

E. The Story of Advanced Industrial *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,” and the rapidly progressing periods of “industrial,” and “advanced industrial” history.
2. We are able to divide up technological history in this way thanks to the *cardinal* anchor facts of technological progress.
3. That said, there is *so much more to the story!* Industrial progress means progress in terms of the provision of basic necessities like water and shelter; it means progress in medicine; it means progress in communication technology; it means progress in terms of entertainment and recreation; and it means progress in terms of the production of *food*.
4. The theme of advanced industrial food is closely linked to the other themes of technology. Indeed, our advanced age of food begins around **1945**, like so many other types of progress, once World War II was over. Although it is difficult to assign a date to it, the “Green Revolution” is often said to have started at that point.
5. This advance is complex. It involves 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) to create an unprecedented expansion of food production.
6. 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 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.
7. Behind this amazing transformation of food is a long story of starvation and famine that was one of the main reasons why the human population in the world did not rise much and life expectancy in pre-industrial times was about 25 years.
8. After learning to grow crops in the “Agricultural Revolution” that precedes the dawn of history, human beings were basically stuck at that level for thousands of years.
9. Globalization brought about changes in the types of food available to people around the world, including, via the “Columbian Exchange,” the transfer of corn, potatoes, and tomatoes, among other things from America to Europe, and the transfer of crops like wheat, and animal breeds of cattle and horses to the Americas.
10. The first *proto*-industrial advance to impact the amount of food available to people was the honing of a system called “crop rotation,” whereby fields that produce food are sometimes used to grow other things, which are then plowed under to serve as “food for food.”
11. The *industrial* story is when the most dramatic progress happens, however. 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.
12. With mechanization of farms (using tractors and harvesters) and with the user of fertilizers, fewer and fewer people were needed to work on farms, and they moved to city.



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

13. This led to the challenge of how to transport all the food produced from the farm to them in the cities. The Frigidaire Company was among the modern industrial companies that created the electrical “refrigerator.” First train cars were refrigerated, then the coolers in stores, and then finally, in 1916, the average American family could purchase a home refrigerator to help delay the spoiling of food.
14. Industrial superabundance 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. With the huge 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.
15. 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 to zero.
16. On the other hand, superabundance is not an unalloyed good. It comes with a cost. We *do* have too much junk food and processed food, and it’s harder for people to make nutritional choices today. There are a number of food-related diseases like diabetes that seem to affect us more today than any other time.
17. As a result of the challenges involved in having so many chemicals in our food chain, many people now choose “organic” food.
18. 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”.
19. 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!*



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.