically reliant also on a direct interaction with a farmer. Processed foods are much more profitable for a corporation, especially when sold through a massive supply chain which grew in tandem with ever-larger supermarkets. The

changing contents of our shopping carts was the result of a supply-driven process by food companies, contrary to popular ideas of women's liberation as the main driver.

Food marketing was quick to focus its efforts toward women, specifically in creating the language of freeing women from traditional social structures and kitchen labor. Much as Bernays linked smoking cigarettes to women's rights, the food industry sought to connect processed food, fast food, and the drive thru to feminism and gender equality. For instance, in the 1970's, "KFC ran billboards depicting a family-sized bucket of fried chicken under the slogan 'Women's Liberation,'"[121] an extreme case of catering to this enormous market segment. Pollan further wrote that

> running just beneath the surface of food-industry feminism was an implicit antifeminist message. Then as now, ads for packaged foods were aimed almost exclusively at women, and so reinforced the retrograde idea that the responsibility for feeding the family fell to Mom.[122]

The central message of food marketing in the second half of the twentieth century comprised the demonization of cooking and an emphasis on freedom of choice. Liberating women from the kitchen was pushed forward by fabricating a sense of anxiety regarding time. Processed food commercials have often depicted rushed families in a frenzy to get ready for the day, the only solutions to which are processed cereals or toaster pastries hastily prepared and eaten on the go. The problem of a lack of time is countered with the immediate solution: buy pre-made and convenient goods to save yourself the trouble of cooking for the family. As Pollan wrote, advertising rarely, if ever, brought up the role of a husband, instead choosing to remove the debate entirely as distant corporations entered the kitchen. At the end of the day, the family

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[121] Pollan, *Cooked*, 131.
[122] ibid, 187.

could gather in the living room, chairs angled at the picture box and enjoy microwaved TV dinners, removing nearly all the work required to prepare a meal. As televisions became commonplace and ubiquitous in American households, so too did the onslaught of advertising and commercials which fought to become the next night's meal.

Automobile dependence also played a central role in the rise of industrial food and displacement of cooking. Massive grocery stores were situated in suburban areas where most people could only access them with a personal vehicle, in turn displacing the now-quaint early models of self-service stores. Fast food restaurants spread like wildfire throughout the states, quick and cheap burgers and fries becoming an integral part of the collective American consciousness. The number of food options seemed to grow exponentially as free time steadily decreased. Time spent in the kitchen was traded for time spent in a queue line inside McDonald's, or a line of cars circling the building.

Each society, around the world and throughout time, can be defined by the food it eats and celebrates. In general, western countries have been stepping further and further away from whole foods and how and where they are grown, instead walking toward an increasingly frenetic pace of life which relies on quick and convenient options. Modern food shows may be a social response to the loss of cooking in daily life, perhaps even an attempt to regain the drama and suspense associated with a lifestyle of hunting and gathering. In a society plagued by both mental and physical health issues, reclaiming cooking can be a vitally important step in improving an individual's diet and facilitating social ties. Regarding personal freedom, the most American of all values, is the ability to choose between Burger King and Kentucky Fried Chicken truly an expression of freedom? The abandonment of growing and cooking one's own food in favor of industrially manufactured junk food, it seems, limits freedom to a much greater

extent than a soda or sugar tax, for example. Prohibiting certain advertising, such as those directed toward children or placed in public schools, can counteract the effects of an overstimulated world and allow future generations to truly experience freedom in a way which has been lost over recent decades.

Conclusion: A Disconnect

You are what you eat. In light of the ongoing global crises surrounding hunger, obesity, food insecurity, mental health, and environmental degradation, never before has such a banal saying been infused with such gravitas. The issues may often feel beyond comprehension, yet just as humanity conjured technology, marketing, and social structures out of thin air, so too can the efforts of many reverse the destructive course which has been set out over recent centuries.

The story of our relationship with the food we eat is a story which touches all life on the planet. The underlying narrative during more than 10,000 years of planting crops, sailing across oceans, moving to cities, and cooking food for the family is one of connection. More specifically, mankind's connection to the natural world, individuals' connections to one another, and one's connection to the very experience of reality.

The first great exodus from nature coincided with the dawn of agriculture. Modifying food itself through cooking over fires and in hot water enabled the evolution of a larger human brain, one which was eager to discover more ways to assert control over the natural world. Civilizations formed in areas of the world where deliberately planting crops yielded a competitive advantage in terms of food supply. Those who found themselves at the top of a new social pyramid came to lead early human societies, most often in the direction of unrelenting growth. Societies which overexerted their natural resources, effectively outstripping a region's carrying capacity, were doomed to collapse. Occasional failures would not convince mankind that the new agricultural paradigm was one to be given up, however, and intensive land management slowly morphed into a God-given right, humans justly exerting their dominance over all other species. Humanity would go on to overcome even the limitations imposed by

shifting tectonic plates, early European explorers venturing out across massive seas in search of resources to bring back home. Species crossed previously impenetrable boundaries as the entire planet shrunk, plants and animals setting roots in new lands just as the pilgrims and conquistadors.

Ever since an imbalance of power between humans emerged with agricultural surplus, forced labor was a fact of life, yet the slavery facilitated by trade across the Atlantic was unprecedented in terms of sheer scale and suffering. Groups of humans, purely by virtue of being born in different regions and taking up varying farming and cultural practices, waged war against one another and exploited life to perpetuate the control of wealth and natural resources around the world. As agriculture continued to intensify, new farming technologies and the use of fossil fuels for energy catapulted the destruction of the natural world into the future. To this day, chemicals found to speed up plant growth are applied to fields in massive quantities, a significant amount of which simply become pollutants in soil, rivers, and massive aquatic dead zones incapable of supporting life.

The most recent chapter in the story of food concerns individual's connections to reality and true health. The rise of industrialization set forth a world in which corporations dominated trade and the (ab)use of the planet's resources. Money equated power and opulence, wealth which could be acquired irrespective of one producing food, consumer goods, or weapons of war. The World Wars themselves, examples of a great disconnect between human societies, left a manufacturing industry hungry for more income. The efforts of early public relations and marketing professionals such as Bernays and Calkins offered the solution companies desired: artificially create demand for goods by convincing consumers that they want certain products through massive advertising campaigns. The shift from meeting one's needs to satisfying one's

wants (whether or not they are genuine) signifies a departure from reality, as what is reality other than the combination of one's sensory experience and thoughts? Significant ramifications result when an individual believes he wants something because of advertising, particularly when the product being sold is food implicit in a harmful global supply chain. Not only with food, the desire for more and more invoked by marketing for all types of products traps individuals in anxiety and discontent. Food marketing in particular has focused on the experience of pleasure obtained from eating industrial, processed, and fast food, sugar and fat-laden treats which breed addiction and a narrow focus on being perpetually happy. As worldwide increases in depression, anxiety, and a host of mental health issues indicate, true joy cannot be achieved by making another purchase or eating that dessert.

The solutions available to rebuild a true sense of connection and bring about a more just, sustainable food system are manifold and can be carried out on all levels of society. Purchasing locally grown food from farmers' markets or consumer supported agriculture (CSA) mechanisms can shift demand back to food which nourishes both humans and the planet. Growing food, either in a home garden, containers, or on a windowsill, can also cultivate greater food security for both single homes and communities. Cooking from real, whole foods offers the chance to interact with the products of nature, create healthy meals, and even facilitate interaction with other members of a household as the pace of life gradually slows around the chopping of onions and garlic. Certainly, a return to the days of hunting and gathering is impractical in a mechanized world of more than seven billion people. Looking to the future, however, continuing down the exact same path of resource exploitation and climatic variation must be reconsidered.

The opportunity to choose a new path is available to each person at every single meal. Putting more nourishing food on the plate, and not that which is eaten on TV, may be humanity's greatest chance to protect life as we know it.

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