

## TECHNOLOGY AND SOCIETY

### A. Material Inventions and Their Impact on Human Life

1. Human beings have material and non-material needs. To stay alive, we need: food, water, clothing, shelter, and medicine. We also need things that are non-material, such as love and friendship.
2. When we study technology (which means *material inventions*) as part of history, we want to know how it affects *society*—which in this context means organized human life.
3. Some technologies don't produce food or clothing or other values, but they help us to do it. Communication and transportation technology are like this. (As a simple example, imagine a 911 call, and the ambulance that comes because of it, which combination of communication and transportation are often necessary in order to bring a person in need to the medicine, i.e. medical *technology*, that can save them.)
4. One thing that most of our technologies have in common is the need for some kind of *power*. That by itself is a part of the story that deserves special attention. The modern Internet and all the devices that tap into it obviously need electricity. The vast majority of vehicles need some kind of fossil fuel to propel them.
5. As we will see, the spread of technology in modern history has at least *doubled*, if not *tripled*, the average human life span, i.e. how long we live, and also greatly improved the *quality* of life.
6. That said, technological advancement comes at a cost, and with various challenges, from things like negative lifestyle changes (sitting too much, and not getting enough exercise) to overeating (because of the superabundance of food, especially processed food) to wider—even global—impacts, such as of pollution.
7. Not surprisingly, even though technology has been widely embraced because of its life-serving power, people have also responded to the costs and challenges of technological adoption in various ways, including by the outright rejection of technology in various regards. (Some people reject vaccines because they view them as unsafe; others ride bicycles to work instead of driving; parents place “screen time” limits on their kids; most people recycle various products; and people generally strive to be “environmentally conscious,” even to the point of advocating de- or anti- industrialization.)
8. The obvious, positive impact of technology on human life, and the social responses to both the positives and negatives will be focus of this segment of the course.

### B. Organizing the Story

1. Since the story of technology involves so many different kinds of technology, we will need to use a new kind of timeline.
2. The timeline we will use, available on the next page, will divide the story into four periods, or chapters: *pre-industrial*, *proto-industrial*, *industrial*, and *advanced industrial*.
3. This way of organizing history will help us to group together the major inventions and to see how they affect organized human life. You can use it as a handout for writing the information yourself, as you see it in class, or you can wait for versions of diagram to be provided as handouts on the class web page as we go.

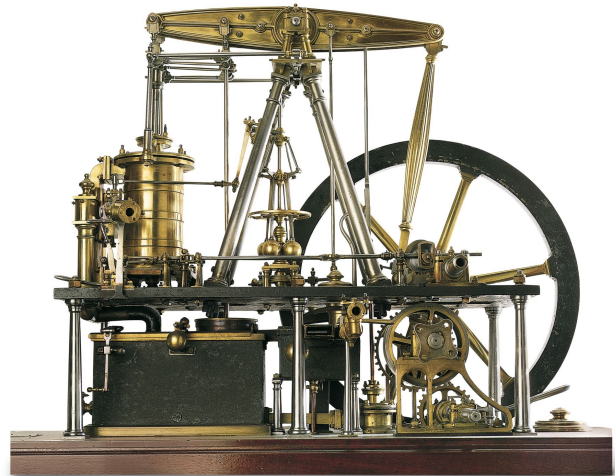
<i>pre-industrial</i>	1769	<i>proto-industrial</i>	1869	<i>industrial</i>	1969	<i>advanced ind.</i>
Food & Water						
Clothing						
Shelter						
Medicine						
Power						
Transportation						
Communication						
Life Expectancy						
Social Movements						

## C. Pre-Industrial Life (- c.1769)

7. Pre-industrial life is the stage of civilization before **c.1769**. It is a long chapter when human beings did not possess any of the advanced technology we have today. Life was much simpler and moved at a slower pace.
8. The main problem people had was how to obtain enough food. The so-called “Agricultural Revolution” occurred some time before **3000 BC**, leading early civilizations to become fixed in place and focused on producing crops and domesticating certain types of animals.
9. This gave people just enough spare time to spend on such things like the invention of writing, and thus the recording of history.
10. Amazingly, little beyond the creation of agriculture was accomplished to further material life for the next 5000 years. The pre-industrial era is an era of stagnation on the plateau of *subsistence* (survival, but not progress).
11. Human beings worldwide until industrial times live only about 25 years. (This is, of course, an average. Some lucky and hardy individuals lived perhaps as long as we do today. Some people died very young from famine, malnutrition, disease, and war.)

## D. The Watt Steam Engine (c.1769)

1. By far the most important technological advance in history was the Steam Engine of James Watt, invented **c.1769**.
  - a) A steam engine uses the sciences of physics, which studies physical things and energy.
  - b) As anyone can observe, when you boil a pot of water with a lid on it, the steam forces the lid to jump as it escapes.
  - c) Physics explains how water vapor creates this pressure.
  - d) If one can create a vessel where water is heated to produce vapor and the pressure created by that vapor is captured as a mechanical force, one can produce an *engine*.
  - e) It was by examining a prior engine, made by another engineer named Thomas Newcomen, that inventor James Watt was able to create his breakthrough design, the *Watt* Steam Engine **c.1769**.
  - f) Because the process of invention is usually long and arduous, it is often difficult to assign a precise date to an invention. Does one choose the first moment when an inventor had the basic idea? Does one choose the time when his first prototype is created? Or is it the first production model? Or the year when (and if) he is able to obtain a patent (official recognition)? It is sometimes impossible to assign a single year, let alone a date, to an invention. For that reason, we will say the invention of the Watt Steam Engine as occurred **c. (“circa”) 1769**.



An early working model of the Watt Steam Engine. Large stationary engines like this were used in mining to raise large amounts of ore, run escalators for workers, pump water, and later to move very large vehicles.