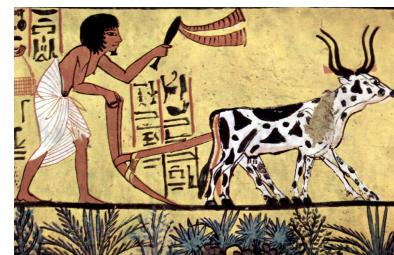


H. The Story of Food

1. We now have a basic way of organizing technological history into four main segments: the long, stagnant period of “pre-industrial” history, the slowly accelerating period of progress that is “proto-industrial,” the rapidly progressing periods of “industrial,” and the latest “advanced industrial” period that we have yet to precisely define.
2. Charting the story of one of the key values of human life—*food*—can help us to see each of these phases of history more clearly.
3. This story begins at the dawn of human history, with what is sometimes called the “Agricultural Revolution” **c.3000 BC** in places like ancient Egypt. Simply put, this revolution means that human beings stopped hunting and gathering food, and instead developed ways of *producing it*, i.e. agriculture.
4. From that point onward for nearly *five thousand years*, there was almost no fundamental progress in food production!
5. Even in the proto-industrial period, there was little advancement. (One reason is that the steam engine was too heavy to use in agriculture.)
6. Finally when mechanical contraptions like the McCormick Reaper—as I think of it, the *Spinning Jenny of agriculture*—were paired with tractors powered by internal combustion engines, it became possible to at least mechanically harvest more food. The problem, however, was that the technology had not yet been invented to actually get the land to yield more crops in the first place.
7. The *industrial* story of food production really only begins when in **1910** a German scientist named Fritz Haber invented the “Haber Process” to create ammonia fertilizer for plants. The permitted previously unknown quantities of crops to be grown.
8. With mechanization of farms (using tractors and harvesters) and with the use of fertilizers, fewer and fewer people were needed to work on farms, and they moved to city.
9. This led to the challenge of how to transport all the food produced from the farm to the people in the cities without it spoiling. The Frigidaire Company was among the modern industrial companies that created the electrical “refrigerator.” First train cars were refrigerated, then the coolers and freezers in stores, and then finally, in **1916**, the average American family could purchase a home refrigerator to help delay the spoiling of food.
10. Industrial abundance also led to changes in how people shop for food. Traditional markets usually had the food behind the counter. Only staff were allowed to handle it. Along with the increase in the quantity and variety of foods available came the rise of the modern “supermarket,” such as the Piggly Wiggly, which first opened in **1916**.
11. Then came the final integrated set of advances that have generated advanced industrial super-abundance today. Because of the complexity of this set of advances, it is difficult to assign a date to it, but the “Green Revolution,” as it was called, occurred generally between **1945** and **1970**.
12. It involves the combination of the application of irrigation (water distribution) and fertilization (plant food) techniques previously available in combination with herbicides (chemicals to kill weeds) and pesticides (chemicals to kill bugs) and finally hybridization initiatives to make plants more hardy (for different climates) and more productive of seeds and fruits and basically whatever parts are actually edible for humans.
13. The main architect of this **Green Revolution (1945-70)** was an agricultural scientist named Norman Borlaug. Because of his work, countries like Mexico and India, where previously famines were normal, became self-sustaining, and in the case of Mexico



Ancient Egypt, **c.3000 BC**, was one of the first cultures to develop agriculture and thus emerge as an organized civilization.

- became an *exporter* of food. The significance of this advanced did not go unnoticed, and Borlaug was honored with a Nobel peace prize in 1970.
14. What does it all mean for us? It means there is no good reason for anyone to starve ever again. Indeed, deaths due to famine in the world have almost plummeted almost to zero (see chart below).
 15. On the other hand, superabundance is not an unalloyed good. It comes with costs and challenges. For instance, we now have too much junk food and processed food, and it's harder for people to make good nutritional choices today. A number of food-related diseases like diabetes affect modern populations much more today than any other time.
 16. As a result of the challenges involved in having so many chemicals in our food chain, many people now choose "organic" food, which started to become a prominent social phenomenon in **1994**.
 17. On the other hand, scientists continue to try to use science to improve food, and now create more and various kinds of "genetically modified organisms" or "GMOs" since **1990**.
 18. Controversies seem to abound about modern industrialized food. Perhaps only the world's greatest experts on any particular topic can say with regard to any particular question. Regardless, thanks to the creation of modern, advanced industrial food, *we have the luxury of arguing about it!*



The spraying of crops with pesticides and herbicides is part of the "Green Revolution" that makes modern *super-abundance* possible.



FIGURE 3.1 GLOBAL DEATH TOLL FROM GREAT FAMINES, 1870s–2010s



Note: Each great famine killed more than 100,000 people.
Source: World Peace Foundation (2015).

Because of scientists like Norman Borlaug, famines are essentially a thing of the past in our world.