

ADAM SMITH'S INVISIBLE HAND IS AT OUR THROATS

John Scales Avery

December 13, 2020

Introduction¹

The invisible hand

As everyone knows, Adam Smith invented the theory that individual self-interest is, and ought to be, the main motivating force of human economic activity, and that this, in effect, serves the wider social interest. He put forward a detailed description of this concept in an immense book, “The Wealth of Nations” (1776).

Adam Smith (1723-1790) had been Professor of Logic at the University of Glasgow, but in 1764 he withdrew from his position at the university to become the tutor of the young Duke of Buccleuch. In those days a Grand Tour of Europe was considered to be an important part of the education of a young nobleman, and Smith accompanied Buccleuch to the Continent. To while away the occasional dull intervals of the tour, Adam Smith began to write an enormous book on economics which he finally completed twelve years later. He began his “Inquiry into the Nature and Causes of the Wealth of Nations” by praising division of labor. As an example of its benefits, he cited a pin factory, where ten men, each a specialist in his own set of operations, could produce 48,000 pins in a day. In the most complex civilizations, Smith stated, division of labor has the greatest utility.

The second factor in prosperity, Adam Smith maintained, is a competitive market, free from monopolies and entirely free from governmental interference. In such a system, he tells us, the natural forces of competition are able to organize even the most complex economic operations, and are able also to maximize productivity. He expressed this idea in the following words:

“As every individual, therefore, endeavors as much as he can, both to employ his capital in support of domestic industry, and so to direct that industry that its produce may be of greatest value, each individual necessarily labours to render the annual revenue of the Society as great as he can.”

“He generally, indeed, neither intends to promote the public interest, nor knows how much he is promoting it. By preferring the support of domestic to that of foreign industry, he intends only his own security; and by directing that industry in such a manner as its produce may be of greatest value, he intends only his own gain; and he is in this, as in many other cases, led by an

¹This book draws heavily on chapters that I have previously published in various books, but a considerable amount of new material has also been added.

invisible hand to promote an end that was no part of his intention. Nor is it always the worse for Society that it was no part of it. By pursuing his own interest, he frequently promotes that of Society more effectively than when he really intends to promote it.”

In other words, Smith maintained that self-interest (even greed) is a sufficient guide to human economic actions. The passage of time has shown that he was right in many respects. The free market, which he advocated, has turned out to be the optimum prescription for economic growth. However, history has also shown that there is something horribly wrong or incomplete about the idea that individual self-interest alone, uninfluenced by ethical and ecological considerations, and totally free from governmental intervention, can be the main motivating force of a happy and just society. There has also proved to be something terribly wrong with the concept of unlimited economic growth. Here is what actually happened:

In pre-industrial Europe, peasant farmers held a low but nevertheless secure position, protected by a web of traditional rights and duties. Their low dirt-floored and thatched cottages were humble but safe refuges. If a peasant owned a cow, it could be pastured on common land.

With the invention of the steam engine and the introduction of spinning and weaving machines towards the end of the 18th Century, the pattern changed, at first in England, and afterwards in other European countries. Land-owners in Scotland and Northern England realized that sheep were more profitable to have on the land than “crofters” (i.e., small tenant farmers), and families that had farmed land for generations were violently driven from their homes with almost no warning. The cottages were afterwards burned to prevent the return of their owners.

The following account of the Highland Clearances has been left by Donald McLeod, a crofter in the district of Sutherland: “The consternation and confusion were extreme. Little or no time was given for the removal of persons or property; the people striving to remove the sick or helpless before the fire should reach them; next struggling to save the most valuable of their effects. The cries of the women and children; the roaring of the affrighted cattle, hunted at the same time by the yelling dogs of the shepherds amid the smoke and fire, altogether presented a scene that completely baffles description - it required to be seen to be believed... The conflagration lasted for six days, until the whole of the dwellings were reduced to ashes and smoking ruins.”

Between 1750 and 1860, the English Parliament passed a large number of “Enclosure Acts”, abolishing the rights of small farmers to pasture their

animals on common land that was not under cultivation. The fabric of traditional rights and duties that once had protected the lives of small tenant farmers was torn to pieces. Driven from the land, poor families flocked to the towns and cities, hoping for employment in the textile mills that seemed to be springing up everywhere. According to the new rules by which industrial society began to be governed, traditions were forgotten and replaced by purely economic laws.

Labor was viewed as a commodity, like coal or grain, and wages were paid according to the laws of supply and demand, without regard for the needs of the workers. Wages fell to starvation levels, hours of work increased, and working conditions deteriorated.

John Fielden's book, "The Curse of the Factory System" was written in 1836, and it describes the condition of young children working in the cotton mills. "The small nimble fingers of children being by far the most in request, the custom instantly sprang up of procuring 'apprentices' from the different parish workhouses of London, Birmingham and elsewhere... Overseers were appointed to see to the works, whose interest it was to work the children to the utmost, because their pay was in proportion to the quantity of pay that they could exact."

"Cruelty was, of course, the consequence; and there is abundant evidence on record to show that in many of the manufacturing districts, the most heart-rending cruelties were practiced on the unoffending and friendless creatures... that they were flogged, fettered and tortured in the most exquisite refinements of cruelty, that they were in many cases starved to the bone while flogged to their work, and that they were even in some instances driven to commit suicide... The profits of manufacture were enormous, but this only whetted the appetite that it should have satisfied."

Dr. Peter Gaskell, writing in 1833, described the condition of the English mill workers as follows: "The vast deterioration in personal form which has been brought about in the manufacturing population during the last thirty years... is singularly impressive, and fills the mind with contemplations of a very painful character... Their complexion is sallow and pallid, with a peculiar flatness of feature caused by the want of a proper quantity of adipose substance to cushion out the cheeks. Their stature is low - the average height of men being five feet, six inches... Great numbers of the girls and women walk lamely or awkwardly... Many of the men have but little beard, and that in patches of a few hairs... (They have) a spiritless and dejected air, a sprawling and wide action of the legs..."

“Rising at or before daybreak, between four and five o’clock the year round, they swallow a hasty meal or hurry to the mill without taking any food whatever... At twelve o’clock the engine stops, and an hour is given for dinner... Again they are closely immured from one o’clock till eight or nine, with the exception of twenty minutes, this being allowed for tea. During the whole of this long period, they are actively and unremittingly engaged in a crowded room at an elevated temperature.”

Dr. Gaskell described the housing of the workers as follows: “One of the circumstances in which they are especially defective is that of drainage and water-closets. Whole ranges of these houses are either totally undrained, or very partially... The whole of the washings and filth from these consequently are thrown into the front or back street, which, often being unpaved and cut into deep ruts, allows them to collect into stinking and stagnant pools; while fifty, or even more than that number, having only a single convenience common to them all, it is in a very short time choked with excrementous matter. No alternative is left to the inhabitants but adding this to the already defiled street.”

“It frequently happens that one tenement is held by several families... The demoralizing effects of this utter absence of domestic privacy must be seen before they can be thoroughly appreciated. By laying bare all the wants and actions of the sexes, it strips them of outward regard for decency - modesty is annihilated - the father and the mother, the brother and the sister, the male and female lodger, do not scruple to commit acts in front of each other which even the savage keeps hid from his fellows.”

The landowners of Scotland were unquestionably following self-interest as they burned the cottages of their crofters; and self-interest motivated overseers as they whipped half-starved child workers in England’s mills. Adam Smith’s “invisible hand” no doubt guided their actions in such a way as to maximize production. But whether a happy and just society was created in this way is questionable. Certainly it was a society with large areas of unhappiness and injustice. Self-interest alone was not enough. A society following purely economic laws - a society where selfishness is exalted as the main-spring for action - lacks both the ethical and ecological dimensions needed for social justice, widespread happiness, and sustainability

Our greed-based economic system today

Today our greed-based, war addicted, and growth-obsessed economic system poses even greater threats than it did during the early phases of the Industrial Revolution. Today it threatens to destroy human civilization and much of the biosphere.

According to a recently-published study by Oxfam, just 1 percent of the world's population controls nearly half of the planet's wealth. The study says that this tiny slice of humanity controls 110 trillion US dollars, or 65 times the total wealth of the poorest 3.5 billion people. The world's 85 richest people own as much as the poorest 50 percent of humanity. 70 percent of the world's people live in a country where income inequality has increased in the past three decades.

This shocking disparity in wealth has led to the decay of democracy in many countries, because the very rich have used their money to control governments, and also to control the mass media and hence to control public opinion. The actions of many governments today tend not to reflect what is good for the people (or more crucially, what is good for the future of our planet), but rather what is good for special interest groups, for example, the fossil fuel industry and the military-industrial complex.

An excellent description of the military-industrial complex was given by US President Dwight D. Eisenhower. When he retired, he made a memorable farewell address, containing the following words: "...We have been compelled to create an armaments industry of vast proportions. Added to this, three and a half million men are directly engaged in the defense establishment....In the councils of government, we must guard against the acquisition of unwarranted influence, whether sought or unsought, by the military-industrial complex. The potential for the disastrous rise of misplaced power exists and will persist. "

In another speech, Eisenhower said: "Every gun that is made, every warship launched, every rocket fired, signifies in a final sense, a theft from those who hunger and are not fed, those who are cold and are not clothed. The world in arms is not spending money alone. It is spending the sweat of its laborers, the genius of its scientists, and the hopes of its children."

Today the world spends roughly 1,700,000,000,000 US dollars on armaments, almost 2 trillion. This vast river of money, almost too great to be imagined, flows into the pockets of arms manufacturers, and is used by them to control governments, which in turn vote for bloated military budgets

and aggressive foreign policies which provoke the endless crises and conflicts that are necessary to justify the diversion of such vast sums of money from urgently-needed social goals into the bottomless pit of war.

The reelection of the slave-like politicians is ensured by the huge sums made available for their campaigns by the military-industrial complex. This pernicious circular flow of money, driving endless crises, has sometimes been called “The Devil’s Dynamo”. Thus the world is continually driven to the brink of thermonuclear war by highly dangerous interventions such as the recent ones in North Africa, the Middle East, Ukraine, South and Central America, and the Korean Peninsula.

It is doubtful that any of the political or military figures involved with this arrogant risking of human lives and the human future have any imaginative idea of what a thermonuclear war would be like. In fact it would be an ecological catastrophe of huge proportions, making large areas of the world permanently uninhabitable through long-lived radioactive contamination. The damage to global agriculture would be so great as to produce famine leading to a billion or more deaths from starvation. All the nations of the earth would suffer, neutrals as well as belligerents.

Besides supporting the appalling war machine, our bought-and-paid-for politicians also fail to take the actions that would be needed to prevent the worst effects of climate change. The owners of the fossil fuel industries have even mounted advertising campaigns to convince the public that the threat of anthropogenic climate change is not real. Sadly, the threat of catastrophic climate change is all too real, as 99 percent the worlds climate scientists have warned. The world has recently passed a dangerous landmark in atmospheric CO₂ concentration, 400 ppm. The last time that the earth experienced such high concentrations of this greenhouse gas were several million years ago. At that time the Arctic was free from ice, and sea levels were 40 meters higher than they are today.

Global warming is a slow and long-term effect, so such high sea levels will be slow in arriving, but ultimately we must expect that coastal cities and much of the world’s low-lying land will be under water. We must also expect many tropical regions of the world to become uninhabitable because of high temperatures. Finally there is a threat of famine because agriculture will be hit by high temperatures and aridity.

There are several very dangerous feedback loops that may cause the earth’s temperatures to rise much faster than has been predicted by the International Panel on Climate Change. By far the most dangerous of these comes

from the melting of methane hydrate crystals that are currently trapped in frozen tundra and on the floor of seabeds.

At high pressures, methane combines with water to form crystals called hydrates or clathrates. These crystals are stable at the temperatures currently existing on ocean floors, but whenever the water temperature rises sufficiently, the crystals become unstable and methane gas bubbles to the surface. This effect has already been observed in the Arctic seas north of Russia.

The total amount of methane clathrates on ocean floors is not precisely known, but it is estimated to be very large indeed, corresponding to between 3,000 and 11,000 gigatons of carbon. The release of even a small fraction of this amount of methane into our atmosphere would greatly accelerate rising temperatures, leading to the release of still more methane, in a highly dangerous feedback loop. We must at all costs avoid global temperatures which will cause this feedback loop to trigger in earnest.

Human motivations were not always so selfish

For the reasons mentioned above, we can see that an economic system where selfishness and greed are exalted as the mainspring for human actions lacks both a social conscience and an ecological conscience. Both these dimensions are needed for the long-term survival of human civilization and the biosphere.

We must remember, however, that the worship of the free market and the exaltation of selfishness are relatively recent developments in human history. During most of their million-year history, humans lived in small groups, not in great cities or nations, and sharing was part of their lifestyle. Perhaps that lifestyle is the one to which we should return if we wish the human future to stretch out for another million years.

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Chapter 1

ECONOMICS WITHOUT ETHICS

“Like him who perverts the revenues of some pious foundation to profane purposes, he pays the wages of idleness with those funds which the frugality of his forefathers had, as it were, consecrated to the maintenance of industry.”

Adam Smith (describing an industrialist who fails to reinvest his profits)

“That population cannot increase without the means of subsistence is a proposition so evident that it needs no illustration. That population does invariably increase, where there are means of subsistence, the history of every people who have ever existed will abundantly prove. And that the superior power cannot be checked without producing misery and vice, the ample portion of these two bitter ingredients in the cup of human life, and the continuation of the physical causes that seem to have produced them, bear all too convincing a testimony”

Thomas Robert Malthus

1.1 Introduction

The history of the epoch that immediately preceded the modern era can cast much light on the challenges facing us today, so we will begin by reviewing it. Until the start of the Industrial Revolution in the 18th and 19th centuries, human society maintained a more or less sustainable relationship with nature. However, with the beginning of the industrial era, traditional ways of life, containing both ethical and environmental elements, were replaced by the money-centered, growth-oriented life of today, from which these vital elements are missing.

1.2 Economics without ethics

According to the great classical economist Adam Smith (1723-1790), self-interest (even greed) is a sufficient guide to human economic actions. The passage of time has shown that Smith was right in many respects. The free market, which he advocated, has turned out to be the optimum prescription for economic growth. However, history has also shown that there is something horribly wrong or incomplete about the idea that individual self-interest alone, uninfluenced by ethical and ecological considerations, and totally free from governmental intervention, can be the main motivating force of a happy and just society. There has also proved to be something terribly wrong with the concept of unlimited economic growth. Here is what actually happened:

1.3 Industrialism in 18th and 19th centuries

Highland Clearances and Enclosure Acts

In pre-industrial Europe, peasant farmers held a low but nevertheless secure position, protected by a web of traditional rights and duties. Their low dirt-floored and thatched cottages were humble but safe refuges. If a peasant owned a cow, it could be pastured on common land.

With the invention of the steam engine and the introduction of spinning and weaving machines towards the end of the 18th Century, the pattern changed, at first in England, and afterwards in other European countries. Land-owners in Scotland and Northern England realized that sheep were more profitable to have on the land than “crofters” (i.e., small tenant farmers), and families that had farmed land for generations were violently driven from their homes with almost no warning. The cottages were afterwards burned to prevent the return of their owners.

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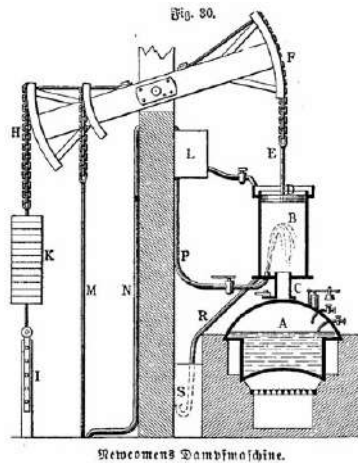


Figure 1.1: **Newcomen's steam engine** , (from Hmlopedia)

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Working conditions in 19th century England

According to the new rules by which industrial society began to be governed, traditions were forgotten and replaced by purely economic laws. Labor was viewed as a commodity, like coal or grain, and wages were paid according to the laws of supply and demand, without regard for the needs of the workers. Wages fell to starvation levels, hours of work increased, and working conditions deteriorated.

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"Cruelty was, of course, the consequence; and there is abundant evidence on record to show that in many of the manufacturing districts, the most heart-rending cruelties were



Figure 1.2: A watercolor painting by Vincent van Gogh showing wives of Belgian miners carrying bags of coal. (Public domain)



Figure 1.3: London during the industrial revolution (Public domain)

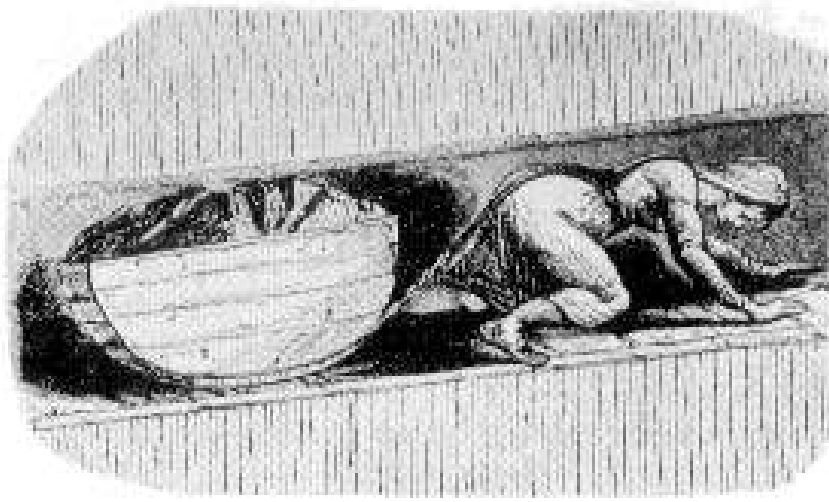


Figure 1.4: **A girl pulling a coaltub through the narrow space left by removal of coal from a seam.** (Public domain)

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1.4 Adam Smith

The invisible hand

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The second factor in prosperity, Adam Smith maintained, is a competitive market, free from monopolies and entirely free from governmental interference. In such a system, he tells us, the natural forces of competition are able to organize even the most complex economic operations, and are able also to maximize productivity. He expressed this idea in the following words:

“As every individual, therefore, endeavors as much as he can, both to employ his capital in support of domestic industry, and so to direct that industry that its produce may be of greatest value, each individual necessarily labours to render the annual revenue of the Society as great as he can.”

“He generally, indeed, neither intends to promote the public interest, nor knows how much he is promoting it. By preferring the support of domestic to that of foreign industry, he intends only his own security; and by directing that industry in such a manner as its produce may be of greatest value, he intends only his own gain; and he is in this, as in many other cases, led by an invisible hand to promote an end that was no part of his intention. Nor is it always the worse for Society that it was no part of it. By pursuing his own interest, he frequently promotes that of Society more effectively than when he really intends to promote it.”

For example, a baker does not bake bread out of an unselfish desire to help his fellow humans; he does so in order to earn money; but if he were not performing a useful service, he would not be paid. Thus the “invisible hand” guides him to do something useful. Free competition also regulates prices: If the baker charges too much, he will be undersold. Finally, if there are too many bakers, the trade will become so unprofitable that some bakers will be forced into other trades. Thus highly complex operations are automatically regulated by the mechanisms of the free market. “Observe the accommodation of the most common artificer or day labourer in a civilized and thriving country”, Smith continues, “and



Figure 1.5: **Adam Smith (1723-1790)** (Public domain)

you will perceive that the number of people of whose industry a part, though but a small part, has been employed in securing him this accommodation, exceeds all computation. The woolen coat, which covers the day-labourer, as coarse and rough as it may seem, is the joint labour of a great multitude of workmen. The shepherd, the sorter of wool, the wool-comber, the carder, the dyer, the scribbler, the spinner, the weaver, the fuller, the dresser, with many others, must all join their different arts to complete even the most homely production. How many merchants and carriers, besides, must have been employed... how much commerce and navigation... how many ship-builders, sailors, sail-makers, rope-makers...”

Reinvestment and growth

An important feature of Adam Smith's economic model is that it is by no means static. The virtuous manufacturer does not purchase pearl necklaces for his wife; he reinvests his profits, buying more machinery or building new factories. An industrialist who ignores the commandment to reinvest is “...like him who perverts the revenues of some pious foundation

to profane purposes; he pays the wages of idleness with those funds which the fragility of his forefathers had, as it were, consecrated to the maintenance of industry.”

The expansion of the system will not be slowed, Smith maintained, by shortages of labor, because “...the demand for men, like that for any other commodity, necessarily regulates the production of men.” Smith did not mean that more births would occur if the demand for workers became greater. He meant that if wages began to rise above the lowest level needed to maintain life, more children of the workers would survive. In those days, the rates of infant and child mortality were horrendous, particularly among the half-starved poor. “It is not uncommon”, Smith wrote, “in the Highlands of Scotland, for a mother who has borne twenty children not to have two alive.”

Adam Smith’s ideas were enthusiastically adopted by the rising class of manufacturers and by their representatives in government. The reverence shown to him can be illustrated by an event that occurred when he visited England’s Prime Minister, William Pitt, and his Cabinet. The whole gathering stood up when Smith entered. “Pray be seated, gentlemen”, Smith said. “Not until you first are seated Sir”, Pitt replied, “for we are all your scholars.”

History has shown that Adam Smith was right in many respects. The free market is indeed a dynamo that produces economic growth, and it is capable of organizing even the most complex economic endeavors. Through Adam Smith’s “invisible hand”, self interest is capable of guiding the economy so that it will maximize the production of wealth. However, history has also shown the shortcomings of a market that is totally free of governmental regulation.

The landowners of Scotland were unquestionably following self-interest as they burned the cottages of their crofters; and self-interest motivated overseers as they whipped half-starved child workers in England’s mills. Adam Smith’s “invisible hand” no doubt guided their actions in such a way as to maximize production. But whether a happy and just society was created in this way is questionable. Certainly it was a society with large areas of unhappiness and injustice. Self-interest alone was not enough. A society following purely economic laws - a society where selfishness is exalted as the mainspring for action - lacks both the ethical and ecological dimensions needed for social justice, widespread happiness, and sustainability¹.

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¹In fact, Adam Smith himself would have accepted this criticism of his enthronement of self-interest as the central principle of society. He believed that his “invisible hand” would not work for the betterment of society except within the context of a certain amount of governmental regulation. His modern Neoliberal admirers, however, forget this aspect of Smith’s philosophy, and maintain that market forces alone can achieve a desirable result.

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Chapter 2

MALTHUS AND HIS CONTEMPORARIES

2.1 Godwin's *Political Justice*

In 1793 the English novelist and philosopher William Godwin published an enormously optimistic book, *Political Justice*. As the eighteenth century neared its end, this book became the focus of hopes for political reform and the center of the debate on human progress. Godwin was lifted briefly to enormous heights of fame and adulation, from which he plunged, a few years later, into relative obscurity.

In *Political Justice*, Godwin predicted a future society where scientific progress would liberate humans from material want. Godwin predicted that in the future, with the institution of war abolished, with a more equal distribution of property, and with the help of scientific improvements in agriculture and industry, much less labour would be needed to support life. Luxuries are at present used to maintain artificial distinctions between the classes of society, Godwin wrote, but in the future values will change; humans will live more simply, and their efforts will be devoted to self-fulfillment and to intellectual and moral improvement, rather than to material possessions. With the help of automated agriculture, the citizens of a future society will need only a few hours a day to earn their bread.

Godwin went on to say, “The spirit of oppression, the spirit of servility and the spirit of fraud - these are the immediate growth of the established administration of property. They are alike hostile to intellectual improvement. The other vices of envy, malice, and revenge are their inseparable companions. In a state of society where men lived in the midst of plenty, and where all shared alike the bounties of nature, these sentiments would inevitably expire. The narrow principle of selfishness would vanish. No man being obliged to guard his little store, or provide with anxiety and pain for his restless wants, each would lose his own individual existence in the thought of the general good. No man would be the enemy of his neighbor, for they would have nothing to contend; and of consequence philanthropy would resume the empire which reason assigns her. Mind would be delivered

from her perpetual anxiety about corporal support, and free to expatiate in the field of thought which is congenial to her. Each man would assist the inquiries of all."

Godwin insisted that there is an indissoluble link between politics, ethics and knowledge. *Political Justice* is an enthusiastic vision of what humans could be like at some future period when the trend towards moral and intellectual improvement has lifted men and women above their present state of ignorance and vice. Much of the savage structure of the penal system would then be unnecessary, Godwin believed. (At the time when he was writing, there were more than a hundred capital offenses in England, and this number had soon increased to almost two hundred. The theft of any object of greater value than ten shillings was punishable by hanging.)

In its present state, Godwin wrote, society decrees that the majority of its citizens "should be kept in abject penury, rendered stupid with ignorance and disgustful with vice, perpetuated in nakedness and hunger, goaded to the commission of crimes, and made victims to the merciless laws which the rich have instituted to oppress them". But human behavior is produced by environment and education, Godwin pointed out. If the conditions of upbringing were improved, behavior would also improve. In fact, Godwin believed that men and women are subject to natural laws no less than the planets of Newton's solar system. "In the life of every human", Godwin wrote, "there is a chain of causes, generated in that eternity which preceded his birth, and going on in regular procession through the whole period of his existence, in consequence of which it was impossible for him to act in any instance otherwise than he has acted."

The chain of causality in human affairs implies that vice and crime should be regarded with the same attitude with which we regard disease. The causes of poverty, ignorance, vice and crime should be removed. Human failings should be cured rather than punished. With this in mind, Godwin wrote, "our disapprobation of vice will be of the same nature as our disapprobation of an infectious distemper."

With improved environment and education, humans will reach a higher moral level. But what is morality? Here Godwin draws heavily on his Christian background, especially on the moral principles of the Dissenting community. The Parable of the Good Samaritan illustrates the central principle of Christian ethics: We must love our neighbor as much as we love ourselves; but our neighbor is not necessarily a member of our immediate circle. He or she may be distant from us, in culture, in ethnic background or in geographical distance. Nevertheless, that person is still our neighbor, a member of the human family, and our duty to him or her is no less than our duty to those who are closest to us. It follows that narrow loyalties must be replaced or supplemented by loyalty to the interests of humanity as a whole.

Judging the benevolence of our actions is the responsibility of each individual conscience, Godwin says, not the responsibility of the State, and the individual must follow his or her conscience even if it conflicts with the dictates of the State. Each individual case should be judged by itself. If our institutions and laws meet the criteria of benevolence, justice and truth, we should give them our enthusiastic support; if not, we should struggle to change them. In giving personal judgement such a dominant role, Godwin anticipates the ideas of Thoreau, Tolstoy and Gandhi.

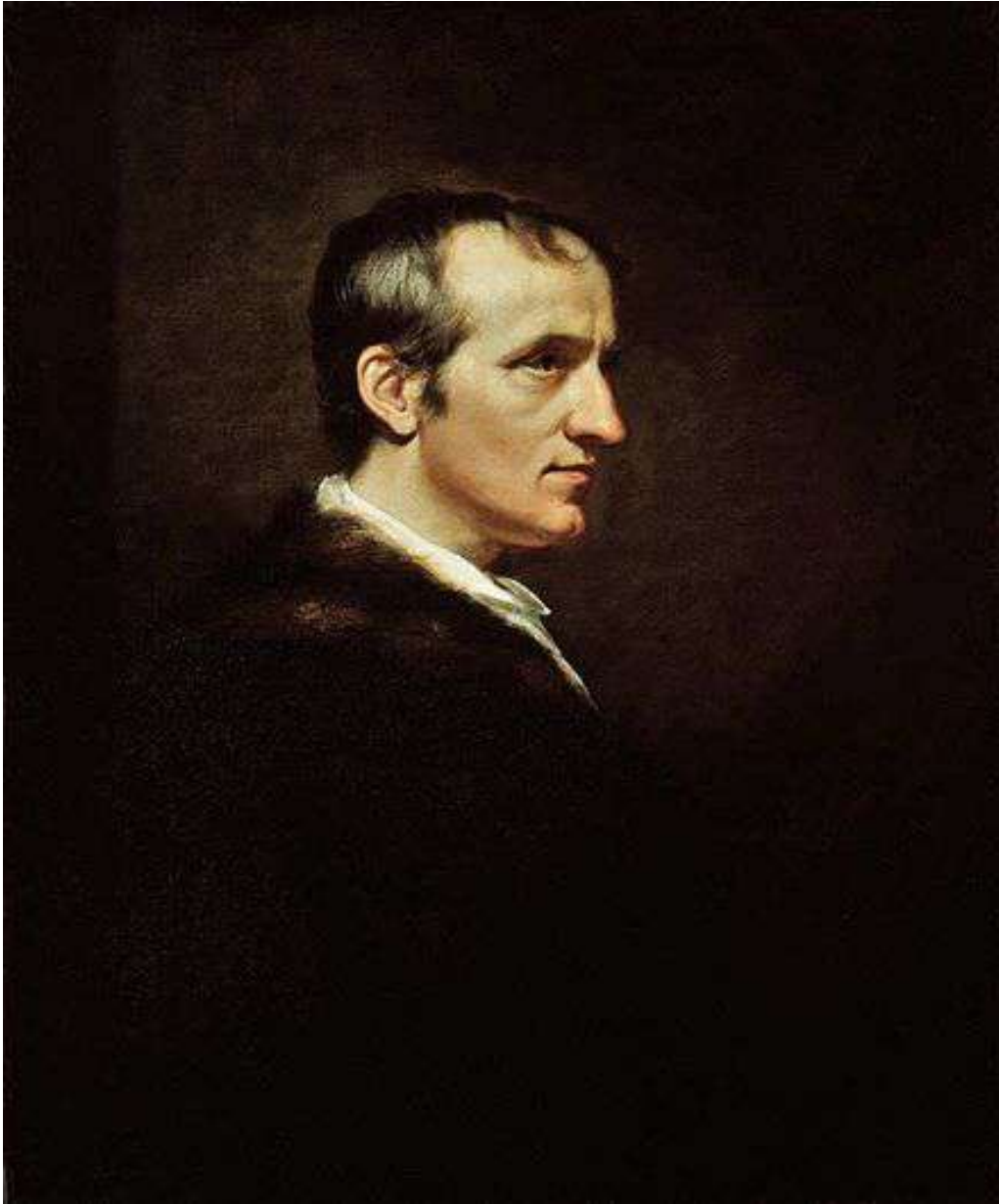


Figure 2.1: William Godwin in a painting by James Northcote (Wikipedia).

The exercise of individual judgement requires great honesty and objectivity. In order for the power of truth and reason to overcome prejudice and error, Godwin says, it is necessary for each person always to speak and act with complete sincerity. Even the degree of insincerity necessary for elegant manners is wrong in Godwin's opinion.

Starting with these ethical principles, Godwin proceeds with almost mathematical logic to deduce the consequences, intoxicated by his enthusiasm and not stopping even when the conclusions to which he is driven conflict with conventional wisdom and intuition. For example, he denies that humans have rights and maintains that they only have duties.

Regarding the right to dispose of private property as one chooses, Godwin says: "To whom does any article, suppose a loaf of bread, justly belong? I have an hundred loaves in my possession, and in the next street there is a poor man expiring with hunger, to whom one of these loaves would be a means of preserving his life. If I withhold this loaf from him, am I not unjust? If I impart it, am I not complying with what justice demands?"

In other words, according to Godwin, our duty to act for the benefit of humanity implies a sacrifice of our private rights as individuals. Private property is not really our own, to be used as we wish; it is held in trust, to be used where it will do the greatest amount of good for humanity as a whole.

Godwin also denies that several commonly admired virtues really are virtues. Keeping promises, he says, is not a virtue because at any given moment we have a duty to do the greatest possible good through our actions. If an act is good, we should do it because we believe it to be good, not because we have promised to do it; and a promise should not force us to perform an act which we believe to be bad. A virtuous person therefore does not make promises. Similarly, Godwin maintains that gratitude is a vice since it distorts our judgement of the benevolence of our actions. When he heard of Godwin's doctrine on gratitude, Edmund Burke remarked "I would save him from that vice by not doing him any service!"

Godwin saw the system of promises, loyalty, and gratitude as a means by which individual judgement can be suspended and tyranny maintained. People can be forced to act against their consciences because of promises which they have made or services which they have received. An example of this is the suspension of private ethical judgement which follows a soldier's induction into an army. We should perform an act, Godwin maintains, not because of fear of punishment or hope of reward or in return for favors that we have received, but rather because we believe the act to be of the highest benefit to humanity as a whole.

Many of our political institutions may be needed now, Godwin said, because of mankind's present faults; but in the future, when humanity has reached a higher level of perfection, they will be needed less and less. The system of nation states might then be replaced by a loose federation of small communities, within each of which problems could be resolved by face-to-face discussion. Regarding this future ideal system, Godwin writes: "It is earnestly to be desired that each man was wise enough to govern himself without the interference of any compulsory restraint; and since government in its best state is an evil, the object principally to be aimed at is, that we should have as little of it as the general peace of human society will permit."

Political Justice is a vision or prophesy of what human life might be like, not in the world as it is but in an ideal world of the future. As Godwin's disciple, Percy Bysshe Shelley, later expressed it in his verse-drama *Prometheus Unbound*,

*The loathsome mask has fallen, the man remains
Sceptreless, free, uncircumscribed, but man
Equal, unclassed, tribeless, and nationless,
Exempt from awe, worship, degree, the king
Over himself; just, gentle, wise...*

2.2 Enormous instant fame; The New Philosophy

The quarto edition of *Political Justice* was a best seller and the book was soon republished in a less expensive octavo edition which sold equally well. It was pirated in Ireland, Scotland, and America and hundreds of groups of workers who could not afford to buy the book individually bought joint copies, which then circulated among the subscribers or were read aloud to groups. The doctrines advocated in *Political Justice* were soon being called the "New Philosophy".

Godwin became famous overnight: "I was nowhere a stranger", he wrote later, "...I was everywhere received with curiosity and kindness. If temporary fame ever was an object worthy to be coveted by the human mind, I certainly obtained it in a degree that has seldom been exceeded."

Godwin's friend, the essayist William Hazlitt, described this sudden burst of fame in the following words: "... he blazed as a sun in the firmament of reputation; no-one was more talked of, more looked up to, more sought after, and wherever liberty, truth, justice was the theme, his name was not far off".

William Wordsworth read *Political Justice* in 1794 and was greatly influenced by it. Between February and August 1795, Wordsworth met Godwin seven times for long private discussions. Much of Wordsworth's writing from the Great Decade shows the mark of Godwin's ideas, as can be seen, for example in the following lines from *The Prelude*:

*How glorious! in self-knowledge and self-rule,
To look through all the frailties of the world,
And, with a resolute mastery shaking off
Infirmities of nature, time and place,
Build social upon personal Liberty,
Which, to the blind restraints of general laws
Superior, magisterially adopts
One guide, the light of circumstances, flashed
Upon an independent intellect*

2.3 *Things as they are*

On 26 May 1794, Godwin added to his already great reputation by publishing a powerful and original psychological novel, *Things as They Are*, later renamed *Caleb Williams*. Godwin's purpose in writing this novel was to illustrate some of the themes of *Political Justice* and to bring his ideas to readers who might not be directly interested in philosophy.

In *Caleb Williams*, Godwin makes several literary innovations which were to influence such writers as Edgar Allan Poe, Charles Dickens, Balzac, and Victor Hugo. *Caleb Williams* is, in fact, the ancestor of the modern thriller and detective story.

2.4 A few hangings needed to cast a chill over discussion

Godwin had written a Preface to *Caleb Williams* in which he said: "The question now afloat in the world respecting THINGS AS THEY ARE, is the most interesting which can be presented to the human mind. While one party pleads for reformation and change, the other extols in the warmest terms the existing constitution of society... It is now known to philosophers that the spirit and character of a government intrudes itself into every rank of society. But this is a truth highly worthy to be communicated to persons whom books of philosophy and science are never likely to reach. Accordingly it was proposed in the invention of the following work, to comprehend, as far as the progressive nature of a single story would allow, a general review of the modes of domestic and unrecorded tyranny." .

This Preface was never printed, because Godwin's publisher, Crosby, was afraid of prosecution. In fact, the publication of *Caleb Williams* coincided with a decision by Pitt's government that a few hangings were needed in order to cast a chill on public discussion of political reform. On the day of publication, orders went out for the arrest of Godwin's friends in the reform movement, Hardy, Thelwall, and Horne Tooke. Although the radical leaders were arrested in May, *habeas corpus* was suspended, and it was not until 2 October 1794 that a charge was brought against them. A few days later, on a trip to Warwickshire, Godwin heard that his closest friend, Thomas Holcroft, also had been arrested.

Godwin hurried back to London and locked himself in his home, studying the charges that had been brought by Lord Chief Justice Eyre against Holcroft and the others. The charge was high treason and the law under which Eyre brought this charge had been passed in the fourteenth century, during the reign of Edward III. It defined high treason as any act which could "compass or imagine the Death of a King". The penalty for this offense was to be hanged by the neck, to be cut down while still living, to be disembowelled, to have one's bowels burnt before one's eyes, and then to be beheaded and quartered. It was rumored that as soon as the 12 prisoners were convicted, 800 further arrest warrants were ready to go out and Godwin's own name might well have been among them.

Godwin soon saw that Eyre's argument involved an unprecedented broadening of the definition of high treason. Essentially Eyre was arguing that the actions of the accused might cause events in England to follow the same course as in France, where Louis XVI

had recently been executed. On 21 October Godwin published an anonymous article in the *Morning Chronicle* entitled *Cursory Strictures on the Charge Delivered by Lord Chief Justice Eyre*. It was a carefully written legal argument, completely different in style from anything that Godwin had written previously. In this article, he argued that in broadening the interpretation of high treason without precedent, Eyre was in effect creating a new law and judging the prisoners *ex post facto*. It was especially necessary for high treason to have a narrow definition, Godwin pointed out, since a broad definition could lead to the abridgement of all English civil liberties.

After the publication of *Cursory Strictures* it became clear to everyone that Eyre's charge lay outside the boundary of the law and that it would probably not be upheld. Nevertheless, the atmosphere in the courtroom was tense as the jury returned its verdicts. As soon as Holcroft was acquitted, he left the dock and went to sit beside Godwin. The artist, Sir Thomas Lawrence, made a sketch of the two friends sitting side-by-side and waiting for the verdict on the other prisoners, Godwin's bending and contemplative figure contrasting with Holcroft's upright and defiant stance. In the end, all charges were dropped.

2.5 William and Mary

Soon after these dramatic events, William Godwin met Mary Wollstonecraft for a second time. On 8 January 1796, Mary Hayes, a friend and admirer of Mary Wollstonecraft, invited her to tea together with William Godwin and Thomas Holcroft. The tea was a success, and Godwin found Mary Wollstonecraft very much changed from the carelessly dressed and irritating woman who had dominated the conversation at Johnson's dinner when he had wanted to hear Thomas Paine. Now, several years later, she had become much more attractive. Mary's beauty and her charming, intelligent conversation won Godwin's heart. He also greatly admired her recently published book, *Letters Written during a Short Residence in Sweden, Norway and Denmark*.

On 13 February, Godwin called on Mary Wollstonecraft, but she was not at home. On 14 April, she broke the social rules of the time and returned his call. During the next few months they often appeared together at literary and artistic dinners in London. They had many friends in common and both of them had many admirers of the opposite sex. Godwin was not a tall man and his nose was rather large. On the other hand, he had fine eyes and a high, impressive brow; his manners had become more gallant and fame is a powerful aphrodisiac. A number of attractive intellectual women fluttered around him. Mary's admirers included the poet Robert Southey, the distinguished artist John Opie, and Godwin's closest friend, Thomas Holcroft.

Gradually, during the spring and summer of 1796, the friendship between Mary Wollstonecraft and William Godwin deepened into love. Outwardly, nothing was changed. Both partners were hard at work, Godwin preparing a new edition of *Political Justice* and Mary writing a novel, *The Wrongs of Woman*. Like *Caleb Williams*, Mary's novel was designed to illustrate the themes of the New Philosophy. They kept their relationship a secret, continued to live separately, and continued to meet their friends as before, but they

had become lovers. For Godwin, this was the first real love affair of his life and he was at first very awkward, afraid of the strong emotions he was experiencing. Mary tenderly and good-humouredly guided him through his difficulties.

As winter approached, a crisis occurred: Johnson, Mary's publisher insisted that she should settle her debts and refused to give her more credit. At the same time, Mary realized that she was pregnant. She had experienced some of the harsh penalties with which English society of that time punished unwed mothers. Many of her former friends had dropped away. Her remaining friends called her Mrs Imlay, maintaining the fiction that she had been legally married; but with the new baby no such cover would be possible. Johnson offered a solution: He knew of a rich but somewhat elderly admirer who was willing to solve all of Mary's problems, both financial and social, by marrying her. Mary felt insulted and would not hear of this solution. In her books she had often denounced marriage for the sake of property as "legalized prostitution". Instead, she asked Godwin to marry her. He did this in spite of his own disapproval of the institution of marriage as practised at that time in Europe, an institution which he had called "the most odious of all monopolies".

Godwin and Mary were in fact extremely happy together. They were not at all alike: He relied on reason, while she placed more trust in her emotions. These differences meant that each revealed a new world for the other. For Godwin, Mary opened a world of strong feelings; and he acquired from her a taste for the writings of Rousseau, whom she called "the Prometheus of Sentiment". Godwin was never the same again. All his later novels and books of philosophy were to stress the importance of domestic affections and sensitivity to the force of emotion.

2.6 Mary's tragic death in childbirth

Mary's baby was due at the end of August 1797. She insisted that no doctor was needed, only a midwife. After a long labour, she gave birth to a baby girl at 11 p.m. and Godwin was overjoyed that all had gone well. However, at 2 a.m. the midwife warned Godwin that his wife was still in danger, since the afterbirth had not yet appeared. A doctor was sent for; and following the accepted medical practice of the time, he removed the afterbirth surgically. Mary at first seemed to be recovering well; but in a few days it became clear that she was fatally ill with an infection, very likely the result of the operation to remove the afterbirth. On 10 September she died, brave and affectionate to the end. In her last words, she spoke of Godwin as "the kindest, best man in the world".

Godwin was left heartbroken by Mary's death. In a letter to Holcroft he wrote: "My wife is now dead. I firmly believe that there does not exist her equal in the world. I know from experience that we were formed to make each other happy. I have not the least expectation that I can now ever know happiness again". In his sorrow, he sat rereading Mary's books and letters, seeming to hear her voice again through the words that she had written.

Soon Godwin found consolation for his grief by editing the unpublished works of his

dead wife and by writing her biography. Believing strongly in the principle of absolute honesty, he tried to describe her life and work as simply and as accurately as he could, not hiding her human weaknesses, but at the same time doing full justice to her stature as a great pioneer of woman's rights. He included her letters to Imlay, and a description of an affair between Mary and the Swiss artist Fuseli, which had taken place before her departure for France.

On 29 January 1798, Johnson published Godwin's *Memoirs of the Author of the Vindication of the Rights of Woman*, together with four small volumes of Mary's posthumous works, including her unfinished novel, *The Wrongs of Woman*.

2.7 The wave of hope crashes down

Godwin's moving and honest portrait of his wife is one of his most enduring and readable books but its honesty shocked his contemporaries more than anything else that he had written. The *European Magazine*, for example, said that it would be read "with disgust by every female who has any pretensions to delicacy; with detestation by everyone attached to the interests of religion and morality; and with indignation by any one who might feel any regard for the unhappy woman, whose frailties should have been buried in oblivion".

This reaction against the *Memoirs* was part of a much more general reaction against all liberal ideas. In 1798, Napoleon's armies were victorious on the continent, and the French were massing their forces for an invasion of England. Napoleon believed that the ordinary people of England would welcome him as a liberator and, in fact, the English government was facing a mutiny in its own navy, massive riots, and rebellion in Ireland. The Establishment was fighting for its life and was not in the mood to make fine distinctions about whether the blows that it struck were above or below the belt. Pitt and Grenville had already introduced the "Gagging Acts", which effectively put an end to freedom of speech and assembly. The government now sponsored, by means of a secret subsidy, the *Anti-Jacobin Review*, a periodical which savagely attacked all of the leading liberals in turn, including both William and Mary.

Godwin had been carried to great heights by the wave of hope which accompanied the French Revolution; and as the wave crashed he was carried down with it. Despite the abuse and ridicule which were increasingly heaped upon him, he maintained a philosophical attitude, confident that he had already made a permanent contribution to the idea of human progress. His ideas, and those of his pioneering wife Mary Wollstonecraft, can speak to our present dangerous situation.

2.8 Condorcet: A vision of human progress

In France the Marquis de Condorcet had written an equally optimistic book, *Esquisse d'un Tableau Historique des Progrès de l'Esprit Humain*. Condorcet's optimism was unaffected

even by the fact that at the time when he was writing he was in hiding, under sentence of death by Robespierre's government. Like Godwin's *Political Justice*, this book offers an optimistic vision of how human society can be improved. Together, the two books provoked Malthus to write his book on population.

2.9 Condorcet becomes a mathematician

Marie-Jean-Antoine-Nicolas Caritat, Marquis de Condorcet, was born in 1743 in the town of Ribemont in southern France. He was born into an ancient and noble family of the principality of Orange but there was nothing in his background to suggest that he might one day become a famous scientist and social philosopher. In fact, for several generations before, most of the men in the family had followed military or ecclesiastical careers and none were scholars.

After an initial education received at home from his mother, Condorcet was sent to his uncle, the Bishop of Lisieux, who provided a Jesuit tutor for the boy. In 1758 Condorcet continued his studies with the Jesuits at the College of Navarre. After he graduated from the College, Condorcet's powerful and independent intelligence suddenly asserted itself. He announced that he intended to study mathematics. His family was unanimously and violently opposed to this idea. The privileges of the nobility were based on hereditary power and on a static society. Science, with its emphasis on individual talent and on progress, undermined both these principles. The opposition of Condorcet's family is therefore understandable but he persisted until they gave in.

From 1765 to 1774, Condorcet focused on science. In 1765, he published his first work on mathematics entitled *Essai sur le calcul intégral*, which was well received, launching his career as a mathematician. He would go on to publish many more papers, and in 1769, at the age of 26, he was elected to the Academie royale des Sciences (French Royal Academy of Sciences)

Condorcet worked with Leonhard Euler and Benjamin Franklin. He soon became an honorary member of many foreign academies and philosophic societies including the Royal Swedish Academy of Sciences (1785), Foreign Honorary Member of the American Academy of Arts and Sciences (1792), and also in Prussia and Russia.

2.10 Human rights and scientific sociology

In 1774, at the age of 31, Condorcet was appointed Inspector-General of the Paris Mint by his friend, the economist Turgot. From this point on, Condorcet shifted his focus from the purely mathematical to philosophy and political matters. In the following years, he took up the defense of human rights in general, and of women's and blacks' rights in particular (an abolitionist, he became active in the Society of the Friends of the Blacks in the 1780s). He supported the ideals embodied by the newly formed United States, and proposed projects of political, administrative and economic reforms intended to transform France.



Figure 2.2: The Marquis de Condorcet (public domain).

The year 1785 saw the publication of Condorcet's highly original mathematical work, *Essai sur l'application de l'analyse à la probabilité des décisions rendues à la pluralité des voix*, in which he pioneered the application of the theory of probability in the social sciences. A later, much enlarged, edition of this book extended the applications to games of chance. Through these highly original works, Condorcet became a pioneer of scientific sociology.

In 1786, Condorcet married one of the most beautiful women of the time, Sophie de Grouchy (1764-1822). Condorcet's position as Inspector-General of the Mint meant that they lived at the Hotel des Monnaies. Mme Condorcet's salon there was famous.

2.11 The French Revolution

Ever since the age of 17, Condorcet had thought about questions of justice and virtue and especially about how it is in our own interest to be both just and virtuous. Very early in his life he had been occupied with the idea of human perfectibility. He was convinced that the primary duty of every person is to contribute as much as possible to the development of mankind, and that by making such a contribution, one can also achieve the greatest possible personal happiness. When the French Revolution broke out in 1789 he saw it as

an unprecedented opportunity to do his part in the cause of progress and he entered the arena wholeheartedly.

Condorcet was first elected as a member of the Municipality of Paris; and then, in 1791, he became one of the six Commissioners of the Treasury. Soon afterwards he was elected to the Legislative Assembly, of which he became first the Secretary and finally the President. In 1792, Condorcet proposed to the Assembly that all patents of nobility should be burned. The motion was carried unanimously; and on 19 June his own documents were thrown on a fire with the others at the foot of a statue of Louis XIV.

Condorcet was one of the chief authors of the proclamation which declared France to be a republic and which summoned a National Convention. As he remained above the personal political quarrels that were raging at the time, Condorcet was elected to the National Convention by five different constituencies. When the Convention brought Louis XVI to trial, Condorcet maintained that, according to the constitution, the monarch was inviolable and that the Convention therefore had no legal right to try the King. When the King was tried despite these protests, Condorcet voted in favor of an appeal to the people.

2.12 Drafting a new constitution for France

In October 1792, when the Convention set up a Committee of Nine to draft a new constitution for France, Condorcet sat on this committee as did the Englishman, Thomas Paine. Under sentence of death in England for publishing his pamphlet *The Rights of Man*, Paine had fled to France and had become a French citizen. He and Condorcet were the chief authors of a moderate (Gerondist) draft of the constitution. However, the Jacobin leader, Robespierre, bitterly resented being excluded from the Committee of Nine and, when the Convention then gave the responsibility for drafting the new constitution to the Committee for Public Safety, which was enlarged for this purpose by five additional members. The result was a hastily produced document with many glaring defects. When it was presented to the Convention, however, it was accepted almost without discussion. This was too much for Condorcet to stomach and he published anonymously a letter entitled *Advice to the French on the New Constitution*, in which he exposed the defects of the Jacobin constitution and urged all Frenchmen to reject it.

2.13 Hiding from Robespierre's Terror

Condorcet's authorship of this letter was discovered and treated as an act of treason. On 8 July 1793, Condorcet was denounced in the Convention; and an order was sent out for his arrest. The officers tried to find him, first at his town house and then at his house in the country but, warned by a friend, Condorcet had gone into hiding.

The house where Condorcet took refuge was at Rue Servandoni, a small street in Paris leading down to the Luxembourg Gardens, and it was owned by Madame Vernet, the

widow of a sculptor. Madame Vernet, who sometimes kept lodgings for students, had been asked by Condorcet's friends whether she would be willing to shelter a proscribed man. 'Is he a good man?', she had asked; and when assured that this was the case, she had said, 'Then let him come at once. You can tell me his name later. Don't waste even a moment. While we are speaking, he may be arrested.' She did not hesitate, although she knew that she risked death, the penalty imposed by the Convention for sheltering a proscribed man.

2.14 Condorcet writes the *Esquisse*

Although Robespierre's agents had been unable to arrest him, Condorcet was sentenced to the guillotine *in absentia*. He knew that in all probability he had only a few weeks or months to live and he began to write his last thoughts, racing against time. Hidden in the house at Rue Servandoni, and cared for by Madame Vernet, Condorcet returned to a project which he had begun in 1772, a history of the progress of human thought, stretching from the remote past to the distant future. Guessing that he would not have time to complete the full-scale work he had once planned, he began a sketch or outline: *Esquisse d'un Tableau Historique des progrès de l'Esprit Humain*.

Condorcet's *Esquisse*, is an enthusiastic endorsement of the idea of infinite human perfectibility which was current among the philosophers of the 18th century, and in this book, Condorcet anticipated many of the evolutionary ideas of Charles Darwin. He compared humans with animals, and found many common traits. Condorcet believed that animals are able to think, and even to think rationally, although their thoughts are extremely simple compared with those of humans. He also asserted that humans historically began their existence on the same level as animals and gradually developed to their present state.

Since this evolution took place historically, he reasoned, it is probable, or even inevitable, that a similar evolution in the future will bring mankind to a level of physical, mental and moral development which will be as superior to our own present state as we are now superior to animals.

In his *Esquisse*, Condorcet called attention to the unusually long period of dependency which characterize the growth and education of human offspring. This prolonged childhood is unique among living beings. It is needed for the high level of mental development of the human species; but it requires a stable family structure to protect the young during their long upbringing. Thus, according to Condorcet, biological evolution brought into existence a moral precept, the sanctity of the family.

Similarly, Condorcet maintained, larger associations of humans would have been impossible without some degree of altruism and sensitivity to the suffering of others incorporated into human behavior, either as instincts or as moral precepts or both; and thus the evolution of organized society entailed the development of sensibility and morality.

Condorcet believed that ignorance and error are responsible for vice; and he listed what he regarded as the main mistakes of civilization: hereditary transmission of power, inequality between men and women, religious bigotry, disease, war, slavery, economic inequality, and the division of humanity into mutually exclusive linguistic groups.

Condorcet believed the hereditary transmission of power to be the source of much of the tyranny under which humans suffer; and he looked forward to an era when republican governments would be established throughout the world. Turning to the inequality between men and women, Condorcet wrote that he could see no moral, physical or intellectual basis for it. He called for complete social, legal, and educational equality between the sexes.

Condorcet predicted that the progress of medical science would free humans from the worst ravages of disease. Furthermore, he maintained that since perfectibility (i.e. evolution) operates throughout the biological world, there is no reason why mankind's physical structure might not gradually improve, with the result that human life in the remote future could be greatly prolonged. Condorcet believed that the intellectual and moral facilities of man are capable of continuous and steady improvement; and he thought that one of the most important results of this improvement will be the abolition of war.

At the end of his *Esquisse*, Condorcet said that any person who has contributed to the progress of mankind to the best of his ability becomes immune to personal disaster and suffering. He knows that human progress is inevitable and can take comfort and courage from his inner picture of the epic march of mankind, through history, towards a better future.

Shortly after Condorcet completed the *Esquisse*, he received a mysterious warning that soldiers of the Convention were on their way to inspect Madame Vernet's house. Wishing to spare his generous hostess from danger, he disguised himself as well as he could and slipped past the portress. However, Condorcet had only gone a few steps outside the house when he was recognized by Madame Verdet's cousin, who risked his life to guide Condorcet past the sentinels at the gates of Paris, and into the open country beyond.

Condorcet wandered for several days without food or shelter, hiding himself in quarries and thickets. Finally, on 27 March 1794, hunger forced him to enter a tavern at the village of Clamart, where he ordered an omelette. When asked how many eggs it should contain, the exhausted and starving philosopher replied without thinking, 'twelve'. This reply, together with his appearance, excited suspicion. He was asked for his papers and, when it was found that he had none, soldiers were sent for and he was arrested. He was taken to a prison at Bourg-la-Reine, but he was so weak that he was unable to walk there, and had to be carried in a cart. The next morning, Condorcet was found dead on the floor of his cell. The cause of his death is not known with certainty. It was listed in official documents as congestion sanguine, congestion of the blood but the real cause may have been cold, hunger, exhaustion or poison. Many historians believe that Condorcet was murdered by Robespierre's agents, since he was so popular that a public execution would have been impossible.

After Condorcet's death the currents of revolutionary politics shifted direction. Robespierre, the leader of the Terror, was himself soon arrested. The execution of Robespierre took place on 25 July 1794, only a few months after the death of Condorcet.

Condorcet's *Esquisse d'un Tableau Historique des Progrès de l'Esprit Humain* was published posthumously in 1795. In the post-Thermidor reconstruction, the Convention voted funds to have it printed in a large edition and distributed throughout France, thus adopting the *Esquisse* as its official manifesto. Condorcet's name will always be linked with this

2.15. CONDORCET'S ON THE ADMISSION OF WOMEN TO THE RIGHTS OF CITIZENSHIP (1790)

small prophetic book. It was destined to establish the form in which the eighteenth-century idea of progress was incorporated into Western thought, and (as was mentioned in Chapter 1) it provoked Robert Malthus to write *An Essay on the Principle of Population*.

2.15 Condorcet's *On the Admission of Women to the Rights of Citizenship* (1790)

Custom may familiarise mankind with the extent, that even among those who have violation of their natural rights to such an lost or been deprived of these rights, no one thinks of reclaiming them, or is even conscious that they have suffered any injustice.

Certain of these violations (of natural right) have escaped the notice of philosophers and legislators, even while concerning themselves zealously to establish the common rights of individuals of the human race, and in this way to lay the foundation of political institutions. For example, have they not all violated the principle of the equality of rights in tranquilly depriving one-half of the human race of the right of taking part in the formation of laws by the exclusion of women from the rights of citizenship? Could there be a stronger proof of the power of habit, even among enlightened men, than to hear invoked the principle of equal rights in favour of perhaps some 300 or 400 men, who had been deprived of it by an absurd prejudice, and forget it when it concerns some 12,000,000 women?

To show that this exclusion is not an act of tyranny, it must be proved either that the natural rights of women are not absolutely the same as those of men, or that women are not capable of exercising these rights.

But the rights of men result simply from the fact that they are rational, sentient beings, susceptible of acquiring ideas of morality, and of reasoning concerning those ideas. Women having, then, the same qualities, have necessarily the same rights. Either no individual of the human species has any true rights, or all have the same; and he or she who votes against the [6] rights of another, whatever may be his or her religion, colour, or sex, has by that fact abjured his own.

It would be difficult to prove that women are incapable of exercising the rights of citizenship. Although liable to become mothers of families, and exposed to other passing indispositions, why may they not exercise rights of which it has never been proposed to deprive those persons who periodically suffer from gout, bronchitis, etc.? Admitting for the moment that there exists in men a superiority of mind, which is not the necessary result of a difference of education (which is by no means proved, but which should be, to permit of women being deprived of a natural right without injustice), this inferiority can only consist in two points. It is said that no woman has made any important discovery in science, or has given any proofs of the possession of genius in arts, literature, etc.; but, on the other hand, it is not pretended that the rights of citizenship should be accorded only to men of genius. It is added that no woman has the same extent of knowledge, the same power of reasoning, as certain men; but what results from that? Only this, that with the exception of a limited number of exceptionally enlightened men, equality is absolute between women

and the remainder of the men; that this small class apart, inferiority and superiority are equally divided between the two sexes. But since it would be completely absurd to restrict to this superior class the rights of citizenship and the power of being entrusted with public functions, why should women be excluded any more than those men who are inferior to a great number of women? Lastly, shall it be said that there exists in the minds and hearts of women certain qualities which ought to exclude them from the enjoyment of their natural rights? Let us interrogate the facts. Elizabeth of England, Maria Theresa, the two Catherine of Russia - have they not shown that neither in courage nor in strength of mind are women wanting?

Elizabeth possessed all the failings of women. Did these failings work more harm during her reign than resulted from the failings of men during the reign of her father, Henry VIII., or her successor, James I.? Have the lovers of certain empresses exercised a more dangerous influence than the mistresses of Louis XIV., of Louis XV., or even of Henry IV.?

Will it be maintained that Mistress Macaulay would not have expressed her opinions in the House of Commons better than many representatives of the British nation? In dealing with the question of liberty of conscience, would she not have expressed more elevated principles than those of Pitt, as well as more powerful reasoning? Although as great an enthusiast on behalf of liberty as Mr. Burke could be on behalf of its opposite, would she, while defending the French Constitution, have made use of such absurd and offensive nonsense as that which this celebrated rhetorician made use of in attacking it? Would not the adopted daughter of Montaigne have better defended the rights of citizens in France, in 1614, than the Councillor Courtin, who was a believer in magic and occult powers? Was not the Princesse des Ursins superior to Chamillard? Could not the Marquise de Chatelet have written equally as well as M. RouillÃ©? Would Mme. de Lambert have made laws as absurd and as barbarous as those of the "garde des Sceaux," of Armenouville, against Protestants, invaders of domestic privacy, robbers and negroes? In looking back over the list of those who have governed the world, men have scarcely the right to be so very uplifted.

Women are superior to men in the gentle and domestic virtues; they, as well as men, know how to love liberty, although they do not participate in all its advantages; and in republics they have been known to sacrifice themselves for it. They have shown that they possess the virtues of citizens whenever chance or civil disasters have brought them upon a scene from which they have been shut out by the pride and the tyranny of men in all nations.

It has been said that women, in spite of much ability, of much sagacity, and of a power of reasoning carried to a degree equalling that of subtle dialecticians, yet are never governed by what is called "reason."

This observation is not correct. Women are not governed, it is true, by the reason (and experience) of men; they are governed by their own reason (and experience).

Their interests not being the same (as those of men) by the fault of the law, the same things not having the same importance for them as for men, they may, without failing in rational conduct, govern themselves by different principles, and [8] tend towards a different result. It is as reasonable for a woman to concern herself respecting her personal attractions

2.15. CONDORCET'S ON THE ADMISSION OF WOMEN TO THE RIGHTS OF CITIZENSHIP (1790)⁴

as it was for Demosthenes to cultivate his voice and his gestures.

It is said that women, although superior in some respects to man - more gentle, more sensitive, less subject to those vices which proceed from egotism and hardness of heart - yet do not really possess the sentiment of justice; that they obey rather their feelings than their conscience. This observation is more correct, but it proves nothing; it is not nature, it is education, it is social existence which produces this difference.

Neither the one nor the other has habituated women to the idea of what is just, but only to the idea of what is "honest", or respectable. Excluded from public affairs, from all those things which are judged of according to rigorous ideas of justice, or according to positive laws, the things with which they are occupied and which are affected by them are precisely those which are regulated by natural feelings of honesty (or, rather, propriety) and of sentiment. It is, then, unjust to allege as an excuse for continuing to refuse to women the enjoyment of all their natural rights motives which have only a kind of reality because women lack the experience which comes from the exercise of these rights.

If reasons such as these are to be admitted against women, it will become necessary to deprive of the rights of citizenship that portion of the people who, devoted to constant labour, can neither acquire knowledge nor exercise their reason; and thus, little by little, only those persons would be permitted to be citizens who had completed a course of legal study. If such principles are admitted, we must, as a natural consequence, renounce the idea of a liberal constitution. The various aristocracies have only had such principles as these for foundation or excuse. The etymology of the word is a sufficient proof of this.

Neither can the subjection of wives to their husbands be alleged against their claims, since it would be possible in the same statute to destroy this tyranny of the civil law. The existence of one injustice can never be accepted as a reason for committing another.

There remain, then, only two objections to discuss. And, in truth, these can only oppose motives of expediency against the admission of [9] women to the right of voting; which motives can never be upheld as a bar to the exercise of true justice. The contrary maxim has only too often served as the pretext and excuse of tyrants; it is in the name of expediency that commerce and industry groan in chains; and that Africa remains afflicted with slavery: it was in the name of public expediency that the Bastille was crowded; that the censorship of the press was instituted; that accused persons were not allowed to communicate with their advisers; that torture was resorted to. Nevertheless, we will discuss these objections, so as to leave nothing without reply.

It is necessary, we are warned, to be on guard against the influence exercised by women over men. We reply at once that this, like any other influence, is much more to be feared when not exercised openly; and that, whatever influence may be peculiar to women, if exercised upon more than one individual at a time, will in so far become proportionately lessened. That since, up to this time, women have not been admitted in any country to absolute equality; since their empire has none the less existed everywhere; and since the more women have been degraded by the laws, the more dangerous has their influence been; it does not appear that this remedy of subjection ought to inspire us with much confidence. Is it not probable, on the contrary, that their special empire would diminish if women had less interest in its preservation; if it ceased to be for them their sole means of defence, and

of escape from persecution?

If politeness does not permit to men to maintain their opinions against women in society, this politeness, it may be said, is near akin to pride; we yield a victory of no importance; defeat does not humiliate when it is regarded as voluntary. Is it seriously believed that it would be the same in a public discussion on an important topic? Does politeness forbid the bringing of an action at law against a woman?

But, it will be said, this change will be contrary to general expediency, because it will take women away from those duties which nature has reserved for them. This objection scarcely appears to me well founded. Whatever form of constitution may be established, it is certain that in the present state of civilisation among European nations there will never be more than a [10] limited number of citizens required to occupy themselves with public affairs. Women will no more be torn from their homes than agricultural labourers from their ploughs, or artisans from their workshops. And, among the richer classes, we nowhere see women giving themselves up so persistently to domestic affairs that we should fear to distract their attention; and a really serious occupation or interest would take them less away than the frivolous pleasures to which idleness, a want of object in life, and an inferior education have condemned them.

The principal source of this fear is the idea that every person admitted to exercise the rights of citizenship immediately aspires to govern others. This may be true to a certain extent, at a time when the constitution is being established, but the feeling can scarcely prove durable. And so it is scarcely necessary to believe that because women may become members of national assemblies, they would immediately abandon their children, their homes, and their needles. They would only be the better fitted to educate their children and to rear men. It is natural that a woman should suckle her infant; that she should watch over its early childhood. Detained in her home by these cares, and less muscular than the man, it is also natural that she should lead a more retired, a more domestic life. The woman, therefore, as well as the man in a corresponding class of life, would be under the necessity of performing certain duties at certain times according to circumstances. This may be a motive for not giving her the preference in an election, but it cannot be a reason for legal exclusion. Gallantry would doubtless lose by the change, but domestic customs would be improved by equality in this as in other things.

Up to this time the manners of all nations have been more or less brutal and corrupt. I only know of one exception, and that is in favour of the Americans of the United States, who are spread, few in number, over a wide territory. Up to this time, among all nations, legal inequality has existed between men and women; and it would not be difficult to show that, in these two phenomena, the second is one of the causes of the first, because inequality necessarily introduces corruption, and is the most common cause of it, if even it be not the sole cause. [11]

I now demand that opponents should condescend to refute these propositions by other methods than by pleasantries and declamations; above all, that they should show me any natural difference between men and women which may legitimately serve as foundation for the deprivation of a right.

The equality of rights established between men by our new constitution has brought down

upon us eloquent declamations and never-ending pleasantries; but up till now no one has been able to oppose to it one single reason, and this is certainly neither from lack of talent nor lack of zeal. I venture to believe that it will be the same with regard to equality of rights between the two sexes. It is sufficiently curious that, in a great number of countries, women have been judged incapable of all public functions yet worthy of royalty; that in France a woman has been able to be regent, and yet that up to 1776 she could not be a milliner or dressmaker ("marchande des modes") in Paris, except under cover of her husband's name; and that, lastly, in our elective assemblies they have accorded to rights of property what they have refused to natural right. Many of our noble deputies owe to ladies the honour of sitting among the representatives of the nation. Why, instead of depriving of this right women who were owners of landed estates, was it not extended to all those who possessed property or were heads of households? Why, if it be found absurd to exercise the right of citizenship by proxy, deprive women of this right, rather than leave them the liberty of exercising it in person?

2.16 The education of Malthus

T.R. Malthus' *Essay on The Principle of Population*, the first edition of which was published in 1798, was one of the the first systematic studies of the problem of population in relation to resources. Earlier discussions of the problem had been published by Boterrio in Italy, Robert Wallace in England, and Benjamin Franklin in America. However Malthus' *Essay* was the first to stress the fact that, in general, powerful checks operate continuously to keep human populations from increasing beyond their available food supply. In a later edition, published in 1803, he buttressed this assertion with carefully collected demographic and sociological data from many societies at various periods of their histories.

The publication of Malthus' *Essay* coincided with a wave of disillusionment which followed the optimism of the Enlightenment. The utopian societies predicted by the philosophers of the Enlightenment were compared with reign of terror in Robespierre's France and with the miseries of industrial workers in England; and the discrepancy required an explanation. The optimism which preceded the French Revolution, and the disappointment which followed a few years later, closely paralleled the optimistic expectations of our own century, in the period after the Second World War, when it was thought that the transfer of technology to the less developed parts of the world would eliminate poverty, and the subsequent disappointment when poverty persisted. Science and technology developed rapidly in the second half of the twentieth century, but the benefits which they conferred were just as rapidly consumed by a global population which today is increasing at the rate of one billion people every decade. Because of the close parallel between the optimism and disappointments of Malthus' time and those of our own, much light can be thrown on our present situation by rereading the debate between Malthus and his contemporaries.

Thomas Robert Malthus (1766-1834) came from an intellectual family: His father, Daniel Malthus, was a moderately well-to-do English country gentleman, an enthusiastic believer in the optimistic ideas of the Enlightenment, and a friend of the philosophers Jean-



Figure 2.3: **The Rookery near Dorking in Surrey**

Jaques Rousseau, David Hume and William Godwin. The famous book on population by the younger Malthus grew out of conversations with his father.

Daniel Malthus attended Oxford, but left without obtaining a degree. He later built a country home near Dorking, which he called “The Rookery”. The house had Gothic battlements, and the land belonging to it contained a beech forest, an ice house, a corn mill, a large lake, and serpentine walks leading to “several romantic buildings with appropriate dedications”. Daniel Malthus was an ardent admirer of Rousseau; and when the French philosopher visited England with his mistress, Thérèse le Vasseur, Daniel Malthus entertained him at the Rookery. Rousseau and Thérèse undoubtedly saw Daniel’s baby son (who was always called Robert or Bob) and they must have noticed with pity that he had been born with a hare lip. This was later sutured, and apart from a slight scar which marked the operation, he became very handsome.

Robert Malthus was at first tutored at home; but in 1782, when he was 16 years old, he was sent to study at the famous Dissenting Academy at Warrington in Lancashire. Joseph Priestly had taught at Warrington, and he had completed his famous *History of Electricity* there, as well as his *Essay on Government*, which contains the phrase “the greatest good for the greatest number”.

Robert’s tutor at Warrington Academy was Gilbert Wakefield (who was later imprisoned for his radical ideas). When Robert was 18, Wakefield arranged for him to be admitted to Jesus College, Cambridge University, as a student of mathematics. Robert Malthus graduated from Cambridge in 1788 with a first-class degree in mathematics. He was Ninth Wrangler, which meant that he was the ninth-best mathematician in his graduating class. He also won prizes in declamation, both in English and in Latin, which is surprising in view of the speech defect from which he suffered all his life.

2.17 Debate on the views of Godwin and Condorcet

In 1793, Robert Malthus was elected a fellow of Jesus College, and he also took orders in the Anglican Church. He was assigned as Curate to Okewood Chapel in Surrey. This small chapel stood in a woodland region, and Malthus' illiterate parishioners were so poor that the women and children went without shoes. They lived in low thatched huts made of woven branches plastered with mud. The floors of these huts were of dirt, and the only light came from tiny window openings. Malthus' parishioners diet consisted almost entirely of bread. The children of these cottagers developed late, and were stunted in growth. Nevertheless, in spite of the harsh conditions of his parishioners' lives, Malthus noticed that the number of births which he recorded in the parish register greatly exceeded the number of deaths. It was probably this fact which first turned his attention to the problem of population.

By this time, Daniel Malthus had sold the Rookery; and after a period of travel, he had settled with his family at Albury, about nine miles from Okewood Chapel. Robert Malthus lived with his parents at Albury, and it was here that the famous debates between father and son took place. 1793, the year when Robert Malthus took up his position at Okewood, was also the year in which Daniel Malthus friend, William Godwin, published his enormously optimistic book, *Political Justice*. In this book, Godwin predicted a future society where scientific progress would liberate humans from material want. Godwin predicted that in the future, with the institution of war abolished, with a more equal distribution of property, and with the help of scientific improvements in agriculture and industry, much less labour would be needed to support life. Luxuries are at present used to maintain artificial distinctions between the classes of society, Godwin wrote, but in the future values will change; humans will live more simply, and their efforts will be devoted to self-fulfillment and to intellectual and moral improvement, rather than to material possessions. With the help of automated agriculture, the citizens of a future society will need only a few hours a day to earn their bread.

Godwin went on to say, "The spirit of oppression, the spirit of servility and the spirit of fraud - these are the immediate growth of the established administration of property. They are alike hostile to intellectual improvement. The other vices of envy, malice, and revenge are their inseparable companions. In a state of society where men lived in the midst of plenty, and where all shared alike the bounties of nature, these sentiments would inevitably expire. The narrow principle of selfishness would vanish. No man being obliged to guard his little store, or provide with anxiety and pain for his restless wants, each would lose his own individual existence in the thought of the general good. No man would be the enemy of his neighbor, for they would have nothing to contend; and of consequence philanthropy would resume the empire which reason assigns her. Mind would be delivered from her perpetual anxiety about corporal support, and free to expatiate in the field of thought which is congenial to her. Each man would assist the inquiries of all."

Godwin insisted that there is an indissoluble link between politics, ethics and knowledge. *Political Justice* is an enthusiastic vision of what humans could be like at some future period when the trend towards moral and intellectual improvement has lifted men



Figure 2.4: **William Godwin (1756-1836).**

and women above their present state of ignorance and vice. Much of the savage structure of the penal system would then be unnecessary, Godwin believed. (At the time when he was writing, there were more than a hundred capital offenses in England, and this number had soon increased to almost two hundred. The theft of any object of greater value than ten shillings was punishable by hanging.) In its present state, Godwin wrote, society decrees that the majority of its citizens “should be kept in abject penury, rendered stupid with ignorance and disgustful with vice, perpetuated in nakedness and hunger, goaded to the commission of crimes, and made victims to the merciless laws which the rich have instituted to oppress them”. But human behavior is produced by environment and education, Godwin pointed out. If the conditions of upbringing were improved, behavior would also improve. In fact, Godwin believed that men and women are subject to natural laws no less than the planets of Newton’s solar system. “In the life of every human”, Godwin wrote, “there is a chain of causes, generated in that eternity which preceded his birth, and going on in regular procession through the whole period of his existence, in consequence of which it was impossible for him to act in any instance otherwise than he has acted.”

The chain of causality in human affairs implies that vice and crime should be regarded with the same attitude with which we regard disease. The causes of poverty, ignorance, vice and crime should be removed. Human failings should be cured rather than punished. With this in mind, Godwin wrote, “our disapprobation of vice will be of the same nature as our disapprobation of an infectious distemper.”

In France the Marquis de Condorcet had written an equally optimistic book, *Esquisse d'un Tableau Historique des Progrès de l'Esprit Humain*. Condorcet’s optimism was unaffected even by the fact that at the time when he was writing he was in hiding, under sentence of death by Robespierre’s government. Besides enthusiastically extolling Godwin’s ideas to his son, Daniel Malthus also told him of the views of Condorcet.

Condorcet’s *Esquisse*, is an enthusiastic endorsement of the idea of infinite human perfectibility which was current among the philosophers of the 18th century, and in this book, Condorcet anticipated many of the evolutionary ideas of Charles Darwin. He compared humans with animals, and found many common traits. Condorcet believed that animals are able to think, and even to think rationally, although their thoughts are extremely simple compared with those of humans. He also asserted that humans historically began their existence on the same level as animals and gradually developed to their present state. Since this evolution took place historically, he reasoned, it is probable, or even inevitable, that a similar evolution in the future will bring mankind to a level of physical, mental and moral development which will be as superior to our own present state as we are now superior to animals. In his *Esquisse*, Condorcet called attention to the unusually long period of dependency which characterizes the growth and education of human offspring. This prolonged childhood is unique among living beings. It is needed for the high level of mental development of the human species; but it requires a stable family structure to protect the young during their long upbringing.

Thus, according to Condorcet, biological evolution brought into existence a moral precept, the sanctity of the family.

Similarly, Condorcet maintained, larger associations of humans would have been impos-



Figure 2.5: Thomas Robert Malthus (1766-1834).



Figure 2.6: The Marquis de Condorcet (1743-1794).

sible without some degree of altruism and sensitivity to the suffering of others incorporated into human behavior, either as instincts or as moral precepts or both; and thus the evolution of organized society entailed the development of sensibility and morality.

Condorcet believed that ignorance and error are responsible for vice; and he listened what he regarded as the main mistakes of civilization: hereditary transmission of power, inequality between men and women, religious bigotry, disease, war, slavery, economic inequality, and the division of humanity into mutually exclusive linguistic groups.

Condorcet believed the hereditary transmission of power to be the source of much of the tyranny under which humans suffer; and he looked forward to an era when republican governments would be established throughout the world. Turning to the inequality between men and women, Condorcet wrote that he could see no moral, physical or intellectual basis for it. He called for complete social, legal, and educational equality between the sexes.

Condorcet predicted that the progress of medical science would free humans from the worst ravages of disease. Furthermore, he maintained that since perfectibility (i.e. evolution) operates throughout the biological world, there is no reason why mankind's physical

structure might not gradually improve, with the result that human life in the remote future could be greatly prolonged. Condorcet believed that the intellectual and moral facilities of man are capable of continuous and steady improvement; and he thought that one of the most important results of this improvement will be the abolition of war.

As Daniel Malthus talked warmly about Godwin, Condorcet, and the idea of human progress, the mind of his son, Robert, turned to the unbalance between births and deaths which he had noticed among his parishioners at Okewood Chapel. He pointed out to his father that no matter what benefits science might be able to confer, they would soon be eaten up by population growth. Regardless of technical progress, the condition of the lowest social class would remain exactly the same: The poor would continue to live, as they always had, on the exact borderline between survival and famine, clinging desperately to the lower edge of existence. For them, change for the worse was impossible since it would loosen their precarious hold on life; their children would die and their numbers would diminish until they balanced the supply of food. But any change for the better was equally impossible, because if more nourishment should become available, more of the children of the poor would survive, and the share of food for each of them would again be reduced to the precise minimum required for life.

Observation of his parishioners at Okewood had convinced Robert Malthus that this sombre picture was a realistic description of the condition of the poor in England at the end of the 18th century. Techniques of agriculture and industry were indeed improving rapidly; but among the very poor, population was increasing equally fast, and the misery of society's lowest class remained unaltered.

Daniel Malthus was so impressed with his son's arguments that he urged him to develop them into a small book. Robert Malthus' first essay on population, written in response to his father's urging, was only 50,000 words in length. It was published anonymously in 1798, and its full title was *An Essay on the Principle of Population, as it affects the future improvement of society, with remarks on the speculations of Mr. Godwin, M. Condorcet, and other writers*. Robert Malthus' Essay explored the consequences of his basic thesis: that "the power of population is indefinitely greater than the power in the earth to produce subsistence for man".

2.18 Publication of the first essay in 1798

"That population cannot increase without the means of subsistence", Robert Malthus wrote, "is a proposition so evident that it needs no illustration. That population does invariably increase, where there are means of subsistence, the history of every people who have ever existed will abundantly prove. And that the superior power cannot be checked without producing misery and vice, the ample portion of these two bitter ingredients in the cup of human life, and the continuance of the physical causes that seem to have produced them, bear too convincing a testimony."

In order to illustrate the power of human populations to grow quickly to enormous numbers if left completely unchecked, Malthus turned to statistics from the United States,

where the population had doubled every 25 years for a century and a half. Malthus called this type of growth “geometrical” (today we would call it “exponential”); and, drawing on his mathematical education, he illustrated it by the progression 1,2,4,8,16,32,64,128,256,...etc. In order to show that, in the long run, no improvement in agriculture could possibly keep pace with unchecked population growth, Malthus allowed that, in England, agricultural output might with great effort be doubled during the next quarter century; but during a subsequent 25-year period it could not again be doubled. The growth of agricultural output could at the very most follow an arithmetic (linear) progression, 1,2,3,4,5,6,...etc.

Because of the overpoweringly greater numbers which can potentially be generated by exponential population growth, as contrasted to the slow linear progression of sustenance, Malthus was convinced that at almost all stages of human history, population has not expanded freely, but has instead pressed painfully against the limits of its food supply. He maintained that human numbers are normally held in check either by “vice or misery”. (Malthus classified both war and birth control as a forms of vice.) Occasionally the food supply increases through some improvement in agriculture, or through the opening of new lands; but population then grows very rapidly, and soon a new equilibrium is established, with misery and vice once more holding the population in check.

Like Godwin’s *Political Justice*, Malthus’ *Essay on the Principle of Population* was published at exactly the right moment to capture the prevailing mood of England. In 1793, the mood had been optimistic; but by 1798, hopes for reform had been replaced by reaction and pessimism. Public opinion had been changed by Robespierre’s Reign of Terror and by the threat of a French invasion. Malthus’ clear and powerfully written essay caught the attention of readers not only because it appeared at the right moment, but also because his two contrasting mathematical laws of growth were so striking.

One of Malthus’ readers was William Godwin, who recognized the essay as the strongest challenge to his utopian ideas that had yet been published. Godwin several times invited Malthus to breakfast at his home to discuss social and economic problems. (After some years, however, the friendship between Godwin and Malthus cooled, the debate between them having become more acrimonious.)

In 1801, Godwin published a reply to his critics, among them his former friends James Mackintosh and Samuel Parr, by whom he recently had been attacked. His *Reply to Parr* also contained a reply to Malthus: Godwin granted that the problem of overpopulation raised by Malthus was an extremely serious one. However, Godwin wrote, all that is needed to solve the problem is a change of the attitudes of society. For example we need to abandon the belief “that it is the first duty of princes to watch for (i.e. encourage) the multiplication of their subjects, and that a man or woman who passes the term of life in a condition of celibacy is to be considered as having failed to discharge the principal obligations owed to the community”. “On the contrary”, Godwin continued, “it now appears to be rather the man who rears a numerous family that has to some degree transgressed the consideration he owes to the public welfare”. Godwin suggested that each marriage should be allowed only two or three children or whatever number might be needed to balance the current rates of mortality and celibacy. This duty to society, Godwin wrote, would surely not be too great a hardship to be endured, once the reasons for it were thoroughly understood.

2.19 The second essay published in 1803

Malthus' small essay had captured public attention in England, and he was anxious to expand it with empirical data which would show his principle of population to be valid not only in England in his own day, but in all societies and all periods. He therefore traveled widely, collecting data. He also made use of the books of explorers, such as Cook and Vancouver.

Malthus second edition - more than three times the length of his original essay on population - was ready in 1803. Book I and Book II of the 1803 edition of Malthus' *Essay* are devoted to a study of the checks to population growth which have operated throughout history in all the countries of the world for which he possessed facts.

In his first chapter, Malthus stressed the potentially enormous power of population growth contrasted the slow growth of the food supply. He concluded that strong checks to the increase of population must almost always be operating to keep human numbers within the bounds of sustenance. He classified the checks as either preventive or positive, the preventive checks being those which reduce fertility, while the positive checks are those which increase mortality. Among the positive checks, Malthus listed "unwholesome occupations, severe labour and exposure to the seasons, extreme poverty, bad nursing of children, great towns, excesses of all kinds, the whole train of common diseases and epidemics, wars, plague, and famine".

In the following chapters of Books I, Malthus showed in detail the mechanisms by which population is held at the level of sustenance in various cultures. He first discussed primitive hunter-gatherer societies, such as the inhabitants of Tierra del Fuego, Van Diemens Land and New Holland, and those tribes of North American Indians living predominantly by hunting. In hunting societies, he pointed out, the population is inevitably very sparse: "The great extent of territory required for the support of the hunter has been repeatedly stated and acknowledged", Malthus wrote, "...The tribes of hunters, like beasts of prey, whom they resemble in their mode of subsistence, will consequently be thinly scattered over the surface of the earth."

"Like beasts of prey, they must either drive away or fly from every rival, and be engaged in perpetual contests with each other...The neighboring nations live in a perpetual state of hostility with each other. The very act of increasing in one tribe must be an act of aggression against its neighbors, as a larger range of territory will be necessary to support its increased numbers.

"The contest will in this case continue, either till the equilibrium is restored by mutual losses, or till the weaker party is exterminated or driven from its country... Their object in battle is not conquest but destruction. The life of the victor depends on the death of the enemy". Malthus concluded that among the American Indians of his time, war was the predominant check to population growth, although famine, disease and infanticide each played a part.

In the next chapter, Malthus quoted Captain Cook's description of the natives of the region near Queen Charlotte's Sound in New Zealand, whose way of life involved perpetual war. "If I had followed the advice of all our pretended friends", Cook wrote, "I might have

extirpated the whole race; for the people of each hamlet or village, by turns, applied to me to destroy the other". According to Cook, the New Zealanders practiced both ceaseless war and cannibalism; and population pressure provided a motive for both practices.

In later chapters on nomadic societies of the Near East and Asia, war again appears, not only as a consequence of the growth of human numbers, but also as one of the major mechanisms by which these numbers are reduced to the level of their food supply. The studies quoted by Malthus make it seem likely that the nomadic Tartar tribes of central Asia made no use of the preventive checks to population growth. In fact the Tartar tribes may have regarded growth of their own populations as useful in their wars with neighboring tribes.

Malthus also described the Germanic tribes of Northern Europe, whose population growth led them to the attacks which destroyed the Roman Empire.

He quoted the following passage from Machiavelli's *History of Florence*: "The people who inhabit the northern parts that lie between the Rhine and the Danube, living in a healthful and prolific climate, often increase to such a degree that vast numbers of them are forced to leave their native country and go in search of new habitations. When any of those provinces begins to grow too populous and wants to disburden itself, the following method is observed. In the first place, it is divided into three parts, in each of which there is an equal portion of the nobility and commonality, the rich and the poor. After this they cast lots; and that division on which the lot falls quits the country and goes to seek its fortune, leaving the other two more room and liberty to enjoy their possessions at home. These emigrations proved the destruction of the Roman Empire". Regarding the Scandinavians in the early middle ages, Malthus wrote: "Mallet relates, what is probably true, that it was their common custom to hold an assembly every spring for the purpose of considering in what quarter they should make war".

In many of the societies which Malthus described, a causal link can be seen, not only between population pressure and poverty, but also between population pressure and war. As one reads his *Essay*, it becomes clear why both these terrible sources of human anguish saturate so much of history, and why efforts to eradicate them have so often met with failure: The only possible way to eliminate poverty and war is to reduce the pressure of population by preventive checks, since the increased food supply produced by occasional cultural advances can give only very temporary relief.

In Book II, Malthus turned to the nations of Europe, as they appeared at the end of the 18th century, and here he presents us with a different picture. Although in these societies poverty, unsanitary housing, child labour, malnutrition and disease all took a heavy toll, war produced far less mortality than in hunting and pastoral societies, and the preventive checks, which lower fertility, played a much larger roll.

Malthus had visited Scandinavia during the summer of 1799, and he had made particularly detailed notes on Norway. He was thus able to present a description of Norwegian economics and demography based on his own studies. Norway was remarkable for having the lowest reliably-recorded death rate of any nation at that time: Only 1 person in 48 died each year in Norway. (By comparison, 1 person in 20 died each year in London.) The rate of marriage was also remarkably low, with only 1 marriage each year for every 130



Figure 2.7: Captain James Cook, FRS (1728-1779). According to Cook, the native New Zealanders practiced both ceaseless war and cannibalism; and population pressure provided a motive for both practices. Malthus based his description of hunter-gatherer societies on the writings of explorers such as Cook and Vancouver.

inhabitants; and thus in spite of the low death rate, Norway's population had increased only slightly from the 723,141 inhabitants recorded in 1769.

There were two reasons for late marriage in Norway: Firstly, every man born of a farmer or a labourer was compelled by law to be a soldier in the reserve army for a period of ten years; and during his military service, he could not marry without the permission of both his commanding officer and the parish priest. These permissions were granted only to those who were clearly in an economic position to support a family. Men could be inducted into the army at any age between 20 and 30, and since commanding officers preferred older recruits, Norwegian men were often in their 40's before they were free to marry. At the time when Malthus was writing, these rules had just been made less restrictive; but priests still refused to unite couples whose economic foundations they judged to be insufficient.

The second reason for late marriages was the structure of the farming community. In general, Norwegian farms were large; and the owner's household employed many young unmarried men and women as servants. These young people had no chance to marry unless a smaller house on the property became vacant, with its attached small parcel of land for the use of the "houseman"; but because of the low death rate, such vacancies were infrequent.

Thus Norway's remarkably low death rate was balanced by a low birth rate. Other chapters in Book II are devoted to the checks to population growth in Sweden, Russia, Central Europe, Switzerland, France, England, Scotland and Ireland.

Malthus painted a very dark panorama of population pressure and its consequences in human societies throughout the world and throughout history: At the lowest stage of cultural development are the hunter-gatherer societies, where the density of population is extremely low. Nevertheless, the area required to support the hunters is so enormous that even their sparse and thinly scattered numbers press hard against the limits of sustenance. The resulting competition for territory produces merciless intertribal wars.

The domestication of animals makes higher population densities possible; and wherever this new mode of food production is adopted, human numbers rapidly increase; but very soon a new equilibrium is established, with the population of pastoral societies once more pressing painfully against the limits of the food supply, growing a little in good years, and being cut back in bad years by famine, disease and war.

Finally, agricultural societies can maintain extremely high densities of population; but the time required to achieve a new equilibrium is very short. After a brief period of unrestricted growth, human numbers are once more crushed against the barrier of limited resources; and if excess lives are produced by overbreeding, they are soon extinguished by deaths among the children of the poor.

Malthus was conscious that he had drawn an extremely dark picture of the human condition. He excused himself by saying that he has not done it gratuitously, but because he was convinced that the dark shades really are there, and that they form an important part of the picture. He did allow one ray of light, however: By 1803, his own studies of Norway, together with personal conversations with Godwin and the arguments in Godwin's *Reply to Parr*, had convinced Malthus that "moral restraint" should be included among the possible checks to population growth. Thus he concluded Book II of his 1803 edition by

saying that the checks which keep population down to the level of the means of subsistence can all be classified under the headings of “moral restraint, vice and misery”. (In his first edition he had maintained that vice and misery are the only possibilities).

2.20 Systems of equality

In the 1803 edition of Malthus' *Essay*, Books III and IV form a second volume.

The ideas which he put forward in this second volume are much more open to dispute than are the solidly empirical demographic studies of Books I and II. Malthus excused himself at the beginning of the second volume, saying that he realized that the ideas which he was about to put forward were less solidly based than those in his first volume. However, he said that he wished to explore all the consequences of his principle of population: “..Even the errors into which I may have fallen”, he wrote, “by according a handle to argument, and an additional excitement to examination, may be subservient to the important end of bringing a subject so nearly connected with the happiness of society into more general notice”.

Malthus began Book III by discussing the systems of equality proposed by Condorcet and Godwin; and he tried to show that such utopian societies would prove impossible in practice, because they would rapidly drown in a flood of excess population. Condorcet himself had recognized this difficulty. He realized that improved living conditions for the poor would lead to a rapid growth of population. “Must not a period then arrive”, Condorcet had written, “... when the increase of the number of men surpassing their means of subsistence, the necessary result must be either a continual diminution of happiness and population... or at least a kind of oscillation between good and evil?”

Condorcet believed the serious consequences of population pressure to be far in the future, but Malthus disagreed with him on exactly that point: “M. Condorcet's picture of what may be expected to happen when the number of men shall surpass subsistence is justly drawn... The only point in which I differ from M. Condorcet in this description is with regard to the period when it may be applied to the human race... This constantly subsisting cause of periodical misery has existed in most countries ever since we have had any histories of mankind, and continues to exist at the present moment.”

“M. Condorcet, however, goes on to say”, Malthus continued, “that should the period, which he conceives to be so distant, ever arrive, the human race, and the advocates of the perfectibility of man, need not be alarmed at it. He then proceeds to remove the difficulty in a manner which I profess not to understand. Having observed that the ridiculous prejudices of superstition would by that time have ceased to throw over morals a corrupt and degrading austerity, he alludes either to a promiscuous concubinage, which would prevent breeding, or to something else as unnatural. To remove the difficulty in this way will surely, in the opinion of most men, be to destroy that virtue and purity of manners which the advocates of equality and of the perfectibility of man profess to be the end and object of their views.”

When Malthus referred to “something else as unnatural”, he of course meant birth

control, some forms of which existed at the time when he was writing; and in this passage we see that he was opposed to the practice. He preferred late marriage or “moral restraint” as a means of limiting excessive population growth.

After his arguments against Condorcet, Malthus discussed William Godwin’s egalitarian utopia, which, he said, would be extremely attractive if only it could be achieved: “The system of equality which Mr. Godwin proposes”, Malthus wrote, “is, on the first view of it, the most beautiful and engaging which has yet appeared. A melioration of society to be produced merely by reason and conviction gives more promise of permanence than any change effected and maintained by force. The unlimited exercise of private judgement is a doctrine grand and captivating, and has a vast superiority over those systems where every individual is in a manner the slave of the public.”

“The substitution of benevolence, as a master-spring and moving principle of society, instead of self-love, appears at first sight to be a consummation devoutly to be wished. In short, it is impossible to contemplate the whole of this fair picture without emotions of delight and admiration, accompanied with an ardent longing for the period of its accomplishment.”

“But alas!” Malthus continued, “That moment can never arrive.... The great error under which Mr. Godwin labours throughout his whole work is the attributing of almost all the vices and misery that prevail in civil society to human institutions. Political regulations and the established administration of property are, with him, the fruitful sources of all evil, the hotbeds of all the crimes that degrade mankind. Were this really a true state of the case, it would not seem a completely hopeless task to remove evil completely from the world; and reason seems to be the proper and adequate instrument for effecting so great a purpose. But the truth is, that though human institutions appear to be, and indeed often are, the obvious and obtrusive causes of much misery in society, they are, in reality, light and superficial in comparison with those deeper-seated causes of evil which result from the laws of nature and the passions of mankind.”

The passions of mankind drive humans to reproduce, while the laws of nature set limits to the carrying capacity of the environment. Godwin’s utopia, if established, would be very favorable to the growth of population; and very soon the shortage of food would lead to its downfall: Because of the overpowering force of population growth, “Man cannot live in the midst of plenty. All cannot share alike the bounties of nature. Were there no established administration of property, every man would be obliged to guard with his force his little store. Selfishness would be triumphant. The subjects of contention would be perpetual. Every individual would be under constant anxiety about corporal support, and not a single intellect would be left free to expatiate in the field of thought.”

Malthus believed that all systems of equality are doomed to failure, not only because of the powerful pressure of population growth, but also because differences between the upper, middle, and lower classes serve the useful purpose of providing humans with an incentive for hard work. He thought that fear of falling to a lower social status, and hope of rising to a higher one, provide a strong incentive for constructive activity. However, he believed that happiness is most often found in the middle ranks of society, and that therefore the highest and lowest classes ought not to be large. Malthus advocated universal

education and security of property as means by which the lowest classes of society could be induced to adopt more virtuous and prudent patterns of behavior.

2.21 The Poor Laws

Among the most controversial chapters of Malthus' second volume are those dealing with the Poor Laws. During the reign of Queen Elisabeth I, a law had been enacted according to which justices were authorized to collect taxes in order to set to work "...the children of all such, whose parents shall not by the said persons be thought able to keep and maintain their children; and also such persons, married or unmarried, as, having no means to maintain them, use no ordinary or daily trade to get their living by..". Malthus commented:

"What is this but saying that the funds for the maintenance of labour in this country may be increased without limit by a fiat of government...? Strictly speaking, this clause is as arrogant and absurd as if it had enacted that two ears of wheat should in the future grow where one had grown before. Canute, when he commanded the waves not to wet his princely foot, did not assume a greater power over the laws of nature." Malthus pointed out that if we believe that every person has a right to have as many children as he or she wishes, and if we enact a law, according to which every person born has a right to sustenance, then we implicitly assume that the supply of food can be increased without limit, which of course is impossible.

During the first few years of the nineteenth century there was a severe shortage of food in England, partly because of war with France, and partly because of harvest failures. As a result, the price of wheat tripled, causing great distress among the poor. By 1803, 3,000,000 pounds sterling were being distributed to make up the difference between the wages of poor workers and the amount which they needed to pay for food. Malthus regarded the supply of grain as constant, i.e. independent of the price; and he therefore believed that distribution of money under the Poor Laws merely raised the price of grain still further in relation to wages, forcing a larger number of independent workers to seek help. He thought that the distributed money helped to relieve suffering in some cases, but that it spread the suffering over a wider area.

In some parishes, the amount of money distributed under the Poor Laws was proportional to the number of children in a family, and Malthus believed that this encouraged the growth of population, further aggravating the shortage of food. "A poor man may marry with little or no prospect of being able to support a family in independence", he wrote, "...and the Poor Laws may be said therefore in some measure to create the poor which they maintain; and as the provisions of the country must, in consequence of the increased population, be distributed to every man in smaller proportions, it is evident that the labour of those who are not supported by parish assistance, will purchase a smaller quantity of provisions than before, and consequently more of them must be driven to ask for support." Malthus advocated a very gradual abolition of the Poor Laws, and he believed that while this change was being brought about, the laws ought to be administered in such a way that the position of least well-off independent workers should not be worse than the position of

those supported by parish assistance.

2.22 Replies to Malthus

The second edition of Malthus' *Essay* was published in 1803. It provoked a storm of controversy, and a flood of rebuttals. In 1803 England's political situation was sensitive. Revolutions had recently occurred both in America and in France; and in England there was much agitation for radical change, against which Malthus provided counter-arguments. Pitt and his government had taken Malthus' first edition seriously, and had abandoned their plans for extending the Poor Laws. Also, as a consequence of Malthus' ideas, England's first census was taken in 1801. This census, and subsequent ones, taken in 1811, 1821 and 1831, showed that England's population was indeed increasing rapidly, just as Malthus had feared. (The population of England and Wales more than doubled in 80 years, from an estimated 6.6 million in 1750 to almost 14 million in 1831.) In 1803, the issues of poverty and population were at the center of the political arena, and articles refuting Malthus began to stream from the pens of England's authors.

William Coleridge planned to write an article against Malthus, and he made extensive notes in the margins of his copy of the *Essay*. In one place he wrote: "Are Lust and Hunger both alike Passions of physical Necessity, and the one equally with the other independent of the Reason and the Will? Shame upon our race that there lives an individual who dares to ask the Question." In another place Coleridge wrote: "Vice and Virtue subsist in the agreement of the habits of a man with his Reason and Conscience, and these can have but one moral guide, Utility, or the virtue and Happiness of Rational Beings". Although Coleridge never wrote his planned article, his close friend Robert Southey did so, using Coleridge's notes almost verbatim. Some years later Coleridge remarked: "Is it not lamentable - is it not even marvelous - that the monstrous practical sophism of Malthus should now have gained complete possession of the leading men of the kingdom! Such an essential lie in morals - such a practical lie in fact it is too! I solemnly declare that I do not believe that all the heresies and sects and factions which ignorance and the weakness and wickedness of man have ever given birth to, were altogether so disgraceful to man as a Christian, a philosopher, a statesman or citizen, as this abominable tenet."

In 1812, Percy Bysshe Shelley, who was later to become William Godwin's son-in-law, wrote: "Many well-meaning persons... would tell me not to make people happy for fear of over-stocking the world... War, vice and misery are undoubtedly bad; they embrace all that we can conceive of temporal and eternal evil. Are we to be told that these are remediless, because the earth would in case of their remedy, be overstocked?" A year later, Shelley called Malthus a "priest, eunuch, and tyrant", and accused him, in a pamphlet, of proposing that "... after the poor have been stript naked by the taxgatherer and reduced to bread and tea and fourteen hours of hard labour by their masters.. the last tie by which Nature holds them to benignant earth (whose plenty is garnered up in the strongholds of their tyrants) is to be divided... They are required to abstain from marrying under penalty of starvation... whilst the rich are permitted to add as many mouths to consume



Figure 2.8: Coleridge's notes on Malthus: "I do not believe that all the heresies and sects and factions which ignorance and the weakness and wickedness of man have ever given birth to, were altogether so disgraceful to man as a Christian, a philosopher, a statesman or citizen, as this abominable tenet."

the products of the poor as they please".

Godwin himself wrote a long book (which was published in 1820) entitled *Of Population, An Enquiry Concerning the Power and Increase in the Number of Mankind, being an answer to Mr. Malthus*. One can also view many of the books of Charles Dickens as protests against Malthus' point of view. For example, *Oliver Twist* gives us a picture of a workhouse "administered in such a way that the position of least well-off independent workers should not be worse than the position of those supported by parish assistance."

Among the authors defending Malthus was Harriet Martineau, who wrote: "The desire of his heart and the aim of his work were that domestic virtue and happiness should be placed within the reach of all... He found that a portion of the people were underfed, and that one consequence of this was a fearful mortality among infants; and another consequence the growth of a recklessness among the destitute which caused infanticide,



Figure 2.9: Shelley: “.. after the poor have been stript naked by the taxgatherer and reduced to bread and tea and fourteen hours of hard labour by their masters.. the last tie by which Nature holds them to benignant earth (whose plenty is garnered up in the strongholds of their tyrants) is to be divided...They are required to abstain from marrying under penalty of starvation...”



Figure 2.10: Tiny Tim, from Charles Dickens' *A Christmas Carol*. When he is informed that Tiny Tim will die unless he receives medical treatment, Scrooge remarks, "Then he had better die and reduce the surplus population!". Many of the events in Dickens' books can be viewed as protests against the ideas of Malthus.



Figure 2.11: Charles Dickens' *Oliver Twist* asks for a second portion of gruel, provoking a storm of outrage. As a boy, Dickens himself spent some time in a workhouse.



Figure 2.12: A portrait of the British political economist, author and social theorist Harriet Martineau (1802-1876). She was a very close friend of Charles Darwin's older brother, Erasmus. Commenting on the ideas of Malthus, she wrote: "Prudence as to time of marriage and making due provision for it was, one would think, a harmless recommendation enough, under the circumstances." Martineau's books were highly successful, sometimes outselling those of Charles Dickens.

corruption of morals, and at best, marriage between pauper boys and girls; while multitudes of respectable men and women, who paid rates instead of consuming them, were unmarried at forty or never married at all. Prudence as to time of marriage and for making due provision for it was, one would think, a harmless recommendation enough, under the circumstances."

2.23 Ricardo's Iron Law of Wages; the Corn Laws

Malthus continued a life of quiet scholarship, unperturbed by the heated public debate which he had caused. At the age of 38, he married a second cousin. The marriage produced only three children, which at that time was considered to be a very small number. Thus he practiced the pattern of late marriage which he advocated. Although he was appointed rector of a church in Lincolnshire, he never preached there, hiring a curate to do this in his place. Instead of preaching, Malthus accepted an appointment as Professor of History and Political Economy at the East India Company's College at Haileybury. This appointment made him the first professor of economics in England, and probably also the first in the world. Among the important books which he wrote while he held this post was *Principles of Political Economy, Considered with a View to their Practical Application*. Malthus also published numerous revised and expanded editions of his *Essay on the Principle of Population*. The third edition was published in 1806, the fourth in 1807, the fifth in 1817, and the sixth in 1826.

Malthus became a close friend of the wealthy financier and economic theorist, David Ricardo (1772-1823). He and Ricardo met frequently to discuss economic problems, and when circumstances prevented them from meeting, they exchanged endless letters. Ricardo and Malthus differed on the subject of the Corn Laws, but they never allowed this difference of opinion to affect their friendship.

Although shortages of food had produced drastic increases in the price of grain, the import of cheap foreign grain was effectively prevented by the Corn Laws. These laws had been introduced by the large landowners, who controlled Parliament, but they were opposed by the manufacturers, who wished to make less expensive food available to their workers. On this issue, Malthus sided with the landowners, arguing that if England became dependent on imports of foreign grain, the country would be insecure: What if England's ability to export manufactured goods in exchange for the grain should later be undermined by foreign competition? Malthus pointed out that the country would then face starvation. Ricardo, on the other hand, sided with the rising class of manufacturers. In 1832 the Reform Bill gave the manufacturers control of Parliament, the Corn Laws were repealed, and England's rapidly-growing population became dependent on imports of foreign grain.

Ricardo accepted Malthus' principle of population, and from it he deduced what came to be called his "Iron Law of Wages". According to Ricardo, labor is a commodity, and wages are determined by the law of supply and demand: When wages fall below the starvation level, the workers' children die. Labor then becomes a scarce commodity, and wages rise. On the other hand, when wages rise above the starvation level, the working population



Figure 2.13: The economist David Ricardo (1772-1823), a close friend of Malthus. The joint pessimism of Ricardo and Malthus caused Carlyle to call economics “the dismal science”.

multiplies rapidly, labor becomes a plentiful commodity, and wages fall again.

Thus, according to Ricardo, there is an Iron Law which holds wages at the minimum level at which life can be supported. The combined pessimism of Malthus and Ricardo caused Carlyle to call economics “the dismal science”.

2.24 The Irish Potato Famine of 1845

Meanwhile, in Ireland, a dramatic series of events had occurred, confirming the ideas of Malthus. Anti-Catholic laws prevented the Irish cottagers from improving their social position; and instead they produced large families, fed almost exclusively on a diet of milk and potatoes. The potato and milk diet allowed a higher density of population to be supported in Ireland than would have been the case if the Irish diet had consisted primarily of wheat. As a result, the population of Ireland grew rapidly: In 1695 it had been approximately one million, but by 1821 it had reached 6,801,827. By 1845, the population of Ireland was more than eight million; and in that year the potato harvest failed because of blight. All who were able to do so fled from the country, many emigrating to the United States; but two million people died of starvation. As the result of this shock, Irish marriage habits changed, and late marriage became the norm, just as Malthus would have wished. After the Potato Famine of 1845, Ireland maintained a stable population of roughly four million.



Figure 2.14: The Irish Potato Famine.



Figure 2.15: **The Irish Potato Famine.**

2.25 The impact of Malthus on biology

The impact of Malthus' *Essay* was great, not only in demography and political economics, but also in biology. In 1836, Charles Darwin returned from his voyage on the Beagle with a mass of facts and ideas on species out of which he was struggling to construct a coherent picture; and Malthus gave him the clue he needed. "In October, 1838", Darwin wrote later in his Autobiography, "that is, fifteen months after I had begun my systematic enquiry, I happened to read for amusement 'Malthus on Population', and being well prepared to appreciate the struggle for existence which everywhere goes on from long-continued observation of the habits of animals and plants, it at once struck me that under these circumstances favorable variations would tend to be preserved, and unfavorable ones to be destroyed. The result of this would be the formation of new species. Here then I had at last got a theory by which to work..."

Darwin wrote a sketch of his theory of evolution through natural selection; but he did not publish it, probably because he had a premonition of the furious opposition which his heretical ideas would provoke. In 1854 he returned to his work on species, but he was writing on a scale which would have developed into an enormous multi-volume work, whose completion might have taken the remainder of his life. Meanwhile, a young English biologist named Alfred Russell Wallace, working in the jungles of Malaysia, arrived at exactly the same theory as Darwin's, and in exactly the same way - by reading Malthus! Wallace wrote a short paper describing his theory and sent it to Darwin, asking the older scientist's opinion. Darwin was at first inclined to burn all his own work on the subject out of fairness to Wallace, but his friends persuaded him to instead write a short paper describing his views, which could be presented together with Wallace's article. The two papers were read together to a meeting of the Linnean Society, which listened in stunned silence. Posterity has given both Darwin and Wallace credit for their joint discovery of the theory of evolution through natural selection.

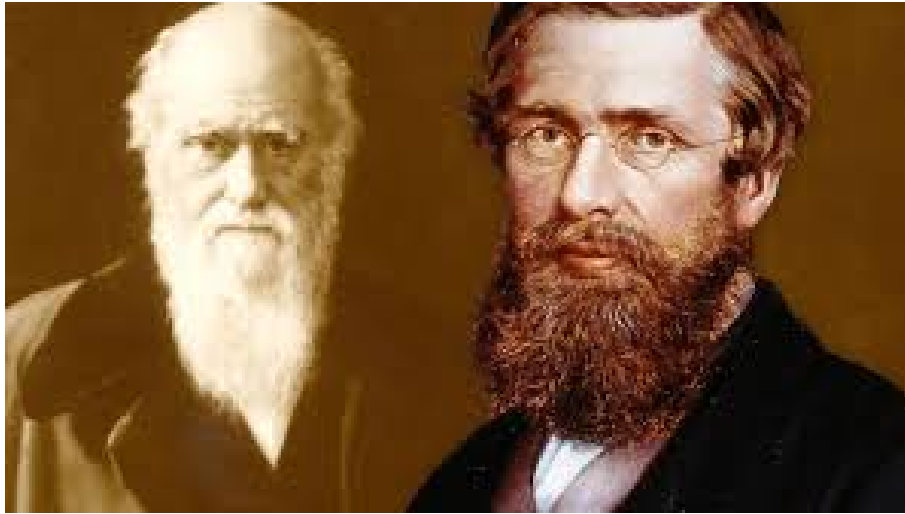


Figure 2.16: Both Charles Darwin and Alfred Russel Wallace arrived at their theories of natural selection in evolution as a result of reading Malthus.

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Chapter 3

THE REFORM MOVEMENT IN ENGLAND

3.1 The dark satanic mills

The poems “Jerusalem” and “London” by William Blake, (1757-1827), can be thought of as protests against the conditions of the early Industrial Revolution in England:

Jerusalem

*And did those feet in ancient time
Walk upon England's mountains green?
And was the holy Lamb of God
On England's pleasant pastures seen?*

*And did the Countenance Divine
Shine forth upon our clouded hills?
And was Jerusalem builded here
Among these dark Satanic Mills?*

*Bring me my bow of burning gold!
Bring me my arrows of desire!
Bring me my spear! O clouds, unfold!
Bring me my chariot of fire!*

*I will not cease from mental fight,
Nor shall my sword sleep in my hand,
Till we have built Jerusalem
In England's green and pleasant land.*

London

*I wandered through each chartered street
Near which the chartered Thames doth flow.
A mark in every face I meet,
Marks of weakness, marks of woe.*

*In every cry of every man,
In every infant's cry of fear,
In every voice, in every ban,
The mind-forged manacles I hear.*

*How the chimney-sweeper's cry
Every blackening church appalls,
And how the hapless soldier's sigh
Runs in blood down palace-walls.*

*But most, through midnight streets I hear
How the youthful harlot's curse
Blasts the new-born infant's tear,
And blights with plagues the marriage-hearse.*

3.2 Working conditions in 19th century England

According to the new rules by which industrial society began to be governed, traditions were forgotten and replaced by purely economic laws. Labor was viewed as a commodity, like coal or grain, and wages were paid according to the laws of supply and demand, without regard for the needs of the workers. Wages fell to starvation levels, hours of work increased, and working conditions deteriorated.

3.3 Ricardo's Iron Law of Wages

Malthus continued a life of quiet scholarship, unperturbed by the heated public debate which he had caused. At the age of 38, he married a second cousin. The marriage produced only three children, which at that time was considered to be a very small number. Thus he practiced the pattern of late marriage which he advocated. Although he was appointed rector of a church in Lincolnshire, he never preached there, hiring a curate to do this in his place. Instead of preaching, Malthus accepted an appointment as Professor of History and Political Economy at the East India Company's College at Haileybury. This appointment made him the first professor of economics in England, and probably also the first in the world. Among the important books which he wrote while he held this post was *Principles*

of *Political Economy, Considered with a View to their Practical Application*. Malthus also published numerous revised and expanded editions of his *Essay on the Principle of Population*. The third edition was published in 1806, the fourth in 1807, the fifth in 1817, and the sixth in 1826.

Ricardo's theory of rent

. Among Malthus' closest friends was the financier David Ricardo (1772-1823). Ricardo had been born into a Jewish family that had moved to London from Portugal. However, at the age of 21 he had broken relations with his family and rejected his orthodox Jewish faith in order to marry a Quaker girl. Ricardo, who had worked with his father on the London Sock Exchange since the age of 14, then proceeded to become a financier in his own right, amassing a fortune worth over a million pounds, in those days an immense sum.

Having read a copy of Adam Smith's *Wealth of Nations*, Ricardo became interested in theoretical economics, and at the age of 37 he began to write about this subject. His articles and books were admired by Malthus, and the two became close friends, although they disagreed on many issues.

Malthus had been brought up as a member of the British landowning class. He valued the beauty of the countryside, and was disturbed by the growth of industrialism. By contrast, Ricardo's sympathies lay with the rising and vigorous class of industrialists. The theory of rent, developed by Ricardo, showed that there is an inevitable conflict between these two classes.

Ricardo's theory of rent dealt with the effect of economic growth on prices, wages and profits. He and Malthus both agreed with Adam Smith's picture of growth: The virtuous industrialist does not spend his profits on luxuries, but instead reinvests them. New factories are built, the demand for workers increases, wages rise, and more workers are "produced" in response to the demand, i.e., more of the worker's children survive, and their numbers grow.

With each turn of the spiral of economic growth, there is an increased demand for food, since the population of workers increases. The most fertile land is already in use, but to meet the larger demand for food, marginal land is tilled, for example land on steep hillside slopes. It costs more to grow grain on marginal land, and therefore grain prices rise. According to Ricardo, the only people who benefit from economic growth are the owners of especially fertile land. The factory owners do not benefit, because they must pay higher wages to meet the increased price of food for their workers, and their profits remain the same. The workers do not benefit, because regardless of the price of grain, each of them is given only enough food to survive. The true beneficiaries of economic growth, according to Ricardo, are the owners of the most fertile land, i.e., the landowning aristocracy.

Ricardo defines "rent" to be the difference, per acre, between the cost of growing grain on good land, and the cost on marginal land. This difference is pocketed by the owners of good land. They do not really deserve it because ownership of fertile land is something that they inherited, rather than something that they produced by their own efforts.



Figure 3.1: The economist David Ricardo (1772-1823), a close friend of Malthus. The joint pessimism of Ricardo and Malthus caused Carlyle to call economics “the dismal science”.

The Corn Laws

At the time when Ricardo was writing, imports of cheap foreign grain were effectively blocked by the Corn Laws, a series of acts of Parliament which were in force between 1815 and 1846. These laws imposed prohibitively high tariffs on the import of foreign grain. Ricardo's theory of rents showed that the Corn Laws benefited the landowning aristocracy at the expense of the industrialists. His sympathies were with the industrialists, because he felt that the Corn Laws were forcing England back into feudalism and economic stagnation. By contrast, Malthus favored the Corn laws because he felt that it was dangerous for England to become dependent on imports of foreign grain. What would the country do in case of war?, Malthus asked. What would England do if it lost its industrial edge and became unable to export its manufactured products? How would the country then support its overgrown population?

In the end, the aristocracy lost its control of Parliament, the Corn Laws were repealed, and the population of England continued to grow. It has grown from 8.3 million in 1801, the year of the first census, to 50.7 million in 2006. Today, England could not possibly support its population on home-grown food. Like the Netherlands and Japan, Britain is dependent on exports of manufactured goods and imports of grain.

The Iron Law of Wages

Ricardo believed that the "natural price" of any commodity is the lowest possible cost of its production, and that in the long run, prices of any commodity would approach this natural value. When he applied this idea to labor, the result was his "Iron Law of Wages". Since the lowest cost of "producing" workers is the cost of keeping them alive at the subsistence level, he reasoned, the natural price of labor is determined by the lowest possible cost of sustenance. If workers are paid less than this, they will die, their numbers will decrease, the demand for workers will increase, and the price of labor will rise. If they are paid more, a greater number of their children will survive, the number of workers will increase above demand, and wages will fall. According to this argument, starvation wages are inevitable.

Ricardo's reasoning assumes industrialists to be completely without social conscience or governmental regulation; it fails to anticipate the development of trade unionism; and it assumes that the working population will multiply without restraint as soon as their wages rise above the starvation level. This was an accurate description of what was happening in England during Ricardo's lifetime, but it obviously does not hold for all times and all places.

Malthus became a close friend of the wealthy financier and economic theorist, David Ricardo (1772-1823). He and Ricardo met frequently to discuss economic problems, and when circumstances prevented them from meeting, they exchanged endless letters. Ricardo and Malthus differed on the subject of the Corn Laws, but they never allowed this difference of opinion to affect their friendship.

Although shortages of food had produced drastic increases in the price of grain, the import of cheap foreign grain was effectively prevented by the Corn Laws. These laws

had been introduced by the large landowners, who controlled Parliament, but they were opposed by the manufacturers, who wished to make less expensive food available to their workers. On this issue, Malthus sided with the landowners, arguing that if England became dependent on imports of foreign grain, the country would be insecure: What if England's ability to export manufactured goods in exchange for the grain should later be undermined by foreign competition? Malthus pointed out that the country would then face starvation. Ricardo, on the other hand, sided with the rising class of manufacturers. In 1832 the Reform Bill gave the manufacturers control of Parliament, the Corn Laws were repealed, and England's rapidly-growing population became dependent on imports of foreign grain.

Ricardo accepted Malthus' principle of population, and from it he deduced what came to be called his "Iron Law of Wages". According to Ricardo, labor is a commodity, and wages are determined by the law of supply and demand: When wages fall below the starvation level, the workers' children die. Labor then becomes a scarce commodity, and wages rise. On the other hand, when wages rise above the starvation level, the working population multiplies rapidly, labor becomes a plentiful commodity, and wages fall again.

Thus, according to Ricardo, there is an Iron Law which holds wages at the minimum level at which life can be supported. The combined pessimism of Malthus and Ricardo caused Carlyle to call economics "the dismal science".

3.4 The slow acceptance of birth control in England

With the gradual acceptance of birth control in England, the growth of trade unions, the passage of laws against child labor and finally minimum wage laws, conditions of workers gradually improved, and the benefits of industrialization began to spread to the whole of society.

One of the arguments which was used to justify the abuse of labor was that the alternative was starvation. The population of Europe had begun to grow rapidly for a variety of reasons: - because of the application of scientific knowledge to the prevention of disease; because the potato had been introduced into the diet of the poor; and because bubonic plague had become less frequent after the black rat had been replaced by the brown rat, accidentally imported from Asia.

It was argued that the excess population could not be supported unless workers were employed in the mills and factories to produce manufactured goods, which could be exchanged for imported food. In order for the manufactured goods to be competitive, the labor which produced them had to be cheap: hence the abuses. (At least, this is what was argued).

Industrialization benefited England, but in a very uneven way, producing great wealth for some parts of society, but also extreme misery in other social classes. For many, technical progress by no means led to an increase of happiness. The persistence of terrible poverty in 19th-century England, and the combined pessimism of Ricardo and Malthus, caused Thomas Carlyle to call economics "the Dismal Science".

Among the changes which were needed to insure that the effects of technical progress

became beneficial rather than harmful, the most important were the abolition of child labor, the development of unions, the minimum wage law, and the introduction of birth control.

Francis Place (1771-1854), a close friend of William Godwin and James Mill, was one of the earliest and most courageous pioneers of these needed changes. Place had known extreme poverty as a child, but he had risen to become a successful businessman and a leader of the trade union movement.

Place and Mill were Utilitarians, and like other members of this movement they accepted the demographic studies of Malthus while disagreeing with Malthus' rejection of birth control. They reasoned that since abortion and infanticide were already widely used by the poor to limit the size of their families, it was an indication that reliable and humane methods of birth control would be welcome. If marriage could be freed from the miseries which resulted from excessive numbers of children, the Utilitarians believed, prostitution would become less common, and the health and happiness of women would be improved.

Francis Place and James Mill decided that educational efforts would be needed to make the available methods of birth control more widely known and accepted. In 1818, Mill cautiously wrote "The great problem of a real check to population growth has been miserably evaded by all those who have meddled with the subject... And yet, if the superstitions of the nursery were discarded, and the principle of utility kept steadily in view, a solution might not be very difficult to be found."

A few years later, Mill dared to be slightly more explicit: "The result to be aimed at", he wrote in his *Elements of Political Economy* (1821), "is to secure to the great body of the people all the happiness which is capable of being derived from the matrimonial union, (while) preventing the evils which the too rapid increase of their numbers would entail. The progress of legislation, the improvement of the education of the people, and the decay of superstition will, in time, it may be hoped, accomplish the difficult task of reconciling these important objects."

In 1822, Francis Place took the considerable risk of publishing a four-page pamphlet entitled *To the Married of Both Sexes of the Working People*, which contained the following passages:

"It is a great truth, often told and never denied, that when there are too many working people in any trade or manufacture, they are worse paid than they ought to be paid, and are compelled to work more hours than they ought to work. When the number of working people in any trade or manufacture has for some years been too great, wages are reduced very low, and the working people become little better than slaves."

"When wages have thus been reduced to a very small sum, working people can no longer maintain their children as all good and respectable people wish to maintain their children, but are compelled to neglect them; - to send them to different employments; - to Mills and Manufactories, at a very early age. The miseries of these poor children cannot be described, and need not be described to you, who witness them and deplore them every day of your lives."

"The sickness of yourselves and your children, the privation and pain and premature death of those you love but cannot cherish as you wish, need only be alluded to. You know



Figure 3.2: The Utilitarian philosopher and economist James Mill (1773-1836) was an early advocate of birth control. (He was the father of John Stuart Mill.)

all these evils too well.”

“And what, you will ask, is the remedy? How are we to avoid these miseries? The answer is short and plain: the means are easy. Do as other people do, to avoid having more children than they wish to have, and can easily maintain.”

“What is to be done is this. A piece of soft sponge is tied by a bobbin or penny ribbon, and inserted just before the sexual intercourse takes place, and is withdrawn again as soon as it has taken place. Many tie a sponge to each end of the ribbon, and they take care not to use the same sponge again until it has been washed. If the sponge be large enough, that is, as large as a green walnut, or a small apple, it will prevent conception... without diminishing the pleasures of married life...”

“You cannot fail to see that this address is intended solely for your good. It is quite impossible that those who address you can receive any benefit from it, beyond the satisfaction which every benevolent person and true Christian, must feel, at seeing you comfortable, healthy and happy.”

The publication of Place’s pamphlet in 1822 was a landmark in the battle for the acceptance of birth control in England. Another important step was taken in 1832, when a small book entitled *The Fruits of Philosophy or, the Private Companion of Young Married People* was published by a Boston physician named Dr. Charles Knowlton. The book contained simple contraceptive advice. It reviewed the various methods of birth control available at the time. In order for the sponge method to be reliable, Knowlton’s book pointed out, use of a saline douching solution was necessary.

The battle for these social reforms was not easily won. For example, in 1876, “The Fruits of Philosophy” was ruled by an English court to be obscene, and a bookseller was sentenced to two years imprisonment for distributing it. The liberal politician Charles Bradlaugh and his friend, the feminist author Annie Besant then decided to provoke a new trial by selling the book themselves. They wrote polite letters to the Chief Clerk of the Magistrates, the Detective Department, and the City Solicitor announcing the time and the place at which they intended to sell the book, and they asked to be arrested. The result was a famous trial in which the two reformers were acquitted, but the jury again ruled “The Fruits of Philosophy” to be obscene.

As the nineteenth century progressed, birth control gradually came to be accepted in England, and the average number of children per marriage fell from 6.16 in 1860 to 4.13 in 1890. By 1915 this figure had fallen to 2.43. Because of lowered population pressure, combined with the growth of trade unions and better social legislation, the condition of England’s industrial workers improved; and under the new conditions, Ricardo’s Iron Law of Wages fortunately no longer seemed to hold.

3.5 Trade unions and child labor laws

Nor was the battle to establish trade unions easily won. At the start of the 19th century, many countries had laws prohibiting organizing unions, and these invoked penalties up to and including death. In England, the Reform Act of 1832 made unions legal, but never-

theless in 1834, six men from Dorset who had formed the “Friendly Society of Agricultural Workers” were arrested and sentenced to a seven years’ transportation to Australia. An obscure law from 1797 was invoked, which prohibited swearing secret oaths. This they had in fact done, but their main crime seems to have been refusing to work for less than 10 shillings a week. Despite bitter opposition, trade unions gradually developed both in England and in other industrial countries.

One of the important influences for reform was the Fabian Society, founded in London in 1884. The group advocated gradual rather than revolutionary reform (and took its name from Quintus Fabius Maximus, the Roman general who defeated Hannibal’s Carthaginian army by using harassment and attrition rather than head-on battles). The Fabian Society came to include a number of famous people, including Sydney and Beatrice Webb, George Bernard Shaw, H.G. Wells, Annie Besant, Leonard Woolf, Emaline Pankhurst, Bertrand Russell, John Maynard Keynes, Harold Laski, Ramsay MacDonald, Clement Attlee, Tony Benn and Harold Wilson. Jawaharlal Nehru, India’s first Prime Minister, was greatly influenced by Fabian economic ideas.

The group was instrumental in founding the British Labour Party (1900), the London School of Economics and the New Statesman. In 1906, Fabians lobbied for a minimum wage law, and in 1911 they lobbied for the establishment of a National Health Service.

Adam Smith had praised division of labor as one of the main elements in industrial efficiency, but precisely this aspect of industrialism was criticized by Thomas Carlyle (1795-1891), John Ruskin (1819-1900) and William Morris (1834-1896). They considered the numbingly repetitive work of factory laborers to be degrading, and they rightly pointed out that important traditions of design were being lost and replaced by ugly mass produced artifacts. The Arts and Crafts movement founded by Ruskin and Morris advocated cooperative workshops, where creative freedom and warm human relationships would make work rewarding and pleasant. In several Scandinavian countries, whose industrialization came later than England’s, efforts were made to preserve traditions of design. Hence the present artistic excellence of Scandinavian furniture and household articles.

Through the influence of reformers, the more brutal aspects of Adam Smith’s economic model began to be moderated. Society was learning that free market mechanisms alone do not lead to a happy and just society. In addition, ethical and ecological considerations and some degree of governmental regulation are also needed.

The Reform Movement aimed at social goals, but left ecological problems untreated. Thus our economic system still does not reflect the true price to society of environmentally damaging activities. For example, the price of coal does not reflect the cost of the environmental damage done by burning it. This being so, our growth-worshiping economic system of today thunders ahead towards an environmental mega-catastrophe, as we will see in the next chapter.



Figure 3.3: Beatrice Webb (1858-1943). Together with her husband Sidney Webb, Graham Wallace and George Bernard Shaw, she founded the London School of Economics using money left to the Fabian Society by Henry Hutchinson. The Fabians also founded the British Labour Party, and they lobbied for a minimum wage law and National Health Service.

3.6 John Stuart Mill

He was not allowed to have a childhood

John Stuart Mill (1806-1873) showed his genius at an early age, and his father, the Utilitarian philosopher and political economist James Mill, immediately began to groom him to replace Jeremy Bentham as the leader of the Utilitarian movement. From the age of 3 onwards, Mill was deliberately kept away from children of his own age and made to spend all his waking hours in study. Play was not allowed, since it would break the habit of continual diligence.

At the age of three, Mill was taught Greek. By the time he reached eight, he had read Aesop's Fables, Xenophon's Anabasis, and all the works of Herodotus. He was also acquainted with Lucian, Diogenes Laërtius, Isocrates and six dialogues of Plato, in their original language. Furthermore, he had also read a great deal of history in English and had been taught arithmetic, physics and astronomy.

When he was twelve, Mill began a thorough study of the scholastic logic, at the same time reading Aristotle's logical treatises in the original language. At thirteen, he was introduced to political economy and studied the classical economists Adam Smith and David Ricardo. In fact Ricardo, who was a close friend of his father, used to invite the young Mill to his house for a walk in order to talk about political economy.

At the age of fourteen, Mill spent a year in France, where he attended the winter courses on chemistry, zoology, logic of the Faculté des Sciences, as well as taking a course of the higher mathematics. He also met the economist Jean-Baptiste Say, a friend of his father, and the political philosopher Henri Saint-Simon.

Limits to growth

John Stuart Mill pioneered the concept of a steady.state economy. He realized that on a finite earth, neither the population of humans nor the economy can continue to grow forever. In 1848 (when there were just over one billion people in the world), he described the optimal global population in the following words:

"The density of population necessary to enable mankind to obtain, in the greatest degree, all the advantages of cooperation and social intercourse, has, in the most populous countries, been attained. A population may be too crowded, although all be amply supplied with food and raiment."

"... Nor is there much satisfaction in contemplating the world with nothing left to the spontaneous activity of nature; with every rood of land brought into cultivation, which is capable of growing food for human beings; every flowery waste or natural pasture plowed up, all quadrupeds or birds which are not domesticated for man's use exterminated as his rivals for food, every hedgerow or superfluous tree rooted out, and scarcely a place left where a wild shrub or flower could grow without being eradicated as a weed in the name of improved agriculture. If the earth must lose that great portion of its pleasantness which it owes to things that the unlimited increase of wealth and population would extirpate



Figure 3.4: **John Stuart Mill and his stepdaughter Helen Taylor, with whom he worked for fifteen years after the death of his wife, Harriet Taylor Mill (Wikipedia).**

from it, for the mere purpose of enabling it to support a larger, but not better or happier population, I sincerely hope, for the sake of posterity, that they will be content to be stationary, long before necessity compels them to it.”

Contributions to Utilitarian theory

Jeremy Bentham (1748-1832) had written that “it is the greatest happiness of the greatest number that is the measure of right and wrong”. Mill refined this basic principle of Utilitarianism by pointing out the difference between higher pleasures, for example moral or intellectual pleasures, and lower ones, such as pleasures of the flesh. Mill remarked that “It is better to be a human being dissatisfied than a pig satisfied; better to be Socrates dissatisfied than a fool satisfied. And if the fool, or the pig, are of a different opinion, it is because they only know their own side of the question.”

Ideas on economics and on individual liberty

According to David Ricardo’s “Iron Law of Wages”, laborers must always live on the exact borderline between starvation and survival. Wages, Ricardo argued, are determined by the laws of supply and demand. If wages increase above the starvation level, more children of workers survive, the supply of workers increases, and the wages fall once more.

Mill rebelled against Ricardo’s dismal “Iron Law” by pointing out that although the means of production might be regulated by the necessities of economics, social conscience

can determine the way in which the goods are distributed. (Later Mahatma Gandhi extended this idea by showing that social conscience can also play a role in the way that goods are produced).

John Stuart Mill also contributed importantly to the idea of individual liberty as opposed to unlimited control by the state or by social opinion. He is the author of the following influential principle: "The only purpose for which power can be rightfully exercised over any member of a civilized community, against his will, is to prevent harm to others."

Opposition to slavery

Regarding slavery, Mill wrote: "This absolutely extreme case of the law of force, condemned by those who can tolerate almost every other form of arbitrary power, and which, of all others, presents features the most revolting to the feeling of all who look at it from an impartial position, was the law of civilized and Christian England within the memory of persons now living: and in one half of Angle-Saxon America three or four years ago, not only did slavery exist, but the slave trade, and the breeding of slaves expressly for it, was a general practice between slave states. Yet not only was there a greater strength of sentiment against it, but, in England at least, a less amount either of feeling or of interest in favour of it, than of any other of the customary abuses of force: for its motive was the love of gain, unmixed and undisguised: and those who profited by it were a very small numerical fraction of the country, while the natural feeling of all who were not personally interested in it, was unmitigated abhorrence."

Member of Parliament and advocate of for votes for women

During the years between 1865 and 1868, John Stuart Mill served simultaneously as a Member of Parliament and as Lord Rector of the University of St. Andrews. In Parliament, Mill was the first person to call for votes for women. His motion was defeated, but it set an important precedent. Mill may have been influenced by his wife, Harriet Taylor Mill, who was a brilliant person in her own right.

Together with his wife and stepdaughter, Mill composed a book entitled *The Subjugation of Women*, which was completed in 1861. It contains a passage arguing that "the legal subordination of one sex to another - is wrong in itself, and now one of the chief hindrances to human improvement; and that it ought to be replaced by a system of perfect equality, admitting no power and privilege on the one side, nor disability on the other.

Some quotations

Bad men need nothing more to compass their ends, than that good men should look on and do nothing.

A person may cause evil to others not only by his actions but by his inaction, and in either case he is justly accountable to them for the injury.

I have learned to seek my happiness by limiting my desires, rather than in attempting to satisfy them.

In this age, the mere example of non-conformity, the mere refusal to bend the knee to custom, is itself a service. Precisely because the tyranny of opinion is such as to make eccentricity a reproach, it is desirable, in order to break through that tyranny, that people should be eccentric. Eccentricity has always abounded when and where strength of character has abounded; and the amount of eccentricity in a society has generally been proportional to the amount of genius, mental vigor, and moral courage which it contained. That so few now dare to be eccentric, marks the chief danger of the time.

The only freedom which deserves the name is that of pursuing our own good in our own way, so long as we do not attempt to deprive others of theirs, or impede their efforts to obtain it. Each is the proper guardian of his own health, whether bodily, or mental or spiritual. Mankind are greater gainers by suffering each other to live as seems good to themselves, than by compelling each to live as seems good to the rest.

It is not because men's desires are strong that they act ill; it is because their consciences are weak

Every man who says frankly and fully what he thinks is so far doing a public service. We should be grateful to him for attacking most unsparingly our most cherished opinions.

Those only are happy (I thought) who have their minds fixed on some object other than their own happiness; on the happiness of others, on the improvement of mankind, even on some art or pursuit, followed not as a means, but as itself an ideal end. Aiming thus at something else, they find happiness by the way. The enjoyments of life (such was now my theory) are sufficient to make it a pleasant thing, when they are taken en passant, without being made a principal object.

Whatever we may think or affect to think of the present age, we cannot get out of it; we must suffer with its sufferings, and enjoy with its enjoyments; we must share in its lot, and, to be either useful or at ease, we must even partake its character.

What is called the Law of Nations is not properly law, but a part of ethics: a

set of moral rules, accepted as authoritative by civilized states.

If all mankind minus one, were of one opinion, and only one person were of the contrary opinion, mankind would be no more justified in silencing that one person, than he, if he had the power, would be justified in silencing mankind.

Member of Parliament and advocate of for votes for women

During the years between 1865 and 1868, John Stuart Mill served simultaneously as a Member of Parliament and as Lord Rector of the University of St. Andrews. In Parliament, Mill was the first person to call for votes for women. His motion was defeated, but it set an important precedent. Mill may have been influenced by his wife, Harriet Taylor Mill, who was a brilliant person in her own right.

Together with his wife and stepdaughter, Mill composed a book entitled *The Subjugation of Women*, which was completed in 1861. It contains a passage arguing that “the legal subordination of one sex to another - is wrong in itself, and now one of the chief hindrances to human improvement; and that it ought to be replaced by a system of perfect equality, admitting no power and privilege on the one side, nor disability on the other.

Ricardo's model accurately described the condition of industrial workers at the time when he was living. However, this model did not take into account the possibility of trade unions and social legislation fixing the minimum wage; nor did Ricardo's model take into account the possibility that workers would use birth control to limit their population growth.

We have seen that Malthus himself was opposed to birth control, advocating late marriage and “moral restraint” instead as the proper means for avoiding excessive population growth. However others in England, notably the Utilitarians, while accepting Malthus' ideas concerning population pressure, advocated birth control as a means of relieving it. In 1821, the Utilitarian philosopher James Mill (the father of John Stuart Mill) wrote in his *Elements of Political Economy*: “The result to be aimed at is to secure to the great body of the people all the happiness which is capable of being derived from the matrimonial union, (while) preventing the evils which the too rapid increase of their numbers would entail. The progress of legislation, the improvement of the education of the people, and the decay of superstition will, in time, it may be hoped, accomplish the difficult task of reconciling these important objects.”

This somewhat vague advocacy of birth control was made much more explicit by the trade union leader Francis Place (1771-1854). In 1822 Place published, at considerable risk to himself, a pamphlet entitled *To the Married of Both Sexes of the Working People*. Place's pamphlet contains the following passages:

“It is a great truth, often told and never denied, that when there are too many working people in any trade or manufacture, they are worse paid than they ought to be paid, and are compelled to work more hours than they ought to work. When the number of working people in any trade or manufacture has for some years been too great, wages are reduced

very low, and the working people become little better than slaves.” “When wages have thus been reduced to a very small sum, working people can no longer maintain their children as all good and respectable people wish to maintain their children, but are compelled to neglect them; - to send them to different employments; - to Mills and Manufactories, at a very early age.”

“The miseries of these poor children cannot be described, and need not be described to you, who witness them and deplore them every day of your lives.”

“The sickness of yourselves and your children, the privation and pain and premature death of those you love but cannot cherish as you wish, need only be alluded to. You know all these evils too well.” “And what, you will ask, is the remedy? How are we to avoid these miseries? The answer is short and plain: the means are easy. Do as other people do, to avoid having more children than they wish to have, and can easily maintain.”

Place’s pamphlet then goes on to describe very explicitly the sponge method of contraception. “What is to be done is this. A piece of soft sponge is tied by a bobbin or penny ribbon, and inserted just before intercourse takes place. Many tie a sponge to each end of a ribbon, and they take care not to use the same sponge again until it has been washed. If the sponge be large enough, that is, as large as a green walnut, or a small apple, it will prevent conception.... without diminishing the pleasures of married life...”

In 1832, Dr. Charles Knowlton, a Boston physician, published a book entitled *The Fruits of Philosophy, or the Private Companion of Young Married People*. It reviewed the various methods of birth control then available, and it pointed out that in order to be reliable, the sponge method required the use of a saline douching solution. This small book was reprinted in England and sold for a number of years without opposition. However, in 1876, the book was classified as obscene under a new law, and a bookseller was sentenced to two years in prison for selling it. The feminist leader, Annie Besant, and the liberal politician, Charles Bradlaugh, then provoked a new trial by selling the book themselves. They sent a polite letter to the magistrates announcing when and where they intended to sell Knowlton’s book, and asking to be arrested. The result was a famous trial, at which the arguments of Malthus were quoted both by the judge and by the defense. The result of trial was inconclusive, however: Annie Besant and Charles Bradlaugh were acquitted, but Knowlton’s book was held to be obscene.

As the nineteenth century progressed, birth control gradually came to be accepted in England, and the average number of children per marriage fell from 6.16 in 1860 to 4.13 in 1890. By 1915 this figure had fallen to 2.43. Because of lowered population pressure, combined with the growth of trade unions and better social legislation, the condition of England’s industrial workers improved; and under the new conditions, Ricardo’s Iron Law of Wages fortunately no longer seemed to hold.



Figure 3.5: **Francis Place (1771-1854)**, was a trade union leader and reformer who was anxious to improve the lives of workers. His political activities brought him into contact with William Godwin, James Mill, John Stuart Mill, Robert Owen and Jeremy Bentham. He courageously advocated birth control at a time when it was dangerous to do so.



Figure 3.6: Annie Besant (1847-1933). She and the Liberal politician Charles Bradlaugh sent a polite letter to the magistrates announcing when and where they intended to sell Knowlton's book on birth control methods, and asking to be arrested. The result was a famous trial, at which the arguments of Malthus were quoted both by the judge and by the defense. The result of trial was inconclusive, however: Annie Besant and Charles Bradlaugh were acquitted, but Knowlton's book was held to be obscene.



Figure 3.7: Marie Stopes (1880-1958). She founded the first birth control clinic in Britain, and authored the controversial sex manual *Married Love*. Stopes disapproved of abortion and believed that birth control methods should be used to make abortion unnecessary. She edited the newsletter *Birth Control News*, which gave explicit practical advice.

3.7 The Fabians

With the gradual acceptance of birth control in England, the growth of trade unions, the passage of laws against child labor and finally minimum wage laws, conditions of workers gradually improved, and the benefits of industrialization began to spread to the whole of society.

One of the important influences for reform was the Fabian Society, founded in London in 1884. The group advocated gradual rather than revolutionary reform (and took its name from Quintus Fabius Maximus, the Roman general who defeated Hannibal's Carthaginian army by using harassment and attrition rather than head-on battles). The Fabian Society came to include a number of famous people, including Sydney and Beatrice Webb, George Bernard Shaw, H.G. Wells, Annie Besant, Leonard Woolf, Emmeline Pankhurst, Bertrand Russell, John Maynard Keynes, Harold Laski, Ramsay MacDonald, Clement Attlee, Tony Benn and Harold Wilson. Jawaharlal Nehru, India's first Prime Minister, was greatly influenced by Fabian economic ideas.

The group was instrumental in founding the British Labour Party (1900), the London School of Economics and the New Statesman. In 1906, Fabians lobbied for a minimum wage law, and in 1911 they lobbied for the establishment of a National Health Service.



Figure 3.8: The sociologist, economist, socialist, labour historian and social reformer, Beatrice Webb (1858-1943), played an important role in the founding of the Fabian Society and the British Labour Party.

3.8 John A. Hobson

The colonial era

The rapid development of technology in the Europe also opened an enormous gap in military strength between the industrialized nations and the rest of the world. Taking advantage of their superior weaponry, the advanced industrial nations rapidly carved the remainder of the world into colonies, which acted as sources of raw materials and food, and as markets for manufactured goods.

Throughout the American continent, the native Indian population had proved vulnerable to European diseases, such as smallpox, and large numbers of them had died. The remaining Indians were driven westward by streams of immigrants arriving from Europe.

In the 18th and 19th centuries, the continually accelerating development of science and science-based industry began to affect the whole world. As the factories of Europe poured out cheap manufactured goods, a change took place in the patterns of world trade: Before the Industrial Revolution, trade routes to Asia had brought Asian spices, textiles and luxury goods to Europe. For example, cotton cloth and fine textiles, woven in India, were imported to England. With the invention of spinning and weaving machines, the trade was reversed. Cheap cotton cloth, manufactured in England, began to be sold in India, and the Indian textile industry withered, just as the hand-loom industry in England itself had done a century before.

Often the industrialized nations made their will felt by means of naval bombardments: In 1854, Commodore Perry forced Japan to accept foreign traders by threatening to bombard Tokyo. In 1856, British warships bombarded Canton in China to punish acts of violence against Europeans living in the city. In 1864, a force of European and American warships bombarded Choshu in Japan, causing a revolution. In 1882, Alexandria was bombarded, and in 1896, Zanzibar.

Much that was beautiful and valuable was lost, as mature traditional cultures collapsed, overcome by the power and temptations of modern industrial civilization. For the Europeans and Americans of the late 19th century and early 20th century, progress was a religion, and imperialism was its crusade.

Between 1800 and 1875, the percentage of the earth's surface under European rule increased from 35 percent to 67 percent. In the period between 1875 and 1914, there was a new wave of colonial expansion, and the fraction of the earth's surface under the domination of colonial powers (Europe, the United States and Japan) increased to 85 percent, if former colonies are included.

The unequal (and unfair) contest between the industrialized countries, armed with modern weapons, and the traditional cultures with their much more primitive arms, was summarized by the English poet Hilaire Belloc in a cynical couplet:

Whatever happens, we have got
The Maxim gun, and they have not.



Figure 3.9: The Maxim gun was one of the world's first automatic machine guns. It was invented in the United States in 1884 by Hiram S. Maxim. The explorer and colonialist Henry Morton Stanley (1841-1904) was extremely enthusiastic about Maxim's machine gun, and during a visit to the inventor he tried firing it, demonstrating that it really could fire 600 rounds per minute. Stanley commented that the machine gun would be "a valuable tool in helping civilization to overcome barbarism".

During the period between 1880 and 1914, British industrial and colonial dominance began to be challenged. Industrialism had spread from Britain to Belgium, Germany and the United States, and, to a lesser extent, to France, Italy, Russia and Japan. By 1914, Germany was producing twice as much steel as Britain, and the United States was producing four times as much.

New techniques in weaponry were introduced, and a naval armaments race began among the major industrial powers. The English found that their old navy was obsolete, and they had to rebuild. Thus, the period of colonial expansion between 1880 and 1914 was filled with tensions, as the industrial powers raced to arm themselves in competition with each other, and raced to seize as much as possible of the rest of the world. Industrial and colonial rivalry contributed to the outbreak of the First World War, to which the Second World War can be seen as a sequel.

Hobson's explanation

The English economist John Atkinson Hobson (1858-1940) offered a famous explanation for the colonial era in his book *Imperialism: A study* (1902). Hobson graduated from Lincoln College, Oxford, and later taught classics and English literature at schools in Faversham and Exeter. In 1887, he joined the Fabian Society and, during the last decade of the 19th century, he wrote several influential books: *Problems of Poverty*, (1891); *Evolution of Modern Capitalism*, (1894); *Problem of the Unemployed*, (1896); and *John Ruskin: Social Reformer*, (1898).

Hobson agreed with Ruskin's belief that economics should not be exclusively concerned with money matters but ought to contain ethical and humanitarian values as well, and he advocated the formation of cooperative labor guilds where human contacts would make work more pleasurable and rewarding.

The editor of the Manchester Guardian recruited John Hobson as a correspondent to cover the Second Boer War. His experiences in Africa as well as in England convinced Hobson that the war was being fought for economic reasons. In his book, *Imperialism*, published in 1902, Hobson analyzed the economic motivations behind the colonial era.

According to Hobson, the basic problem is an excessively unequal distribution of incomes in industrial countries like England. The result of this unequal distribution is that neither the rich nor the poor are in a position to buy back the total output of the highly industrialized nations. The poor cannot consume enough because their incomes are inadequate. Meanwhile the rich, who have enough money, are very few in number, and each of them has only finite needs. Therefore the rich cannot consume enough either, and they tend to save their excess money. The total effect is that the society is producing more than it can consume.

In this situation, Adam Smith would have proposed a simple solution: The rich (Smith would say) ought to reinvest their excess income in new factories. But, as Hobson pointed out, this would only aggravate the situation. If society is already unable to buy back its output, the new factories would only make matters worse by increasing production.



Figure 3.10: A French cartoon from the 1890's showing England, Germany, Russia, France and Japan slicing up the pie of China.

This situation, Hobson pointed out, provides a powerful economic motivation for imperialism. The excess output of industries can be sold to colonial peoples, and the excess savings of the rich can be invested abroad. This was in fact what was happening on a very large scale at the end of the 19th century. However, having personally witnessed the Second Boer War, Hobson believed imperialism to be immoral, since it entailed great suffering both among the colonial peoples and among the poor in the highly industrialized countries. The cure that Hobson recommended was a more equal distribution of incomes in the manufacturing nations.

Hobson was very popular as a lecturer and writer, but his ideas were too unorthodox to be accepted by the established economists of the time. His theory was, however, enthusiastically adopted by V.I. Lenin, and Hobson's economic analysis of imperialism became a central part of Marxist-Leninist doctrine. This gave Hobson's ideas wide circulation, but in a political context that the mild mannered English economist would hardly have endorsed. Hobson's political opinions were in fact close to those of Ruskin and the Fabians, who believed in gradual progress rather than violent revolution.

The neocolonial era?

For a long time, Britain held its position as the leading industrial and colonial power, but from 1890 onwards its dominance was challenged by Germany, the United States, Belgium, France, Italy, Russia and Japan. Rivalry between these industrial powers, competing with each other for colonies, natural resources, markets, and military power, contributed to the start of World War I. At the end of "the Great War", the League of Nations assigned "protectorates" to the victors. These "protectorates" were, in fact, colonies with a new name, although in principle protectorates were supposed to be temporary.

The Second World War was terrible enough to make world leaders resolve to end the institution of war once and for all, and the United Nations was set up for this purpose. Despite the flaws and weaknesses of the UN Charter, the organization was successful in formally ending the era of colonialism. One must say "formally ending" rather than "ending", because colonialism persisted in a new guise: During the classical era of colonialism, there was direct political power, with Viceroys and Governors General acting as formal rulers of colonies. During the decades following the Second World War, almost all colonies were granted formal independence, but nevertheless the influence of the industrialized nations was strongly felt in the developing world. Direct political power was replaced by indirect methods.

3.9 Reforms undermined by globalization

The reform movement's efforts, especially those of the Fabians, overcame the worst horrors of early 19th century industrialism, but today their hard-won achievements are being undermined and lost because of uncritical and unregulated globalization. Today, a factory owner or CEO, anxious to avoid high labor costs, and anxious to violate environmental

regulations merely moves his factory to a country where laws against child labor and rape of the environment do not exist or are poorly enforced. In fact, he must do so or be fired, since the only thing that matters to the stockholders is the bottom line.

The movement of a factory from Europe or North America to a country with poorly enforced laws against environmental destruction, child labor, and slavery, puts workers into unfair competition. Unless they are willing to accept revival of the unspeakable conditions of the early Industrial Revolution, they are unable to compete.

Today, child labor accounts for 22% of the workforce in Asia, 32% in Africa, and 17% in Latin America. Large-scale slavery also exists today, although there are formal laws against it in every country. There are more slaves now than ever before. Their number is estimated to be between 12 million and 27 million. Besides outright slaves, who are bought and sold for as little as 100 dollars, there many millions of workers whose lack of options and dreadful working conditions must be described as slavlike.¹

Adam Smith had praised division of labor as one of the main elements in industrial efficiency, but precisely this aspect of industrialism was criticized by Thomas Carlyle (1795-1891), John Ruskin (1819-1900) and William Morris (1834-1896). They considered the numbingly repetitive work of factory laborers to be degrading, and they rightly pointed out that important traditions of design were being lost and replaced by ugly mass produced artifacts. The Arts and Crafts movement founded by Ruskin and Morris advocated cooperative workshops, where creative freedom and warm human relationships would make work rewarding and pleasant. In several Scandinavian countries, whose industrialization came later than England's, efforts were made to preserve traditions of design. Hence the present artistic excellence of Scandinavian furniture and household articles.

Through the influence of reformers, the more brutal aspects of Adam Smith's economic model began to be moderated. Society was learning that free market mechanisms alone do not lead to a happy and just society. In addition, ethical and ecological considerations and some degree of governmental regulation are also needed.

The Reform Movement aimed at social goals, but left ecological problems untreated. Thus our economic system still does not reflect the true price to society of environmentally damaging activities. For example, the price of coal does not reflect the cost of the environmental damage done by burning it. This being so, our growth-worshiping economic system of today thunders ahead towards an environmental mega-catastrophe.

¹<http://www.commondreams.org/news/2015/08/04/state-dept-accused-watering-down-human-rights-ratings-advance-obama-trade-agenda>
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Chapter 4

THE UTOPIAN SOCIALISTS

4.1 Henri de Saint-Simon

Claude Henri de Rouvroy, comte de Saint-Simon (1760-1825), was a French aristocrat who has an important place in the history of economic thought as one of the principal founders of Utopian Socialism.

From a young age he was very ambitious: He instructed his valet to wake him very early each morning with the words, “Remember, monsieur le comte, that you have great things to do!” Among the young nobleman’s early ideas were a canal to connect the Atlantic with the Pacific, and a canal to connect Madrid with the ocean. Later he fought on the American side in the war that freed the colonies from England, taking part in the siege of Yorktown under George Washington. He also supported the ideals of the French Revolution, but like many others, he was imprisoned during Robespierre’s Reign of Terror.

Here is how the New World Encyclopedia describes this phase of Saint-Simon’s life: “He remained in France during the French Revolution (1789), and bought up newly nationalized land with funds borrowed from a friend. During the Reign of Terror, he was imprisoned in the Palais de Luxembourg, and emerged extremely wealthy because the value of Revolutionary currency had depreciated. Saint-Simon lived a life of luxury, entertaining prominent people from all walks of life at his lavish and glittering salons. Within several years he was on the point of bankruptcy, and began to study science, taking courses at the École Polytechnique and acquainting himself with distinguished scientists. His first published work, *Lettres d’un habitant de Genève à ses contemporains* (1803; *Letters of an Inhabitant of Geneva to His Contemporaries*), proposed that scientists should replace priests in the social order, and that the property owners who held political power could only hope to maintain themselves against the propertyless if they subsidized the advance of knowledge.

“In August 1801, he married Mlle. de Champgrand. Less than a year later he divorced her, hoping to marry Mme. de Staël, who had just become a widow, but she refused. In 1805, completely ruined by his disordered life, he became a copyist at the Mont de Piété,

working nine hours a day for 40 pounds a year. He relied on his activities as a writer for his livelihood; failing in this, he lived on the generosity of a former valet, and finally solicited a small pension from his family. In 1823, he attempted suicide in despair. Late in his career, he made the acquaintance of Olinde Rodrigues, who became inspired by Saint-Simon's social ideas and provided him with a living. When dying, Saint-Simon said to Rodrigues, 'Remember that to do anything great you must be impassioned.'

"...Saint-Simon advocated an arrangement by which the industrial chiefs should control society. In place of the medieval church, the spiritual direction of society should fall to the men of science. Saint-Simon envisioned an industrialist state directed by modern science, in which universal association should suppress war. He believed that the men who are successfully able to organize society for productive labor are entitled to govern it. The social aim was to produce things useful to life. The conflict between labor and capital so much emphasized by later socialism was not present to Saint-Simon, who assumed that the industrial chiefs, to whom the control of production was to be committed, would rule in the interest of society. Later on he gave greater attention to the cause of the poor, until in his greatest work, *The New Christianity*, it took the form of a religion. This development of his teaching resulted in Saint-Simon's final quarrel with Comte.

"Saint-Simon's call for a 'science of society,' similar to the natural sciences, influenced his disciple Auguste Comte and the development of sociology and economics as fields of scientific study. Thomas Carlyle, Michel Chevalier, John Stuart Mill, Napoleon III, and the young Léon Walras were all inspired by Saint-Simonism. Saint-Simon's vision influenced French and European society throughout the nineteenth century. Saint-Simon's 'scientism' also influenced the development of Marxist theory."

Here are a few quotations from Saint-Simon:

Politics is the science of production.

No man has a right to free himself from the law of labour.

True equality consists in each drawing benefits from society in exact proportion to his social outlay, that is to his real capacity, to the beneficent use he makes of his abilities. And this equality is the natural foundation of industrial society.

Equality is the natural foundation of industrial society.

In the old system Society is governed essentially by men; in the new it is governed only by principles.

Today, for the first time since the existence of societies it is a question of organizing a totally new system; of replacing the celestial with the terrestrial, the vague by the positive, and the poetic by the real.



Figure 4.1: **Henri de Saint-Simon, (1760-1825).**

I have divided [the different sections of mankind] into three classes. The first, to which you and I have the honour to belong, marches under the banner of the progress of the human mind. It is composed of scientists, artists and all those who hold liberal ideas. On the banner of the second is written 'No innovation!' All proprietors who do not belong in the first category are part of the second. The third class, which rallies round the slogan of 'Equality' is made up of the rest of the people.

The philosopher places himself at the summit of thought; from there he views what the world has been and what it must become. He is not just an observer, he is an actor; he is an actor of the highest kind in a moral world because it is his opinion of what the world must become that regulates society.

The whole of society rests upon industry. Industry is the sole guarantee of its existence, the single source of all its wealth and all its prosperity. The state of things most favorable to industry is by that very reason the most favorable to society.

Saint-Simon's Declaration of Principles

- We regard society as the ensemble and union of men engaged in useful work. We can conceive of no other kind of society.
- Since governmental activity may be deemed a service which is useful to society, society should consent to pay for this service.
- It was in America, while I was fighting for the cause of industrial liberty, that I first felt the desire to see this plant from another world flower in my own country. This desire has since dominated all my thinking. Without respite I studied the course of advancement and further assured myself that the progress of civilization could have no other end. And I invoked this aim of true liberty, true public happiness, with my most fervent hopes. For me every event that seemed to point in that direction was a new joy, a new hope. The French Revolution broke out, and at first it seemed to be thoroughly industrial. But it soon lost that character, and the many noble efforts which ought to have produced liberty resulted only in the tyranny of the Jacobins and military despotism. A happier age has now started to dawn for us: at last a government has been established which declares its own power to be based on the power of opinion. Ever since then France has yielded to common sense, that is, to the free discussion of its common interests.

- It may be argued that writers stick to their convictions and serve only the truth, and that they only approve and support governmental conduct when they judge it to be in the interests of the governed. We accept that. We know that even those writers working under the eyes and under the influence of the Government always work, or at least claim to work only for society as a whole, and would be offended if it were thought otherwise. Nevertheless, we are convinced that the governed know better than anyone what they want and what is in their interest. We believe that government is at least an unnecessary intermediary between those who think about the public interest and those who feel it, between political writers and industry.

4.2 Charles Fourier

Quotations from Charles Fourier

The Civilized... murder their children by producing too many of them without being able to provide for their well-being. Morality or theories of false virtue stimulate them to manufacture cannon fodder, anthills of conscripts who are forced to sell themselves out of poverty. This improvident paternity is a false virtue, the selfishness of pleasure.

The method of doubt must be applied to civilization; we must doubt its necessity, its excellence, and its permanence.

The philosophers say that the passions are too lively, too fiery; in truth they are weak and languid. All around one sees the mass of men endure the persecution of a few masters and the despotism of prejudices without offering the slightest resistance... their passions are too weak to permit them to derive audacity from despair.

Philosophy was right to vaunt liberty; it is the foremost desire of all creatures. But philosophy forgot that in civilized societies liberty is illusory if the common people lack wealth. When the wage-earning classes are poor, their independence is as fragile as a house without foundations. The free man who lacks wealth immediately sinks back under the yoke of the rich. The newly freed slave takes fright at the need of providing for his own subsistence and hastens to sell himself back into slavery in order to escape this new anxiety that hangs over him like Damocles' sword. In thoughtlessly giving him liberty without wealth, you merely replace his physical torment with a mental torment. He finds life burdensome in his new state... Thus when you give liberty to the people, it must be bolstered by two supports which are the guarantee

of comfort and industrial attraction...

The peoples of civilization see their wretchedness increase in direct proportion to the advance of industry.

Social progress and changes of historical period take place in proportion to the advance of women toward liberty, and social decline occurs as a result of the diminution of the liberty of women.

Love in the Phalanstery is no longer, as it is with us, a recreation which detracts from work; on the contrary it is the soul and the vehicle, the mainspring, of all works and of the whole of universal attraction.

It is easy to compress the passions by violence. Philosophy suppresses them with a stroke of the pen. Locks and the sword come to the aid of sweet morality, but nature appeals these judgments; she regains her rights in secret. Passion stifled at one point reappears at another like water held back by a dike; it is driven inward like the fluid of an ulcer closed to soon.

Under civilization poverty is born of superabundance itself.

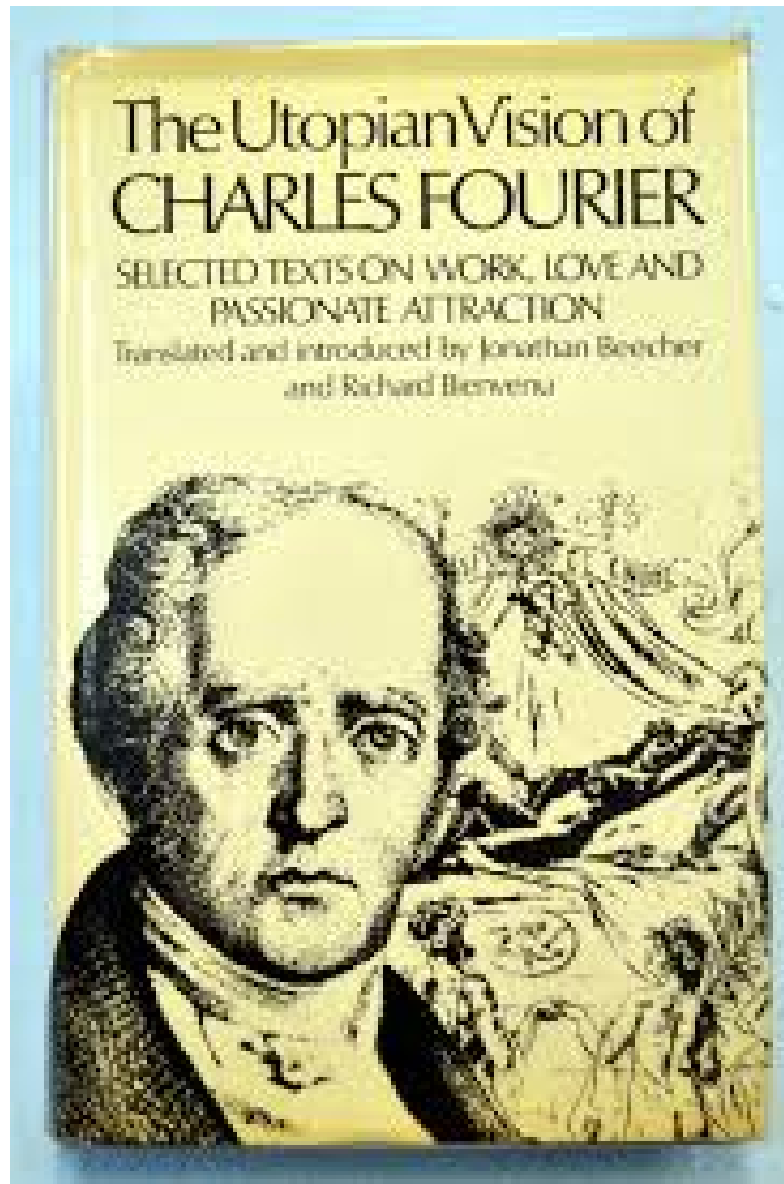


Figure 4.2: Charles Fourier, (1772-1837).

4.3 Robert Owen

During the early phases of the Industrial Revolution in England, the workers suffered greatly. Enormous fortunes were made by mill and mine owners, while workers, including young children, were paid starvation wages for cruelly long working days. However, trade unions, child labor laws, and the gradual acceptance of birth control finally produced a more even distribution of the benefits of industrialization.

One of the most interesting pioneers of these social reforms was Robert Owen (1771-1858), who is generally considered to have been the father of the Cooperative Movement. Although in his later years not all of his projects developed as he wished, his life started as an amazing success story. Owen's life is not only fascinating in itself; it also illustrates some of the reforms that occurred between 1815 and 1850.

Robert Owen was born in Wales, the youngest son of a family of iron-mongers and saddle-makers. He was a very intelligent boy, and did well at school, but at the age of 9, he was apprenticed to a draper, at first in Wales. Later, at the age of 11, he was moved to London, where he was obliged to work eighteen hours a day, six days a week, with only short pauses for meals. Understandably, Robert Owen found this intolerable, and he moved again, this time to Manchester, where he again worked for a draper.

While in Manchester, Robert Owen became interested in the machines that were beginning to be used for spinning and weaving. He borrowed a hundred pounds from his brother, and entered (as a partner) a small business that made these machines. After two years of moderate success as a small-scale industrialist, Owen saw the newspaper advertisement of a position for manager of a large spinning mill, owned by a Mr. Drinkwater.

"I put on my hat", Owen wrote later, "and proceeded straight to Mr. Drinkwater's counting house. 'How old are you?' 'Twenty this May', was my reply. 'How often do you get drunk in the week?'... 'I was never', I said, 'drunk in my life.' blushing scarlet at this unexpected question. 'What salary do you ask?' 'Three hundred a year', was my reply. 'What?', Mr. Drinkwater said with some surprise, repeating the words, 'Three hundred pounds! I have had this morning I know not how many seeking the situation and I do not think that all of their askings would amount to what you require.' 'I cannot be governed by what others seek', said I, 'and I cannot take less.'

Apparently impressed by Robert Owen's success as a small-scale industrialist, and perhaps also impressed by his courage, Mr. Drinkwater hired him. Thus, at the age of 19, Owen became the manager of a large factory. Mr. Drinkwater had no cause to regret his decision, since his new manager quickly became the boy wonder of Manchester's textile community. Within six months, Drinkwater offered Owen a quarter interest in his business.

After several highly successful years in his new job, Robert Owen heard of several mills that were for sale in the village of New Lanark, near to Glasgow. The owner, Mr. Dale, happened to be the father of the girl with whom Robert Owen had fallen in love. Instead of directly asking Dale for permission to marry his daughter, Owen (together with some business partners) first purchased the mills, after which he won the hand of the daughter.

Ownership of the New Lanark mills gave Robert Owen the chance to put into practice the ideas of social reform that he had been developing throughout his life. Instead of



Figure 4.3: New Lanark World Heritage village in Scotland. A view of the school.

driving his workers by threats of punishment, and instead of subjecting them to cruelly long working hours (such as he himself had experienced as a draper's apprentice in London), Owen made the life of his workers at New Lanark as pleasant as he possibly could. He established a creche for the infants of working mothers, free medical care, concerts, dancing, music-making, and comprehensive education, including evening classes. Instead of the usual squalid one-room houses for workers, neat two-room houses were built. Garbage was collected regularly instead of being thrown into the street. New Lanark also featured pleasant landscaped areas.

Instead of leading to bankruptcy, as many of his friends predicted, Robert Owen's reforms led to economic success. Owen's belief that a better environment would lead to better work was vindicated. The village, with its model houses, schools and mills, became internationally famous as a demonstration that industrialism need not involve oppression of the workers. Crowds of visitors made the journey over narrow roads from Glasgow to learn from New Lanark and its visionary proprietor. Among the twenty thousand visitors who signed the guest-book between 1815 and 1825 were the Grand Duke Nicholas of Russia (who later became Czar Nicholas I), and Princes John and Maximilian of Austria.

Robert Owen's ideas of social reform can be seen in the following extract from an "Address to the Inhabitants of New Lanark", which he presented on New Year's Day, 1616: "What ideas individuals may attach to the term 'Millennium' I know not; but I know that society may be formed so as to exist without crime, without poverty, with health greatly improved, with little, if any, misery. and with intelligence and happiness increased a hundredfold; and no obstacle whatsoever intervenes at this moment except

ignorance to prevent such a state of society from becoming universal.”

Robert Owen believed that these principles could be applied not only in New Lanark but also in the wider world. He was soon given a chance to express this belief. During the years from 1816 to 1820, apart from a single year, business conditions in England were very bad, perhaps as a result of the Napoleonic Wars, which had just ended. Pauperism and social unrest were widespread, and threatened to erupt into violence. A committee to deal with the crisis was formed under the leadership of the Dukes of Kent and York.

Because of Owen's reputation, he was asked for his opinion, but the committee was hardly expecting the answer that they received from him. Robert Owen handed the two Dukes and the other committee members a detailed plan for getting rid of pauperism by making paupers productive. They were to be settled in self-governing Villages of Cooperation, each with between 800 and 1,200 inhabitants. Each family was to have a private apartment, but there were to be common sitting rooms, reading rooms and kitchens. Near to the houses, there were to be gardens tended by the children, and farther out, fields to be cultivated by the adults. Still farther from the houses, there was to be a small factory.

Owen's idea for governmentally-planned paupers' collectives was at first rejected out of hand. The early 19th century was, after all, a period of unbridled *laissez-faire* economics. Owen then bombarded the Parliament with pamphlets advocating his scheme. Finally a committee was formed to try to raise the money to establish one Village of Cooperation as an experiment; but the money was never raised.

Unwilling to accept defeat, Robert Owen sold his interest in New Lanark and sailed for America, where he believed that his social experiment would have a better chance of success. He bought the town of Harmonie and 30,000 acres of land on the banks of the Wabash River in Indiana. There he established a Village of Cooperation which he named “New Harmony”. He dedicated it on the 4th of July, 1826. It remained a collective for only two years, after which individualism reasserted itself. Owen's four sons and one of his daughters made their homes in New Harmony, and it also became the home of numerous scientists, writers and artists.

Owen's son, Robert Dale Owen, became a member of the U.S. House of Representatives, where he introduced the bill establishing the Smithsonian Institution. In 1862 he wrote an eloquent letter to Abraham Lincoln urging emancipation of the slaves. Three days later, probably influenced by Owen's letter, Lincoln read the Emancipation Proclamation to his cabinet. Another son, Richard Owen, served as President of the University of Indiana, and was later elected as the first President of Purdue University.

The cooperative movement

When Robert Owen returned to England shortly after dedicating New Harmony, he found that he had become a hero of the working classes. They had read his writings avidly, and had begun to establish cooperatives, following his principles. There were both producer's cooperatives and consumer's cooperatives. In England, the producer's cooperatives failed,



Figure 4.4: **Robert Owen, (1771-1858), founder of the Cooperative Movement.**

but in Denmark they succeeded¹.

One of the early consumer's cooperatives in England was called the Rochdale Society of Equitable Pioneers. It was founded by 28 weavers and other artisans, who were being forced into poverty by mechanization. They opened a small cooperative store selling butter, sugar, flour, oatmeal and candles. After a few months, they also included tobacco and tea. From this small beginning, the Cooperative Movement grew, finally becoming one of the main pillars of the British Labour Party.

¹The success of Danish agricultural producer's cooperatives was helped by the People's High School movement, founded by N.F.S. Grundvig (1783-1872).

Trade unions

Robert Owen's attention now turned from cooperatives to the embryonic trade union movement, which was struggling to establish itself in the face of fierce governmental opposition. He assembled the leaders of the working class movement and proposed the formation of the "Grand National Moral Union of Productive and Useful Classes". The name was soon shortened to "The Grand National Consolidated Trades Union" or simply the "Grand National".

Owen's Grand National was launched in 1833, and its membership quickly grew to half a million. It was the forerunner of modern nationwide trade unions, but it lasted only two years. Factory-owners saw the Grand National as a threat, and they persuaded the government to prosecute it under anti-union laws. Meanwhile, internal conflicts helped to destroy the Grand National. Owen was accused of atheism by the working class leaders, and he accused them of fermenting class hatred.

Robert Owen's influence helped to give raw *laissez faire* capitalism a more human face, and helped to spread the benefits of industrialization more widely. Through the work of other reformers like Owen, local trade unions succeeded, both in England and elsewhere; and in the end, successful national unions were finally established. The worst features of the early Industrial Revolution were moderated by the growth of the trade union movement, by child labor laws, by birth control and by minimum wage laws.

Rusting of the Iron Law

David Ricardo's Iron Law of Wages maintained that workers must necessarily live at the starvation level: Their wages are determined by the law of supply and demand, Ricardo said. If the wages should increase above the starvation level, more workers' children would survive, the supply of workers would increase, and the wages would fall again. This gloomy pronouncement was enthusiastically endorsed by members of the early 19th century Establishment, since it absolved them from responsibility for the miseries of the poor. However, the passage of time demonstrated that the Iron Law of Wages held only under the assumption of an economy totally free from governmental intervention.

Both the growth of the political power of industrial workers, and the gradual acceptance of birth control were important in eroding Ricardo's Iron Law. Birth control is especially important in countering the argument used to justify child labor under harsh conditions. The argument (still used in many parts of the world) is that child labor is necessary in order to save the children from starvation, while the harsh conditions are needed because if a business provided working conditions better than its competitors, it would go out of business. However, with a stable population and appropriate social legislation prohibiting both child labor and harsh working conditions, the Iron Law argument fails.



Figure 4.5: William Morris, (1834-1896), founder of the Arts and Crafts movement and author of the Utopian novel, “News From Nowhere”.



Figure 4.6: A floral design by William Morris.



Figure 4.7: ...and another.



Figure 4.8: ...and another.



Figure 4.9: ...and another.

4.4 William Morris and John Ruskin

News From Nowhere

The Utopian novel, *News from Nowhere*², is written in the form of a dream, in which the dreamer finds himself in a future society where work is not motivated by money but by the pleasure of creative craftsmanship. Here are some excerpts in which Ruskin criticizes the Victorian society in which he lived:

Said he, settling himself in his chair again for a long talk: "It is clear from all that we hear and read, that in the last age of civilization men had got into a vicious circle in the matter of production of wares. They had reached a wonderful facility of production, and in order to make the most of that facility they had gradually created (or allowed to grow, rather) a most elaborate system of buying and selling, which has been called the World-Market; and that World-Market, once set a-going, forced them to go on making more and more of these wares, whether they needed them or not. So that while (of course) they could not free themselves from the toil of making real necessities, they created in a never-ending series sham or artificial necessities, which became, under the iron rule of the aforesaid World-Market, of equal importance to them with the real necessities which supported life. By all this they burdened themselves with a prodigious mass of work merely for the sake of keeping their wretched system going."

"Yes - and then?" said I.

"Why, then, since they had forced themselves to stagger along under this horrible burden of unnecessary production, it became impossible for them to look upon labour and its results from any other point of view than one - to wit, the ceaseless endeavour to expend the least possible amount of labour on any article made, and yet at the same time to make as many articles as possible. To this 'cheapening of production', as it was called, everything was sacrificed: the happiness of the workman at his work, nay, his most elementary comfort and bare health, his food, his clothes, his dwelling, his leisure, his amusement, his education - his life, in short - did not weigh a grain of sand in the balance against this dire necessity of 'cheap production' of things, a great part of which were not worth producing at all. Nay, we are told, and we must believe it, so overwhelming is the evidence, though many of our people scarcely can believe it, that even rich and powerful men, the masters of the poor devils aforesaid, submitted to live amidst sights and sounds and smells which it is in the very nature of man to abhor and flee from, in order that their riches might bolster

²<https://www.gutenberg.org/files/3261/3261-h/3261-h.htm>

up this supreme folly. The whole community, in fact, was cast into the jaws of this ravening monster, ‘the cheap production’ forced upon it by the World-Market.”...

His estimate of the life of the nineteenth century made me catch my breath a little; and I said feebly, “But the labour-saving machines?”

“What’s that you are saying? the labour-saving machines? Yes, they were made to ‘save labour’ (or, to speak more plainly, the lives of men) on one piece of work in order that it might be expended - I will say wasted - on another, probably useless, piece of work. Friend, all their devices for cheapening labour simply resulted in increasing the burden of labour. The appetite of the World-Market grew with what it fed on: the countries within the ring of ‘civilization’ (that is, organized misery) were glutted with the abortions of the market, and force and fraud were used unsparingly to ‘open up’ countries outside that pale. This process of ‘opening up’ is a strange one to those who have read the professions of the men of that period and do not understand their practice; and perhaps shows us at its worst the great vice of the nineteenth century, the use of hypocrisy and cant to evade the responsibility of vicarious ferocity. When the civilized World-Market coveted a country not yet in its clutches, some transparent pretext was found - the suppression of a slavery different from and not so cruel as that of commerce; the pushing of a religion no longer believed in by its promoters; the ‘rescue’ of some desperado or homicidal madman whose misdeeds had got him into trouble amongst the natives of the ‘barbarous’ country - any stick, in short, which would beat the dog at all. Then some bold, unprincipled, ignorant adventurer was found (no difficult task in the days of competition), and he was bribed to ‘create a market’ by breaking up whatever traditional society there might be in the doomed country, and by destroying whatever leisure or pleasure he found there. He forced wares on the natives which they did not want, and took their natural products in ‘exchange,’ as this form of robbery was called, and thereby he ‘created new wants,’ to supply which (that is, to be allowed to live by their new masters) the hapless, helpless people had to sell themselves into the slavery of hopeless toil so that they might have something wherewith to purchase the nullities of ‘civilization.’

John Ruskin’s book, *Unto This Last*

In his autobiography, Mahatma Gandhi says: “Three moderns have left a deep impression on my life and captivated me: Raychandbhai (the Indian philosopher and poet) by his living contact; Tolstoy by his book ‘The Kingdom of God is Within You’; and Ruskin by his book ‘Unto This Last’.”

Ruskin’s book, “Unto This Last”, which Gandhi read in 1904, is a criticism of modern industrial society. Ruskin believed that friendships and warm interpersonal relationships

are a form of wealth that economists have failed to consider. He felt that warm human contacts are most easily achieved in small agricultural communities, and that therefore the modern tendency towards centralization and industrialization may be a step backward in terms of human happiness. While still in South Africa, Gandhi founded two religious Utopian communities based on the ideas of Tolstoy and Ruskin. Phoenix Farm (1904) and Tolstoy Farm (1910).

Here are some quotations from Ruskin's book, *Unto This Last*:

The assumption which lies at the root of nearly all erroneous reasoning on political economy - namely, that its object is to accumulate money or exchangeable property - may be shown in few words to be without foundation. For no economist would admit national economy to be legitimate which proposed to itself only the building of a pyramid of gold. He would declare the gold to be wasted, were it to remain in the monumental form, and would say it ought to be employed. But to what end? Either it must be used only to gain more gold, and build a larger pyramid, or to some purpose other than the gaining of gold. And this other purpose, however at first apprehended, will be found to resolve itself finally into the service of man - that is to say, the extension, defense, or comfort of his life. The golden pyramid may perhaps be providently built, perhaps improvidently; but, at all events, the wisdom or folly of the accumulation can only be determined by our having first clearly stated the aim of all economy, namely, the extension of life.

If the accumulation of money, or of exchangeable property, were a certain means of extending existence, it would be useless, in discussing economical questions, to fix our attention upon the more distant object - life - instead of the immediate one - money. But it is not so. Money may sometimes be accumulated at the cost of life, or by limitations of it; that is to say, either by hastening the deaths of men, or preventing their births. It is therefore necessary to keep clearly in view the ultimate object of economy, and to determine the expediency of minor operations with reference to that ulterior end. It has been just stated that the object of political economy is the continuance not only of life, but of healthy and happy life. But all true happiness is both a consequence and cause of life; it is a sign of its vigour, and means of its continuance. All true suffering is in like manner a consequence and cause of death. I shall therefore, in future, use the word "Life" singly: but let it be understood to include in its signification the happiness and power of the entire human nature, body and soul.

Ruskin believed that warm personal relationships are a form of wealth that economists have neglected, and that these relationships are most easily achieved in small communities where people know each other very well because of working together. He thought that the goal of economics should not be the increase of wealth, but the increase of happiness.

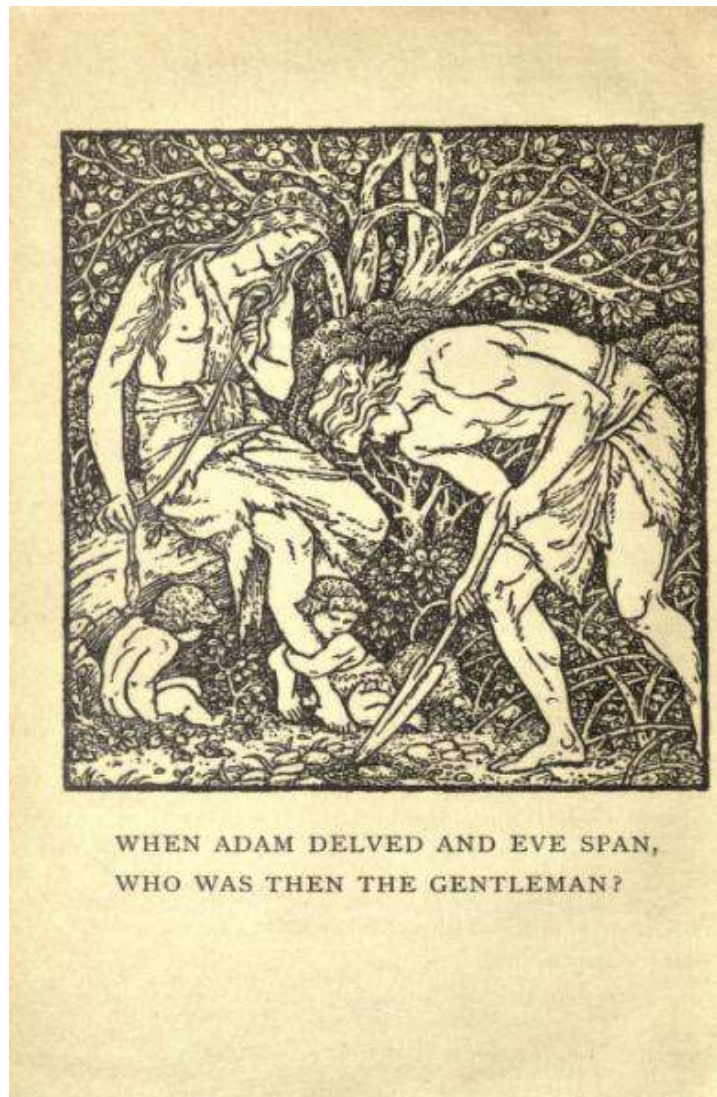


Figure 4.10: A design by William Morris (1834-1896). Together with John Ruskin (1819-1900) and others in the Arts and Crafts Movement, Morris criticized the Industrial Revolution and division of labor for destroying craftsmanship, traditions of design, traditional skills, and pride in work. His Utopian book, "News from Nowhere", is a plea for a return to cooperative workshops where good design and craftsmanship would flourish. Ruskin's Book, "Unto This Last" (which later greatly influenced Gandhi), points out that the pleasure of warm friendships with coworkers in small cooperative communities is not given sufficient weight by the economic systems of industrial societies. Gandhi later put these principles into practice when he introduced spinning and weaving in the home as a means for eliminating the unemployment that had been produced by the importation of factory-made cloth into India.

4.5 Influence on later economic thought

The Utopian Socialists mentioned in this chapter had different messages, which reflected the epochs in which they lived. Saint-Simon and Fourier, who lived at the time of the French Revolution, criticized feudalism and lauded industrial society and science. Robert Owen lived a little later, and he had an opportunity to witness the horrors of the early Industrial Revolution in England. But Owen maintained, and indeed proved, that an industrial society could benefit the workers, instead of mercilessly exploiting them. Finally, Morris and Ruskin, who came still later, criticized industrial society from a partly aesthetic and partly moral standpoint. Production was being maximized, but what about social justice and human happiness?

Whatever influence they may have had during their own lifetimes, the long-term influence of the Utopian Socialists is undeniable. Saint-Simon influenced August Comte, Karl Marx, John Stuart Mill and many others. Fourier's ideas about turning work into play influenced the young Karl Marx, and helped him to form his ideas about alienation. Robert Owen's work led to the foundation of national trade unions and the cooperative movement.

The Utopian Socialist movement led to the foundation of many experimental communities around the world. In America, one can think of New Harmony, Indiana, founded by Robert Owen in 1825; Clermont Phalanx, Ohio, Sodus Bay Phalanx, New York, Spring Farm Colony, Wisconsin and Wisconsin Phalanx, Wisconsin, founded by followers of Charles Fourier in the 1840's. Followers of the French Utopian Socialist Étienne Cabet founded Icarian communities in Louisiana, Texas, Illinois, Iowa, Missouri, and California.

Transition Towns

Most recently the Transition Towns can be seen as part of the Utopian Socialist movement. The philosophy of the Transition Towns movement starts with recognition of the fact that the use of fossil fuels very soon must stop. This being so, Transition Towns aim at being an advance part of the necessary transition to a fossil-fuel-free society.

In 2004, Rob Hopkins, a permaculture designer who taught at Kinsale Further Education College, England, gave his student the task of applying permaculture principles to the concept of peak oil. The Transition Towns concept was developed by two of his students, Louise Rooney and Catherine Dunne. When the two girls presented their plan to the Kinsale Town Council, the councillors accepted it and decided to work for energy independence. Meanwhile, Rob Hopkins developed the ideas further at his home town, Totnes. By 2013, there were 1130 Transition Towns registered in 43 countries.

Thransiton US, the American national bum of Transition Towns, as stated its vision that "every community in the United States will have engaged its collective creativity to unleash an extraordinary and historic transition to a future beyond fossil fuels; a future that is more vibrant, abundant and resilient; one that is ultimately preferable to the present".

In England, Southend-on-Sea in Transition states that "by shifting our mind-set we can actually recognize the coming post-cheap oil era as an opportunity rather than a threat,



Figure 4.11: Transition Towns aim at local self-sufficiency. They produce their own food, thus reducing the need for fossil-fuel-consuming transportation.

and design the future low carbon age to be thriving, resilient and abundant - somewhere much better to live than our current alienated consumer culture based on greed, war and the myth of perpetual growth” .

Suggestions for further reading

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2. J. C. Davis *Utopia and the Ideal Society: A Study of English Utopian Writing 1516-1700*. Cambridge University Press, (1983).
3. Sam Dolgoff *The Anarchist Collectives: Workers' Self-Management in the Spanish Revolution, 1936-1939*, Black Rose Books, (1990).
4. Sheldon Goldenberg and Gerda R. Wekerle, *From utopia to total institution in a single generation: the kibbutz and Bruderhof*. *International Review of Modern Sociology*. 2 (2): 224-232, (September 1972).
5. Donald E. Frey *America's Economic Moralists: A History of Rival Ethics and Economics*, SUNY Press, (2009).

Chapter 5

THOREAU, WEBER AND GANDHI

5.1 Thoreau

In the distant future (and perhaps even in the not-so-distant future) industrial civilization will need to abandon its relentless pursuit of unnecessary material goods and economic growth. Modern society will need to re-establish a balanced and harmonious relationship with nature. In pre-industrial societies harmony with nature is usually a part of the cultural tradition. In our own time, the same principle has become central to the ecological counter-culture while the main-stream culture thunders blindly ahead, addicted to wealth, power and growth.

In the 19th century the American writer, Henry David Thoreau (1817-1862), pioneered the concept of a simple life, in harmony with nature. Today, his classic book, *Walden*, has become a symbol for the principles of ecology, simplicity, and respect for nature.

Thoreau was born in Concord Massachusetts, and he attended Harvard from 1833 to 1837. After graduation, he returned home, worked in his family's pencil factory, did odd jobs, and for three years taught in a progressive school founded by himself and his older brother, John. When John died of lockjaw in 1842, Henry David was so saddened that he felt unable to continue the school alone.

Thoreau refused to pay his poll tax because of his opposition to the Mexican War and to the institution of slavery. Because of his refusal to pay the tax (which was in fact a very small amount) he spent a night in prison. To Thoreau's irritation, his family paid the poll tax for him and he was released. He then wrote down his ideas on the subject in an essay entitled *The Duty of Civil Disobedience*, where he maintains that each person has a duty to follow his own individual conscience even when it conflicts with the orders of his government. "Under a government that which imprisons any unjustly", Thoreau wrote, "the true place for a just man is in prison." *Civil Disobedience* influenced Tolstoy, Gandhi and Martin Luther King, and it anticipated the Nuremberg Principles.

Thoreau became the friend and companion of the transcendentalist writer Ralph Waldo

Emerson (1803-1882), who introduced him to a circle of writers and thinkers that included Ellery Channing, Margaret Fuller and Nathaniel Hawthorne.

Nathaniel Hawthorne described Thoreau in the following words: "Mr. Thorow [sic] is a keen and delicate observer of nature - a genuine observer, which, I suspect, is almost as rare a character as even an original poet; and Nature, in return for his love, seems to adopt him as her especial child, and shows him secrets which few others are allowed to witness. He is familiar with beast, fish, fowl, and reptile, and has strange stories to tell of adventures, and friendly passages with these lower brethren of mortality. Herb and flower, likewise, wherever they grow, whether in garden, or wild wood, are his familiar friends. He is also on intimate terms with the clouds and can tell the portents of storms. It is a characteristic trait, that he has a great regard for the memory of the Indian tribes, whose wild life would have suited him so well; and strange to say, he seldom walks over a plowed field without picking up an arrow-point, a spear-head, or other relic of the red men - as if their spirits willed him to be the inheritor of their simple wealth."

At Emerson's suggestion, Thoreau opened a journal, in which he recorded his observations concerning nature and his other thoughts. Ultimately the journal contained more than 2 million words. Thoreau drew on his journal when writing his books and essays, and in recent years, many previously unpublished parts of his journal have been printed.

From 1845 until 1847, Thoreau lived in a tiny cabin that he built with his own hands. The cabin was in a second-growth forest beside Walden Pond in Concord, on land that belonged to Emerson. Thoreau regarded his life there as an experiment in simple living. He described his life in the forest and his reasons for being there in his book *Walden*, which was published in 1854. The book is arranged according to seasons, so that the two-year sojourn appears compressed into a single year.

"Most of the luxuries", Thoreau wrote, "and many of the so-called comforts of life, are not only not indispensable, but positive hindrances to the elevation of mankind. With respect to luxuries, the wisest have ever lived a more simple and meager life than the poor. The ancient philosophers, Chinese, Hindoo, Persian, and Greek, were a class than which none has been poorer in outward riches, none so rich in inward."

Elsewhere in *Walden*, Thoreau remarks, "It is never too late to give up your prejudices", and he also says, "Why should we be in such desperate haste to succeed, and in such desperate enterprises? If a man does not keep pace with his companions, perhaps it is because he hears a different drummer." Other favorite quotations from Thoreau include "Rather than love, than money, than fame, give me truth", "Beware of all enterprises that require new clothes", "Most men lead lives of quiet desperation" and "Men have become tools of their tools."

Towards the end of his life, when he was very ill, someone asked Thoreau whether he had made his peace with God. "We never quarreled", he answered.

Thoreau's closeness to nature can be seen from the following passage, written by his friend Frederick Willis, who visited him at Walden Pond in 1847, together with the Alcott family: "He was talking to Mr. Alcott of the wild flowers in Walden woods when, suddenly stopping, he said: 'Keep very still and I will show you my family.' Stepping quickly outside the cabin door, he gave a low and curious whistle; immediately a woodchuck came running



Figure 5.1: Henry David Thoreau, 1817-1862.

towards him from a nearby burrow. With varying note, yet still low and strange, a pair of gray squirrels were summoned and approached him fearlessly. With still another note several birds, including two crows flew towards him, one of the crows nestling upon his shoulder. I remember that it was the crow resting close to his head that made the most vivid impression on me, knowing how fearful of man this bird is. He fed them all from his hand, taking food from his pocket, and petted them gently before our delighted gaze; and then dismissed them by different whistling, always strange and low and short, each wild thing departing instantly at hearing his special signal.”

In an essay published by the *Atlantic Monthly* in 1853, Thoreau described a pine tree in Maine with the words: “It is as immortal as I am, and perchance will go to as high a heaven, there to tower above me still.” However, the editor (James Russell Lowell) considered the sentence to be blasphemous, and removed it from Thoreau’s essay before publication.

In one of his essays, Thoreau wrote: “If a man walk in the woods for love of them half of each day, he is in danger of being regarded as a loafer; but if he spends his whole day as a speculator, shearing off those woods and making the earth bald before her time, he is esteemed an industrious and enterprising citizen.”

5.2 Veblen; economics as anthropology

The phrase “conspicuous consumption” was invented by the Norwegian-American economist Thorstein Veblen (1857-1929) in order to describe the way in which our society uses economic waste as a symbol of social status. In *The Theory of the Leisure Class*, first published in 1899, Veblen pointed out that it is wrong to believe that human economic behavior is rational, or that it can be understood in terms of classical economic theory. To understand it, Veblen maintained, one might preferably make use of insights gained from anthropology, psychology, sociology, and history.

Thorstein Veblen was born into a large Norwegian immigrant family living on a farm in Wisconsin. His first language was Norwegian, and in fact he did not learn English well until he was in his teens. He was a strange boy, precociously addicted to reading, but negligent about doing his chores on the farm. His family recognized that he was unusually intelligent and decided to send him to Carlton College, where he obtained a B.A. in 1880. Later he did graduate work at Johns Hopkins University and finally obtained a Ph.D. from Yale in 1884.

Despite the Ph.D., he failed to obtain an academic position. His iconoclastic views and non-conformist attitudes undoubtedly contributed to this joblessness. Returning to the family farm, Thorstein Veblen continued his voracious reading and his neglect of farm duties for six years. As one of his brothers wrote, “He was lucky enough to come out of a race and family who made family loyalty a religion... He was the only loafer in a highly respectable community... He read and loafed, and the next day he loafed and read.”

An interesting fact about this strange man is that, for some reason, women found him very attractive. In 1888, Thorstein Veblen married Ellen Rolfe, the niece of the president of Carlton College. His wife was to leave him many times, partly because of his many

infidelities, and partly because of his aloofness and detachment. He was like a visitor from another planet.

In part, the marriage to Ellen was motivated by Veblen's search for a job. He hoped to obtain work as an economist for the Atchison, Topeka and Santa Fe Railway, of which her uncle was president. However, the railway was in financial difficulties, and it was taken over by bankers, after which the position disappeared.

Finally a family council was held on the Veblen farm, and it was decided that Thorstein should once again attempt to enter the academic world. In 1891, wearing corduroy trousers and a coonskin hat, he walked into the office of the conservative economist J.L. Laughlan and introduced himself. Although taken aback by Veblen's appearance, Laughlan began to talk with him, and he soon recognized Veblen's genius. A year later, when he moved to the University of Chicago, Laughlan brought Veblen with him at a salary of \$520 per year.

At the University of Chicago, Veblen soon established a reputation both for eccentricity and for enormous erudition. His socks were held up by safety pins, but he was reputed to be fluent in twenty-six languages. He gained attention also by publishing a series of brilliant essays.

In 1899, Veblen "fluttered the doves of the East" by publishing a book entitled *The Theory of the Leisure Class*. It was part economics, part anthropology, and part social satire. Nothing of the kind had ever been seen in the field of economics. Until that moment it had been universally assumed that human economic behavior is rational. Veblen's detached and surgically sharp intelligence exposed it as being very largely irrational.

According to Thorstein Veblen, ancient tribal instincts and attitudes motivate us today, just as they motivated our primitive ancestors. Veblen speaks of a predatory phase of primitive society where the strongest fighters were able to subjugate others. This primitive class structure was based on violence, and, according to Veblen, the attitudes associated with it persist today.

For example, Veblen noted that male members of the leisure class liked to go about with walking sticks. Why? Because, answers Veblen, it is "an advertisement that the bearer's hands are employed otherwise than in useful effort." Also, a walking stick is a weapon: "The handling of so tangible and primitive a means of offense is very comforting to anyone who is gifted with even a moderate share of ferocity".

Even in modern society, Veblen says, we have an admiration for those who succeed in obtaining power and money through predatory means, and this admiration makes honest and useful work seem degraded. "During the predatory culture", Veblen wrote, "labour comes to be associated in men's habits of thought with weakness and subjugation to a master. It is therefore a mark of inferiority, and therefore comes to be accounted to be unworthy of man in his best estate. By virtue of this tradition, labour is felt to be debasing, and this tradition has never died out. On the contrary, with the advance of social differentiation it has acquired the axiomatic force of ancient and unquestioned prescription."

"In order to gain and hold the esteem of men it is not sufficient merely to possess wealth or power. The wealth or power must be put in evidence, for esteem is awarded only on evidence. It is felt by all persons of refined taste that a spiritual contamination is inseparable from certain offices that are conventionally required of servants. Vulgar surroundings,

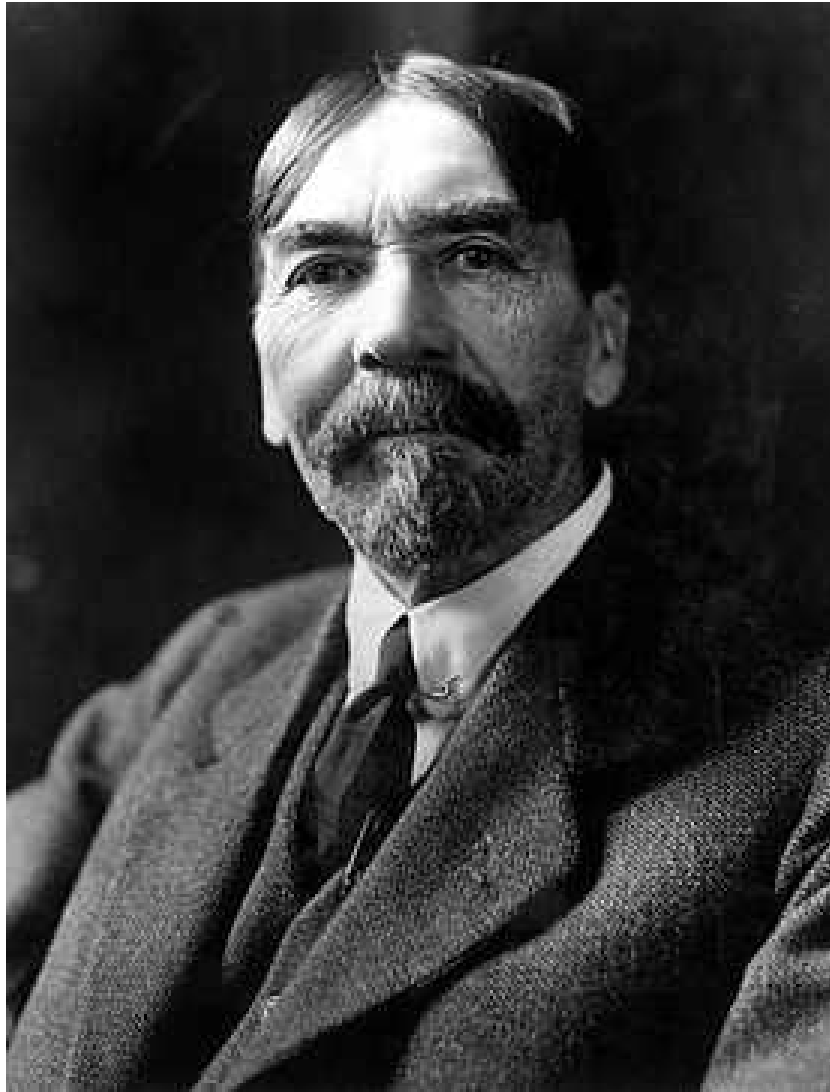


Figure 5.2: **Thorstein Veblen (1857-1929).**

mean (that is to say, inexpensive) habitations, and vulgarly productive occupations are unhesitatingly condemned and avoided. They are incompatible with life on a satisfactory spiritual plane - with 'high thinking'."

"...The performance of labour has been accepted as a conventional evidence of inferior force, therefore it comes by itself, by a mental shortcut, to be regarded as intrinsically base."

"The normal and characteristic occupations of the [leisure] class are... government, war, sports, and devout observances... At this as at any other cultural stage, government and war are, at least in part, carried out for the pecuniary gain of those who engage in them, but it is gain obtained by the honourable method of seizure and conversion."

Veblen also remarks that "It is true of dress even in a higher degree than of most items of consumption, that people will undergo a very considerable degree of privation in the comforts or the necessities of life in order to afford what is considered a decent amount of wasteful consumption; so that it is by no means an uncommon occurrence, in an inclement climate, for people to go ill clad in order to appear well dressed."

The sensation caused by the publication of Veblen's book, and the fact that his phrase, "conspicuous consumption", has become part of our language, indicate that his theory did not completely miss its mark. In fact, modern advertisers seem to be following Veblen's advice: Realizing that much of the output of our economy will be used for the purpose of establishing the social status of consumers, advertising agencies hire psychologists to appeal to the consumer's longing for a higher social position.

When possessions are used for the purpose of social competition, demand has no natural upper limit; it is then limited only by the size of the human ego, which, as we know, is boundless. This would be all to the good if unlimited economic growth were desirable. But today, when further growth implies future collapse, industrial society urgently needs to find new values to replace our worship of power, our restless chase after excitement, and our admiration of excessive consumption.

5.3 Gandhi as an economist

If humans are to achieve a stable society in the distant future, it will be necessary for them to become modest in their economic behavior and peaceful in their politics. For both modesty and peace, Gandhi is useful as a source of ideas.

Mohandas Karamchand Gandhi was born in 1869 in Porbandar, India. His family belonged to the Hindu caste of shopkeepers. (In Gujarati "Gandhi" means "grocer".) However, the family had risen in status, and Gandhi's father, grandfather, and uncle had all served as prime ministers of small principalities in western India.

In 1888, Gandhi sailed for England, where he spent three years studying law at the Inner Temple in London. Before he left India, his mother had made him take a solemn oath not to touch women, wine, or meat. He thus came into contact with the English vegetarians, who included Sir Edward Arnold (translator of the Bhagavad Gita), the Theosophists Madame Blavatsky and Annie Besant, and the Fabians. Contact with this idealistic group

of social critics and experimenters helped to cure Gandhi of his painful shyness, and it also developed his taste for social reform and experimentation.

Gandhi's exceptionally sweet and honest character won him many friends in England, and he encountered no racial prejudice at all. However, when he traveled to Pretoria in South Africa a few years later, he experienced racism in its worst form. Although he was meticulously well dressed in an English frock coat, and in possession of a first-class ticket, Gandhi was given the choice between traveling third class or being thrown off the train. (He chose the second alternative.) Later in the journey he was beaten by a coach driver because he insisted on his right to sit as a passenger rather than taking a humiliating position on the footboard of the coach.

The legal case which had brought Gandhi to South Africa was a dispute between a wealthy Indian merchant, Dada Abdullah Seth, and his relative, Seth Tyeb (who had refused to pay a debt of 40,000 pounds, in those days a huge sum). Gandhi succeeded in reconciling these two relatives, and he persuaded them to settle their differences out of court. Later he wrote about this experience:

"Both were happy with this result, and both rose in public estimation. My joy was boundless. I had learnt the true practice of law. I had learnt to find out the better side of human nature and to enter men's hearts. I realized that the true function of a lawyer was to unite parties riven asunder. The lesson was so indelibly burnt into me that a large part of my time during my twenty years of practice as a lawyer was occupied in bringing about compromises of hundreds of cases. I lost nothing thereby - not even money, certainly not my soul."

Gandhi was about to return to India after the settlement of the case, but at a farewell party given by Abdullah Seth, he learned of a bill before the legislature which would deprive Indians in South Africa of their right to vote. He decided to stay and fight against the bill.

Gandhi spent the next twenty years in South Africa, becoming the leader of a struggle for the civil rights of the Indian community. In this struggle he tried "...to find the better side of human nature and to enter men's hearts." Gandhi's stay in England had given him a glimpse of English liberalism and English faith in just laws. He felt confident that if the general public in England could be made aware of gross injustices in any part of the British Empire, reform would follow. He therefore organized non-violent protests in which the protesters sacrificed themselves so as to show as vividly as possible the injustice of an existing law. For example, when the government ruled that Hindu, Muslim and Parsi marriages had no legal standing, Gandhi and his followers voluntarily went to prison for ignoring the ruling.

Gandhi used two words to describe this form of protest: "satyagraha" (the force of truth) and "ahimsa" (non-violence). Of these he later wrote: "I have nothing new to teach the world. Truth and non-violence are as old as the hills. All that I have done is to try experiments in both on as vast a scale as I could. In so doing, I sometimes erred and learnt by my errors. Life and its problems have thus become to me so many experiments in the practice of truth and non-violence."

In his autobiography, Gandhi says: "Three moderns have left a deep impression on my life and captivated me: Raychandbhai (the Indian philosopher and poet) by his living

contact; Tolstoy by his book 'The Kingdom of God is Within You'; and Ruskin by his book 'Unto This Last'."

Ruskin's book, "Unto This Last", which Gandhi read in 1904, is a criticism of modern industrial society. Ruskin believed that friendships and warm interpersonal relationships are a form of wealth that economists have failed to consider. He felt that warm human contacts are most easily achieved in small agricultural communities, and that therefore the modern tendency towards centralization and industrialization may be a step backward in terms of human happiness. While still in South Africa, Gandhi founded two religious Utopian communities based on the ideas of Tolstoy and Ruskin. Phoenix Farm (1904) and Tolstoy Farm (1910). At this time he also took an oath of chastity ("bramacharya"), partly because his wife was unwell and he wished to protect her from further pregnancies, and partly in order to devote himself more completely to the struggle for civil rights.

Because of his growing fame as the leader of the Indian civil rights movement in South Africa, Gandhi was persuaded to return to India in 1914 and to take up the cause of Indian home rule. In order to re-acquaint himself with conditions in India, he traveled tirelessly, now always going third class as a matter of principle.

During the next few years, Gandhi worked to reshape the Congress Party into an organization which represented not only India's Anglicized upper middle class but also the millions of uneducated villagers who were suffering under an almost intolerable burden of poverty and disease. In order to identify himself with the poorest of India's people, Gandhi began to wear only a white loincloth made of rough homespun cotton. He traveled to the remotest villages, recruiting new members for the Congress Party, preaching non-violence and "firmness in the truth", and becoming known for his voluntary poverty and humility. The villagers who flocked to see him began to call him "Mahatma" (Great Soul).

Disturbed by the spectacle of unemployment and poverty in the villages, Gandhi urged the people of India to stop buying imported goods, especially cloth, and to make their own. He advocated the re-introduction of the spinning wheel into village life, and he often spent some hours spinning himself. The spinning wheel became a symbol of the Indian independence movement, and was later incorporated into the Indian flag.

The movement for boycotting British goods was called the "Swadeshi movement". The word Swadeshi derives from two Sanskrit roots: *Swa*, meaning self, and *Desh*, meaning country. Gandhi described Swadeshi as "a call to the consumer to be aware of the violence he is causing by supporting those industries that result in poverty, harm to the workers and to humans or other creatures."

Gandhi tried to reconstruct the crafts and self-reliance of village life that he felt had been destroyed by the colonial system. "I would say that if the village perishes India will perish too", he wrote, "India will be no more India. Her own mission in the world will get lost. The revival of the village is only possible when it is no more exploited. Industrialization on a mass scale will necessarily lead to passive or active exploitation of the villagers as problems of competition and marketing come in. Therefore we have to concentrate on the village being self-contained, manufacturing mainly for use. Provided this character of the village industry is maintained, there would be no objection to villagers using even the modern machines that they can make and can afford to use. Only they



Figure 5.3: Gandhi and his wife Kasturbhai in 1902.

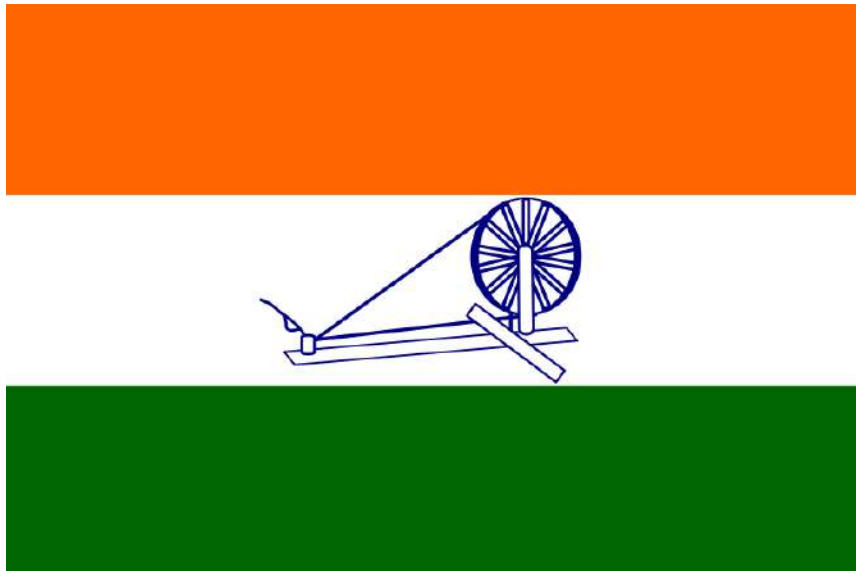


Figure 5.4: Gandhi's spinning wheel was incorporated into the flag of the Congress Party and later into the national flag of an independent India.

should not be used as a means of exploitation by others.”

“You cannot build nonviolence on a factory civilization, but it can be built on self-contained villages... Rural economy as I have conceived it, eschews exploitation altogether, and exploitation is the essence of violence... We have to make a choice between India of the villages that are as ancient as herself and India of the cities which are a creation of foreign domination...”

“Machinery has its place; it has come to stay. But it must not be allowed to displace necessary human labour. An improved plow is a good thing. But if by some chances, one man could plow up, by some mechanical invention of his, the whole of the land of India, and control all the agricultural produce, and if the millions had no other occupation, they would starve, and being idle, they would become dunces, as many have already become. There is hourly danger of many being reduced to that unenviable state.”

In these passages we see Gandhi not merely as a pioneer of nonviolence; we see him also as an economist. Faced with misery and unemployment produced by machines, Gandhi tells us that social goals must take precedence over blind market mechanisms. If machines are causing unemployment, we can, if we wish, and use labor-intensive methods instead. With Gandhi, the free market is not sacred - we can do as we wish, and maximize human happiness, rather than maximizing production and profits.

Gandhi also organized many demonstrations whose purpose was to show the British public that although the British raj gave India many benefits, the toll exacted was too high, not only in terms of money, but also in terms of India's self-respect and self-sufficiency. All of Gandhi's demonstrations were designed to underline this fact. For example, in 1930 Gandhi organized a civil-disobedience campaign against the salt laws. The salt laws gave the Imperial government a monopoly and prevented Indians from making their own salt by evaporating sea water. The majority of Indians were poor farmers who worked long hours in extreme heat, and salt was as much a necessity to them as bread. The tax on salt was essentially a tax on the sweat of the farmers.

Before launching his campaign, Gandhi sent a polite letter to the Viceroy, Lord Irwin, explaining his reasons for believing that the salt laws were unjust, and announcing his intention of disregarding them unless they were repealed. Then, on March 12 1930, Gandhi and many of his followers, accompanied by several press correspondents, started on a march to the sea to carry out their intention of turning themselves into criminals by making salt. Every day, Gandhi led the procession about 12 miles, stopping at villages in the evenings to hold prayer meetings. Many of the villagers joined the march, while others cast flower petals in Gandhi's path or sprinkled water on his path to settle the dust.

On April 5 the marchers arrived at the sea, where they spent the night in prayer on the beach. In the morning they began to make salt by wading into the sea, filling pans with water, and letting it evaporate in the sun. Not much salt was made in this way, but Gandhi's action had a strong symbolic power. A wave of non-violent civil disobedience demonstrations swept over India, so extensive and widespread that the Imperial government, in danger of losing control of the country, decided to arrest as many of the demonstrators as possible. By midsummer, Gandhi and a hundred thousand of his followers were in prison, but nevertheless the civil disobedience demonstrations continued.

In January, 1931, Gandhi was released from prison and invited to the Viceroy's palace to talk with Lord Irwin. They reached a compromise agreement: Gandhi was to call off the demonstrations and would attend a Round Table Conference in London to discuss Indian home rule, while Lord Irwin agreed to release the prisoners and would change the salt laws so that Indians living near to the coast could make their own salt.

The salt march was typical of Gandhi's non-violent methods. Throughout the demonstrations he tried to maintain a friendly attitude towards his opponents, avoiding escalation of the conflict. Thus at the end of the demonstrations, the atmosphere was one in which a fair compromise solution could be reached. Whenever he was in prison, Gandhi regarded his jailers as his hosts. Once, when he was imprisoned in South Africa, he used the time to make a pair of sandals, which he sent to General Smuts, the leader of the South African government. Thus Gandhi put into practice the Christian principle, "Love your enemies; do good to them that hate you."

Gandhi's importance lies in the fact that he was a major political leader who sincerely tried to put into practice the ethical principles of religion. In his autobiography Gandhi says: "I can say without the slightest hesitation, and yet with all humility, that those who say that religion has nothing to do with politics do not know what religion means."

Gandhi believed that human nature is essentially good, and that it is our task to find and encourage whatever is good in the character of others. During the period when he practiced as a lawyer, Gandhi's aim was "to unite parties riven asunder," and this was also his aim as a politician. In order for reconciliation to be possible in politics, it is necessary to avoid escalation of conflicts. Therefore Gandhi used non-violent methods, relying only on the force of truth. "It is my firm conviction," he wrote, "that nothing can be built on violence."

To the insidious argument that "the end justifies the means," Gandhi answered firmly: "They say 'means are after all means'. I would say 'means are after all everything'. As the means, so the end. Indeed the Creator has given us control (and that very limited) over means, none over end. ... The means may be likened to a seed, and the end to a tree; and there is the same inviolable connection between the means and the end as there is between the seed and the tree. Means and end are convertible terms in my philosophy of life." In other words, a dirty method produces a dirty result; killing produces more killing; hate leads to more hate. But there are positive feedback loops as well as negative ones. A kind act produces a kind response; a generous gesture is returned; hospitality results in reflected hospitality. Hindus and Buddhists call this principle "the law of karma".

Gandhi believed that the use of violent means must inevitably contaminate the end achieved. Because Gandhi's methods were based on love, understanding, forgiveness and reconciliation, the non-violent revolution which he led left very little enmity in its wake. When India finally achieved its independence from England, the two countries parted company without excessive bitterness. India retained many of the good ideas which the English had brought - for example the tradition of parliamentary democracy - and the two countries continued to have close cultural and economic ties.

Mahatma Gandhi was assassinated by a Hindu extremist on January 30, 1948. After his death, someone collected and photographed all his worldly goods. These consisted

of a pair of glasses, a pair of sandals and a white homespun loincloth. Here, as in the Swadeshi movement, we see Gandhi as a pioneer of economics. He deliberately reduced his possessions to an absolute minimum in order to demonstrate that there is no connection between personal merit and material goods. Like Veblen, Mahatma Gandhi told us that we must stop using material goods as a means of social competition. We must start to judge people not by what they have, but by what they are.

5.4 The counter-culture

In Chapter 6, we mentioned Say's Law ("Supply creates its own demand"). Jean-Baptiste Say's basis for this proposition was the assumption that a consumer's desire for goods is infinite. He combined this assumption with the observation that the wages paid for the production of goods will provide money enough to buy back the goods, even if the amount involved increases without limit. Comforted by Say's "law", and by the observation that people in industrial societies do indeed consume far more than they actually need, economists continue to pursue economic growth as though it were the Holy Grail. We do indeed devote much of our efforts to "making the earth bald before her time".

As things are today, the advertising industry, which is part of the mainstream culture, whips demand towards ever higher levels by exploiting our tendency to use material goods for the purpose of social competition. Meanwhile, a small but significant counter-culture has realized that unlimited economic growth will lead to ecological disaster unless we stop in time.

In the 1960's, a counter-culture developed in the United States, partly as a reaction against the Vietnam War and partly as a reaction against consumerism. It seemed to young people that they were being offered a possession-centered way of life that they did not want, and that they were being asked to participate in a war that they thought was immoral.

In 1964, a free speech movement began on the campus of the University of California in Berkeley. Students demanded that the university administration should lift a ban that it had imposed on on-campus political activities. Student movements elsewhere in the United States and in Europe echoed the Berkeley protests throughout the late 1960's and early 1970's.

Mario Savo, one of the leaders of the Berkeley free speech movement, compared the Establishment to an enormous anti-human machine: "There is a time when the operation of the machine becomes so odious, makes you so sick at heart, that you can't take part; you can't even passively take part, and you've got to put your bodies upon the gears and upon the wheels, upon the levers, upon all the apparatus, and you've got to make it stop. And you've got to indicate to the people who run it, to the people who own it, that unless you're free, the machine will be prevented from working at all."

The Greening of America, by Charles Reich, describes the youth-centered counter-culture: "Industrialism produced a new man...", Reich wrote, "one adapted to the demands of the machine. In contrast, today's emerging consciousness seeks a new knowledge of what

it means to be human, in order that the machine, having been built, may now be turned to human ends; in order that man once more can become a creative force, renewing and creating his own life and thus giving life back to society.”

5.5 The Brundtland Report

In 1972, the United Nations Conference on the Human Environment took place in Stockholm. In a 1983 follow-up to the Stockholm conference, the General Assembly of the UN adopted a resolution (A/38/161) establishing the World Commission on Environment and Development. It is usually known as the Brundtland Commission after the name of its Chair, Dr. Gro Harlem Brundtland, who was at the time the Prime Minister of Norway. The report of the Brundtland Commission, entitled *Our Common Future*, was submitted to the United Nations in 1987.

In the words of Dr. Brundtland, the goal of the report was “to help define shared perceptions of long-term environmental issues and the appropriate efforts needed to deal successfully with the problems of protecting and enhancing the environment, a long-term agenda for action during the coming decades...”

One of the key concepts of the Brundtland Report was “sustainable development”. The Report offered the following definition: “Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

The Brundtland Commission’s key concepts for sustainability were as follows:

1. Today’s needs should not compromise the ability of future generations to meet their needs.
2. A direct link exists between the economy and the environment.
3. The needs of the poor in all nations must be met.
4. In order for the environment to be protected, the economic conditions of the world’s poor must be improved.
5. In all our actions, we must consider the impact upon future generations.

The Brundtland Commission’s report examines the question of whether the earth can support a population of 10 billion people without the collapse of the ecological systems on which all life depends. The report states that the data “suggest that meeting the food requirements of an ultimate world population of around 10 billion would require some changes in food habits, as well as greatly improving the efficiency of traditional agriculture.”



Figure 5.5: **Gro Harlem Brundtland**

5.6 The Earth Summit at Rio

The Brundtland Report served as a preparation for the United Nations Conference on Environment and Development, which took place from the 3rd to the 14th of June, 1992 in Rio de Janeiro. The conference, informally called the “Earth Summit”, was unprecedented in its size and significance. 172 governments participated, including 108 heads of state or government. 17,000 people attended the Earth Summit, including 2,400 representatives of NGO’s. An estimated 10,000 journalists covered the conference.

The Earth Summit at Rio ought to have been a turning point in the relationship between humans and the global environment. However, despite the size and importance of the conference, and despite the hopes of most of the participants, the the Earth Summit did not result in the changes in laws and lifestyles that will be needed to establish long-term sustainability.

Two basic problems are leading to the destruction of the global environment - excessive population growth in the developing South, and excessive economic growth and overconsumption in the industrial North. Political and religious pressures prevented overpopulation from being named at Rio as one of the root causes of environmental degradation. Political pressures also prevented the necessary changes in laws and lifestyles from being made in the North.

Nevertheless, considerable progress was made at Rio. The resulting documents included Agenda 21 (an environmental agenda for the 21st century), the Rio Declaration on Environment and Development, the Statement on Forest Principles, the United Nations Framework Convention on Climate Change and the United Nations Convention on Biological Diversity. Later the Earth Charter was developed by some of the leaders who met in Rio.

Agenda 21

The first few chapters of Agenda 21 are as follows:

1. Preamble
2. International cooperation to accelerate sustainable development in developing countries and related domestic policies
3. Combating poverty
4. Changing consumption patterns
5. Demographic dynamics and sustainability
6. Protecting and promoting human health conditions
7. Promoting sustainable human settlement development
8. Integrating environment and development in decision-making
9. Protecting the atmosphere
10. Integrated approach to the planning and management of land resources
11. Combating deforestation
12. Managing fragile ecosystems; sustainable mountain development
13. Conservation of biological diversity
14. Environmentally sound management of biotechnology
15. Protection of the oceans

The good intentions of the authors shine from this list! It was a major victory to have Agenda 21 adopted as the official policy of the United Nations. Close examination reveals many political compromises in the wording the conclusions, but the idealism of the document is not entirely lost.

Agenda 21, touches (very lightly!) on the root causes of environmental degradation. In Section 4.6, one finds the extremely weak statement: "Some economists are questioning traditional concepts of economic growth and underlining the importance of pursuing economic objectives that take into account of the full value of natural resource capital. More needs to be known about the role of consumption in relation to economic growth and population dynamics in order to formulate coherent international and national policies." However, in Section 5.3, a clearer statement of the basic problem appears: "The growth of world population and production, combined with unsustainable consumption patterns, places increasingly severe stress on the life-supporting systems of our planet."

Suggestions for further reading

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Chapter 6

JOHN MAYNARD KEYNES

6.1 The transition from growth to a steady state - minimizing the trauma

According to Adam Smith, the free market is the dynamo of economic growth. The true entrepreneur does not indulge in luxuries for himself and his family, but reinvests his profits, with the result that his business or factory grows larger, producing still more profits, which he again reinvests, and so on. This is indeed the formula for exponential economic growth.

Economists (with a few notable exceptions) have long behaved as though growth were synonymous with economic health. If the gross national product of a country increases steadily by 4% per year, most economists express approval and say that the economy is healthy. If the economy could be made to grow still faster (they maintain), it would be still more healthy. If the growth rate should fall, economic illness would be diagnosed. However, the basic idea of Malthus is applicable to exponential increase of any kind. It is obvious that on a finite Earth, neither population growth nor economic growth can continue indefinitely.

A “healthy” economic growth rate of 4% per year corresponds to an increase by a factor of 50 in a century, by a factor of 2500 in two centuries, and by a factor of 125,000 in three centuries. No one can maintain that this type of growth is sustainable except by refusing to look more than a short distance into the future.

But *why* do most economists cling so stubbornly and blindly to the concept of growth? Why do they refuse to look more than a few years into the future? We can perhaps understand this strange self-imposed myopia by remembering some of David Ricardo’s ideas: One of his most important contributions to economic theory was his analysis of rents. Ricardo considered the effects of economic expansion; and he concluded that as population increased, marginally fertile land would be forced into cultivation. The price of grain would be determined by the cost of growing it on inferior land; and the owners of better land would be able to pocket a progressively larger profit as worse and worse land was forced into use by the demands of a growing population. Ricardo’s analysis of rents for agricultural land has various generalizations; for example, a growing population also puts

pressure on land used for building cities, and profits can be gained by holding such land, or through the ownership of houses in growing cities. In general, in a growing economy, investments are likely to be rewarded. In a stationary or contracting economy, the stock market may crash.

Considerations like those just discussed make it easy to understand why economists are biased in favor of growth. However, we are now entering a period where biological and physical constraints will soon put an end to economic growth.

Instead of burning our tropical forests, it might be wise for us to burn our books on growth-oriented economics! An entirely new form of economics is needed today - not the empty-world economics of Adam Smith, but what might be called "full-world economics", or "steady-state economics".

The present use of resources by the industrialized countries is extremely wasteful. A growing national economy must, at some point, exceed the real needs of the citizens. It has been the habit of the developed countries to create artificial needs by means of advertising, in order to allow economies to grow beyond the point where all real needs have been met; but this extra growth is wasteful, and in the future it will be important not to waste the earth's diminishing supply of non-renewable resources.

Thus, the times in which we live present a challenge: We need a revolution in economic thought. We must develop a new form of economics, taking into account the realities of the world's present situation - an economics based on real needs and on a sustainable equilibrium with the environment, not on the thoughtless assumption that growth can continue forever.

Adam Smith was perfectly correct in saying that the free market is the dynamo of economic growth; but exponential growth of human population and economic activity have brought us, in a surprisingly short time, from the empty-world situation in which he lived to a full-world situation. In today's world, we are pressing against the absolute limits of the earth's carrying capacity, and further growth carries with it the danger of future collapse. Full-world economics, the economics of the future, will no longer be able to rely on growth to give profits to stockbrokers or to solve problems of unemployment or to alleviate poverty. In the long run, growth of any kind is not sustainable; and we are now nearing its sustainable limits.

Like a speeding bus headed for a brick wall, the earth's rapidly-growing population of humans and its rapidly-growing economic activity are headed for a collision with a very solid barrier - the carrying capacity of the global environment. As in the case of the bus and the wall, the correct response to the situation is to apply the brakes in time - but fear prevents us from doing this. What will happen if we slow down very suddenly? Will not many of the passengers be injured? Undoubtedly. But what will happen if we hit the wall at full speed? Perhaps it would be wise, after all, to apply the brakes!

The memory of the great depression of 1929 makes us fear the consequences of an economic slowdown, especially since unemployment is already a serious problem in many parts of the world. Although the history of the 1929 depression is frightening, it may nevertheless be useful to look at the measures which were used then to bring the global economy back to its feet. A similar level of governmental responsibility may help us to

avoid some of the more painful consequences of the necessary transition from the economics of growth to steady-state economics.

In the United States, President Franklin D. Roosevelt was faced with the difficult problems of the depression during his first few years in office. Roosevelt introduced a number of special governmental programs, such as the WPA, the Civilian Construction Corps and the Tennessee Valley Authority, which were designed to create new jobs on projects directed towards socially useful goals - building highways, airfields, auditoriums, harbors, housing projects, schools and dams. The English economist John Maynard Keynes, (1883-1946), provided an analysis of the factors that had caused the 1929 depression, and a theoretical justification of Roosevelt's policies.

The transition to a sustainable global society will require a similar level of governmental responsibility, although the measures needed are not the same as those which Roosevelt used to end the great depression. Despite the burst of faith in the free market which has followed the end of the Cold War, it seems unlikely that market mechanisms alone will be sufficient to solve problems of unemployment in the long-range future, or to achieve conservation of land, natural resources and environment.

6.2 Keynesian economics

In December, 1933, Keynes wrote to Franklin D. Roosevelt: "Dear Mr. President, You have made yourself the Trustee for those in every country who seek to mend the evils of our condition by reasoned experiment within the framework of the existing social system. If you fail, rational change will be gravely prejudiced throughout the world, leaving orthodoxy and revolution to fight it out. But if you succeed, new and bolder methods will be tried everywhere, and we may date the first chapter of a new economic era from your accession to office..."

"...Thus as the prime mover in the first stage of the technique of recovery I lay overwhelming emphasis on the increase of national purchasing power resulting from governmental expenditure which is financed by Loans and not by taxing present incomes. Nothing else counts in comparison with this. In a boom inflation can be caused by allowing unlimited credit to support the excited enthusiasm of business speculators. But in a slump governmental Loan expenditure is the only sure means of securing quickly a rising output at rising prices. That is why war has always caused intense industrial activity. In the past orthodox finance has regarded war as the only legitimate excuse for creating employment by governmental expenditure. You, Mr. President, having cast off such fetters, are free to engage in the interests of peace and prosperity the technique which hitherto has only been allowed to serve the purposes of war and destruction."

John Maynard Keynes (1883-1946), the author of this letter to Roosevelt, was the son of the Cambridge University economist and logician, Neville Keynes. After graduating from Eton and studying economics at King's College, Cambridge, Keynes spent a few years as a civil servant in the India Office. In 1909, he returned to Cambridge as a Fellow of King's College. He became a member of the "Bloomsbury Group", a collection of intellectual



Figure 6.1: John Maynard Keynes (right) with Harry Dexter White at the Bretton Woods Conference. Keynes was an extremely tall man - 6 feet and 6 inches tall, i.e. 198 cm. Heart problems caused his early death.

friends that included Virginia and Leonard Woolf, E.M. Forster, Clive and Vanessa Bell, Duncan Grant, Lytton Strachy, Roger Fry, and Bertrand Russell. In 1911, Keynes became the editor of the *Economic Journal*, a position that he retained almost until the end of his life.

In 1918, Keynes married the Russian ballerina Lydia Lopokova. They met at a party given by the Sitwells. Lydia was struggling to learn English, and one of her more interesting remarks was, “I dislike being in the country in August because my legs get so bitten by barristers”. To everyone’s surprise, Lydia proved to be the perfect wife for Keynes, encouraging his wide range of cultural interests. He and Lydia did much to develop the Cambridge Arts Theatre. Lydia maintained her interest in the ballet, although she no longer danced professionally. Visitors to the couple’s house occasionally heard formidable thumpings from an upper room, and they realized that Lydia was practicing.

During World War I, Keynes worked in the British Treasury, helping to find ways to finance the war. In 1919, he was sent to the peace conference at Versailles as a representative of the Treasury. Keynes recognized the disastrous economic consequences that would follow from the Treaty of Versailles, and returning to Cambridge, he wrote *The Economic Consequences of the Peace* (1919). “It is an extraordinary fact”, Keynes wrote, “that the fundamental problems of a Europe starving and disintegrating before their eyes, was the one question in which it was impossible to arouse the interest of the [Council of] Four.”

The book became a best seller and was very influential in shaping public opinion, both in England and in the United States. In his book, Keynes predicted that the reparations imposed against Germany at Versailles would cause economic ruin. He advocated instead a loan system to rebuild postwar Europe. The plan advocated by Keynes was similar to the Marshall Plan that followed World War II. Had it been put into effect in 1919, it might have prevented the Second World War.

In 1936, Keynes published his magnum opus, *General Theory of Employment, Interest and Money*. In this book, he provided a theoretical explanation for the fact that the great depression showed no tendency to right itself, as well as arguments for governmental interventions to counter business cycles and to produce full employment. Once again, Keynes had written a best-seller. His *General Theory* proved to be one of the most influential books on economics ever written.

Keynes rebelled against the ideas of the classical economists, who believed that if let entirely alone, the world economy would correct itself. The classical economists recommended that, to end the depression, labor unions should be made illegal, minimum wages and long-term wage contracts abolished, and government spending curtailed (to restore business confidence). Then, they maintained, wages would fall, businessmen would hire more workers, and full employment and production would be restored. One reason for the popularity of the *General Theory* was that everyone knew the recommendations of the classical economists were bad policies. Now Keynes showed why these bad policies were also bad economics.

Keynes pointed out that a fall in wages would produce a fall in purchasing power, and hence a fall in aggregate demand. Producers would then be less able to sell their products. Thus Keynes believed that falling wages would deepen the depression, rather than ending

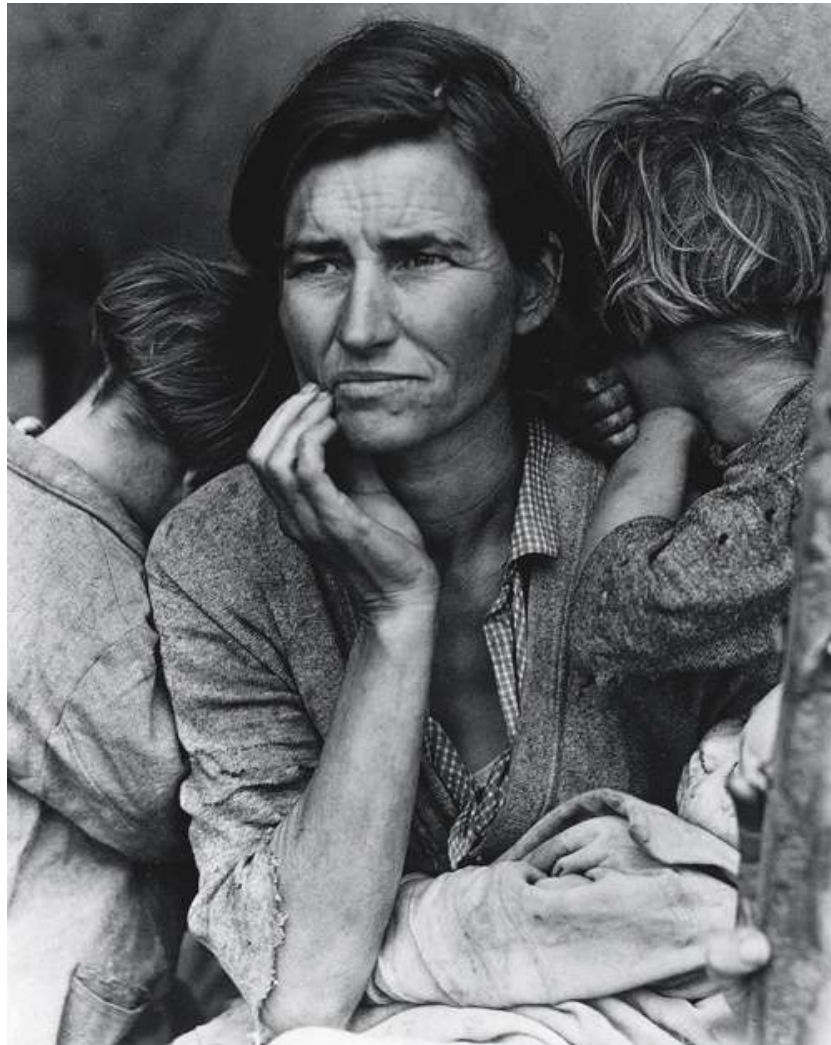


Figure 6.2: Migrant Mother, a photograph by Dorothea Lange, shows a destitute pea picker in California in 1936, during the Great Depression.

it.

Part of Keynes' skepticism towards classical economics had to do with his criticisms of the short-term version of Say's Law, on which classical economics was based. In Chapter 2, we mentioned that Jean-Baptiste Say (1767-1832) believed a general glut to be impossible, since wages for the production of goods could be used by society to buy back its aggregate production. "A glut", Say wrote, "can take place only when there are too many means of production applied to one kind of product, and not enough to another."

Say considered the influence of the money supply on this process to be negligible, and he believed that the problem could be analyzed from the standpoint of barter. Say believed that no one would keep money for long. Having obtained money in a transaction, he believed, people would immediately spend it again. Thus Say did not worry about the problem of excessive saving that bothered both Malthus and Hobson.

"It is not the abundance of money", Say wrote, "but the abundance of other products in general that facilitates sales... Money performs no more than the role of a conduit in this double exchange. When the exchanges have been completed, it will be found that one has paid for products with products."

"It is worthwhile to remark", Say continued, "that a product is no sooner created than it, from that instant, affords a market for other products to the full extent of its value. When the producer has put the finishing hand to his product, he is most anxious to sell it immediately, lest its value should diminish in his hands. Nor is he less anxious to dispose of the money he may get for it; for the value of money is also perishable. But the only way to get rid of money is in the purchase some product or other. Thus the mere circumstance of creation of one product immediately opens a vent for other products."

Keynes disagreed with these conclusions in several respects. First of all, he did not believe, like Say, that the money supply played a negligible role in determining economic activity. Secondly he did not agree that the producer who has received money for his goods is necessarily "anxious to dispose of the money". As a recession deepens, the value of money in terms of goods increases, and therefore it is rational to keep money, hoping to get more goods for it at a later time. Whether it is more rational to keep money or to spend it immediately depends on the phase of the business cycle, Keynes pointed out.

In James Mill's version, Say's Law states that "supply creates its own demand". Keynes reversed this, and maintained in a depression, the fault may be on the demand side, i.e., "demand creates supply", rather than the reverse. It is true that during the great depression, many people were in need; but need does not constitute demand in the economic sense unless it is combined with purchasing power.

Keynes (like Malthus and Hobson) believed that excessive saving could be a serious problem, capable of causing a "general glut" or depression. By excessive saving, he meant saving beyond planned investment, a condition that could be caused by falling consumer demand, overinvestment in previous years, or lack of business confidence. The classical economists believed that excessive saving would be corrected by falling interest rates. Keynes did not believe that interest rates would respond quickly enough to perform this corrective function. Instead, Keynes believed, excessive savings would be in the end corrected by the fall in aggregate income which characterizes a recession or depression. The econ-

omy would reach a new equilibrium at low levels of employment, income, investment and production. This new, undesirable equilibrium would not be self-correcting. (By calling his theory a *General Theory*, Keynes meant that he treated not only the full-employment equilibrium, but also other types of equilibria.)

Keynes believed that active government fiscal and monetary policy could be effective in combating cycles of inflation and depression. *Fiscal policy* is defined as policy regarding government expenditure, while *monetary policy* means governmental policy with respect to the money supply. Keynes advocated a counter-cyclical use of these two tools, i.e. he believed that government spending and expansionist monetary policy should be used to combat recessions and depressions, while the opposite policies should be used to cool an economy whenever it became overheated.

Keynes visited Roosevelt in Washington in 1934. Roosevelt liked him, but found his theories overly mathematical. Nevertheless Keynes ideas influenced Roosevelt's policies, especially in 1937, when a new dip in the economy occurred. Over the years, Keynes' advocacy of counter-cyclical governmental intervention has become widely accepted, especially by social-democratic governments in Europe.

The New Deal measures inaugurated by Roosevelt were only partially effective in producing full employment. The reason that they were only partially successful was that although they were designed to help business get restarted, they were viewed with hostility by the business community. This hostility prevented Roosevelt from using fiscal policy on a large enough scale to produce full employment. Also, because businessmen felt uneasy with the new political climate, business investment remained sluggish.

One of the conclusions of Keynes' *General Theory* was that investment by expanding businesses is essential to keep an economy from contracting. This conclusion is worrying, because in the future, exponential expansion of business activity will gradually become less and less possible. Thus we can visualize a future need for governmental intervention to prevent a depression.

During World War II, Keynes advice on how to finance the war effort was sought by the British government. He did as much as he could, but his activity was limited by increasing heart problems. At the end of the war, Keynes represented England at the Breton Woods Conference, which established the World Bank and the International Monetary Fund. He received many honors - for example, he became Lord Keynes. However, his health remained unstable, and in 1946 he died of a heart attack. His life and work had produced a permanent change from the *laissez faire* economics of Adam Smith to an era of recognized governmental responsibility.

6.3 Avoiding a depression: Strong governmental action will be needed

Inside Job

The Academy-Award-Winning documentary film **Inside Job**¹ tells the shocking story of the corruption of the financial sector that led to the 2008 subprime mortgage crisis and bank bailout. The film can be seen online free of charge, and is well worth viewing. Of particular interest are discussions of the history of bank deregulation, governmental collusion, and the destabilizing effects of the enormous derivative market.

What are derivatives?

Investopedia² gives the following definition of derivatives:

- A derivative is a contract between two or more parties whose value is based on an agreed-upon underlying financial asset, index or security.
- Futures contracts, forward contracts, options, swaps, and warrants are commonly used derivatives.
- Derivatives can be used to either mitigate risk (hedging) or assume risk with the expectation of commensurate reward (speculation).

How large is the derivative market?

Investopedia³ states that “The derivatives market is, in a word, gigantic - often estimated at more than \$1.2 quadrillion on the high end. How can that be? Largely because there are numerous derivatives in existence, available on virtually every possible type of investment asset, including equities, commodities, bonds and foreign currency exchange. Some market analysts even place the size of the market at more than 10 times that of the total world gross domestic product (GDP).

Iran and a global financial meltdown?

Here are some excerpts from a June 7 2019 article by Pepe Escobar entitled *Why Trump Now Wants Talks With Iran: If Iran Blocks the Strait of Hormuz It Will Send the Price*

¹<https://www.theguardian.com/film/2011/feb/17/inside-job-review>
<https://topdocumentaryfilms.com/inside-job/>

²<https://www.investopedia.com/ask/answers/052715/how-big-derivatives-market.asp>

³<https://www.investopedia.com/ask/answers/052715/how-big-derivatives-market.asp>

*of Oil Soaring And Cause Global Financial Derivatives Meltdown*⁴:

If Tehran blocks the Strait of Hormuz it could send the price of oil soaring and cause a global recession.

The great Bilderberg secret of 2019 had to do with why, suddenly, the Trump administration has decided that it wants to talk to Iran “with no preconditions”...

An American source said a series of studies hit President Trump’s desk and caused panic in Washington. These showed that in the case of the Strait of Hormuz being shut down, whatever the reason, Iran has the power to hammer the world financial system, by causing global trade in derivatives to be blown apart.

The Bank for International Settlements said last year that the “notional amount outstanding for derivatives contracts” was \$542 trillion, although the gross market value was put at just \$12.7 trillion. Others suggest it is \$1.2 quadrillion or more.

The example of FDR and Keynes

Because of the financially destabilizing effect of the enormous derivative market, and because of radical adjustments that will be needed to meet the challenges of the climate crisis, there is currently a strong danger that the world will be thrown into a severe depression. If this occurs, we must remember the methods used by Franklin D. Roosevelt to end the depression of the 1930’s. Following the advice of Keynes, he used the power of the federal government to simultaneously create jobs and much-needed infrastructure.

The Worldwatch Institute, Washington D.C., lists the following steps as necessary for the transition to sustainability⁵:

1. Stabilizing population
2. Shifting to renewable energy
3. Increasing energy efficiency
4. Recycling resources
5. Reforestation
6. Soil Conservation

⁴<http://socioecohistory.x10host.com/2019/06/07/why-trump-now-wants-talks-with-iran-if-tehran-blocks-the-strait-of-hormuz-it-will-send-the-price-of-oil-soaring-and-cause-global-financial-derivatives-meltdown/>

⁵L.R. Brown and P. Shaw, 1982.

All of these steps are labor-intensive; and thus, wholehearted governmental commitment to the transition to sustainability can help to solve the problem of unemployment.

In much the same spirit that Roosevelt (with Keynes' approval) used governmental powers to end the great depression, we must now urge our governments to use their powers to promote sustainability and to reduce the trauma of the transition to a steady-state economy. For example, an increase in the taxes on fossil fuels could make a number of renewable energy technologies economically competitive; and higher taxes on motor fuels would be especially useful in promoting the necessary transition from private automobiles to bicycles and public transportation. Tax changes could also be helpful in motivating smaller families.

Governments already recognize their responsibility for education. In the future, they must also recognize their responsibility for helping young people to make a smooth transition from education to secure jobs. If jobs are scarce, work must be shared, in a spirit of solidarity, among those seeking employment; hours of work (and if necessary, living standards) must be reduced to insure a fair distribution of jobs. Market forces alone cannot achieve this. The powers of government are needed.

Economic activity is usually divided into two categories, 1) production of goods and 2) provision of services. It is the rate of production of goods that will be limited by the carrying capacity of the global environment. Services that have no environmental impact will not be constrained in this way. Thus a smooth transition to a sustainable economy will involve a shift of a large fraction the work force from the production of goods to the provision of services.

In his recent popular book *The Rise of the Creative Class*, the economist Richard Florida points out that in a number of prosperous cities - for example Stockholm - a large fraction of the population is already engaged in what might be called creative work - a type of work that uses few resources, and produces few waste products - work which develops knowledge and culture rather than producing material goods. For example, producing computer software requires few resources and results in few waste products. Thus it is an activity with a very small ecological footprint. Similarly, education, research, music, literature and art are all activities that do not weigh heavily on the carrying capacity of the global environment. Florida sees this as a pattern for the future, and maintains that everyone is capable of creativity. He visualizes the transition to a sustainable future economy as one in which a large fraction of the work force moves from industrial jobs to information-related work. Meanwhile, as Florida acknowledges, industrial workers feel uneasy and threatened by such trends.

Population and goods per capita

In the distant future, the finite carrying capacity of the global environment will impose limits on the amount of resource-using and waste-generating economic activity that it will be possible for the world to sustain. The consumption of goods per capita will be equal to this limited total economic activity divided by the number of people alive at that time. Thus, our descendants will have to choose whether they want to be very numerous and

very poor, or less numerous and more comfortable, or very few and very rich. Perhaps the middle way will prove to be the best.

Given the fact that environmental carrying capacity will limit the sustainable level of resource-using economic activity to a fixed amount, average wealth in the distant future will be approximately inversely proportional to population over a certain range of population values.⁶

6.4 Kenneth E. Boulding: *Spaceship Earth*

Some quotations from Kenneth E. Boulding

Anyone who believes in indefinite growth in anything physical, on a physically finite planet, is either mad or an economist.

Mathematics brought rigor to economics. Unfortunately it also brought mortis.

Nothing fails like success because we don't learn from it. We learn only from failure.

If the society toward which we are developing is not to be a nightmare of exhaustion, we must use the interlude of the present era to develop a new technology which is based on a circular flow of materials such that the only sources of man's provisions will be his own waste products.

Economics has been incurably growth-oriented and addicted to everybody growing richer, even at the cost of exhaustion of resources and pollution of the environment.

Nationalism is the only religion today that requires human sacrifice.

Know this: though love is weak and hate is strong, Yet hate is short, and love is very long.

As long as man was small in numbers and limited in technology, he could realistically regard the earth as an infinite resource, an infinite source of inputs, and an infinite cesspool of outputs. Today, we can no longer make this assumption. Earth has become a spaceship. not only in our imagination but also in the hard

⁶Obviously, if the number of people is reduced to such an extent that it approaches zero, the average wealth will not approach infinity, since a certain level of population is needed to maintain a modern economy. However, if the global population becomes extremely large, the average wealth will indeed approach zero.



Figure 6.3: **Kenneth E. Boulding (1910-1993)**, author of more than 36 books and 112 articles on the relationship of economics with social and philosophical questions. His influential book, “*Economics of the Coming Spaceship Earth*”, was published in 1966.

realities of the social, biological and physical systems in which man is enmeshed.

The economy of the future might be called the “spaceman economy,” in which the earth has become a single spaceship, without unlimited reservoirs of anything.

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Chapter 7

ADDICTION TO GROWTH

7.1 Madmen and economists

“Anyone who believes in indefinite growth in anything physical, on a physically finite planet, is either mad or an economist”. Kenneth E. Boulding (1910-1993)

Why are economists addicted to growth?

Economists (with a few notable exceptions) have long behaved as though growth were synonymous with economic health. If the gross national product of a country increases steadily by 4 percent per year, most economists express approval and say that the economy is healthy. If the economy could be made to grow still faster (they maintain), it would be still more healthy. If the growth rate should fall, economic illness would be diagnosed. However, it is obvious that on a finite Earth, neither population growth nor economic growth can continue indefinitely.

But why do economists cling almost religiously to the idea of growth? In general, growth brings profits to speculators. For example, purchase of land on the outskirts of a growing city will be rewarded as the land increases in value.; and when the economy grows, stocks rise in value. ’

Today, as economic growth falters, the defects and injustices of our banking system have come sharply into focus, and light has also been thrown onto the much-too-cozy relationship between banking and government. The collapse of banks during the subprime mortgage crisis of 2008 and their subsequent bailout by means of the taxpayer’s money can give us an insight into both phenomena - the faults of our banking system and its infiltration into the halls of government. The same can be said of the present national debt crisis in the Euro zone and elsewhere.



7.2 Fractional reserve banking

One feature of banking that cries out for reform is “fractional reserve banking”, i.e. the practice whereby private banks keep only a tiny fraction of the money entrusted to them by their depositors, and lend out all the remaining amount. By doing so, the banks are in effect coining their own money and putting it into circulation, a prerogative that ought to be reserved for governments. Under the system of fractional reserve banking, profits from any expansion of the money supply go to private banks rather than being used by the government to provide social services. This is basically fraudulent and unjust; the banks are in effect issuing their own counterfeit money.

When the economy contracts instead of expanding, the effect of fractional reserve banking is still worse. In that case the depositors ask the banks for their money, which it is their right to do. But the banks do not have the money - they have lent it out, and thus they fail. However, the bankers have insured themselves against this eventuality by buying the votes of government officials. Thus the banks are bailed out and the taxpayers are left with the bill, as in the recent example in which the US Federal Reserve secretly gave 7.7 trillion of the taxpayers’ dollars to bail out various banks.

Inside Job

The Academy-Award-Winning documentary film **Inside Job**¹ tells the shocking story of the corruption of the financial sector that led to the 2008 subprime mortgage crisis and bank

¹<https://www.theguardian.com/film/2011/feb/17/inside-job-review>
<https://topdocumentaryfilms.com/inside-job/>

bailout. The film can be seen online free of charge, and is well worth viewing. Of particular interest are discussions of the history of bank deregulation, governmental collusion, and the destabilizing effects of the enormous derivative market.

7.3 Information-driven population growth

Today we are able to estimate the population of the world at various periods in history, and we can also make estimates of global population in prehistoric times. Looking at the data, we can see that the global population of humans has not followed an exponential curve as a function of time, but has instead followed a hyperbolic trajectory.

At the time of Christ, the population of the world is believed to have been approximately 220 million. By 1500, the earth contained 450 million people, and by 1750, the global population exceeded 700 million. As the industrial and scientific revolution has accelerated, global population has responded by increasing at a break-neck speed: In 1930, the population of the world reached two billion; in 1958 three billion; in 1974 four billion; in 1988 five billion, and in 1999, six billion. Today, we have reached 7.6 billion, and roughly a billion people are being added to the world's population every twelve years.

As the physicist Murray Gell-Mann has pointed out, a simple mathematical curve which closely approximates the global population of humans over a period of several thousand years is a hyperbola of the form $P = 190,000,000,000/(2025-t)$. Here P represents the global population of humans and t is the year.

How are we to explain the fact that the population curve is not an exponential? We can turn to Malthus for an answer: According to his model, population does not increase exponentially, except under special circumstances, when the food supply is so ample that the increase of population is entirely unchecked.

Malthus gives us a model of culturally-driven population growth. He tells us that population increase tends to press against the limits of the food supply, and since these limits are culturally determined, population density is also culturally-determined. Hunter-gatherer societies need large tracts of land for their support; and in such societies, the population density is necessarily low. Pastoral methods of food production can support populations of a higher density. Finally, extremely high densities of population can be supported by modern agriculture. Thus, Gell-Mann's hyperbolic curve, should be seen as describing the rapidly-accelerating growth of human culture, this being understood to include methods of food production.

If we look at the curve, $P=C/(2025-t)$, it is obvious that human culture has reached a period of crisis. The curve predicts that the world's population will rise to infinity in the year 2025, which of course is impossible. Somehow the actual trajectory of global population as a function of time must deviate from the hyperbolic curve, and in fact, the trajectory has already begun to fall away from the hyperbola.

Because of the great amount of human suffering which may be involved, and the potentially catastrophic damage to the earth's environment, the question of how the actual trajectory of human population will come to deviate from the hyperbola is a matter of

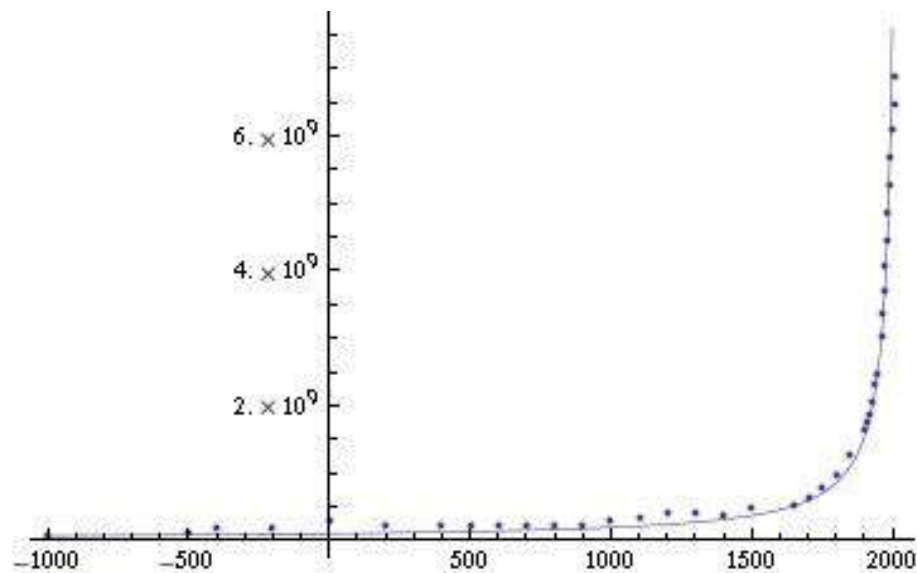


Figure 7.1: The simple mathematical curve that fits best to human population data over the last 3,000 years is not an exponential increase, but rather a hyperbola of the form $P=C/(2025-t)$. Here P represents population, $C=190,000,000,000$ and t is the year. The curve goes to infinity at $t=2025$ (only a few years away), which is of course impossible. Global population has already started to fall away from the hyperbolic trajectory. Will it level off, or will it crash disastrously? Because of the enormous amount of human suffering that would be involved in a population crash, the question has great importance.

enormous importance. Will population overshoot the sustainable limit, and crash? Or will it gradually approach a maximum? In the case of the second alternative, will the checks which slow population growth be later marriage and family planning? Or will the grim Malthusian forces - famine, disease and war - act to hold the number of humans within the carrying capacity of their environment?

We can anticipate that as the earth's human population approaches 10 billion, severe famines will occur in many developing countries. The beginnings of this tragedy can already be seen. It is estimated that roughly 30,000 children now die every day from starvation, or from a combination of disease and malnutrition.

Beyond the fossil fuel era

An analysis of the global ratio of population to cropland shows that we have probably already exceeded the sustainable limit of population through our dependence on petroleum: Between 1950 and 1982, the use of cheap synthetic fertilizers increased by a factor of 8. Much of our present agricultural output depends on their use, but their production is expensive in terms of energy. Furthermore, petroleum-derived synthetic fibers have reduced the amount of cropland needed for growing natural fibers, and petroleum-driven tractors have replaced draft animals which required cropland for pasturage.

Also, petroleum fuels have replaced fuelwood and other fuels derived from biomass. The reverse transition, from fossil fuels back to renewable energy sources, will require a considerable diversion of land from food production to energy production. For example, 1.1 hectares are needed to grow the sugarcane required for each alcohol-driven Brazilian automobile. This figure may be compared with the steadily falling average area of cropland available to each person in the world: .24 hectares in 1950, .16 hectares in 1982.

Thus there is a danger that just as global population reaches the unprecedented level of 10 billion or more, the agricultural base for supporting it may suddenly collapse. Ecological catastrophe, possibly compounded by war and other disorders, could produce famine and death on a scale unprecedented in history - a disaster of unimaginable proportions, involving billions rather than millions of people.

What would Malthus say today?

What would Malthus tell us if he were alive today? Certainly he would say that we have reached a period of human history where it is vital to stabilize the world's population if catastrophic environmental degradation and famine are to be avoided. He would applaud efforts to reduce suffering by eliminating poverty, widespread disease, and war; but he would point out that, since it is necessary to stop the rapid increase of human numbers, it follows that whenever the positive checks to population growth are removed, it is absolutely necessary to replace them by preventive checks. Malthus' point of view became more broad in the successive editions of his Essay; and if he were alive today, he would probably agree that family planning is the most humane of the preventive checks.

Eliminating poverty and war

In most of the societies which Malthus described, a clear causal link can be seen, not only between population pressure and poverty, but also between population pressure and war. As one reads his Essay, it becomes clear why both these terrible sources of human anguish saturate so much of history, and why efforts to eradicate them have so often met with failure: The only possible way to eliminate poverty and war is to reduce the pressure of population by preventive checks, since the increased food supply produced by occasional cultural advances can give only very temporary relief.

Today, the links between population pressure, poverty, and war are even more pronounced than they were in the past, because the growth of human population has brought us to the absolute limits imposed by ecological constraints. Furthermore, the development of nuclear weapons has made war prohibitively dangerous.

How many people can the earth support in comfort?

The resources of the earth and the techniques of modern science can support a global population of moderate size in comfort and security; but the optimum size is undoubtedly smaller than the world's present population. Given a sufficiently small global population, renewable sources of energy can be found to replace disappearing fossil fuels. Technology may also be able to find renewable substitutes for many disappearing mineral resources for a global population of a moderate size. What technology cannot do, however, is to give a global population of 10 billion people the standard of living which the industrialized countries enjoy today.

7.4 Entropy and economics

We urgently need to shift quickly from fossil fuels to renewable energy if we are to avoid a tipping point after which human efforts to avoid catastrophic climate change will be futile because feedback loops will have taken over. The dangerous methane hydrate feedback loop is discussed in an excellent short video made by Thom Hartmann and the Leonardo DiCaprio Foundation.²

Celebrated author and activist Naomi Klein has emphasized the link between need for economic reform and our urgent duty to address climate change.³

Rebel economist Prof. Tim Jackson discusses the ways in which our present economic system has failed us, and the specific reforms that are needed. In one of his publications, he says: "The myth of growth has failed us. It has failed the two billion people who still live on 2 dollars a day. It has failed the fragile ecological systems on which we depend for

²<https://www.youtube.com/watch?v=sRGVTK-AAvw>
<http://lasthours.org/>

³<http://thischangeseverything.org/naomi-klein/>
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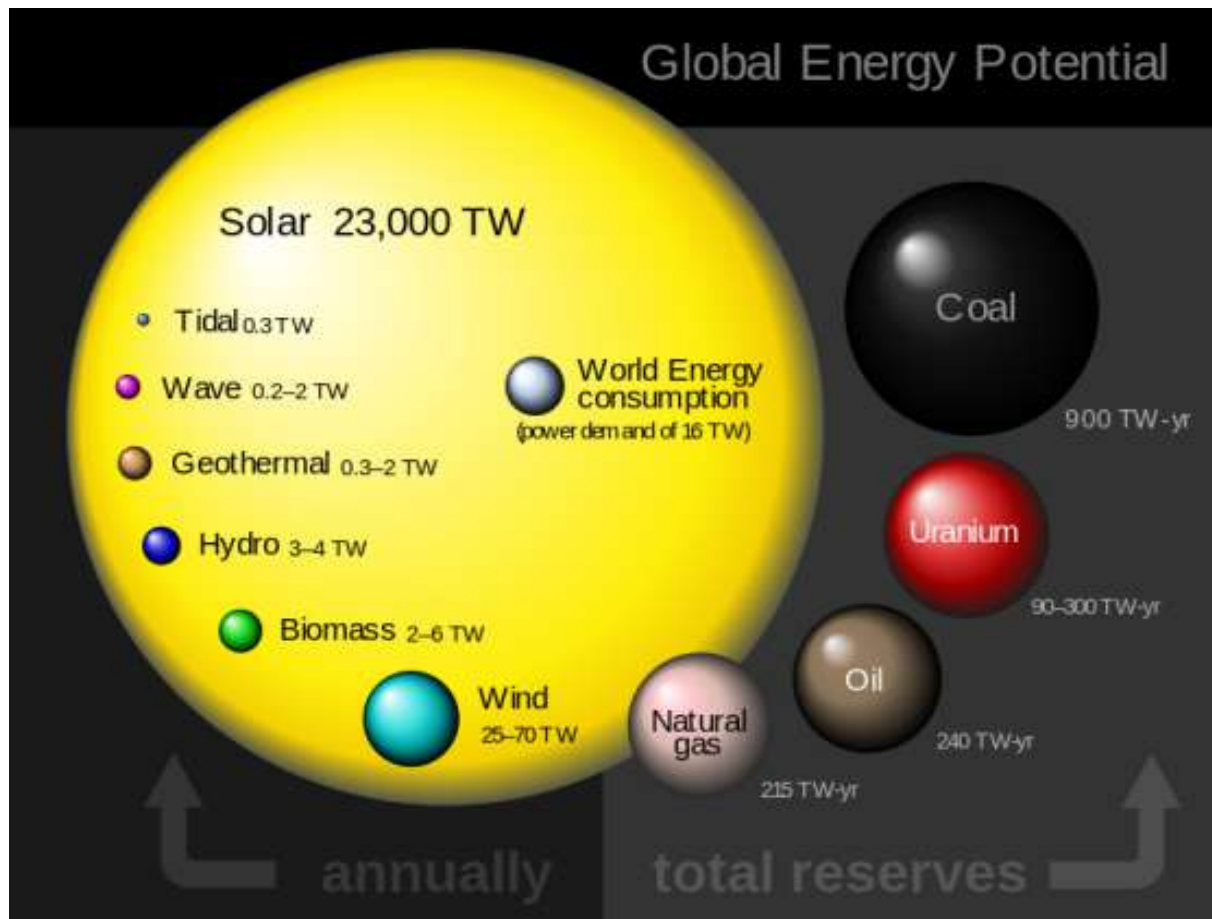


Figure 7.2: Global energy potential. Comparison of renewable and conventional planetary energy reserves and sources. While renewables display their power potential in terawatts (TW) with the corresponding annual amount of energy, conventional sources display their total recoverable energy reserves in terawatt-years (TW-yr). Author: Rfassbind, Wikimedia Commons

survival. It has failed, spectacularly, in its own terms, to provide economic stability and secure people's livelihood." ⁴

What is entropy?

Entropy is a quantity, originally defined in statistical mechanics and thermodynamics. It is a measure of the statistical probability of any state of a system: The greater the entropy, the greater the probability. The second law of thermodynamics asserts that entropy of the universe always increases with time. In other words, the universe as a whole is constantly moving towards states of greater and greater probability.

For any closed system, the same is true. Such systems move in time towards states of greater and greater probability. However, the earth, with its biosphere, is not a closed system. The earth constantly receives an enormous stream of light from the sun. The radiation which we receive from the sun brings us energy that can be used to perform work, and in physics this is called "free energy". Because of this flood of incoming sunlight, plants, animals and humans are able to create structures which from a statistical point of view are highly unlikely.

The disorder and statistical probability of the universe is constantly increasing, but because the earth is not a closed system, we are able to create local order, and complex, statistically improbable structures, like the works of Shakespeare, the Mona Lisa and the Internet. The human economy is driven by the free energy which we receive as income from the sun. Money is, in fact, a symbol for free energy, and free energy might be thought of as "negative entropy". There is also a link between free energy and information.⁵

Human society as a superorganism, with the global economy as its digestive system

A completely isolated human being would find it as difficult to survive for a long period of time as would an isolated ant or bee or termite. Therefore it seems correct to regard human society as a superorganism. In the case of humans, the analog of the social insects' nest is the enormous and complex material structure of civilization. It is, in fact, what we call the human economy. It consists of functioning factories, farms, homes, transportation links, water supplies, electrical networks, computer networks and much more.

Almost all of the activities of modern humans take place through the medium of these external "exosomatic" parts of our social superorganism. The terms "exosomatic" and "endosomatic" were coined by the American scientist Alfred Lotka (1880-1949). A lobster's claw is endosomatic; it is part of the lobster's body. The hammer used by a human is exosomatic, like a detachable claw. Lotka spoke of "exosomatic evolution", including in

⁴<http://www.theguardian.com/sustainable-business/rio-20-tim-jackson-leaders-green-economy?newsfeed=true>

<http://www.theguardian.com/sustainable-business/consumerism-sustainability-short-termism>

⁵<http://www.amazon.com/Information-Theory-And-Evolution-Edition/dp/9814401234>

this term not only cultural evolution but also the building up of the material structures of civilization.

The economy associated with the human superorganism “eats” resources and free energy. It uses these inputs to produce local order, and finally excretes them as heat and waste. The process is closely analogous to food passing through the alimentary canal of an individual organism. The free energy and resources that are the inputs of our economy drive it just as food drives the processes of our body, but in both cases, waste products are finally excreted in a degraded form.

Almost all of the free energy that drives the human economy came originally from the sun’s radiation, the exceptions being geothermal energy which originates in the decay of radioactive substances inside the earth, and tidal energy, which has its origin in the slowing of the motions of the earth-moon system. However, since the start of the Industrial Revolution, our economy has been using the solar energy stored in of fossil fuels. These fossil fuels were formed over a period of several hundred million years. We are using them during a few hundred years, i.e., at a rate approximately a million times the rate at which they were formed.

The present rate of consumption of fossil fuels is more than 14 terawatts and, if used at the present rate, fossil fuels would last less than a century. However, because of the very serious threats posed by climate change, human society would be well advised to stop the consumption of coal, oil and natural gas within the next two decades.

The rate of growth of of new renewable energy sources is increasing rapidly. These sources include small hydro, modern biomass, solar, wind, geothermal, wave and tidal energy. There is an urgent need for governments to set high taxes on fossil fuel consumption and to shift subsidies from the petroleum and nuclear industries to renewables. These changes in economic policy are needed to make the prices of renewables more competitive.

The shock to the global economy that will be caused by the end of the fossil fuel era will be compounded by the scarcity of other non-renewable resources, such as metals. While it is true (as neoclassical economists emphasize) that “matter and energy can neither be created nor destroyed”, free energy can be degraded into heat, and concentrated deposits of minerals can be dispersed. Both the degradation of free energy into heat and the dispersal of minerals involve increases of entropy.

7.5 Frederick Soddy

One of the first people to call attention to the relationship between entropy and economics was the English radiochemist Frederick Soddy (1877-1956). Soddy won the Nobel Prize for Chemistry in 1921 for his work with Ernest Rutherford demonstrating the transmutation of elements in radioactive decay processes. His concern for social problems then led him to a critical study of the assumptions of classical economics. Soddy believed that there is a close connection between free energy and wealth, but only a very tenuous connection between wealth and money.

Soddy was extremely critical of the system of “fractional reserve banking” whereby

private banks keep only a small fraction of the money that is entrusted to them by their depositors and lend out the remaining amount. He pointed out that this system means that the money supply is controlled by the private banks rather than by the government, and also that profits made from any expansion of the money supply go to private corporations instead of being used to provide social services. Fractional reserve banking exists today, not only in England but also in many other countries. Soddy's criticisms of this practice cast light on the subprime mortgage crisis of 2008 and the debt crisis of 2011.

As Soddy pointed out, real wealth is subject to the second law of thermodynamics. As entropy increases, real wealth decays. Soddy contrasted this with the behavior of debt at compound interest, which increases exponentially without any limit, and he remarked:

"You cannot permanently pit an absurd human convention, such as the spontaneous increment of debt [compound interest] against the natural law of the spontaneous decrement of wealth [entropy]". Thus, in Soddy's view, it is a fiction to maintain that being owed a large amount of money is a form of real wealth.

Frederick Soddy's book, "Wealth, virtual wealth and debt: The solution of the economic paradox", published in 1926 by Allen and Unwin, was received by the professional economists of the time as the quixotic work of an outsider. Today, however, Soddy's common-sense economic analysis is increasingly valued for the light that it throws on the problems of our fractional reserve banking system, which becomes more and more vulnerable to failure as economic growth falters.⁶

Currency reform, and nationalization of banks

Frederick Soddy was writing at a time when England's currency was leaving the gold standard, and in order to replace this basis for the currency, he proposed an index system. Soddy's index was to be based on a standard shopping basket containing household items, such as bread, milk, potatoes and so on. If the price of the items in the basket rose, more currency would be issued by the nationalized central bank. If the price fell, currency would be withdrawn.

Nationalization of banks was proposed by Soddy as a means of avoiding the evils of the fractional reserve banking system. Today we see a revival of the idea of nationalized banks, or local user-owned cooperative banks. The Grameen Bank, founded by Prof. Muhammad Yunus, pioneered the idea of socially-motivated banks for the benefit poor people who would ordinarily be unable to obtain loans. The bank and its founder won a Nobel Peace Prize in 2006.⁷

⁶www.fadedpage.com/link.php?file=20140873-a5.pdf
<http://human-wrongs-watch.net/2015/07/08/debt-slavery/>

⁷<http://www.grameen-info.org/history/>
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7.6 Nicholas Georgescu-Roegen: Ecological Economics

The incorporation of the idea of entropy into economic thought also owes much to the mathematician and economist Nicholas Georgescu-Roegen (1906-1994), the son of a Romanian army officer. Georgescu-Roegen's talents were soon recognized by the Romanian school system, and he was given an outstanding education in mathematics, which later contributed to his success and originality as an economist.

Between 1927 and 1930 the young Georgescu studied at the Institute de Statistique in Paris, where he completed an award-winning thesis: "On the problem of finding out the cyclical components of phenomena". He then worked in England with Karl Pearson from 1930 to 1932, and during this period his work attracted the attention of a group of economists who were working on a project called the Harvard Economic Barometer. He received a Rockefeller Fellowship to join this group, but when he arrived at Harvard, he found that the project had been disbanded.

In desperation, Georgescu-Roegen asked the economist Joseph Schumpeter for an appointment to his group. Schumpeter's group was in fact a remarkably active and interesting one, which included the future Nobel laureate Wassely Leontief; and there followed a period of intense intellectual activity during which Georgescu-Roegen became an economist.

Despite offers of a permanent position at Harvard, Georgescu-Roegen returned to his native Romania in the late 1930's and early 1940's in order to help his country. He served as a member of the Central Committee of the Romanian National Peasant Party. His experiences at this time led to his insight that economic activity involves entropy. He was also helped to this insight by Borel's monograph on Statistical Mechanics, which he had read during his Paris period.

Georgescu-Roegen later wrote: "The idea that the economic process is not a mechanical analogue, but an entropic, unidirectional transformation began to turn over in my mind long ago, as I witnessed the oil wells of the Ploesti field of both World Wars' fame becoming dry one by one, and as I grew aware of the Romanian peasants' struggle against the deterioration of their farming soil by continuous use and by rains as well. However it was the new representation of a process that enabled me to crystallize my thoughts in describing the economic process as the entropic transformation of valuable natural resources (low entropy) into valueless waste (high entropy)."

After making many technical contributions to economic theory, Georgescu-Roegen returned to this insight in his important 1971 book, "The Entropy Law and the Economic Process" (Harvard University Press), where he outlines his concept of bioeconomics. In a later book, "Energy and Economic Myths" (Pergamon Press, New York, 1976), he offered the following recommendations for moving towards a bioeconomic society:

1. The complete prohibition of weapons production, thereby releasing productive forces

<https://en.wikipedia.org/wiki/Nationalization>

<http://www.theguardian.com/world/2015/jul/23/beppe-grillo-calls-for-nationalisation-of-italian-banks-and-exit-from-euro>

<http://dissidentvoice.org/2015/07/whats-wrong-with-our-monetary-system-and-how-to-fix-it/>

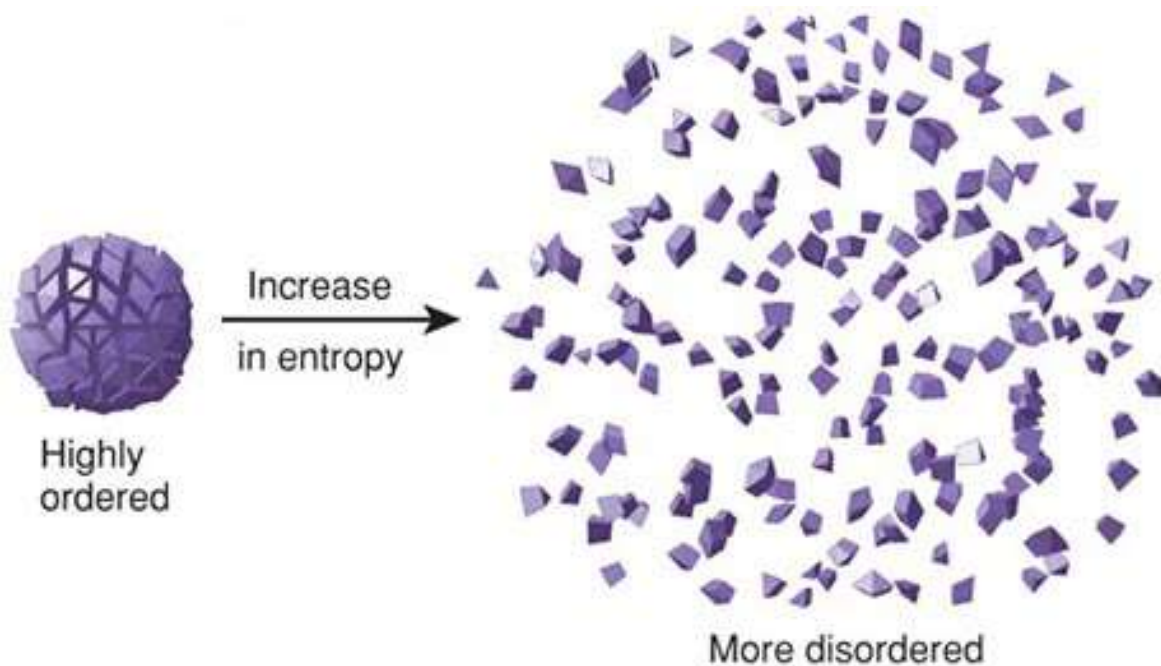


Figure 7.3: According to the second law of thermodynamics, the entropy of the universe constantly increases. Increase of entropy corresponds to increase of disorder, and also to increase of statistical probability. Living organisms on the earth are able to achieve a high degree of order and highly improbable structures because the earth is not a closed system. It constantly receives free energy (i.e. energy capable of doing work) from the sun, and this free energy can be thought of as carrying thermodynamic information, or “negative entropy”. Source: flowchainsensel.wordpress.co,



Figure 7.4: **Wind, solar, and biomass are three emerging renewable sources of energy. Wind turbines in a rapeseed field in Sandesneben, Germany. Author: Jürgen from Sandesneben, Germany, Wikimedia Commons**

- for more constructive purposes;
- 2. Immediate aid to underdeveloped countries;
- 3. Gradual decrease in population to a level that could be maintained only by organic agriculture;
- 4. Avoidance, and strict regulation if necessary, of wasteful energy use;
- 5. Abandon our attachment to “extravagant gadgetry”;
- 6. “Get rid of fashion”;
- 7. Make goods more durable and repairable; and
- 8. Cure ourselves of workaholic habits by re-balancing the time spent on work and leisure, a shift that will become incumbent as the effects of the other changes make themselves felt.

Georgescu-Roegen did not believe that his idealistic recommendations would be adopted, and he feared that human society is headed for a crash.

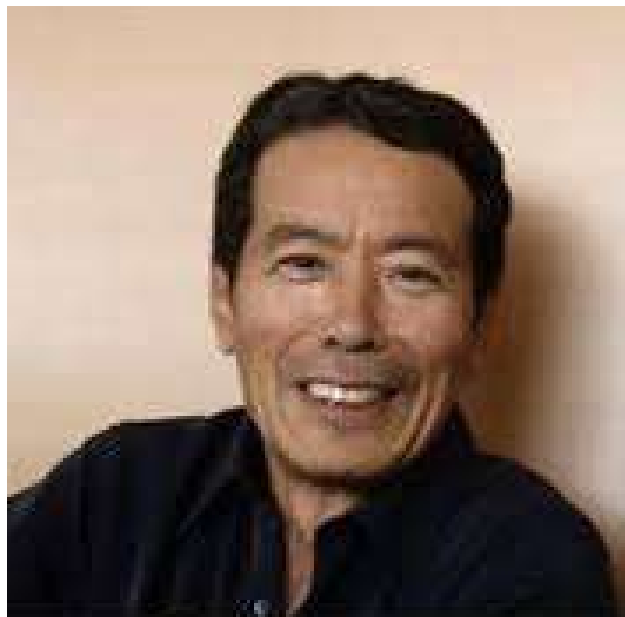
7.7 Herman E. Daly and Kozo Mayumi

Limits to growth

Nicholas Georgescu-Roegen’s influence continues to be felt today, not only through his own books and papers but also through those of his students, the distinguished economists Herman E. Daly and Kozo Mayumi, who for many years have been advocating a steady-state



Figure 7.5: Today, Nicholas Georgescu-Roegen's work for a sustainable steady.state economic system is ably carried forward by his two distinguished students, Professors Herman E. Daly (above) and Kozo Mayumi (below).



economy. As they point out in their books and papers, it is becoming increasingly apparent that unlimited economic growth on a finite planet is a logical impossibility. However, it is important to distinguish between knowledge, wisdom and culture, which can and should continue to grow, and growth in the sense of an increase in the volume of material goods produced. It is growth in the latter sense that is reaching its limits.

Daly describes our current situation as follows: “The most important change in recent times has been the growth of one subsystem of the Earth, namely the economy, relative to the total system, the ecosphere. This huge shift from an ‘empty’ to a ‘full’ world is truly ‘something new under the sun’... The closer the economy approaches the scale of the whole Earth, the more it will have to conform to the physical behavior mode of the Earth... The remaining natural world is no longer able to provide the sources and sinks for the metabolic throughput necessary to sustain the existing oversized economy, much less a growing one. Economists have focused too much on the economy’s circulatory system and have neglected to study its digestive tract.”⁸

In the future, the only way that we can avoid economic collapse is to build a steady-state economy. There exists much literature on how this can be achieved, and these writings ought to become a part of the education of all economists and politicians.

7.8 The global food crisis

Optimum population in the long-term future

What is the optimum population of the world? It is certainly not the maximum number that can be squeezed onto the globe by eradicating every species of plant and animal that cannot be eaten. The optimum global population is one that can be supported in comfort, equality and dignity, and with respect for the environment.

In 1848 (when there were just over one billion people in the world), John Stuart Mill described the optimal global population in the following words: “The density of population necessary to enable mankind to obtain, in the greatest degree, all the advantages of cooperation and social intercourse, has, in the most populous countries, been attained. A population may be too crowded, although all be amply supplied with food and raiment.”

“... Nor is there much satisfaction in contemplating the world with nothing left to the spontaneous activity of nature; with every rood of land brought into cultivation, which is capable of growing food for human beings; every flowery waste or natural pasture plowed up, all quadrupeds or birds which are not domesticated for man’s use exterminated as his rivals for food, every hedgerow or superfluous tree rooted out, and scarcely a place left where a wild shrub or flower could grow without being eradicated as a weed in the name

⁸<http://dalynews.org/learn/blog/>
<http://steadystate.org/category/herman-daly/>
<https://www.youtube.com/watch?v=EN5esbvAt-w>
<https://www.youtube.com/watch?v=wIR-VsXtM4Y>
<http://www.imf.org/external/pubs/ft/survey/so/2015/car031315a.htm>

John Stuart Mill (1806-1873, England)



Mill “had a lifelong goal of reforming the world in the interest of human well-being”

<http://plato.stanford.edu/entries/mill/>

Figure 7.6: Mill wrote: “I sincerely hope, for the sake of posterity, that they will be content to be stationary, long before necessity compels them to it.” Source: www.slideshare.net

of improved agriculture. If the earth must lose that great portion of its pleasantness which it owes to things that the unlimited increase of wealth and population would extirpate from it, for the mere purpose of enabling it to support a larger, but not better or happier population, I sincerely hope, for the sake of posterity, that they will be content to be stationary, long before necessity compels them to it.” (From John Stuart Mill, “Principles of Political Economy, With Some of Their Applications to Social Philosophy”, 1848.)

Has the number of humans in the world already exceeded the earth’s sustainable limits? Will the global population of humans crash catastrophically after having exceeded the carrying capacity of the environment? There is certainly a danger that this will happen - a danger that the 21st century will bring very large scale famines to vulnerable parts of the world, because modern energy-intensive agriculture will be dealt a severe blow by the end of the fossil fuel era, and because climate change will reduce the world’s agricultural output.

When the major glaciers in the Himalayas have melted, they will no longer be able to give India and China summer water supplies; rising oceans will drown much agricultural land; and aridity will reduce the output of many regions that now produce much of the world’s grain. Falling water tables in overdrawn aquifers, and loss of topsoil will add to the problem. We should be aware of the threat of a serious global food crisis in the 21st century if we are to have a chance of avoiding it.

The term *ecological footprint* was introduced by William Rees and Mathis Wackernagel in the early 1990’s to compare demands on the environment with the earth’s capacity to regenerate. In 2015, humanity used environmental resources at such a rate that it would

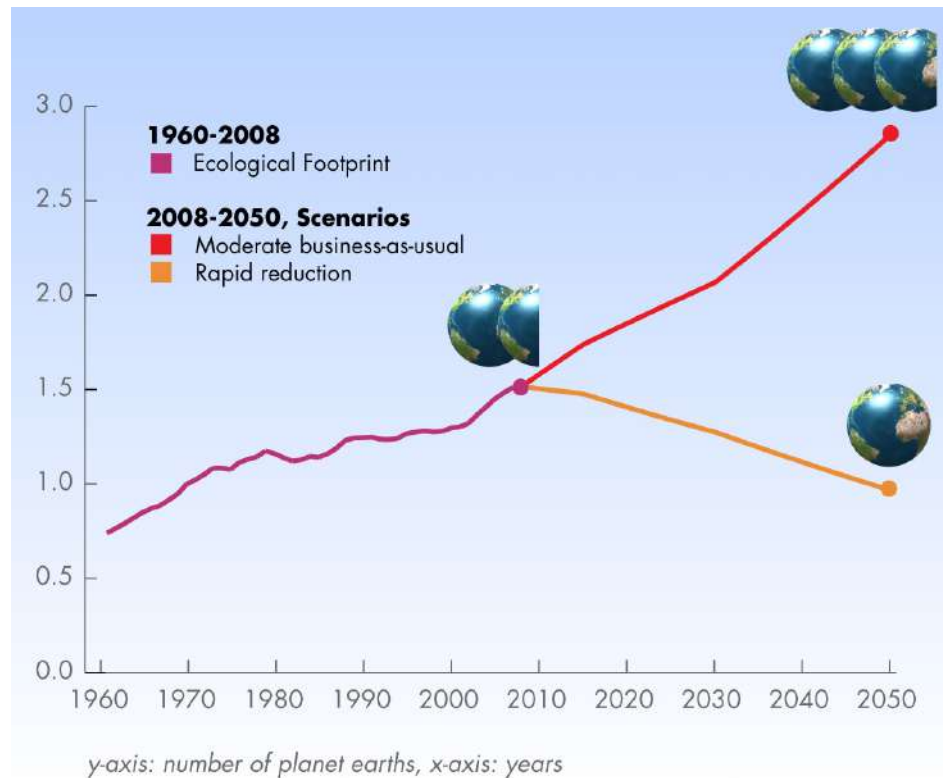


Figure 7.7: **Our present trajectory is completely unsustainable. If we follow it, then by 2050 it would take almost three earths to regenerate our demands on resources.** Source: footprintnetwork.org

take 1.6 earths to renew them. In other words, we have already exceeded the earth's carrying capacity. Since eliminating the poverty that characterizes much of the world today will require more resources per capita, rather than less, it seems likely that in the era beyond fossil fuels, the optimum global population will be considerably less than the present population of the world.

Limitations on cropland

In 1944 the Norwegian-American plant geneticist Norman Borlaug was sent to Mexico by the Rockefeller Foundation to try to produce new wheat varieties that might increase Mexico's agricultural output. Borlaug's dedicated work on this project was spectacularly successful. He remained with the project for 16 years, and his group made 6,000 individual crossings of wheat varieties to produce high-yield disease-resistant strains.

In 1963, Borlaug visited India, bringing with him 100 kg. of seeds from each of his most promising wheat strains. After testing these strains in Asia, he imported 450 tons of the Lerma Rojo and Sonora 64 varieties: 250 tons for Pakistan and 200 for India. By 1968, the success of these varieties was so great that school buildings had to be commandeered



Figure 7.8: **Norman Borlaug and agronomist George Harrer in 1943.** Source: beforeitsnews.com

to store the output. Borlaug's work began to be called a "Green Revolution". In India, the research on high-yield crops was continued and expanded by Prof. M.S. Swaminathan and his co-workers. The work of Green Revolution scientists, such as Norman Borlaug and M.S. Swaminathan, has been credited with saving the lives of as many as a billion people.

Despite these successes, Borlaug believes that the problem of population growth is still a serious one. "Africa and the former Soviet republics", Borlaug states, "and the Cerrado, are the last frontiers. After they are in use, the world will have no additional sizable blocks of arable land left to put into production, unless you are willing to level whole forests, which you should not do. So, future food-production increases will have to come from higher yields. And though I have no doubt that yields will keep going up, whether they can go up enough to feed the population monster is another matter. Unless progress with agricultural yields remains very strong, the next century will experience human misery that, on a sheer numerical scale, will exceed the worst of everything that has come before."

With regard to the prospect of increasing the area of cropland, a report by the United Nations Food and Agricultural Organization (Provisional Indicative World Plan for Agricultural Development, FAO, Rome, 1970) states that "In Southern Asia,... in some countries of Eastern Asia, in the Near East and North Africa... there is almost no scope for expanding agricultural area... In the drier regions, it will even be necessary to return to permanent pasture the land that is marginal and submarginal for cultivation. In most of Latin America and Africa south of the Sahara, there are still considerable possibilities for expanding cultivated areas; but the costs of development are high, and it will often be more economical to intensify the utilization of areas already settled." Thus there is a possibility

of increasing the area of cropland in Africa south of the Sahara and in Latin America, but only at the cost of heavy investment and at the additional cost of destruction of tropical rain forests.

Rather than an increase in the global area of cropland, we may encounter a future loss of cropland through soil erosion, salination, desertification, loss of topsoil, depletion of minerals in topsoil, urbanization and failure of water supplies. In China and in the Southwestern part of the United States, water tables are falling at an alarming rate. The Ogallala aquifer (which supplies water to many of the plains states in the central and southern parts of the United States) has a yearly overdraft of 160%.

In the 1950's, both the U.S.S.R and Turkey attempted to convert arid grasslands into wheat farms. In both cases, the attempts were defeated by drought and wind erosion, just as the wheat farms of Oklahoma were overcome by drought and dust in the 1930's. If irrigation of arid lands is not performed with care, salt may be deposited, so that the land is ruined for agriculture. This type of desertification can be seen, for example, in some parts of Pakistan. Another type of desertification can be seen in the Sahel region of Africa, south of the Sahara. Rapid population growth in the Sahel has led to overgrazing, destruction of trees, and wind erosion, so that the land has become unable to support even its original population.

Especially worrying is a prediction of the International Panel on Climate Change concerning the effect of global warming on the availability of water: According to Model A1 of the IPCC, global warming may, by the 2050's, have reduced by as much as 30% the water available in large areas of world that now a large producers of grain.

Added to the agricultural and environmental problems, are problems of finance and distribution. Famines can occur even when grain is available somewhere in the world, because those who are threatened with starvation may not be able to pay for the grain, or for its transportation. The economic laws of supply and demand are not able to solve this type of problem. One says that there is no "demand" for the food (meaning demand in the economic sense), even though people are in fact starving.⁹

Energy-dependence of modern agriculture

A very serious problem with Green Revolution plant varieties is that they require heavy inputs of pesticides, fertilizers and irrigation. Because of this, the use of high-yield varieties contributes to social inequality, since only rich farmers can afford the necessary inputs. Monocultures, such as the Green Revolution varieties may also prove to be vulnerable to future epidemics of plant diseases, such as the epidemic that caused the Irish Potato Famine in 1845. Even more importantly, pesticides, fertilizers and irrigation all depend

⁹<http://www.independent.co.uk/environment/climate-change/society-will-collapse-by-2040-due-to-catastrophic-food-shortages-says-study-10336406.html>
<http://www.truth-out.org/news/item/32131-the-new-climate-normal-abrupt-sea-level-rise-and-predictions-of-civilization-collapse>
<http://www.commondreams.org/views/2015/08/13/dignity-democracy-and-food-interview-frances-moore-lappe>

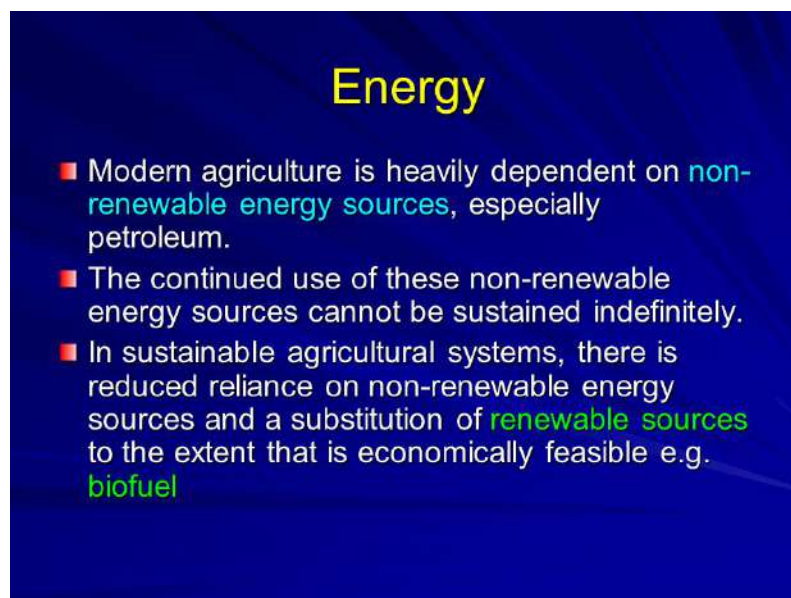


Figure 7.9: **Source: slideplayer.com**

on the use of fossil fuels. One must therefore ask whether high agricultural yields can be maintained in the future, when fossil fuels are expected to become prohibitively scarce and expensive.

Modern agriculture has become highly dependent on fossil fuels, especially on petroleum and natural gas. This is especially true of production of the high-yield grain varieties introduced in the Green Revolution, since these require especially large inputs of fertilizers, pesticides and irrigation. Today, fertilizers are produced using oil and natural gas, while pesticides are synthesized from petroleum feedstocks, and irrigation is driven by fossil fuel energy. Thus agriculture in the developed countries has become a process where inputs of fossil fuel energy are converted into food calories.

The ratio of the fossil fuel energy inputs to the food calorie outputs depends on how many energy-using elements of food production are included in the accounting. David Pimental and Mario Giampietro of Cornell University estimated in 1994 that U.S. agriculture required 0.7 kcal of fossil fuel energy inputs to produce 1.0 kcal of food energy. However, this figure was based on U.N. statistics that did not include fertilizer feedstocks, pesticide feedstocks, energy and machinery for drying crops, or electricity, construction and maintenance of farm buildings. A more accurate calculation, including these inputs, gives an input/output ratio of approximately 1.0. Finally, if the energy expended on transportation, packaging and retailing of food is included, Pimental and Giampietro found that the input/output ratio for the U.S. food system was approximately 10, and this figure did not include energy used for cooking.

The Brundtland Report's estimate of the global potential for food production assumes "that the area under food production can be around 1.5 billion hectares (3.7 billion acres - close to the present level), and that the average yields could go up to 5 tons of grain

equivalent per hectare (as against the present average of 2 tons of grain equivalent).” In other words, the Brundtland Report assumes an increase in yields by a factor of 2.5. This would perhaps be possible if traditional agriculture could everywhere be replaced by energy-intensive modern agriculture using Green Revolution plant varieties. However, Pimental and Giampietro’s studies show that modern energy-intensive agricultural techniques cannot be maintained after fossil fuels have been exhausted or after their use has been discontinued to avoid catastrophic climate change.

At the time when the Brundtland Report was written (1987), the global average of 2 tons of grain equivalent per hectare included much higher yields from the sector using modern agricultural methods. Since energy-intensive petroleum-based agriculture cannot be continued in the post-fossil-fuel era, future average crop yields will probably be much less than 2 tons of grain equivalent per hectare.

The 1987 global population was approximately 5 billion. This population was supported by 3 billion tons of grain equivalent per year. After fossil fuels have been exhausted, the total world agricultural output is likely to be considerably less than that, and therefore the population that it will be possible to support sustainably will probably be considerably less than 5 billion, assuming that our average daily per capita use of food calories remains the same, and assuming that the amount of cropland and pasturage remains the same (1.5 billion hectares cropland, 3.0 billion hectares pasturage).

The Brundtland Report points out that “The present (1987) global average consumption of plant energy for food, seed and animal feed amounts to 6,000 calories daily, with a range among countries of 3,000-15,000 calories, depending on the level of meat consumption.” Thus there is a certain flexibility in the global population that can survive on a given total agricultural output. If the rich countries were willing to eat less meat, more people could be supported.¹⁰

Effects of climate change on agriculture

a) The effect of temperature increase

There is a danger that when climate change causes both temperature increases and increased aridity in regions like the US grain belt, yields will be very much lowered. Of the three main grain types (corn, wheat and rice) corn is the most vulnerable to the direct effect of increases in temperature. One reason for this is the mechanism of pollination of corn: A pollen grain lands on one end of a corn-silk strand, and the germ cell must travel the length of the strand in order to fertilize the kernel. At high temperatures, the corn silk becomes dried out and withered, and is unable to fulfill its biological function. Furthermore, heat can cause the pores on the underside of the corn leaf to close, so that photosynthesis stops.

According to a study made by Mohan Wali and coworkers at Ohio State University,

¹⁰<http://www.truth-out.org/news/item/32354-environmentalists-sue-epa-over-dead-zone-in-gulf-of-mexico>

the photosynthetic activity of corn increases until the temperature reaches 20°C. It then remains constant until the temperature reaches 35°C, after which it declines. At 40°C and above, photosynthesis stops altogether.

Scientists in the Phillipines report that the pollination of rice fails entirely at 40°C, leading to crop failures. Wheat yields are also markedly reduced by temperatures in this range.¹¹

b) The effect of decreased rainfall

According to the Stern Report, some of the major grain-producing areas of the world might loose up to 30% of their rainfall by 2050. These regions include much of the United States, Brazil, the Mediterranean region, Eastern Russia and Belarus, the Middle East, Southern Africa and Australia. Of course possibilities for agriculture may simultaneously increase in other regions, but the net effect of climate change on the world's food supply is predicted to be markedly negative.

c) Unsustainable use of groundwater

It may seem surprising that fresh water can be regarded as a non-renewable resource. However, groundwater in deep aquifers is often renewed very slowly. Sometimes renewal requires several thousand years. When the rate of withdrawal of groundwater exceeds the rate of renewal, the carrying capacity of the resource has been exceeded, and withdrawal of water becomes analogous to mining a mineral. However, it is more serious than ordinary mining because water is such a necessary support for life.

In many regions of the world today, groundwater is being withdrawn faster than it can be replenished, and important aquifers are being depleted. In China, for example, groundwater levels are falling at an alarming rate. Considerations of water supply in relation to population form the background for China's stringent population policy. At a recent lecture, Lester Brown of the Worldwatch Institute was asked by a member of the audience to name the resource for which shortages would most quickly become acute. Most of the audience expected him to name oil, but instead he replied "water".

Lester Brown then cited China's falling water table. He predicted that within decades, China would be unable to feed itself. He said that this would not cause hunger in China itself: Because of the strength of China's economy, the country would be able to purchase grain on the world market. However Chinese purchases of grain would raise the price, and put world grain out of reach of poor countries in Africa. Thus water shortages in China will produce famine in parts of Africa, Brown predicted.

Under many desert areas of the world are deeply buried water tables formed during glacial periods when the climate of these regions was wetter. These regions include the Middle East and large parts of Africa. Water can be withdrawn from such ancient reservoirs by deep wells and pumping, but only for a limited amount of time.

¹¹<http://ecowatch.com/2015/08/03/heat-wave-iran/>



Figure 7.10: Lester R. Brown has been a pioneer in the study of the future global food crisis. Source: www.azquotes.com

In oil-rich Saudi Arabia, petroenergy is used to drill wells for ancient water and to bring it to the surface. Much of this water is used to irrigate wheat fields, and this is done to such an extent that Saudi Arabia exports wheat. The country is, in effect, exporting its ancient heritage of water, a policy that it may, in time, regret. A similarly short-sighted project is Muammar Qaddafi's enormous pipeline, which will bring water from ancient sub-desert reservoirs to coastal cities.

In the United States, the great Ogallala aquifer is being overdrawn. This aquifer is an enormous stratum of water-saturated sand and gravel under-lying parts of northern Texas, Oklahoma, New Mexico, Kansas, Colorado, Nebraska, Wyoming and South Dakota. The average thickness of the aquifer is about 70 meters. The rate of water withdrawal from the aquifer exceeds the rate of recharge by a factor of eight.

Thus we can see that in many regions, the earth's present population is living on its inheritance of water, rather than its income. This fact, coupled with rapidly increasing populations and climate change, may contribute to a very serious food crisis partway through the 21st century.

d) Glacial melting and summer water supplies

The summer water supplies of both China and India are threatened by the melting of glaciers. The Gangotri glacier, which is the principle glacier feeding India's great Ganges River, is reported to be melting at an accelerating rate, and it could disappear within a few decades. If this happens, the Ganges could become seasonal, flowing only during the monsoon season. Chinese agriculture is also threatened by disappearing Himalayan glaciers, in this case those on the Tibet-Quinghai Plateau. The respected Chinese glaciol-



Figure 7.11: **Whitechuck Glacier in the North Cascades National Park in 1973.**
Source: www.nichols.ewdu

ogist Yao Tandong estimates that the glaciers feeding the Yangtze and Yellow Rivers are disappearing at the rate of 7% per year.¹²

The Indus and Mekong Rivers will be similarly affected by the melting of glaciers. Lack of water during the summer season could have a serious impact on the irrigation.

Mature forests contain vast amounts of sequestered carbon, not only in their trees, but also in the carbon-rich soil of the forest floor. When a forest is logged or burned to make way for agriculture, this carbon is released into the atmosphere.

One fifth of the global carbon emissions are at present due to destruction of forests. This amount is greater than the CO₂ emissions for the world's transportation systems. An intact forest pumps water back into the atmosphere, increasing inland rainfall and benefiting agriculture. By contrast, deforestation, for example in the Amazonian rainforest, accelerates the flow of water back into the ocean, thus reducing inland rainfall. There is a danger that the Amazonian rainforest may be destroyed to such an extent that the region will become much more dry. If this happens, the forest may become vulnerable to fires produced by lightning strikes. This is one of the feedback loops against which the Stern Report warns: the drying and burning of the Amazonian rainforest may become irreversible, greatly accelerating climate change, if destruction of the forest proceeds beyond a certain point.

e) Erosion of topsoil.

¹²<http://www.commondreams.org/news/2015/08/04/global-glaciers-melting-three-times-rate-20th-century>



Figure 7.12: The same glacier in 2006. Source: www.nichols.edu

Besides depending on an adequate supply of water, food production also depends on the condition of the thin layer of topsoil that covers the world's croplands. This topsoil is being degraded and eroded at an alarming rate: According to the World Resources Institute and the United Nations Environment Programme, "It is estimated that since World War II, 1.2 billion hectares... has suffered at least moderate degradation as a result of human activity. This is a vast area, roughly the size of China and India combined." This area is 27% of the total area currently devoted to agriculture. The report goes on to say that the degradation is greatest in Africa. The risk of topsoil erosion is greatest when marginal land is brought into cultivation, since marginal land is usually on steep hillsides which are vulnerable to water erosion when wild vegetation is removed.

David Pimental and his associates at Cornell University pointed out in 1995 that "Because of erosion-associated loss of productivity and population growth, the per capita food supply has been reduced over the past 10 years and continues to fall. The Food and Agricultural Organization reports that the per capita production of grains which make up 80% of the world's food supply, has been declining since 1984... During the past 40 years nearly one-third of the world's cropland (1.5 billion hectares) has been abandoned because of soil erosion and degradation. Most of the replacement has come from marginal land made available by removing forests. Agriculture accounts for 80% of the annual deforestation."

Topsoil can also be degraded by the accumulation of salt when irrigation water evaporates. The worldwide area of irrigated land has increased from 8 million hectares in 1800 to more than 100 million hectares today. This land is especially important to the world food supply because it is carefully tended and yields are large in proportion to the area. To protect this land from salination, it should be irrigated in such a way that evaporation is minimized.

Finally cropland with valuable topsoil is being lost to urban growth and highway development, a problem that is made more severe by growing populations and by economic

growth.

Every year, more than 100,000 square kilometers of rain forest are cleared and burned, an area which corresponds to that of Switzerland and the Netherlands combined. Almost half of the world's tropical forests have already been destroyed. Ironically, the land thus cleared often becomes unsuitable for agriculture within a few years. Tropical soils may seem to be fertile when covered with luxuriant vegetation, but they are usually very poor in nutrients because of leeching by heavy rains. The nutrients which remain are contained in the vegetation itself; and when the forest cover is cut and burned, the nutrients are rapidly lost.

Often the remaining soil is rich in aluminum oxide and iron oxide. When such soils are exposed to oxygen and sun-baking, a rock-like substance called Laterite is formed.

Secret land purchases in Africa

According to a report released by the Oakland Institute, in 2009 alone, hedge funds bought or leased nearly 60 million hectares of land in Africa, an area the size of France.

As populations increase, and as water becomes scarce, China, and other countries, such as Saudi Arabia are also buying enormous tracts of agricultural land, not only in Africa, but also in other countries.

These land purchases are very often kept secret from the local populations by corrupt governments.¹³

Some conclusions

There is a danger that just as global population reaches the unprecedented level of 9 billion or more, the agricultural base for supporting it may suddenly collapse. Ecological catastrophe, possibly compounded by war and other disorders, could produce famine and death on a scale unprecedented in history, a disaster of unimaginable proportions, involving billions rather than millions of people.

The resources of the earth and the techniques of modern science can support a global population of moderate size in comfort and security; but the optimum size is undoubtedly smaller than the world's present population. Given a sufficiently small global population, renewable sources of energy can be found to replace disappearing fossil fuels. Technology may also be able to find renewable substitutes for many disappearing mineral resources for a global population of moderate size. What technology cannot do, however, is to give a global population of 9 billion people the standard of living which the industrialized countries enjoy today.

¹³<http://www.latimes.com/world/asia/la-fg-china-foreign-farmland-20140329-story.html>
<http://www.bbc.com/news/world-africa-13688683>

7.9 Aurelio Peccei

The Club of Rome

In 1968 Aurelio Peccei, Thorkil Kristensen and others founded the Club of Rome, an organization of economists and scientists devoted to studying the predicament of human society. One of the first acts of the organization was to commission an MIT study of future trends using computer models. The result was a book entitled “Limits to Growth”, published in 1972. From the outset the book was controversial, but it became a best-seller. It was translated into many languages and sold 30 million copies. The book made use of an exponential index for resources, i.e. the number of years that a resource would last if used at an exponentially increasing rate.

Today the more accurate Hubbert Peak model is used instead to predict rate of use of a scarce resource as a function of time. Although the specific predictions of resource availability in “Limits to Growth” lacked accuracy, its basic thesis, that unlimited industrial growth on a finite planet is impossible, was indisputably correct. Nevertheless the book was greeted with anger and disbelief by the community of economists, and these emotions still surface when it is mentioned.

Economic activity is usually divided into two categories, 1) production of goods and 2) provision of services. It is the rate of production of goods that will be limited by the carrying capacity of the global environment. Services that have no environmental impact will not be constrained in this way. Thus a smooth transition to a sustainable economy will involve a shift of a large fraction the work force from the production of goods to the provision of services.

In his recent popular book “The Rise of the Creative Class” the economist Richard Florida points out that in a number of prosperous cities, for example Stockholm, a large fraction of the population is already engaged in what might be called creative work, a type of work that uses few resources, and produces few waste products, work which develops knowledge and culture rather than producing material goods. For example, producing computer software requires few resources and results in few waste products. Thus it is an activity with a very small ecological footprint.

Similarly, education, research, music, literature and art are all activities that do not weigh heavily on the carrying capacity of the global environment. Furthermore, cultural activities lead in a natural way to global cooperation and internationalism, since cultural achievements are shared by the people of the entire world. Indeed, the shared human inheritance of culture and knowledge is growing faster than ever before.

Florida sees this as a pattern for the future, and maintains that everyone is capable of creativity. He visualizes the transition to a sustainable future economy as one in which a large fraction of the work force moves from industrial jobs to information-related work. Meanwhile, as Florida acknowledges, industrial workers feel uneasy and threatened by such trends.¹⁴

¹⁴<http://www.clubofrome.org/?p=326>
<http://www.donellameadows.org/wp-content/userfiles/Limits-to-Growth-digital-scan-version.pdf>

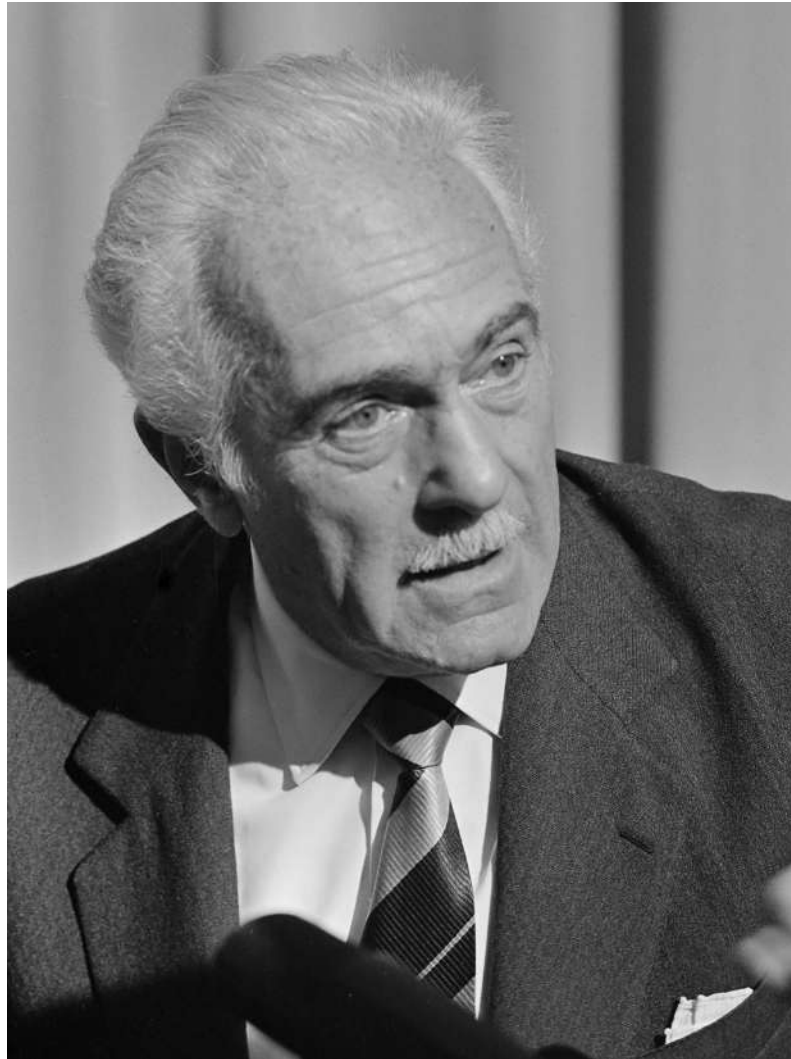


Figure 7.13: Aurelio Peccei (1908-1984), main founder of the Club of Rome. Concerning our present economic system, he wrote: “The only way we have devised to meet the surging waves of our rampant militarism and consumerism is to draw increasingly on the natural environment and to exploit, indiscriminately, the most accessible mineral and fuel deposits and all living resources we can lay our hands on. Such actions irreversibly impoverish our unique, irreplaceable, world, whose bounty and generosity are not infinite. Even if all the other adverse situations we find ourselves in today were to be alleviated, in itself, our high-handed treatment of Nature can bring about our doom.” Photograph by Koen Suyk/Anefo (Nationaal Archief), CC BY-SA 3.0, Wikimedia Commons



Figure 7.14: **When a forest is destroyed, topsoil is often lost to erosion. Source: United Nations.**

Biological Carrying capacity and Economics

Classical economists pictured the world as largely empty of human activities. According to the empty-world picture of economics, the limiting factors in the production of food and goods are shortages of human capital and labor. The land, forests, fossil fuels, minerals, oceans filled with fish, and other natural resources upon which human labor and capital operate, are assumed to be present in such large quantities that they are not limiting factors. In this picture, there is no naturally-determined upper limit to the total size of the human economy. It can continue to grow as long as new capital is accumulated, as long as new labor is provided by population growth, and as long as new technology replaces labor by automation.

Biology, on the other hand, presents us with a very different picture. Biologists remind us that if any species, including our own, makes demands on its environment which exceed the environment's carrying capacity, the result is a catastrophic collapse both of the environment and of the population which it supports. Only demands which are within the carrying capacity are sustainable. For example, there is a limit to regenerative powers of a forest.

It is possible to continue to cut trees in excess of this limit, but only at the cost of a loss of forest size, and ultimately the collapse and degradation of the forest. Similarly, cattle populations may for some time exceed the carrying capacity of grasslands, but the

<http://www.donellameadows.org/archives/a-synopsis-limits-to-growth-the-30-year-update/>

ultimate penalty for overgrazing will be degradation or desertification of the land. Thus, in biology, the concept of the carrying capacity of an environment is extremely important; but in economic theory this concept has not yet been given the weight which it deserves.

Exponential growth of human population and economic activity have brought us, in a surprisingly short time, from the empty-world situation to a full-world situation. In today's world, we are pressing against the absolute limits of the earth's carrying capacity, and further growth carries with it the danger of future collapse.

Full-world economics, the economics of the future, will no longer be able to rely on industrial growth to give profits to stockbrokers or to solve problems of unemployment or to alleviate poverty. In the long run, neither the growth of industry nor that of population is sustainable; and we have now reached or exceeded the sustainable limits.

The limiting factors in economics are no longer the supply of capital or human labor or even technology. The limiting factors are the rapidly vanishing supplies of petroleum and metal ores, the forests damaged by acid rain, the diminishing catches from over-fished oceans, and the cropland degraded by erosion or salination, or lost to agriculture under a cover of asphalt.

Neoclassical economists have maintained that it is generally possible to substitute man-made capital for natural resources; but a closer examination shows that there are only very few cases where this is really practical. (See G.E. Tverberg, "Thoughts on why energy use and CO₂ emissions are rising as fast as GDP", www.ourfiniteworld.com, November 30, 2011.)

The size of the human economy is, of course, the product of two factors the total number of humans, and the consumption per capita. If we are to achieve a sustainable global society in the future, a society whose demands are within the carrying capacity of of the global environment, then both these factors must be reduced.

The responsibility for achieving sustainability is thus evenly divided between the North and the South: Where there is excessively high consumption per capita, it must be reduced; and this is primarily the responsibility of the industrialized countries. High birth rates must also be reduced; and this is primarily the responsibility of the developing countries. Both of these somewhat painful changes are necessary for sustainability; but both will be extremely difficult to achieve because of the inertia of institutions, customs and ways of thought which are deeply embedded in society, in both the North and the South.

Population and food supply

Let us look first at the problem of high birth rates: The recent spread of modern medical techniques throughout the world has caused death rates to drop sharply; but since social customs and attitudes are slow to change, birth rates have remained high. As a result, between 1930 and 2011, the population of the world increased with explosive speed from two billion to seven billion.

During the last few decades, the number of food-deficit countries has lengthened; and it now reads almost like a United Nations roster. The food-importing nations are dependent,



Figure 7.15: Our global food system is broken. Source: Oxfam

almost exclusively, on a single food-exporting region, the grain belt of North America. In the future, this region may be vulnerable to droughts produced by global warming.

An analysis of the global ratio of population to cropland shows that we probably already have exceeded the sustainable limit of population through our dependence on petroleum: Between 1950 and 1982, the use of cheap petroleum-derived fertilizers increased by a factor of 8, and much of our present agricultural output depends their use. Furthermore, petroleum-derived synthetic fibers have reduced the amount of cropland needed for growing natural fibers, and petroleum-driven tractors have replaced draft animals which required cropland for pasturage. Also, petroleum fuels have replaced fuelwood and other fuels derived for biomass. The reverse transition, from fossil fuels back to renewable energy sources, will require a considerable diversion of land from food production to energy production.

As population increases, the cropland per person will continue to fall, and we will be forced to make still heavier use of fertilizers to increase output per hectare. Also marginal land will be used in agriculture, with the probable result that much land will be degraded through erosion or salination.

Reserves of oil are likely to be exhausted by the middle of this century. Thus there is a danger that just as global population reaches the unprecedented level of 9 billion or more, the agricultural base for supporting it may suddenly collapse. The resulting catastrophe, possibly compounded by war and other disorders, could produce famine and death on a scale unprecedented in history, a disaster of unimaginable proportions, involving billions rather than millions of people. The present tragic famine in Africa is to this possible future disaster what Hiroshima is to the threat of thermonuclear war a tragedy of smaller scale, whose horrors should be sufficient, if we are wise, to make us take steps to avoid the larger catastrophe.

At present a child dies from starvation every six seconds. Five million children die from hunger every year. Over a billion people in today's world are chronically undernourished.

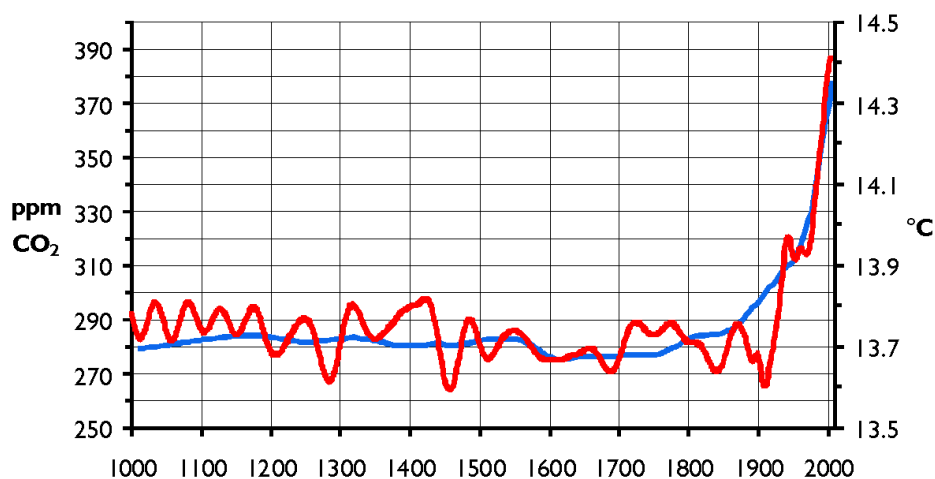


Figure 7.16: The Hanno graph used by the United Nations Climate Change Compendium 2009. Source: wattsupwiththat.com

There is a threat that unless prompt and well-informed action is taken by the international community, the tragic loss of life that is already being experienced will increase to unimaginable proportions.

As glaciers melt in the Himalayas, threatening the summer water supplies of India and China; as ocean levels rise, drowning the fertile rice-growing river deltas of Asia; as aridity begins to decrease the harvests of Africa, North America and Europe; as populations grow; as aquifers are overdrawn; as cropland is lost to desertification and urban growth; and as energy prices increase, the billion people who now are undernourished but still survive, might not survive. They might become the victims of a famine whose proportions could exceed anything that the world has previously experienced.

7.10 E.F. Schumacher: *Small is Beautiful*

Some quotations from *Small is Beautiful*

Wisdom demands a new orientation of science and technology toward the organic, the gentle, the elegant and beautiful.

An attitude to life which seeks fulfilment in the single-minded pursuit of wealth - in short, materialism - does not fit into this world, because it contains within itself no limiting principle, while the environment in which it is placed is strictly limited.

If greed were not the master of modern man—ably assisted by envy—how could it be that the frenzy of economism does not abate as higher “standards of living”

are attained, and that it is precisely the richest societies which pursue their economic advantage with the greatest ruthlessness? How could we explain the almost universal refusal on the part of the rulers of the rich societies—where organized along private enterprise or collective enterprise lines—to work towards the humanization of work? It is only necessary to assert that something would reduce the “standard of living” and every debate is instantly closed. That soul-destroying, meaningless, mechanical, monotonous, moronic work is an insult to human nature which must necessarily and inevitably produce either escapism or aggression, and that no amount of “bread and circuses” can compensate for the damage done—these are facts which are neither denied nor acknowledged but are met with an unbreakable conspiracy of silence—because to deny them would be too obviously absurd and to acknowledge them would condemn the central preoccupation of modern society as a crime against humanity.

Any intelligent fool can make things bigger, more complex, and more violent. It takes a touch of genius - and a lot of courage - to move in the opposite direction.

Modern man does not experience himself as a part of nature but as an outside force destined to dominate and conquer it. He even talks of a battle with nature, forgetting that, if he won the battle, he would find himself on the losing side.

Much of the economic decay of southeast Asia (as of many other parts of the world) is undoubtedly due to a heedless and shameful neglect of trees.

How could we even begin to disarm greed and envy? Perhaps by being much less greedy and envious ourselves; perhaps by resisting the temptation of letting our luxuries become needs; and perhaps by even scrutinizing our needs to see if they cannot be simplified and reduced.

The all-pervading disease of the modern world is the total imbalance between city and countryside, an imbalance in terms of wealth, power, culture, attraction and hope. The former has become over-extended and the latter has atrophied. The city has become the universal magnet, while rural life has lost its savor. Yet it remains an unalterable truth that, just as a sound mind depends on a sound body, so the health of the cities depends on the health of the rural areas. The cities, with all their wealth, are merely secondary producers, while primary production, the precondition of all economic life, takes place in the countryside. The prevailing lack of balance, based on the age-old exploitation of countryman and raw material producer, today threatens all countries throughout the world, the rich even more than the poor. To restore a proper balance between city and rural life is perhaps the greatest task in front of modern man.

The Buddhist point of view takes the function of work to be at least threefold: to give a man a chance to utilize and develop his faculties; to enable him to overcome his egocentredness by joining with other people in a common task; and to bring forth the goods and services needed for a becoming existence. Again.

The economics of permanence implies a profound reorientation of science and technology, which have to open their doors to wisdom and, in fact, have to incorporate wisdom into their very structure... Wisdom demands a new orientation of science and technology towards the organic, the gentle, the non-violent, the elegant and beautiful.

Where is the rich society that says: "Halt! We have enough"?

Already, there is overwhelming evidence that the great self-balancing system of nature is becoming increasingly unbalanced in particular respects and at specific points.

The greatest danger invariably arises from the ruthless application, on a vast scale, of partial knowledge such as we are currently witnessing in the application of nuclear energy, of the new chemistry in agriculture, of transportation technology, and countless other things.

It is moreover obvious that men organized in small units will take better care of their bit of land or other natural resources than anonymous companies or megalomaniac governments which pretend to themselves that the whole universe is their legitimate quarry.

I suggest that the foundations of peace cannot be laid by universal prosperity, in the modern sense. because such prosperity, if attainable at all. is attainable only by cultivating such drives of human nature as greed and envy, which destroy intelligence, happiness, serenity, and thereby the peacefulness of man.

Nothing makes economic sense unless its continuance for a long time can be projected without running into absurdities.



Figure 7.17: E.F. Schumacher (1911-1977), author of *Small is Beautiful: Economics as if People Mattered*. He was the protégé of John Maynard Keynes and also the teacher of Nicholas Georgescu-Roegen.

7.11 Helena Norberg-Hodge: *Ancient Futures*

Our ancestors were hunter-gatherers, living in close contact with nature, and respecting the laws and limitations of nature. There are many hunter-gatherer cultures existing today, from whose values and outlook we could learn much. Unfortunately, instead of learning from them, we often move in with our bulldozers and make it impossible for their way of life to continue. During the past several decades, for example, approximately one tribe of South American forest Indians has died out every year. Of the 6000 human languages now spoken, it is estimated that half will vanish during the next 50 years.

In some parts of Africa, before cutting down a tree, a man will offer a prayer of apology to the spirit of the tree, explaining why necessity has driven him to such an act. The attitude involved in this ritual is something which industrialized society needs to learn, or relearn. Older cultures have much to teach industrial society because they already have experience with full-world situation which we are fast approaching.

In a traditional culture, where change is extremely slow, population has an opportunity to expand to the limits which the traditional way of life allows, so that it reaches an equilibrium with the environment. For example, in a hunter-gatherer culture, population has expanded to the limits which can be supported without the introduction of agriculture. The density of population is, of course, extremely low, but nevertheless it is pressing against the limits of sustainability. Overhunting or overfishing would endanger the future. Respect for the environment is thus necessary for the survival of such a culture.

Similarly, in a stable, traditional agricultural society which has reached an equilibrium with its environment, population is pressing against the limits of sustainability. In such a culture, one can usually find expressed as a strong ethical principle the rule that the land must not be degraded, but must be left fertile for the use of future generations.

Today, the whole world seems to be adopting values, fashions, and standards of behavior presented in the mass media of western society. The unsustainable, power-worshipping, consumption-oriented values of western society are so strongly propagandized by television, films and advertising, that they overpower and sweep aside the wisdom of older societies. This is unfortunate, since besides showing us unsustainable levels of affluence and economic waste, the western mass media depict values and behavior patterns which are hardly worthy of imitation. We need to reverse this trend. The industrialized countries must learn from the values of older traditional cultures. The wisdom of our ancestors, their respect for nature and their hospitable traditions of sharing, can help us to create a new economic system founded on social and environmental ethics.¹⁵

Some quotations for Helena Norberg-Hodge

If our starting point is a respect for nature and people, diversity is an inevitable consequence. If technology and the needs of the economy are our

¹⁵<http://www.learndev.org/dl/harmony8.pdf>
<http://dissidentvoice.org/2015/05/gandhi-as-an-economist/>
<http://www.encyclopedia.com/doc/1G2-3401804813.html>



Figure 7.18: Helena Norberg-Hodge (born in 1946) is the founder and director of Local Futures, which was previously named International Society for Ecology and Culture. She states that the organization is “dedicated to the revitalization of cultural and biological diversity, and the strengthening of local communities and economies worldwide”. In her important book, *Ancient Futures*, Norberg-Hodge says that modern industrial societies ought to learn from more sustainable traditional cultures, rather than the reverse.

starting point, then we have what we are faced with today - a model of development that is dangerously distanced from the needs of particular peoples and places and rigidly imposed from the top down.

The old culture reflected fundamental human needs while respecting natural limits. And it worked. It worked for nature, and it worked for people. The various connecting relationships in the traditional system were mutually reinforcing, encouraging harmony and stability.

As signs of climate instability increase, radical and rapid action is becoming ever more urgent.

One of the best ways of reducing both CO₂ emissions and poverty in the South would be to strengthen the existing demographic pattern by keeping villages and small towns alive. This would allow communities to maintain social cohesion and closer contact with the land.

It may seem absurd to believe that a primitive culture in the Himalayas has anything to teach our industrialized society. But our search for a future that works keeps spiraling back to an ancient connection between ourselves and the earth, an interconnectedness that ancient cultures have never abandoned.

7.12 Sir Partha Dasgupta; Population stabilization

It is vital for the world to stabilize its population, not only because of the threat of a catastrophic future famine, but also because rapid population growth is closely linked with poverty. Today, a large fraction of the world's people live in near-poverty or absolute poverty, lacking safe water, sanitation, elementary education, primary health care and proper nutrition. Governments struggling to solve these problems, and to provide roads, schools, jobs and medical help for all their citizens, find themselves defeated by the rapid doubling times of populations. For example, in Liberia, the rate of population growth is 4% per year, which means that the population of Liberia doubles in size every eighteen years.

Under such circumstances, despite the most ambitious development programs, the infrastructure per capita decreases. Also, since new jobs must be found for the new millions added to the population, the introduction of efficient modern methods in industry and agriculture aggravates the already-serious problem of unemployment.

Education of women and higher status for women are vitally important measures, not only for their own sake, but also because in many countries these social reforms have proved to be strongly correlated with lower birth rates. Religious leaders who oppose programs for the education of women and for family planning on "ethical" grounds should think carefully about the scope and consequences of the catastrophic global famine which will



Figure 7.19: Sir Partha Dasgupta, of Cambridge University. He has pointed out that all of the measures needed to break the cycle of overpopulation and poverty are desirable in themselves. Besides education and higher status for women, they include state-provided social security for old people, provision of water supplies near to dwellings, provision of health services to all, abolition of child labor, and general economic development. Sir Partha's father was also a famous economist; in fact he was the teacher of Nobel Laureate Amartya Sen.

undoubtedly occur within the next 50 years if population is allowed to increase unchecked.

One of the most important keys to controlling the global population explosion is giving women better education and equal rights. These goals are desirable for the sake of increased human happiness, and for the sake of the uniquely life-oriented point of view which women can give us; but in addition, education and improved status for women have shown themselves to be closely connected with lowered birth rates.

When women lack education and independent careers outside the home, they can be forced into the role of baby-producing machines by men who do not share in the drudgery of cooking, washing and cleaning; but when women have educational, legal, economic, social and political equality with men, experience has shown that they choose to limit their families to a moderate size.

Sir Partha Dasgupta of Cambridge University has pointed out that the changes needed to break the cycle of overpopulation and poverty are all desirable in themselves. Besides education and higher status for women, they include state-provided social security for old people, provision of water supplies near to dwellings, provision of health services to all, abolition of child labor and general economic development.¹⁶

Social Values and Levels of Consumption

Let us next turn to the problem of reducing the per-capita consumption in the industrialized countries. The whole structure of western society seems designed to push its citizens in the opposite direction, towards ever-increasing levels of consumption. The mass media hold before us continually the ideal of a personal utopia filled with material goods. Every young man in a modern industrial society feels that he is a failure unless he fights his way to the "top"; and in recent years, women too have been drawn into this competition.

Of course not everyone can reach the top; there would not be room for everyone; but society urges all us to try, and we feel a sense of failure if we do not reach the goal. Thus, modern life has become a struggle of all against all for power and possessions.

One of the central problems in reducing consumption is that in our present economic and social theory, consumption has no upper bound; there is no definition of what is enough; there is no concept of a state where all of the real needs of a person have been satisfied. In our growth-oriented present-day economics, it is assumed that, no matter how much a person earns, he or she is always driven by a desire for more.

The phrase "conspicuous consumption" was invented by the Norwegian-American economist Thorstein Veblen (1857-1929) in order to describe the way in which our society uses economic waste as a symbol of social status. In "The Theory of the Leisure Class", first published in 1899, Veblen pointed out that it is wrong to believe that human economic behavior is rational, or that it can be understood in terms of classical economic theory. To understand it, Veblen maintained, one might better make use of insights gained from anthropology, psychology, sociology, and history.

The sensation caused by the publication of Veblen's book, and the fact that his phrase,

¹⁶<http://www.poverties.org/famine-in-africa.html>

“conspicuous consumption”, has become part of our language, indicate that his theory did not completely miss its mark. In fact, modern advertisers seem to be following Veblen’s advice: Realizing that much of the output of our economy will be used for the purpose of establishing the social status of consumers, advertising agencies hire psychologists to appeal to the consumer’s longing for a higher social position.

When possessions are used for the purpose of social competition, demand has no natural upper limit; it is then limited only by the size of the human ego, which, as we know, is boundless. This would be all to the good if unlimited economic growth were desirable. But today, when further industrial growth implies future collapse, western society urgently needs to find new values to replace our worship of power, our restless chase after excitement, and our admiration of excessive consumption.

The values which we need, both to protect nature from civilization and to protect civilization from itself, are perhaps not new: Perhaps it would be more correct to say that we need to rediscover ethical values which once were part of human culture, but which were lost during the process of industrialization, when technology allowed us to break traditional environmental constraints.

Our ancestors were hunter-gatherers, living in close contact with nature, and respecting the laws and limitations of nature. There are many hunter-gatherer cultures existing today, from whose values and outlook we could learn much. Unfortunately, instead of learning from them, we often move in with our bulldozers and make it impossible for their way of life to continue. During the past several decades, for example, approximately one tribe of South American forest Indians has died out every year. Of the 6000 human languages now spoken, it is estimated that half will vanish during the next 50 years.

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Similarly, in a stable, traditional agricultural society which has reached an equilibrium with its environment, population is pressing against the limits of sustainability. In such a culture, one can usually find expressed as a strong ethical principle the rule that the land must not be degraded, but must be left fertile for the use of future generations.

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Figure 7.20: **Amartya Sen** was born in 1933 into an academic family living in Decca, Bangladesh. He was awarded a Nobel Prize in Economics in 1998. His studies of Amartyafamines and of developmental economics are particularly notable.

This is unfortunate, since besides showing us unsustainable levels of affluence and economic waste, the western mass media depict values and behavior patterns which are hardly worthy of imitation. We need to reverse this trend. The industrialized countries must learn from the values of older traditional cultures. The wisdom of our ancestors, their respect for nature and their hospitable traditions of sharing, can help us to create a new economic system founded on social and environmental ethics.¹⁷

7.13 Amartya Sen: Inequality and famine

In his autobiographical notes, written for the Swedish Academy, Professor Sen wrote: “I was at Presidency College during 1951 to 1953. The memory of the Bengal famine of 1943, in which between two and three million people had died, and which I had watched from Santiniketan, was still quite fresh in my mind. I had been struck by its thoroughly class-dependent character. (I knew of no one in my school or among my friends and relations whose family had experienced the slightest problem during the entire famine; it was not a famine that afflicted even the lower middle classes - only people much further down the economic ladder, such as landless rural labourers.) Calcutta itself, despite its immensely

¹⁷<http://www.learndev.org/dl/harmony8.pdf>
<http://dissidentvoice.org/2015/05/gandhi-as-an-economist/>
<http://www.encyclopedia.com/doc/1G2-3401804813.html>

rich intellectual and cultural life, provided many constant reminders of the proximity of unbearable economic misery, and not even an elite college could ignore its continuous and close presence.”

Benefits of equality

As was mentioned in Chapter 5, the English economist and Fabian, John Atkinson Hobson (1858-1940), offered a famous explanation of the colonial era in his book “Imperialism: A Study” (1902). According to Hobson, the basic problem that led to colonial expansion was an excessively unequal distribution of incomes in the industrialized countries. The result of this unequal distribution was that neither the rich nor the poor could buy back the total output of their society. The incomes of the poor were insufficient, and rich were too few in number. The rich had finite needs, and tended to reinvest their money. As Hobson pointed out, reinvestment in new factories only made the situation worse by increasing output.

Hobson had been sent as a reporter by the Manchester Guardian to cover the Second Boer War. His experiences had convinced him that colonial wars have an economic motive. Such wars are fought, he believed, to facilitate investment of the excess money of the rich in African or Asian plantations and mines, and to make possible the overseas sale of excess manufactured goods. Hobson believed imperialism to be immoral, since it entails suffering both among colonial peoples and among the poor of the industrial nations. The cure that he recommended was a more equal distribution of incomes in the manufacturing countries.

Interestingly, TED Talks (ideas worth spreading) was recently under fire from many progressive groups for censoring a short talk by the adventure capitalist, Nick Hanauer, entitled “Income Inequality”. In this talk, Hanauer said exactly the same thing as John Hobson, but he applies the ideas, not to colonialism, but to current unemployment in the United States. Hanauer said that the rich are unable to consume the products of society because they are too few in number. To make an economy work, demand must be increased, and for this to happen, the distribution of incomes must become much more equal than it is today in the United States.

TED has now posted Hanauer’s talk, and the interested reader can find another wonderful TED talk dealing with the same issues from the standpoint of health and social problems. In a splendid lecture entitled “How economic inequality harms societies”, Richard Wilkinson demonstrates that there is almost no correlation between gross national product and a number of indicators of the quality of life, such as physical health, mental health, drug abuse, education, imprisonment, obesity, social mobility, trust, violence, teenage pregnancies and child well-being. On the other hand he offers comprehensive statistical evidence that these indicators are strongly correlated with the degree of inequality within countries, the outcomes being uniformly much better in nations where income is more equally distributed.

Warren Buffet famously remarked, “There’s class warfare, all right. But it’s my class, the rich class, that’s making war, and we’re winning.” However, the evidence presented by Hobson, Hanauer and Wilkinson shows conclusively that no one wins in a society where inequality is too great, and everyone wins when incomes are more evenly distributed.



Figure 7.21: World wealth levels in 2004. Countries with per capita wealth greater than 100,000 USD are shown in red, while those with per capita wealth less than 5,000 USD are shown in blue.



Figure 7.22: In many countries, children live by scavaging from garbage dumps.



Figure 7.23: Even in rich countries, many millions of people live in poverty,

Extreme inequality today

Here are some quotations from a report by the Global Inequality organization:¹⁸

Inequality has been on the rise across the globe for several decades. Some countries have reduced the numbers of people living in extreme poverty. But economic gaps have continued to grow as the very richest amass unprecedented levels of wealth. Among industrial nations, the United States is by far the most top-heavy, with much greater shares of national wealth and income going to the richest 1 percent than any other country.

The world's richest 1 percent, those with more than \$1 million, own 45 percent of the world's wealth. Adults with less than \$10,000 in wealth make up 64 percent of the world's population but hold less than 2 percent of global wealth. The world's wealthiest individuals, those owning over \$100,000 in assets, total less than 10 percent of the global population but own 84 percent of global wealth. Credit Suisse defines "wealth" as the value of a household's financial assets plus real assets (principally housing), minus their debts.

"Ultra high net worth individuals" - the wealth management industry's term for people worth more than \$30 million - hold an astoundingly disproportionate share of global wealth. These wealth owners hold 11.3 percent of total global wealth, yet represent only a tiny fraction (0.003%) of the world population.

The world's 10 richest billionaires, according to Forbes, own \$745 billion in combined wealth, a sum greater than the total goods and services most nations produce on an annual basis. The globe is home to 2,208 billionaires, according to the 2018 Forbes ranking.

¹⁸<https://inequality.org/facts/global-inequality/>

Those with extreme wealth have often accumulated their fortunes on the backs of people around the world who work for poor wages and under dangerous conditions. According to Oxfam, the wealth divide between the global billionaires and the bottom half of humanity is steadily growing. Between 2009 and 2017, the number of billionaires it took to equal the wealth of the world's poorest 50 percent fell from 380 to 42...

The United States has more wealth than any other nation. But America's top-heavy distribution of wealth leaves typical American adults with far less wealth than their counterparts in other industrial nations.

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Chapter 8

WE CAN AFFORD THE GREEN NEW DEAL

8.1 Cutting military budgets

The cost of US wars since 2001

According to the National Priorities Project¹, the total cost of US wars between November 11, 2001 and April 8, 2019 has been 4.77 trillion US dollars, or written out in detail \$4,773,527,023,293.00. Every hour US taxpayers are paying 32.08 million dollars for the total costs of war. Globally, the world spent 1.9 trillion dollars on military budgets in 2018, according to the Stockholm International Peace Research Institute.

Every war is a war against children

War was always madness, always immoral, always the cause of unspeakable suffering, economic waste and widespread destruction, and always a source of poverty, hate, barbarism and endless cycles of revenge and counter-revenge. It has always been a crime for soldiers to kill people, just as it is a crime for murderers in civil society to kill people. No flag has ever been wide enough to cover up atrocities. Every war is a war against children.

But today, the development of all-destroying modern weapons has put war completely beyond the bounds of sanity and elementary humanity. The danger of a catastrophic nuclear war casts a dark shadow over the future of our species. It also casts a very black shadow over the future of the global environment. The environmental consequences of a massive exchange of nuclear weapons have been treated in a number of studies by meteorologists and other experts from both East and West. Scientists believe that the “nuclear winter” effect could kill a large proportion of the plants, animals and humans on earth.

¹<https://www.nationalpriorities.org/cost-of/war/>

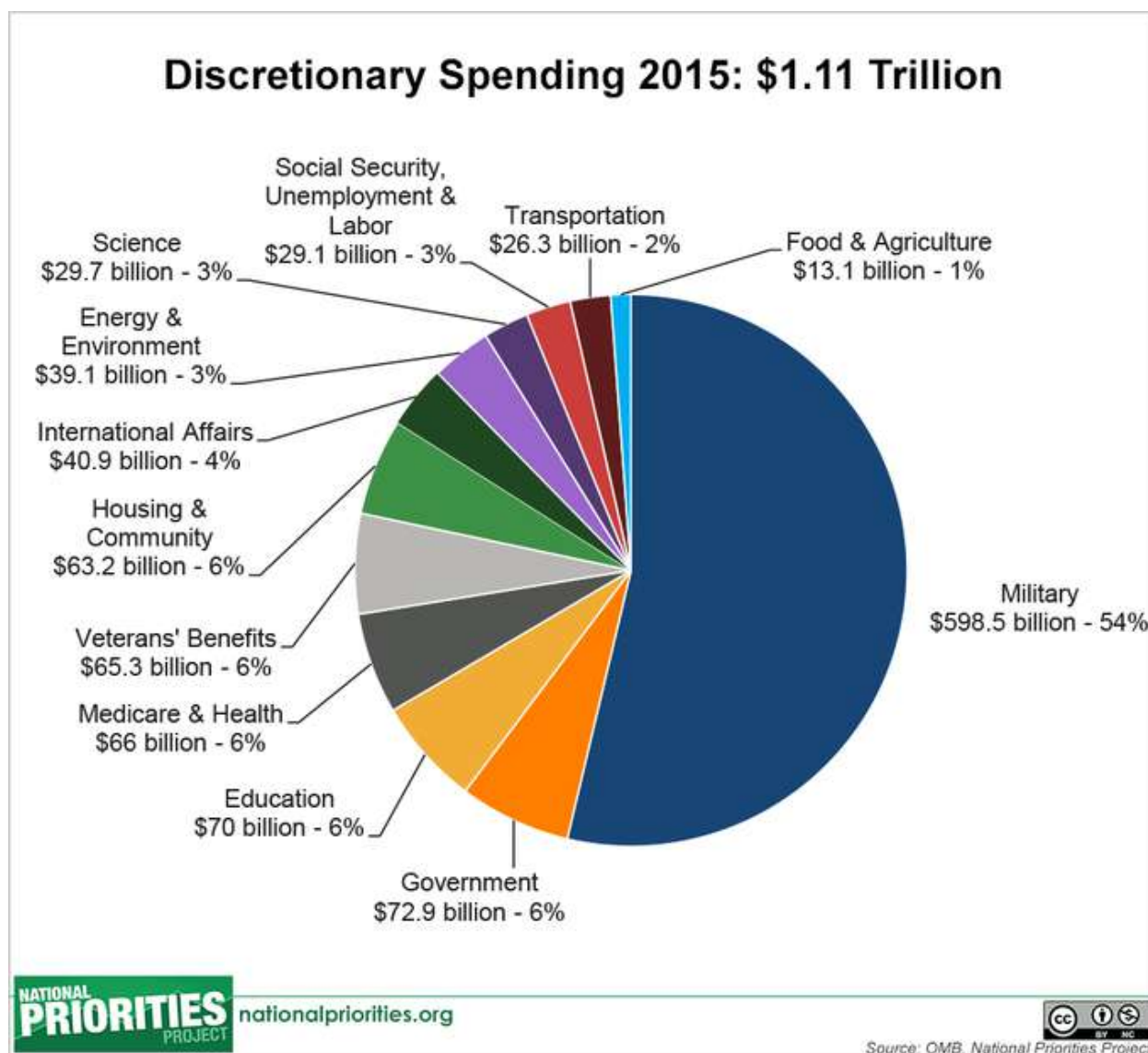


Figure 8.1: In the fiscal year US 2015, military spending accounted for 54 percent of all federal discretionary spending, a total of \$598.5 billion. Military spending includes: all regular activities of the Department of Defense; war spending; nuclear weapons spending; international military assistance; and other Pentagon-related spending.

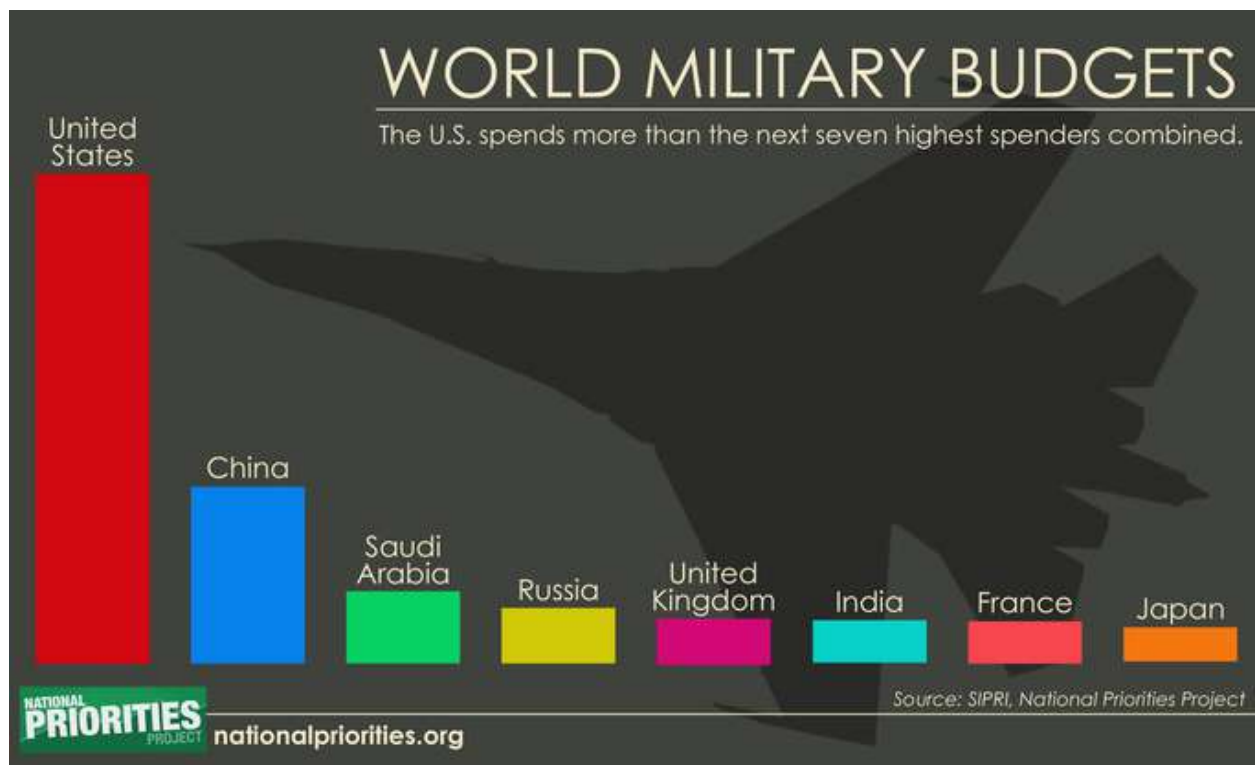


Figure 8.2: U.S. military spending dwarfs the budget of the #2 country - China. For every dollar China spends on its military, the U.S. spends \$2.77. The U.S. outpaces all other nations in military expenditures. World military spending totaled more than \$1.6 trillion in 2015. The U.S. accounted for 37 percent of the total. U.S. military expenditures are roughly the size of the next seven largest military budgets around the world, combined.



Figure 8.3: An attempt was made to audit Pentagon spending, but the firm entrusted with this task eventually pronounced it impossible because of confusing records and lack of records. Trillions of dollars are unaccounted for.



Figure 8.4: No War! No Warming! There are two important connections between war and global warming. Firstly, military organizations run on oil and are the largest single users of fossil fuels. Secondly, and even more importantly, money saved by slashing military budgets would be more than enough to carry out programs to avoid catastrophic climate change.



Figure 8.5: Military-industrial complexes want war. Ordinary people do not want it. According to the Stockholm International Peace Research Institute, global military expenses in 2018 amounted to 1.8 trillion dollars. This almost unimaginable river of money is the basic reason why the terrible suffering and waste of war is inflicted on the world's people.

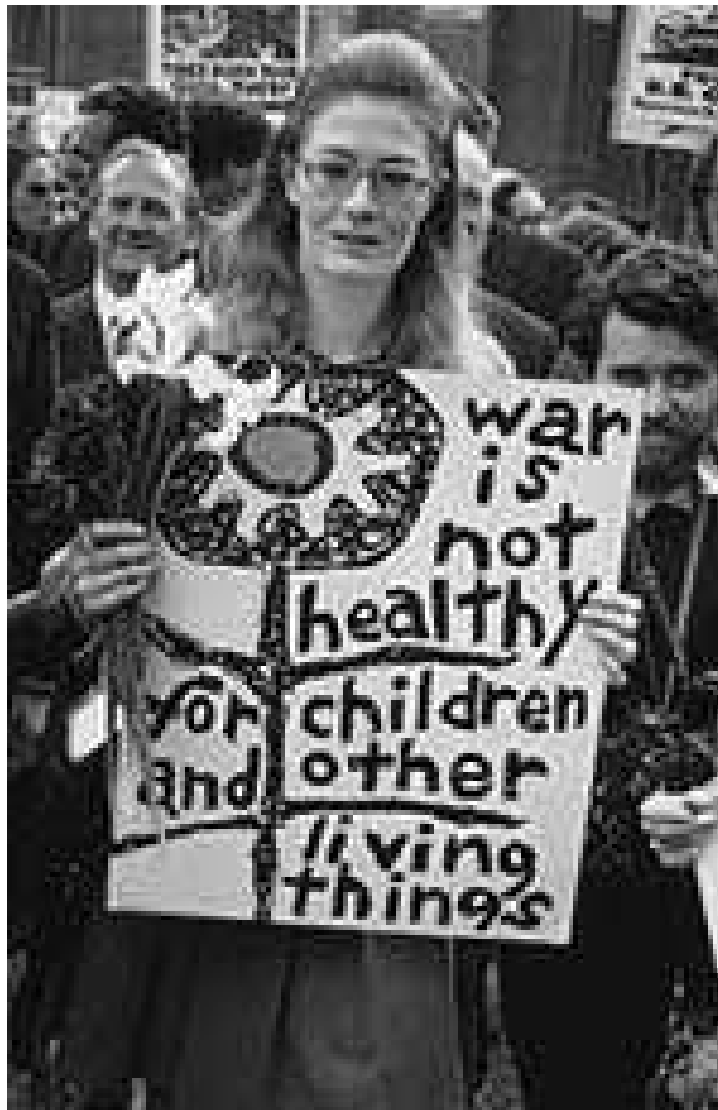


Figure 8.6: The actress Vanessa Redgrave was part of a 1968 protest against the Vietnam War.



Figure 8.7: We must do whatever is necessary to save the future.



Figure 8.8: Young protesters from the Sunrise Movement call on leaders to back the Green New Deal.

8.2 The Extinction Rebellion

In an open letter to governments, reported in *The Guardian* ², leaders of the environmental movement said:

In our complex, interdependent global ecosystem, life is dying, with species extinction accelerating. The climate crisis is worsening much faster than previously predicted. Every single day 200 species are becoming extinct. This desperate situation can't continue.

Political leaders worldwide are failing to address the environmental crisis. If global corporate capitalism continues to drive the international economy, global catastrophe is inevitable.

Complacency and inaction in Britain, the US, Australia, Brazil, across Africa and Asia - all illustrate diverse manifestations of political paralysis, abdicating humankind's grave responsibility for planetary stewardship.

International political organizations and national governments must foreground the climate-emergency issue immediately, urgently drawing up comprehensive policies to address it. Conventionally privileged nations must voluntarily fund comprehensive environment-protection policies in impoverished nations, to compensate the latter for foregoing unsustainable economic growth, and paying recompense for the planet-plundering imperialism of materially privileged nations.

With extreme weather already hitting food production, we demand that governments act now to avoid any risk of hunger, with emergency investment in agro-ecological extreme-weather-resistant food production. We also call for an urgent summit on saving the Arctic icecap, to slow weather disruption of our harvests.

We further call on concerned global citizens to rise up and organize against current complacency in their particular contexts, including indigenous people's rights advocacy, decolonization and reparatory justice - so joining the global movement that's now rebelling against extinction (eg Extinction Rebellion in the UK).

We must collectively do whatever's necessary non-violently, to persuade politicians and business leaders to relinquish their complacency and denial. Their "business as usual" is no longer an option. Global citizens will no longer put up with this failure of our planetary duty.

Every one of us, especially in the materially privileged world, must commit to accepting the need to live more lightly, consume far less, and to not only uphold human rights but also our stewardship responsibilities to the planet.

The letter was signed by 100 academics, authors, politicians and campaigners from

²<https://www.theguardian.com/environment/2018/dec/09/act-now-to-prevent-an-environmental-catastrophe>



Figure 8.9: Young protesters in London demanding action to prevent catastrophic climate change.

across the world. Among them were Vandana Shiva, Noam Chomsky, Naomi Klein and Bill McKibben.

8.3 Naomi Klein on the urgency of the Green New Deal

A recent article by journalist Naomi LaChance describes a meeting at the Sanders Institute (founded by Senator Bernie Sanders and his wife Jane) at which the famous author and activist Naomi Klein and others spoke about the scope and urgency of the Green New Deal. Here are some excerpts from the article:

Progressive journalist and activist Naomi Klein urged sweeping change that tackles the climate crisis, capitalism, racism and economic inequality in tandem on Friday in Burlington, Vt. If that seems challenging, add the fact that the



Figure 8.10: Award-winning Canadian author Naomi Klein, speaking at the Sanders Institute in January, 2019. Her book *This Changes Everything: Capitalism vs. the Climate* (2014) was a New York Times Bestseller List non-fiction bestseller and the winner of the Hilary Weston Writers' Trust Prize for Nonfiction in its year. In 2016 Klein was awarded the Sydney Peace Prize for her activism on climate justice. Klein frequently appears on global and national lists of top influential thinkers. Writing in the wake of Hurricane Sandy she warned that the climate crisis constitutes a massive opportunity for disaster capitalists and corporations seeking to profit from crisis. But equally, the climate crisis "can be a historic moment to usher in the next great wave of progressive change". On November 9, 2016, following the election of Donald Trump as the 45th President of the United States, Klein called for an international campaign to impose economic sanctions on the United States if his administration refuses to abide by the terms of the Paris Agreement.

clock is ticking³ and there might not be another chance.

“We need to have started yesterday”, Klein said at the three-day Sanders Institute Gathering on a panel moderated by environmental activist Bill McKibben. “What all of us who follow the science know is that we just can’t lose these four years”, she said, referring to the presidency of climate change denier Donald Trump. The conference, organized by the think tank founded by Vermont Sen. Bernie Sanders’ wife, Jane, is aimed at forming bold progressive agendas for the future.

Progressives are looking to incoming Democratic New York Rep. Alexandria Ocasio-Cortez for leadership as she galvanizes a grassroots effort by the youth-led climate change group Sunrise Movement⁴ to reduce fossil fuel dependence. Eighteen members of Congress support the idea of creating a House select committee to look at making a realistic plan by January 2020.

8.4 The cost of inaction

In a sense, the cost of inaction is incalculably high. At stake is the entire future of human civilization and the biosphere. Our children’s future and our grandchildren’s future will be lost if we do not take rapid action to avoid catastrophic climate change. Nevertheless, scientists studying two of the most dangerous feedback loops, the albedo effect from melting of Arctic sea ice, and the release of methane from melting permafrost, have attempted to put a price tag on the cost of inaction under various scenarios. Their results were recently published in *Nature*⁵, and reported in *The National Geographic*⁶.

The *National Geographic* article, written by Stephen Leahey and published on April 24, 2019, states the following:

Scientists have long warned that climate change is likely to bring expensive impacts, from rising seas to stronger storms. And a new study comes with a hefty price tag.

A warming Arctic is shifting from white to dark as sea ice melts and land-covered snow retreats, and that means it can absorb even more of the sun’s heat. Plus, the Arctic’s vast permafrost area is thawing, releasing more heat-trapping carbon and methane. These climate-change-driven feedbacks in the Arctic are accelerating warming even faster and may add nearly \$70 trillion to the overall costs of climate change - even if the world meets the Paris Agreement climate targets, a new study says.

³<https://www.theguardian.com/environment/2018/oct/08/global-warming-must-not-exceed-15c-warns-landmark-un-report>

⁴<https://www.truthdig.com/articles/will-democrats-back-a-green-new-deal/>

⁵<https://www.nature.com/articles/s41467-019-09863-x>

⁶<https://www.msn.com/en-us/weather/topstories/a-warming-arctic-could-cost-the-world-trillions-of-dollars/ar-BBWcxsz?li=BBnbcA1>

GLOBAL ATMOSPHERIC CARBON DIOXIDE SETS NEW RECORD HIGH IN 2017

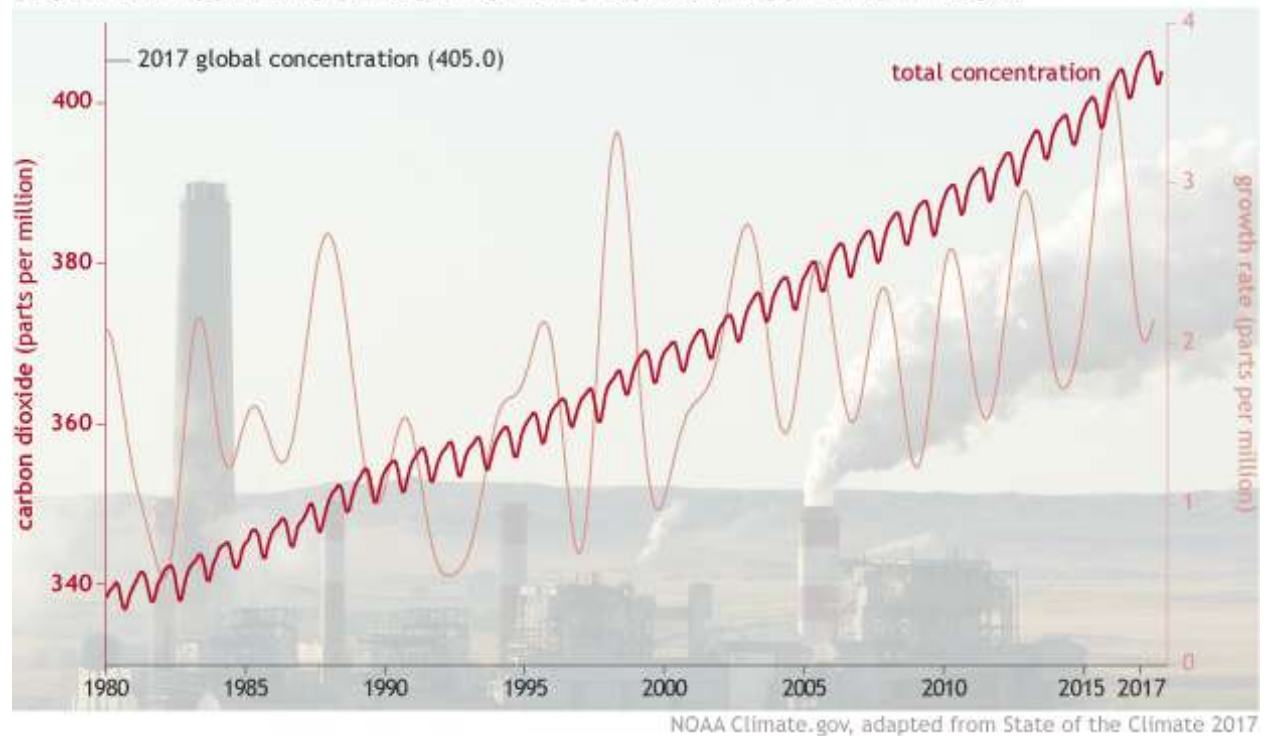


Figure 8.11: Today the atmospheric concentration of CO_2 is 413 ppm., roughly double the pre-industrial concentration. The last time that it was this high was in the Pliocene Epoch 5.3 to 2.6 million years ago. Sea levels were then 20 meters higher than they are right now, and trees were growing at the South Pole. Unless we quickly lower carbon emissions, most coastal cities and low-lying countries will be lost to rising seas.

However, if efforts can be made to keep climate change limited to 2.7 degrees Fahrenheit (1.5C), the extra cost of Arctic warming drops to \$25 trillion, new research published in Nature Communications reports. A trillion is a thousand billion. For comparison, the global GDP in 2016 was around \$76 trillion.

“Massive changes are underway in the Arctic. Permafrost and loss of sea ice and snow are two known tipping elements in the climate system,” said lead author Dmitry Yumashev of the Pentland Centre for Sustainability in Business, Lancaster University in the United Kingdom.

“We wanted to know what Arctic warming could do to the rest of the world,” said Yumashev.

Climate “tipping elements” are also known as tipping points or feedbacks, where a change in a natural system triggers further warming. Last year, a study documented ten tipping points and noted that these can act like a row of dominoes, one pushing another system over. Once started, these tipping points are nearly impossible to stop and risk what researchers called a “Hothouse Earth” state - in which the global average temperature is 4 to 5 degrees Celsius higher, with regions like the Arctic averaging 10 degrees C higher than today.

The Arctic is warming at least twice as fast as the global average. Sea ice has been in decline since the 1990s, exposing a million square miles of ocean. As more solar energy is absorbed it creates what’s called the surface albedo feedback...

The \$25 to \$70 trillion cost of Arctic warming adds four to six percent to the total cost of climate change - which is estimated to reach \$1,390 trillion by the year 2300 if emissions cuts are not better than the Paris Agreement. However, the costs of the current business-as-usual path could be more than \$2,000 trillion.

Global carbon debt increasing by \$16 trillion annually

Another estimate of the cost of climate inaction has been made by Dr. Gideon Polya in an article entitled “Inescapable \$200-250 Trillion Global Carbon Debt Increasing by \$16 Trillion Annually”⁷. Here are some quotations from the article:

Carbon Debt is simply the damage-related cost of greenhouse gas (GHG) pollution that if not addressed now will inescapably have to be paid by future generations. However GHG emissions continue to rise inexorably and there is no global program to draw down CO₂ and other GHGs from the atmosphere. While young people are now vociferously demanding massive climate action, inescapable global Carbon Debt is \$200-\$250 trillion and increasing by \$16

⁷<https://countercurrents.org/2019/04/27/inescapable-200-250-trillion-global-carbon-debt-increasing-by-16-trillion-annually-gideon-polya/>

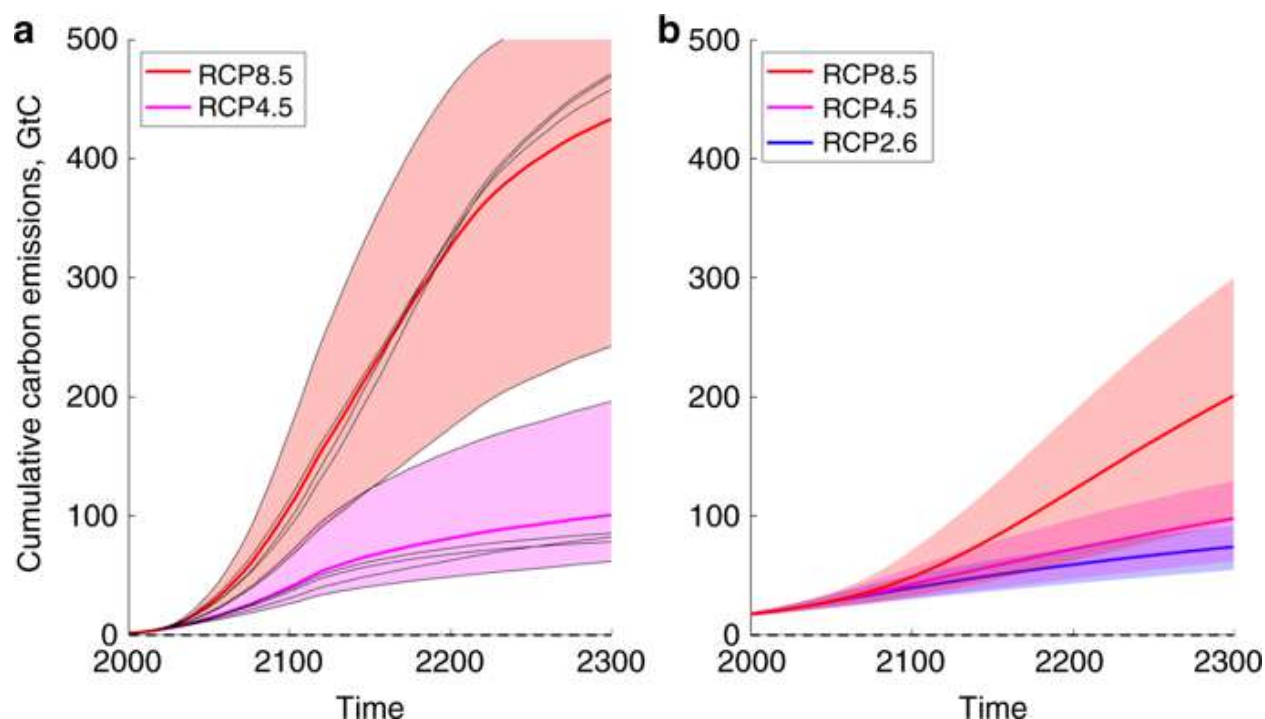


Figure 8.12: Cumulative carbon emissions in gigatons under various scenarios.

trillion each year.

Unlike Conventional Debt that can be variously expunged by bankruptcy, printing money or default, Carbon Debt is inescapable - thus, for example, national commitments to GHG pollution reduction made to the 2015 Paris Climate Conference amount to a temperature rise of over 3 degrees Centigrade (3C) , and unless huge sea walls are built Netherlands-style , coastal cities of the world housing hundreds of millions of people will be submerged by rising sea levels (notably in Asia), mega-delta agricultural lands vital for feeding Humanity will be subject to inundation and salinization, and low-lying Island States will cease to exist

While outright, anti-science climate change denialism is politically entrenched in climate criminal Trump America and its climate criminal lackey Australia, most governments around the world are politically committed to effective climate change denialism through climate change inaction. That climate change inaction is most clearly quantitated in terms of Carbon Debt, but the very term has been white-washed out of public perception by US owned or subverted Mainstream media. Thus the Australian ABC (the taxpayer-funded Australian equivalent of the UK BBC) is self-assertedly “progressive” but a Search of the ABC for the term “Climate Debt” reveals zero (0) reportage. A Search of the self-assertedly “ethical” UK BBC for the term “Climate Debt” yields 9 items with none later than 2009, defining the term or quantifying

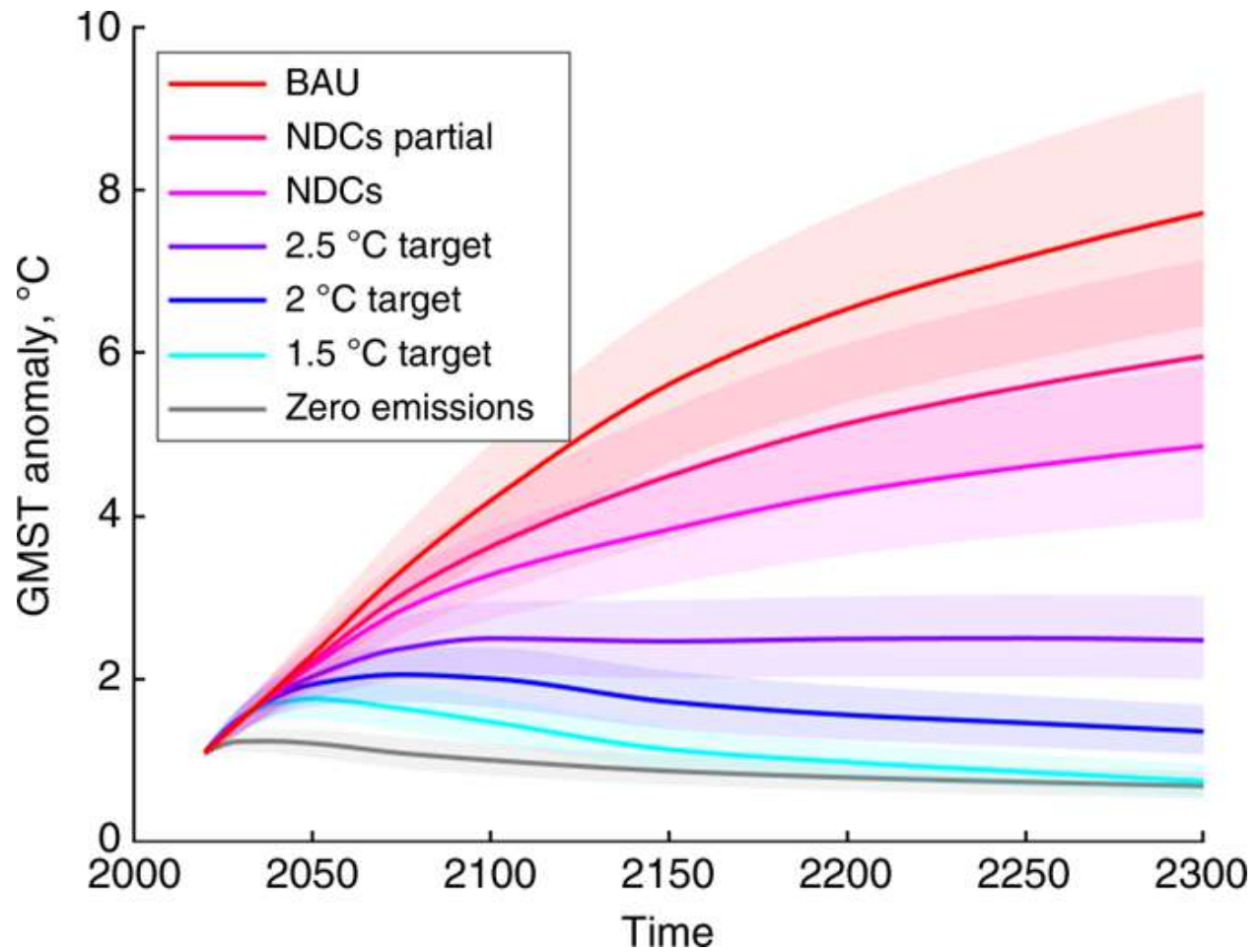


Figure 8.13: Global mean temperature simulations under the range of climate scenarios considered.

global or national Carbon Debt.

Explanations for this extraordinary mainstream media lying by omission over Carbon Debt can be variously advanced, ranging from entrenched mendacity by US- and corporate- subverted media to cognitive dissonance in the face of a worsening climate emergency. However I am confident in predicting that if governments do not take action on the world's massive Carbon Debt then intergenerational justice action by the utterly betrayed and robbed young people of the world will make the present Extinction Rebellion climate demonstrations in London look like a proverbial Teddy Bear's Picnic. A young people-led Climate Revolution (non-violent one hopes) is coming...

Up to one million species face extinction

According to a recent United Nations report⁸

The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) report warns of “an imminent rapid acceleration in the global rate of species extinction.”

The pace of loss “is already tens to hundreds of times higher than it has been, on average, over the last 10 million years,” it notes.

“Half-a-million to a million species are projected to be threatened with extinction, many within decades.”

Refugees from climate change

The United Nations High Commission on Refugees

In an article on *Climate Change and Disasters* the United Nations High Commission on Refugees makes the following statement:

“The Earth’s climate is changing at a rate that has exceeded most scientific forecasts. Some families and communities have already started to suffer from disasters and the consequences of climate change, forced to leave their homes in search of a new beginning.

“For UNHCR, the consequences of climate change are enormous. Scarce natural resources such as drinking water are likely to become even more limited. Many crops and some livestock are unlikely to survive in certain locations if conditions become too hot and dry, or too cold and wet. Food security, already a concern, will become even more challenging.

“People try to adapt to this situation, but for many this will mean a conscious move to another place to survive. Such moves, or the effects of climate change on natural resources, may spark conflict with other communities, as an increasing number of people compete for a decreasing amount of resources.

⁸<https://news.yahoo.com/one-million-species-risk-extinction-due-humans-draft-131407174.html>

“Since 2009, an estimated one person every second has been displaced by a disaster, with an average of 22.5 million people displaced by climate- or weather-related events since 2008 (IDMC 2015). Disasters and slow onsets, such as droughts in Somalia in 2011 and 2012, floods in Pakistan between 2010 and 2012, and the earthquake in Nepal in 2015, can leave huge numbers of people traumatized without shelter, clean water and basic supplies.”

Populations displaced by sea level rise

In a recent article⁹ discussed the long-term effects of sea level rise and the massive refugee crisis that it might create. By 2060, about 1.4 billion people could be climate change refugees, according to the paper, and that number could reach 2 billion by 2100.

The lead author, Prof. Emeritus Charles Geisler of Cornell University says: “The colliding forces of human fertility, submerging coastal zones, residential retreat, and impediments to inland resettlement is a huge problem. We offer preliminary estimates of the lands unlikely to support new waves of climate refugees due to the residues of war, exhausted natural resources, declining net primary productivity, desertification, urban sprawl, land concentration, ‘paving the planet’ with roads and greenhouse gas storage zones offsetting permafrost melt.”

We should notice that Prof. Geisler’s estimate of 2 billion climate refugees by 2100 includes all causes, not merely sea level rise. However, the number of refugees from sea level rise alone will be very large, since all the world’s coastal cities, and many river deltas will be at risk.

Populations displaced by drought and famine

Climate change could produce a refugee crisis that is “unprecedented in human history”, Barack Obama has warned as he stressed global warming was the most pressing issue of the age.

Speaking at an international food conference in Milan, the former US President said rising temperatures were already making it more difficult to grow crops and rising food prices were “leading to political instability”.

If world leaders put aside “parochial interests” and took action to reduce greenhouse gas emissions by enough to restrict the rise to one or two degrees Celsius, then humanity would probably be able to cope.

Failing to do this, Mr Obama warned, increased the risk of “catastrophic” effects in the future, “not only real threats to food security, but also increases in conflict as a consequence of scarcity and greater refugee and migration patterns”.

“If you think about monsoon patterns in the Indian subcontinent, maybe half a billion people rely on traditional rain patterns in those areas,”

⁹Geisler C. et al., *Impediments to inland resettlement under conditions of accelerated sea level rise*, Land Use Policy, Vol 55, July 2017, Pages 322-330

Populations displaced by rising temperatures

A new study published in *Nature: Climate Change* has warned that up to 75% of the world's population could face deadly heat waves by 2100 unless greenhouse gas emissions are rapidly controlled.¹⁰ The following is an excerpt from the article:

"Here we conducted a global analysis of documented lethal heat events to identify the climatic conditions associated with human death and then quantified the current and projected occurrence of such deadly climatic conditions worldwide. We reviewed papers published between 1980 and 2014, and found 783 cases of excess human mortality associated with heat from 164 cities in 36 countries.

"Based on the climatic conditions of those lethal heat events, we identified a global threshold beyond which daily mean surface air temperature and relative humidity become deadly. Around 30% of the world's population is currently exposed to climatic conditions exceeding this deadly threshold for at least 20 days a year.

"By 2100, this percentage is projected to increase to 48% under a scenario with drastic reductions of greenhouse gas emissions and 74% under a scenario of growing emissions. An increasing threat to human life from excess heat now seems almost inevitable, but will be greatly aggravated if greenhouse gases are not considerably reduced." ¹¹

Populations displaced by war

A recent article in *The Guardian*¹² discusses the relationship between climate change and war, Here are some excerpts from the article:

"Climate change is set to cause a refugee crisis of 'unimaginable scale', according to senior military figures, who warn that global warming is the greatest security threat of the 21st century and that mass migration will become the 'new normal'.

"The generals said the impacts of climate change were already factors in the conflicts driving a current crisis of migration into Europe, having been linked to the Arab Spring, the war in Syria and the Boko Haram terrorist insurgency.

"Military leaders have long warned that global warming could multiply and accelerate security threats around the world by provoking conflicts and migration. They are now warning that immediate action is required.

"Climate change is the greatest security threat of the 21st century,' said Maj Gen Muniruzzaman.

"Muniruzzaman, chairman of the Global Military Advisory Council on climate change and a former military adviser to the president of Bangladesh. He said one meter of sea level rise will flood 20% of his nation. 'We're going to see refugee problems on an unimaginable scale, potentially above 30 million people.'

¹⁰Mora, C. et al., *Global risk of deadly heat*, *Nature: Climate Change*, 19 June 2017

¹¹See also <https://phys.org/news/2017-08-deadly-south-asia-century.html> and <https://cleantechnica.com/2017/09/28/extreme-heatwaves-like-recent-lucifer-heatwave-become-normal-europe-2050s/>

¹²Thursday, 1 December, 2016

“Previously, Bangladesh’s finance minister, Abul Maal Abdul Muhith, called on Britain and other wealthy countries to accept millions of displaced people.

“Brig Gen Stephen Cheney, a member of the US Department of State’s foreign affairs policy board and CEO of the American Security Project, said: ‘Climate change could lead to a humanitarian crisis of epic proportions. We’re already seeing migration of large numbers of people around the world because of food scarcity, water insecurity and extreme weather, and this is set to become the new normal’.

Political reactions to migration

Brexit

Across the developed world, the reaction to threatened migration of refugees from climate change has been less than generous, to say the least. The recent decision of Britain to leave the European Union was motivated largely by the fear of British workers that EU laws would force their country to accept large numbers of refugees.

Swings to the right in Europe

In Germany, Angela Merkel’s generous policies towards refugees have cost her votes, while an openly racist party, the Alternative for Germany (AfD) party, has gained in strength. Frauke Petry, 40, the party’s leader, has said border guards might need to turn guns on anyone crossing a frontier illegally. The party’s policy platform says “Islam does not belong in Germany” and calls for a ban on the construction of mosques.

In September, 2017, eight people from the neo-Nazi Freital Group were put on trial in Dresden for bomb attacks on homes for asylum applicants. Hundreds of similar assaults occur in Germany every year, but they had never before been tried as terrorism in a federal court.

In the German election, which took place on Sunday, October 1, 2017, Angela Merkel won a fourth term as Chancellor, but her party won only 33% of the votes, a percentage much reduced from the 41% won in the election of 2013. Angela Merkel was paying a high price for her refugee-friendly policies.

Meanwhile the far right anti-immigration AfD party made a historic breakthrough, winning 13.5% of the vote, thus becoming the first overtly nationalist party to sit in the Bundestag in 60 years. The Greens have already complained that “Nazis have returned to parliament”. In fact, members of the AfD party have begun to say that Germans should stop being ashamed of their country’s Nazi past.

In France, the National Front is a nationalist party that uses populist rhetoric to promote its anti-immigration and anti-European Union positions. The party favors protectionist economic policies and would clamp down on government benefits for immigrants.

Similarly, in the Netherlands, the anti-European Union, anti-Islam Party for Freedom has called for closing all Islamic schools and recording the ethnicity of all Dutch citizens. In

early November, the party was leading in polls ahead of next year's parliamentary elections.

Other far-right anti-immigrant parties in Europe include Golden Dawn (Greece), Jobbic (Hungary), Sweden Democrats (Sweden), Freedom Party (Austria), and People's Party - Our Slovakia (Slovakia). All of these parties have gained in strength because of the widespread fear of immigration.

Populism in the United States

The election of Donald Trump, who ran for President in 2016 on an openly racist and anti-immigrant platform, can also be seen as the result of fear of immigration, especially on the part of industrial workers.

A more humane response to the refugee crisis

In the long-term future, climate change will make the refugee crisis much more severe. Heat and drought will make large regions of the world uninhabitable, and will threaten many populations with famine. The severity of the refugee crisis will depend on how quickly we reduce greenhouse gas emissions.

While making many parts of the world uninhabitable, long-term climate change will make other regions more suitable for human habitation and agriculture. For example, farming will become more possible in Siberia, Greenland, the Canadian Arctic, Alaska and Patagonia. A humane response to the refugee crisis could include the generous opening of these regions to refugees.

The global population of humans is currently increasing by almost a billion people every decade. Global population must be stabilized, and in the long run, gradually reduced. Money currently wasted (or worse than wasted) on armaments could be used instead to promote universal primary health care, and with it, universal access to the knowledge and materials needed for family planning.

Finally, reduced consumption of meat, particularly beef, would shorten the food chain thus make more food available for famine relief.

8.5 Social systems in Scandinavia

The Green New Deal can simultaneously address the climate crisis and the problem of excessive economic inequality. In this context, it is interesting to look at the social and economic systems of the Scandinavian countries, Norway, Sweden, Finland, Denmark and Iceland. In these countries the contrast between the rich and poor has been very much reduced. It is almost true to say that poverty has been eliminated in these countries. At the same time, the Scandinavians have strong policies to address the climate emergency. Thus Scandinavian successes are a counter-argument to those who say that the Green New

Deal cannot be put into practice.¹³

The Danish system today

In 2017, Denmark ranked 2nd in the world (after Norway) in the World Happiness Report. In a number of other years, Denmark has ranked 1st. In compiling the report, researchers ask people in a given country whether they are happy, and record how many say “yes”. Interestingly, in Denmark, women are the most happy of all. It is therefore relevant to look at the Danish social and political system of today, and to examine the reasons why women are so satisfied with it.

Denmark has very high taxes, but in return for these, its citizens receive many social services, such as free health care. If they qualify for university education, the tuition is free, and students are given an allowance for their living expenses. Mothers or alternatively fathers, can take paid leave of up to 52 weeks after the birth of a child. After that, a *vuggestue* (cresch) is always available, so that mothers can return to their jobs. When the child become too old for the cresch, day care centers are always available. For children of school age, after-school clubs are available where children can practice arts and crafts or other activities under supervision until their parents come home from work.

It is illegal in Denmark to fire a woman because she has become pregnant, or to deny her work because the employer fears that she may become pregnant. Thus, Danish women grow up expecting to find jobs outside the home. Danish women are happy to have careers, but it is also a necessity, because with taxes so high that a single income is not enough to give a family the desired standard of living. Husbands are grateful to their wives for helping to support the family. In the case of single mothers, support is given by the state.

The number of births per woman-life reached a low of 1.38 in 1983, but since that time the number has gradually risen gradually and in 2017 the fertility rate was 1.77, still less than the replacement level. The other Scandinavian countries have very similar systems, and they all have high human development indices, as well as a high degree of economic equality. When US Senator Bernie Sanders declared that he is a socialist, he made the statement more precise by saying that he is in favor of the Scandinavian social and political system.

Renewable energy in Denmark

Here are some excerpts from a recent report by the Danish Ministry of Energy, Utilities and Climate:¹⁴

Denmark’s success in transforming into a sustainable, green society is widely recognized. Denmark is at the forefront of numerous international initiatives and collaborative endeavors. In 2017, for the second consecutive year in a row,

¹³But, of course, it cannot be put into practice while maintaining an economic oligarchy.

¹⁴Denmark: Energy and climate pioneer. Status of the green transition

Denmark won the World Energy Council award for the world's best energy system.

Denmark's energy and climate policy was also high lighted in 2017 by the International Energy Agency (IEA), as an international model because the country produces wind turbines, provides record low energy prices and good electricity connections to neighboring countries.

In 2017, Denmark achieved a world record of 43.4% power produced solely by wind turbines.

Denmark can cover the largest share of its electricity production with green power from wind turbines.

Denmark is also a European leader in the export of energy technology, as exports of energy equipment account for a larger share of total exports than in any other EU country.

The government has set ambitious goals that few other countries can match:

- At least 50% of Denmark's energy needs must be covered by renewable energy by 2030.
- Coal must be completely phased out of the power supply by 2030.
- Moratorium on all exploration and drilling activities for oil, gas and shale gas on land and inland waters of Denmark.
- Denmark must be a low-emission society independent of fossil fuels in 2050.



Figure 8.14: Senator Bernie Sanders, the popular front-running candidate for the US Presidency in 2020, says that he is a socialist. When asked to explain this in detail, Senator Sanders said that he believes that the United States would benefit from a social system similar to the systems in present-day Scandinavia.



Figure 8.15: A day-care center in Sweden. In the Scandinavian countries, most women work, and state-provided day-care centers for pre-school children make this possible.

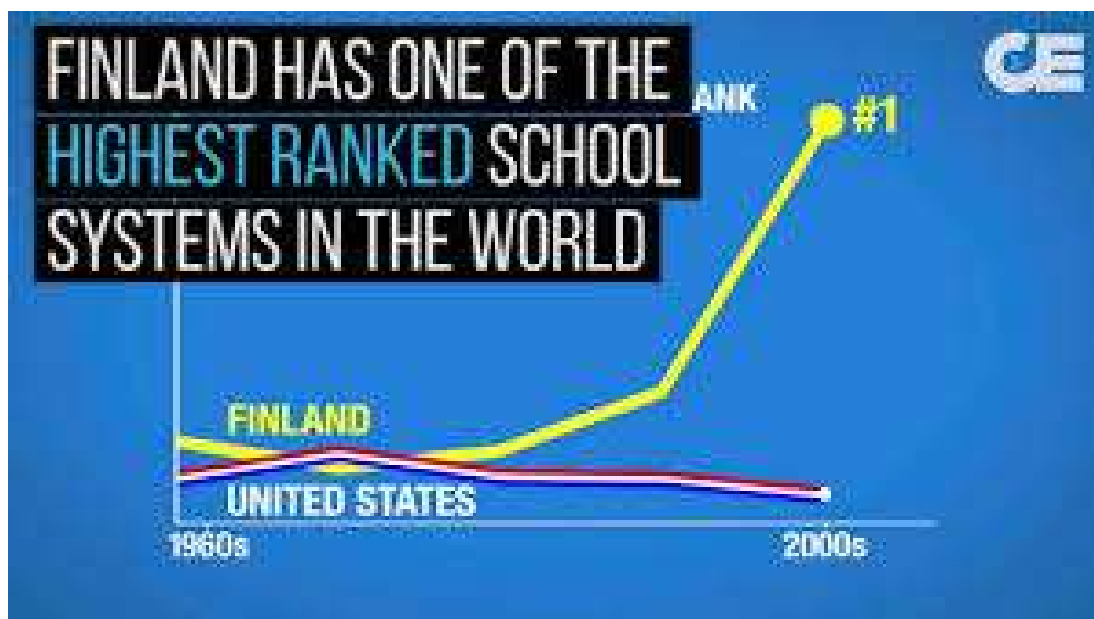


Figure 8.16: Finland has the best school system in the world. One reason for this is that the teachers are very highly selected and highly paid. Another reason is that the children are given frequent short rest periods, during which they may go outdoors and breath fresh air. They return from these small breaks with improved concentration.



Figure 8.17: The long-serving Danish Prime Minister Thorvald Stauning (1873-1942). He was the architect of the Danish social and economic system, which combines a free-market economy with such social benefits as universal free health care, state-provided day-care centers and free higher education. Thanks to Stauning's initiatives, those who qualify for college or university in Denmark are not only given free tuition, but also a stipend to support their living expenses. A high progressive income tax in Denmark pays for these benefits and reduces economic inequality. Stauning forged a coalition that united both labor and employers behind his reforms.

8.6 Roosevelt saves his nation and the world

Born into a very wealthy Dutch-American family Franklin Delano Roosevelt (1882-1945) attended Groton School, Harvard College and Columbia Law School. After practicing law in New York, he was elected to the NY State Senate. During World War I, he served as Assistant Secretary of the Navy. In 1920 he was the Democratic Party's Candidate for US Vice President, but he and James G. Cox were defeated by Warren Harding's ticket.

In 1921, FDR contracted polio and lost the use of his legs. His mother urged him to leave politics and return to the family estate at Hyde Park, but he vigorously resisted this suggestion and struggled to continue despite his handicap. In 1928, Roosevelt was elected Governor of New York. As Governor, he instituted many reforms to combat the economic problems that had followed the 1929 Black Friday stock market crash.

After winning a second term as Governor of New York State in 1930, FDR became the front-running candidate for the US Presidency in 1932. In accepting the Democratic Party nomination at the Chicago convention, he said: "I pledge you, I pledge myself to a new deal for the American people... This is more than a political campaign. It is a call to arms."

Here are some excerpts from FDR's First Inaugural Address, Saturday, March 4th, 1933:

I am certain that my fellow Americans expect that on my induction into the Presidency I will address them with a candor and a decision which the present situation of our Nation impels. This is preeminently the time to speak the truth, the whole truth, frankly and boldly. Nor need we shrink from honestly facing conditions in our country today. This great Nation will endure as it has endured, will revive and will prosper. So, first of all, let me assert my firm belief that the only thing we have to fear is fear itself - nameless, unreasoning, unjustified terror which paralyzes needed efforts to convert retreat into advance. In every dark hour of our national life a leadership of frankness and vigor has met with that understanding and support of the people themselves which is essential to victory. I am convinced that you will again give that support to leadership in these critical days.

In such a spirit on my part and on yours we face our common difficulties. They concern, thank God, only material things. Values have shrunk to fantastic levels; taxes have risen; our ability to pay has fallen; government of all kinds is faced by serious curtailment of income; the means of exchange are frozen in the currents of trade; the withered leaves of industrial enterprise lie on every side; farmers find no markets for their produce; the savings of many years in thousands of families are gone.

More important, a host of unemployed citizens face the grim problem of existence, and an equally great number toil with little return. Only a foolish optimist can deny the dark realities of the moment. ..

Recognition of the falsity of material wealth as the standard of success goes

hand in hand with the abandonment of the false belief that public office and high political position are to be valued only by the standards of pride of place and personal profit; and there must be an end to a conduct in banking and in business which too often has given to a sacred trust the likeness of callous and selfish wrongdoing. Small wonder that confidence languishes, for it thrives only on honesty, on honor, on the sacredness of obligations, on faithful protection, on unselfish performance; without them it cannot live.

Restoration calls, however, not for changes in ethics alone. This Nation asks for action, and action now.

Our greatest primary task is to put people to work. This is no unsolvable problem if we face it wisely and courageously. It can be accomplished in part by direct recruiting by the Government itself, treating the task as we would treat the emergency of a war, but at the same time, through this employment, accomplishing greatly needed projects to stimulate and reorganize the use of our natural resources.

Hand in hand with this we must frankly recognize the overbalance of population in our industrial centers and, by engaging on a national scale in a redistribution, endeavor to provide a better use of the land for those best fitted for the land. The task can be helped by definite efforts to raise the values of agricultural products and with this the power to purchase the output of our cities. It can be helped by preventing realistically the tragedy of the growing loss through foreclosure of our small homes and our farms. It can be helped by insistence that the Federal, State, and local governments act forthwith on the demand that their cost be drastically reduced. It can be helped by the unifying of relief activities which today are often scattered, uneconomical, and unequal. It can be helped by national planning for and supervision of all forms of transportation and of communications and other utilities which have a definitely public character. There are many ways in which it can be helped, but it can never be helped merely by talking about it. We must act and act quickly.

Roosevelt's New Deal programs aimed at "the three R's": **relief** of the poor, **reform** of financial institutions, and **recovery** of confidence. New Deal programs aimed at employing people on infrastructure projects that included the following:

- The Civilian Conservation Corps
- The Civil Works Administration
- The Farm Security Administration
- The National Industrial Recovery Act of 1933
- The Social Security Administration
- The Works Progress Administration of 1937 (WPA)

Wikipedia states that "The WPA financed a variety of projects such as hospitals, schools and roads, and employed more than 8.5 million workers who built 650,000 miles of highways and roads, 125,000 public buildings as well as bridges, reservoirs, irrigation systems, parks, playgrounds and so on."



Figure 8.18: Franklin Delano Roosevelt (FDR) in 1933. Wikipedia says of him: “Roosevelt is widely considered to be one of the most important figures in American history, as well as among the most influential figures of the 20th century. Though he has been subject to substantial criticism, he is generally rated by scholars as one of the three greatest U.S. presidents, along with George Washington and Abraham Lincoln.”



Figure 8.19: Eleanor and Franklin with two of their children in 1908. Eleanor was called Roosevelt even before her marriage. She was the niece of US President Theodore Roosevelt, a distant cousin of Franklin. She is remembered as an outstanding advocate of racial equality, journalistic freedom and human rights.



Figure 8.20: A photograph of FDR with his dog Fala and Ruthie Bie, the daughter of caretakers at his Hyde Park estate. Roosevelt was careful never to be seen using his wheelchair in public. Although disabled, he managed to give a public impression of buoyant energy and confidence. One of his slogans, which he used to end the depression, was “The only thing that we have to fear is fear itself!”

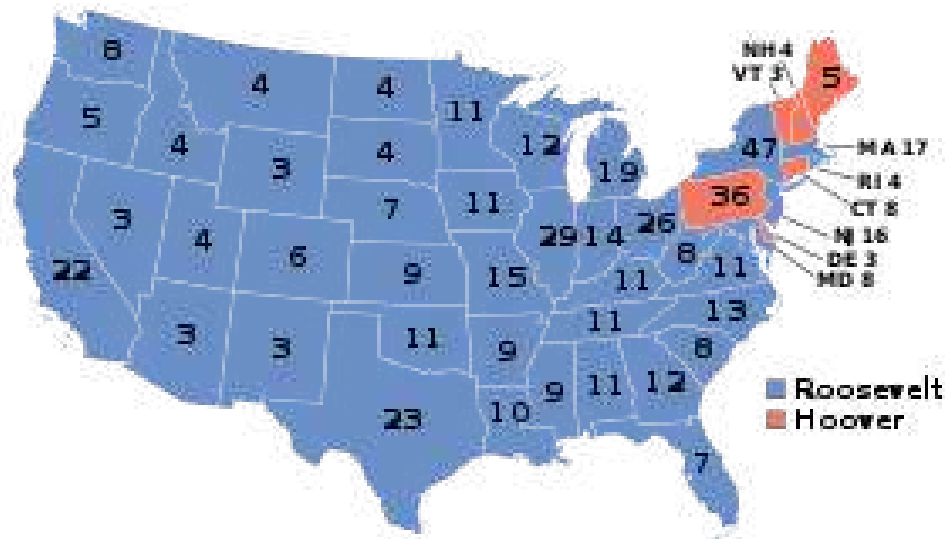


Figure 8.21: The 1932 electoral vote. Roosevelt also won landslide victories in 1936, 1940 and 1944. FDR died in office, shortly before the end of World War II. His administration's support for England during the the dark hours of the Battle of Britain had prevented Hitler's forces from invading the UK. In 1945, Eleanor Roosevelt helped to carry through FDR's plans for setting up the United Nations, and she was one of the two main drafters of the Universal Declaration of Human Rights.



Figure 8.22: A photo of Eleanor Roosevelt with Charles Malik and their grandchildren. Malik and Eleanor Roosevelt worked together to draft the Universal Declaration of Human Rights.

Roosevelt's New Deal serves a model for a Green New Deal that can save human civilization and the biosphere from catastrophic climate change, an emergency even more severe than those faced by Roosevelt. We can afford the Green New Deal. What we cannot afford is inaction.

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Chapter 9

THE POPULARITY OF RACISM

9.1 Racism, colonialism and exceptionalism

It seems to be possible for nations, and the majority of their citizens, to commit the worst imaginable atrocities, including torture, murder and genocide, while feeling that what they are doing is both noble and good. Some understanding of how this is possible can be gained by watching the 3-part BBC documentary, “The History of Racism”.¹

The series was broadcast by BBC Four in March 2007, and videos of the broadcasts are available on the Internet. Watching this eye-opening documentary can give us much insight into the link between racism and colonialism. We can also begin to see how both racism and colonialism are linked to US exceptionalism and neocolonialism.

9.2 Heart of Darkness

Looking at the BBC documentary we can see how often in human history economic greed and colonial exploitation have been justified by racist theories. The documentary describes almost unbelievable cruelties committed against the peoples of the Americas and Africa by Europeans. For example, in the Congo, a vast region which King Leopold II of Belgium claimed as his private property, the women of villages were held as hostages while the men were forced to gather rubber in the forests. Since neither the men nor the women could produce food under these circumstances, starvation was the result.

Leopold’s private army of 90,000 men were issued ammunition, and to make sure that they used it in the proper way, the army was ordered to cut off the hands of their victims and send them back as proof that the bullets had not been wasted. Human hands became a kind of currency, and hands were cut off from men, women and children when rubber quotas were not fulfilled. Sometimes more than a thousand human hands were gathered in

¹<https://www.youtube.com/watch?v=efl6T8lovqY>
<https://www.youtube.com/watch?v=IdBDRbjx9jo>
<https://www.youtube.com/watch?v=oCJHJWaNL-g>



Figure 9.1: **Half of the population of Belgian Congo died during the rule of Leopold II.**

a single day. During the rule of Leopold, roughly 10,000,000 Congolese were killed, which was approximately half the population of the region.

According to the racist theories that supported these atrocities, it was the duty of philanthropic Europeans like Leopold to bring civilization and the Christian religion to Africa. Similar theories were used to justify the genocides committed by Europeans against the native inhabitants of the Americas.

Racist theories were also used to justify enormous cruelties committed by the British colonial government in India. For example, during the great famine of 1876-1878, in which ten million people died, the Viceroy, Lord Lytton, oversaw the export to England of a record 6.4 million hundredweight of wheat.

Meanwhile, in Europe, almost everyone was proud of the role which they were playing in the world. All that they read in newspapers and in books or heard from the pulpits of their churches supported the idea that they were serving the non-Europeans by bringing them the benefits of civilization and Christianity. On the whole, the mood of Europe during this orgy of external cruelty and exploitation, was self-congratulatory.

Can we not see a parallel with the self-congratulatory mood of the American people and their allies, who export violence, murder, torture and neocolonialism to the whole world, and who justify it by thinking of themselves as "exceptional"?

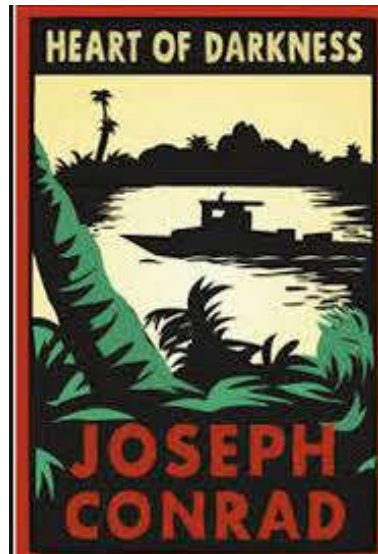


Figure 9.2: Joseph Conrad's famous book was written against the background of Leopold's atrocities.



Figure 9.3: *Heart of Darkness*: In Leopold's Congo, human hands became a currency.



Figure 9.4: **Heart of Darkness:** Part of a palace built by Leopold II to glorify his “humanitarian” activities in the Congo.

9.3 The racism of Cecil Rhodes

Cecil Rhodes, who was born in Bishop’s Stortford in Hertfordshire, came to South Africa in the late 1800s and made his fortune in the country’s diamond mines before moving into politics. He served as prime minister of the Cape Colony and later founded the southern African territory of Rhodesia, which would later become independent Zimbabwe. He was the architect of South Africa’s notorious apartheid system, and a rabid advocate of British imperialism. Social Darwinism and the eugenics movement may have contributed to the racism and imperialism of Cecil Rhodes.

In a December 2015 article in *The Telegraph*, Dalia Gebrial wrote: “Cecil Rhodes was a man responsible for untold, unending devastation and violence. An architect of South African apartheid, he explicitly believed in the existence of an Anglo-Saxon master race - an ideology that drove him to not only steal approximately one [square] million miles of South African land, but to facilitate the deaths of hundreds of thousands of black South Africans.

“His establishment of a paramilitary private army, the British South Africa Company’s Police (BSACP) resulted in the systematic murder of approximately 60,000 people; his amendment of the Masters and Servants Act (1890) reintroduced conditions of torture for black labourers; his infamous racist ‘land grabs’ set up a system in which the unlawful and illegitimate acquisition of land through armed force was routine.

“ In 1887 he told the House of Assembly in Cape Town: ‘The native is to be treated as a child and denied the franchise. We must adopt a system of despotism in our relations with the barbarians of South Africa.’ His 1892 Franchise and Ballot Act effectively eliminated African voting rights. He repeatedly reminded his colleagues of the ‘extreme caution’ they must exercise when it comes to ‘granting the franchise to coloured people.

Rhodes wanted to create an international movement to extend British influence. He once said: “Why should we not form a secret society with but one object, the furtherance of the British Empire and the bringing of the whole world under British rule, for the recovery of the United States, for making the Anglo-Saxon race but one Empire?”

Rhodes did, in fact, establish this secret society, and it remains very influential today. According to G. Edward Griffin², “Financed by Nathan Rothschild and the Bank of England, he [Rhodes] established a monopoly over the diamond output of South Africa and most of the gold as well. He formed a secret society which included many of the top leaders of British government. Their elitist goal was nothing less than world domination and the establishment of a modern feudal society controlled by themselves through the world’s central banks. In America, the Council on Foreign Relations (CFR) was an outgrowth of that group.”

9.4 Nazi atrocities

During the World War II Holocaust, six million Jews were systematically murdered. This amounted to two thirds of the Jewish population of Europe. A broader definition of the Holocaust includes the murder of the Roma and the “incurably sick”. as well as ethnic Poles, other Slavic groups, Soviet citizens and prisoners of war, homosexuals, Jehovah’s Witnesses, black people, and political opponents.

At least three million Soviet prisoners of war died in German custody, but this figure is small compared with the total number of lives lost in the Soviet Union during World War II. Depending on which historian you believe, the USSR lost at least 11,000,000 soldiers (killed and missing) as well as somewhere between 7,000,000 and 20,000,000 million of its civilians. The total number of people killed in World War II is approximately 60,000,000. If deaths from war-related disease and famine are included, this figure becomes an estimated 80,000,000.

²in his book, *The Creature from Jeckyll Island*



Figure 9.5: Nazi genocides: A pile of corpses in the Buchenwald extermination camp.



Figure 9.6: The idea of the superiority of one race over another was at the root of Nazi atrocities.



Figure 9.7: Nazi racism was built on the idea that Aryans are superior to all other races. But who is to decide? Will not each ethnic group or nation always decide that they themselves are the “chosen people”, loved by God and superior to all others?



Figure 9.8: **Baba Yar.**



Figure 9.9: Polish farmers killed by German forces, German-occupied Poland, 1943.



Figure 9.10: Polish teachers from Bydgoszcz guarded by members of Volksdeutscher Selbstschutz before execution,



Figure 9.11: Mass murder of Soviet civilians near Minsk, 1943.



Figure 9.12: The anti-Jewish pogrom in Kaunas, in which thousands of Jews were killed in the last few days of June 1941.



Figure 9.13: German police shooting women and children from the Mizocz Ghetto, 14 October 1942.



Figure 9.14: Crowds of Germans applauding Adolf Hitler at a rally in Nuremberg.



Figure 9.15: Another photo from Nuremberg. Racism is popular!

9.5 Donald trump was elected on a platform of racism

Here is a list taken from an article by German Lopaz, entitled *Donald Trump's long history of racism, from the 1970s to 2019*³.

- Trump launched his campaign in 2015 by calling Mexican immigrants “rapists” who are “bringing crime” and “bringing drugs” to the US. His campaign was largely built on building a wall to keep these immigrants out of the US.
- As a candidate in 2015, Trump called for a ban on all Muslims coming into the US. His administration eventually implemented a significantly watered-down version of the policy.
- When asked at a 2016 Republican debate whether all 1.6 billion Muslims hate the US, Trump said, “I mean a lot of them. I mean a lot of them.”
- He argued in 2016 that Judge Gonzalo Curiel - who was overseeing the Trump University lawsuit - should recuse himself from the case because of his Mexican heritage and membership in a Latino lawyers association. House Speaker Paul Ryan, who endorsed Trump, later called such comments “the textbook definition of a racist comment.”
- Trump has been repeatedly slow to condemn white supremacists who endorse him, and he regularly retweeted messages from white supremacists and neo-Nazis during his presidential campaign.

³<https://www.vox.com/2016/7/25/12270880/donald-trump-racist-racism-history>

- He tweeted and later deleted an image that showed Hillary Clinton in front of a pile of money and by a Jewish Star of David that said, “Most Corrupt Candidate Ever!” The tweet had some very obvious anti-Semitic imagery, but Trump insisted that the star was a sheriff’s badge, and said his campaign shouldn’t have deleted it.
- Trump has repeatedly referred to Sen. Elizabeth Warren (D-MA) as “Pocahontas,” using her controversial - and later walked-back - claims to Native American heritage as a punchline.
- At the 2016 Republican convention, Trump officially seized the mantle of the “law and order” candidate - an obvious dog whistle playing to white fears of black crime, even though crime in the US is historically low. His speeches, comments, and executive actions after he took office have continued this line of messaging.
- In a pitch to black voters in 2016, Trump said, “You’re living in poverty, your schools are no good, you have no jobs, 58 percent of your youth is unemployed. What the hell do you have to lose?”
- Trump stereotyped a black reporter at a press conference in February 2017. When April Ryan asked him if he plans to meet and work with the Congressional Black Caucus, he repeatedly asked her to set up the meeting - even as she insisted that she’s “just a reporter.”
- In the week after white supremacist protests in Charlottesville, Virginia, in August 2017, Trump repeatedly said that “many sides” and “both sides” were to blame for the violence and chaos that ensued - suggesting that the white supremacist protesters were morally equivalent to counterprotesters that stood against racism. He also said that there were “some very fine people” among the white supremacists. All of this seemed like a dog whistle to white supremacists - and many of them took it as one, with white nationalist Richard Spencer praising Trump for “defending the truth.”
- Throughout 2017, Trump repeatedly attacked NFL players who, by kneeling or otherwise silently protesting during the national anthem, demonstrated against systemic racism in America.
- Trump reportedly said in 2017 that people who came to the US from Haiti “all have AIDS,” and he lamented that people who came to the US from Nigeria would never “go back to their huts” once they saw America. The White House denied that Trump ever made these comments.
- Speaking about immigration in a bipartisan meeting in January 2018, Trump reportedly asked, in reference to Haiti and African countries, “Why are we having all these people from shithole countries come here?” He then reportedly suggested that the US should take more people from countries like Norway. The implication: Immigrants from predominantly white countries are good, while immigrants from predominantly black countries are bad.

The disastrous 2016 US election

In the United States, campaigns for the presidential election of 2016 might have been an occasion for a realistic discussion of the enormously important challenges which we now face, not only in the America, but also throughout the world.

Most thoughtful people agree that the two most important issues facing humanity today are the threat of catastrophic and uncontrollable climate change, and the threat of nuclear war. Each of these threatened disasters has the potential to destroy human civilization and much of the biosphere. But on the whole these vitally important issues were not discussed in an honest way in the mainstream media. Instead the campaign spectacle presented to us by the media was washed down into the murky depths of stupidity by rivers of money from the fossil fuel giants and the military industrial complex.

The Republican presidential candidates were almost single-voiced in denying the reality of climate change, and they were almost unanimously behind foreign policy options that would push the world to the brink of nuclear war.

Unless rapid action is taken, the world may soon pass a tipping point after which human efforts to avoid catastrophic climate change will be useless because feedback loops will have taken over. However, our present situation is by no means hopeless, because of the extremely rapid rate of growth of renewable energy. What can governments do to help? They can stop subsidizing the fossil fuel industry! Without massive fossil fuel subsidies, renewables would be the cheaper option, and economic forces alone would drive the urgently-needed transition to 100% renewable energy.

A report by RNE21, a global renewable energy policy network, states that “Global subsidies for fossil fuels remain high despite reform efforts. Estimates range from USD 550 billion (International Energy Agency) to USD 5.6 trillion per year (International Monetary Fund), depending on how ‘subsidy’ is defined and calculated.”

“Growth in renewable energy (and energy efficiency improvements) is tempered by subsidies to fossil fuels and nuclear power, particularly in developing countries. Subsidies keep conventional energy prices artificially low, which makes it more difficult for renewable energy to compete...”

“Creating a level playing field can lead to a more efficient allocation of financial resources, helping to strengthen to advance the development of energy efficiency and renewable energy technologies. Removing fossil fuel and energy subsidies globally would reflect more accurately the true cost of energy generation.”⁴

There is, so to speak, an elephant in the room; but no one wants to talk about it. Everyone (with a very few exceptions) pretends not to see it. They pretend that it is not there. What is this metaphorical elephant? It is the Pentagon’s colossal budget, which is far too sacred a thing to be mentioned in an election campaign.

The size of this budget is almost beyond comprehension: 610 billion dollars per year. This does not include nuclear weapons research, maintenance, cleanup and production, which are paid for by the Department of Energy. Nor does it include payments in pensions

⁴<http://www.ren21.net/status-of-renewables/global-status-report/>

to military retirees and widows, nor interest on debt for past wars, nor the State Department's financing foreign arms sales and military-related development assistance, nor special emergency grants for current wars. Nor are the expenses of the Department of Homeland Security included in the Pentagon's budget, nor those of the CIA, nor the huge budget of NSA and other dark branches of the US government. One can only guess at the total figure if everything should be included, but it is probably well over a trillion dollars per year.

The hidden presence in the room is a trillion-dollar elephant. Perhaps we should include subsidies to fossil fuel giants. Then we would have a multi-trillion-dollar elephant. But it is too sacred to be mentioned. Cut Medicare! Cut pensions! Cut Social Security! Abolish food stamps! Sacrifice support for education! We are running out of money! (Meanwhile the elephant stands there, too holy to be seen.)

Against expectations, Donald Trump who, in the words of Michael Moore, is a "wretched, ignorant, dangerous part-time clown and full-time sociopath", was elected in 2016. What happened? Disillusioned by the way in which the immensely popular Senator Bernie Sanders was sabotaged by the media and by the Democratic National Committee, and despising Hillary Clinton for her involvement in US wars and Wall Street banks, many progressive voters stayed away from the polls. In their absence, Trump won narrowly. He lost the popular vote, but won the electoral vote. Today, the White House is a morass of dissension, erratic decisions and lies.



Figure 9.16: Is this the person to whom we ought to entrust the future of our planet? When elected, Donald Trump not only pulled the United States out of the Paris Agreement; he also sabotaged the Environmental Protection Agency to such an extent that the carefully collected facts on climate change that the agency had accumulated had to be secretly saved by scientists to prevent their destruction by the Trump administration. Furthermore, Donald Trump's administration not only subsidizes giant coal corporations. It also has sabotages renewable energy initiatives in the United States.



Figure 9.17: When Senator Bernie Sanders began his campaign for the Democratic presidential nomination, few people believed that he could succeed. But as his campaign gained momentum, enormous crowds were attracted to his reformist speeches, and small individual donors supported his expenses. Although the crowds at Sanders' speeches were at least four times the size of those attending the rallies of other candidates, they were not reported in the mass media. Sanders' campaign was also sabotaged by the corporate-controlled Democratic National Committee. His huge popularity remains undimmed today, despite his loss in the 2016 primary. He advocates a social system for the United States similar to these which have made the Scandinavian countries leaders in both human development and human happiness indices.



Figure 9.18: Dr. Jill Stein was the Green Party’s presidential candidate in 2016. She was the only candidate who was willing to talk about the “elephant in the room” - the obscenely enormous military budget that consumed almost a trillion dollars that could otherwise have been used for social goals, health, education and infrastructure.



Figure 9.19: Disillusioned progressive voters who stayed at home were responsible for Trump's victory. Democrats must be very careful not to make the same mistake in the 2020 election. They must nominate a truly progressive candidate for President. A ticket with Elizabeth Warren for President and Bernie Sanders for Vice-President would certainly beat Trump. A ticket with Joe Biden for President would probably lose. Biden is dangerously similar to Hillary Clinton. He is tainted by corporate money and has blood from the Iraq War on his hands. With Biden as the Democrat's candidate, progressive voters would stay home in disgust in 2020, just as they did in 2016.

9.6 Children in cages

Inhumane treatment at the border

Here are some excerpts from the written testimony of Clara Long Deputy Washington Director (Acting) Senior Researcher, US Program Human Rights Watch. The testimony was submitted to the U.S. House Committee on Oversight and Reform for a hearing on July 19, 2019.

Our in-depth interviews with children revealed that the US Border Patrol is holding many children, including some who are much too young to take care of themselves, in jail - like border facilities for weeks at a time without contact with family members, or regular access to showers, clean clothes, toothbrushes, or proper beds. Many were sick. Many, including children as young as 2 or 3, were separated from adult caretakers without any provisions for their care besides that provided by unrelated older children also being held in detention. These conditions are consistent with those Human Rights Watch documented in our February 2018 report, "In the Freezer." In contrast with the conditions as of February 2018, the harms of CBP detention for children are now compounding over weeks instead of days.

On my first day at Clint, I spoke with an 11-year-old boy who was caring for his 3-year-old brother. Both were fending for themselves in cinder-block cells with dozens of other children for three weeks. When I met them, the little one was quiet with matted hair, a hacking cough, muddy pants and eyes that fluttered closed with fatigue. As we spoke, he fell asleep on two office chairs drawn together. "I am the one who takes care of him here," the older brother told us. "There was a teenage girl with curly hair who was helping me take care of him for a while. I don't know her name. But she's gone now. Now, no one helps me to take care of him."

A 14-year-old told our team she was taking care of a 4-year-old girl who had been placed in her cell with no relatives. "I take her to the bathroom, give her my extra food if she is hungry, and tell people to leave her alone if they are bothering her", she said. "She has been sick the whole time I have been taking care of her, and is coughing and has mucous. She doesn't talk hardly at all, just 'yes' and 'no'. She wears diapers and I change them for her."...

We also spoke with children who had been held for some period of time in quarantine cells. A 14-year-old girl told us, "I was in the first cell for seven days, sleeping with no mattress. It is hard to sleep when you don't have a mattress. I then came down with the flu. I then went into the flu cell for seven days. When you are in the flu cell, you also sleep on the floor, but you have a mattress. There were 21 other kids in that space with the flu. I had a fever in there and I was shaking. Some of the other kids were vomiting. They all had fevers. No one was taking care of the kids with the flu.... We were not allowed



to leave the flu cell, ever. It was very boring. I did nothing to entertain myself, nor was anything offered. It was sad, very sad. I felt locked up and closed in.”

An 11-year-old boy held in CBP custody for 12 days, despite having parents in New Jersey, said, “About three days ago I got a fever. They moved me alone to a flu cell. There is no one to take care of you there. They just give you pills twice a day. I also am having an allergic reaction all over my skin. My skin is itchy and red and my nose is stuffed up. Two times they gave me a pill for it but not anymore”

A 7-year-old girl I attempted to interview entered the room silently but burst into tears when we asked whom she traveled with to the US. “My aunt,” she said, with a keening cry. She was so upset we decided not to attempt to interview her, a situation that happened several times during our visit. A bracelet on her wrist had the words “US parent” and a phone number written in permanent marker. We called the number on the spot and found out that no one had informed her desperate parents where she was being held. Some of the most emotional moments of our visit came witnessing children speak for the first time with their parents on an attorney’s phone.

Based on our interviews, US officials at the border seem to be making no discernible effort to release children to caregivers while children are in Customs and Border Protection custody - though many have parents in the US - rather than holding them for weeks in overcrowded cells, incommunicado from their desperate loved ones.







The definition of genocide

Here is the UN's definition of genocide under the statutes of the International Criminal Court:

“In the present Convention, genocide means any of the following acts committed with intent to destroy, in whole or in part, a national, ethnical, racial or religious group, as such:

- a Killing members of the group;**
- b Causing serious bodily or mental harm to members of the group;**
- c Deliberately inflicting on the group conditions of life calculated to bring about its physical destruction in whole or in part;**
- d Imposing measures intended to prevent births within the group;**
- (e) Forcibly transferring children of the group to another group.”**

Does not the treatment of children at the US southern border fulfill this definition?

9.7 Demonizing the Squad

On Sunday, July 14, Trump Tweeted

“So interesting to see ‘Progressive’ Democrat Congresswomen, who originally came from countries whose governments are a complete and total catastrophe, the worst, most corrupt and inept anywhere in the world (if they even have a functioning government at all), now loudly and viciously telling the people of the United States, the greatest and most powerful Nation on earth, how our government is to be run,”



Figure 9.20: The “Squad”, four first-term congresswomen: Representatives Alexandria Ocasio-Cortez (D-NY), Ayanna Pressley (D-MA), Rashida Tlaib (D-MI), Alexandria Ocasio-Cortez (lower left) has made extremely important contributions to the struggle to avoid catastrophic climate change. Highly intelligent, vocal, eloquent and witty, she is a thorn in the Republican’s side.

“Why don’t they go back and help fix the totally broken and crime infested places from which they came. Then come back and show us how it is done. These places need your help badly, you can’t leave fast enough. I’m sure that Nancy Pelosi would be very happy to quickly work out free travel arrangements!”

His targets were the four first-term congresswomen known as the Squad: Representatives Alexandria Ocasio-Cortez (D-NY), Ayanna Pressley (D-MA), Rashida Tlaib (D-MI), and Ilhan Omar (D-MN). Of the four, only Omar was born outside the United States. Trump later accused the four women of hating America and not loving Israel enough. This is one more example of Trump’s racist rhetoric.

The United States is a multiethnic country, whose internal cohesion can easily be destroyed by racism. During most of its history, the US has had substantial Spanish-speaking and Italian-speaking minorities, as well as great religious diversity. During the 1960’s the civil rights movement fought against racial prejudice and gradually achieved most of its goals. Thus, over a very long period of time, the United States learned to avoid racial and religious insults in its media, and this hard-earned wisdom has allowed the very markedly multi-ethnic US society to function with a minimum of racial and religious conflicts. Trump’s racism risks destroying these hard-earned lessons.

Suggestions for further reading

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Chapter 10

CLIMATE CHANGE DENIAL

10.1 Donald Trump's climate change denial

In a recent article, climate expert Dr. Andrew Glickson wrote: “The train has left the station and global heating is advancing toward +2 and then toward +4 degrees Celsius, as projected by the IPCC and in the words of Joachim Hans Schellnhuber, Germany’s chief climate scientist, signifies the breakdown of civilization. Largely ignored or watered down by much of the mainstream media, betrayed by most political parties, including those who used to regard climate change as “the greatest moral issue of our time”, the population continues to be distracted by bread and circuses. Nowadays even some of the Greens appear to consider plastic bags and the tampon tax as greater vote winners than the demise of the biosphere.”

Why did Professor Noam Chomsky call the US Republican Party “The most dangerous organization in the history of the world”? In the primary that preceded the 2016 presidential election, every single Republican candidate with a chance of being nominated was a climate change denier. All received amazingly generous checks from giant fossil fuel organizations. When elected, Donald Trump not only pulled the United States out of the Paris Agreement; he also sabotaged the Environmental Protection Agency to such an extent that the carefully collected facts on climate change that the agency had accumulated had to be secretly saved by scientists to prevent their destruction by the Trump administration. Furthermore, Donald Trump not only subsidizes giant coal corporations. He also has sabotages renewable energy initiatives in the United States.

Here are some quotations from an article by Coral Davenport and Mark Landler, May 27, 2019¹:

President Trump has rolled back environmental regulations, pulled the United States out of the Paris climate accord, brushed aside dire predictions about the effects of climate change, and turned the term “global warming” into a punch line rather than a prognosis.

¹<https://www.nytimes.com/2019/05/27/us/politics/trump-climate-science.html>

Now, after two years spent unraveling the policies of his predecessors, Mr. Trump and his political appointees are launching a new assault.

In the next few months, the White House will complete the rollback of the most significant federal effort to curb greenhouse-gas emissions, initiated during the Obama administration. It will expand its efforts to impose Mr. Trump's hard-line views on other nations, building on his retreat from the Paris accord and his recent refusal to sign a communiqué to protect the rapidly melting Arctic region unless it was stripped of any references to climate change.

And, in what could be Mr. Trump's most consequential action yet, his administration will seek to undermine the very science on which climate change policy rests.

Mr. Trump is less an ideologue than an armchair naysayer about climate change, according to people who know him. He came into office viewing agencies like the Environmental Protection Agency as bastions of what he calls the "deep state," and his contempt for their past work on the issue is an animating factor in trying to force them to abandon key aspects of the methodology they use to try to understand the causes and consequences of a dangerously warming planet.

As a result, parts of the federal government will no longer fulfill what scientists say is one of the most urgent jobs of climate science studies: reporting on the future effects of a rapidly warming planet and presenting a picture of what the earth could look like by the end of the century if the global economy continues to emit heat-trapping carbon dioxide pollution from burning fossil fuels...

The administration's prime target has been the National Climate Assessment, produced by an interagency task force roughly every four years since 2000. Government scientists used computer-generated models in their most recent report to project that if fossil fuel emissions continue unchecked, the earth's atmosphere could warm by as much as eight degrees Fahrenheit by the end of the century. That would lead to drastically higher sea levels, more devastating storms and droughts, crop failures, food losses and severe health consequences.



Figure 10.1: There is so much wrong with Donald Trump that one hardly knows where to start. He is a bully, braggart, narcissist, racist, mysogenist, habitual liar, and tax evader, in addition to being demonstrably ignorant. He has contempt for both domestic and international law, as well as for the US Constitution. In the words of Michael Moore, he is a “part-time clown and full-time sociopath”. However, it is Trump’s climate change denial, withdrawal from the Paris agreement, and sponsorship of fossil fuels that pose the greatest threats to the future of humans society and the biosphere. The general support of the Republican Party for the fossil fuel industry is the reason why Prof. Noam Chomsky has called the party “the most dangerous organization in history”.

10.2 Jair Bolsonaro, the Trump of the Tropics

The newly elected President of Brazil, Jair Bolsonaro, has praised Pinochet, expressed support for torturers and called for political opponents to be shot, earning him the label of “the most misogynistic, hateful elected official in the democratic world”. Bolsonaro speaks nostalgically about the country’s 1964-1985 military dictatorship and has promised to fill his government with current and former military leaders. Here, in his own words, are some of his ideas:

On refugees: “The scum of the earth is showing up in Brazil, as if we didn’t have enough problems of our own to sort out.” (September 2015)

On gay people: “I would be incapable of loving a homosexual son. I’m not going to be a hypocrite: I’d rather my son died in an accident than showed up with some bloke with a moustache.” (June 2011)

On democracy and dictatorship: “You’ll never change anything in this country through voting. Nothing. Absolutely nothing. Unfortunately, things will only change when a civil war kicks off and we do the work the [military] regime didn’t. Killing some 30,000... Killing them! If a couple of innocents die, that’s OK.” (May 1999)

On human rights: “I’m in favour of torture.” (May 1999)

On women: “I said I wouldn’t rape you because you don’t deserve it.” (December 2014, to politician Maria do Rosário, repeating a comment first made to her in 2003).

Indigenous rights activists fear Bolsonaro’s avowed plan to wring riches from the Amazon - whether from expanding agriculture into indigenous lands, building roads and other infrastructure projects, or allowing mining on public lands - will unleash a tide of violence and environmental devastation.

“All indigenous communities are afraid right now,” says Felipe Milanez, professor of humanities at the Universidade Federal de Bahia. “There is a risk of brutal, violent attack.” Milanez fears that indigenous efforts to patrol and protect their own lands from outsiders, such as the Forest Guardians recently covered in National Geographic magazine, will be banned and persecuted.

“His economic project is to destroy the Amazon, to transform the Amazon into commodities for export,” Milanez says.

Human rights activists are concerned that a surge in violent land conflicts will accompany an increase in environmentally destructive development in the Amazon. “There is no doubt that devastation will spread in the region,” says Diogo Cabral, an attorney with the Sociedade Maranhense de Direitos Humanos. “At the same time, he aims to extinguish policies that protect human rights defenders in Brazil. Under Bolsonaro, human life will have no value.”



Figure 10.2: Jair Bolsonaro visiting Donald Trump in Washington. Like Trump, he is an utterly despicable person, but (again like Trump) his worst crime is against the future of human civilization and the biosphere. Under Bolsonaro, the vitally important Amazon rainforests are being destroyed, a terrible blow to our efforts to avoid catastrophic ciliate change.



Figure 10.3: The indigenous peoples of the Amazon are the guardians of the lungs of Planet Earth. Within hours of taking office on 1 January, 2019, the Trump of the Tropics, aka the new President of Brazil, Jair Bolsonaro, launched an all-out assault against the Amazon rainforest and its indigenous communities, potentially paving the way for large scale deforestation by agricultural, mining and oil companies.

The indigenous peoples' website Mongabay ² states that "The potentially resulting wholesale deforestation could be a disaster to indigenous peoples, biodiversity, and even the regional and global climate."

It adds: "Bolsonaro's proposed Amazon policies, if carried out, could ultimately help dash the world's hopes of achieving the global climate goals agreed to in Paris, a failure that could lead to climate chaos."

Leading Brazilian researchers, from the National Institute of Space Research (INPE), have calculated that Bolsonaro's policies could triple deforestation in the Amazon from present levels of 6,900 square kilometers (2,664 square miles) annually, to 25,600 square kilometers (9,884 square miles) per year by 2020.

10.3 The Evangelicals believe that there is no need to act

Here is an excerpt from an article by Bernard Daley Zaleha and Andrew Szasz entitled *Why conservative Christians don't believe in climate change*³:

American Christians have become increasingly polarized on issues of climate change and environmental regulation. In recent years, mainline Protestant denominations and the Roman Catholic Church have made explicit declarations of support for global climate action. Prominent Southern Baptists and other evangelical Protestants, on the other hand, have issued statements that are strikingly similar to the talking points of secular climate skeptics, and have attempted to stamp out "green" efforts within their own ranks. An analysis of resolutions and campaigns by evangelicals over the past 40 years shows that anti-environmentalism within conservative Christianity stems from fears that "stewardship" of God's creation is drifting toward neo-pagan nature worship, and from apocalyptic beliefs about "end times" that make it pointless to worry about global warming. As the climate crisis deepens, the moral authority of Christian leaders and organizations may play a decisive role in swaying public policy toward (or away from) action to mitigate global warming.

The highly dangerous beliefs of the Evangelicals are in strong contrast to the courageous and enlightened leadership of Pope Francis, who urges us to act resolutely to prevent catastrophic climate change.

²<https://news.mongabay.com/2019/01/bolsonaro-hands-over-indigenous-land-demarcation-to-agriculture-ministry/?fbclid=IwAR3UG-jneDheuddVEWVcCrcWKk4bnnsdE1uIBMLlnLtS6zGqMmGSPxtgEzM>

³Bulletin of the Atomic Scientists 2015, Vol. 71(5) 19-30

10.4 Banks give fossil fuel giants \$1.9 trillion since Paris

Banking on Climate Change 2019 - Fossil Fuel Report Card / : Alison Kirsch et al Rainforest Action Network (RAN) et al.. For the first time, this report adds up lending and underwriting from 33 global banks to the fossil fuel industry as a whole. The findings are stark: these Canadian, Chinese, European, Japanese, and U.S. banks have financed fossil fuels with \$1.9 trillion since the Paris Agreement was adopted (2016-2018), with financing on the rise each year. This report finds that fossil fuel financing is dominated by the big U.S. banks, with JPMorgan Chase as the world's top funder of fossil fuels by a wide margin. In other regions, the top bankers of fossil fuels are Royal Bank of Canada in Canada, Barclays in Europe, MUFG in Japan, and Bank of China in China. Here are some quotations from the report:

In October 2018, the Intergovernmental Panel on Climate Change (IPCC) released a sobering report on the devastating impacts our world will face with 1.5° Celsius of warming - let alone 2°C - while setting out the emissions trajectory the nations of the world need to take if we are to have any shot at keeping to that 1.5°C limit. This 10th edition of the annual fossil fuel finance report card, greatly expanded in scope, reveals the paths banks have taken in the past three years since the Paris Agreement was adopted, and finds that overall bank financing continues to be aligned with climate disaster.

For the first time, this report adds up lending and underwriting from 33 global banks to the fossil fuel industry as a whole. The findings are stark: these Canadian, Chinese, European, Japanese, and U.S. banks have financed fossil fuels with \$1.9 trillion since the Paris Agreement was adopted (2016-2018), with financing on the rise each year. This report finds that fossil fuel financing is dominated by the big U.S. banks, with JPMorgan Chase as the world's top funder of fossil fuels by a wide margin. In other regions, the top bankers of fossil fuels are Royal Bank of Canada in Canada, Barclays in Europe, MUFG in Japan, and Bank of China in China.

This report also puts increased scrutiny on the banks' support for 100 top companies that are expanding fossil fuels, given that there is no room for new fossil fuels in the world's carbon budget. And yet banks supported these companies with \$600 billion in the last three years. JPMorgan Chase is again on top, by an even wider margin, and North American banks emerge as the biggest bankers of expansion as well.

This report also grades banks' overall future-facing policies regarding fossil fuels, assessing them on restrictions on financing for fossil fuel expansion and commitments to phase out fossil fuel financing on a 1.5°C-aligned trajectory. While some banks have taken important steps, overall major global banks have simply failed to set trajectories adequate for dealing with the climate crisis.





As in past editions, this fossil fuel finance report card also assesses bank policy and practice around financing in certain key fossil fuel subsectors, with league tables and policy grades on:

- **Tar sands oil:** RBC, TD, and JPMorgan Chase are the biggest bankers of 30 top tar sands producers, plus four key tar sands pipeline companies. In particular, these banks and their peers support companies working to expand tar sands infrastructure, such as Enbridge and Teck Resources.
- **Arctic oil and gas:** JPMorgan Chase is the world's biggest banker of Arctic oil and gas by far, followed by Deutsche Bank and SMBC Group. Worryingly, financing for this subsector increased from 2017 to 2018.
- **Ultra-deepwater oil and gas:** JPMorgan Chase, Citi, and Bank of America are the top bankers here. Meanwhile, none of the 33 banks have policies to proactively restrict financing for ultra-deepwater extraction.
- **Fracked oil and gas:** For the first time, the report card looks at bank support for top fracked oil and gas producers and transporters - and finds financing is on the rise over the past three years. Wells Fargo and JPMorgan Chase are the biggest bankers of fracking overall - and, in particular, they support key companies active in the Permian Basin, the epicenter of the climate-threatening global surge of oil and gas production.
- **Liquefied natural gas (LNG):** Banks have financed top companies building LNG import and export terminals around the world with \$46 billion since the Paris Agreement, led by JPMorgan Chase, Société Générale, and SMBC Group. Banks have an opportunity to avoid further damage by not financing Anadarko's Mozambique LNG project, in particular.
- **Coal mining:** Coal mining finance is dominated by the four major Chinese banks, led by China Construction Bank and Bank of China. Though many European and U.S. banks have policies in place restricting financing for coal mining, total financing has only fallen by three to five percentage points each year.
- **Coal power:** Coal power financing is also led by the Chinese banks - Bank of China and ICBC in particular - with Citi and MUFG as the top non-Chinese bankers of coal power. Policy grades for this subsector show some positive examples of European banks restricting financing for coal power companies.

The human rights chapter of this report shows that as fossil fuel companies are increasingly held accountable for their contributions to climate change, finance for these companies also poses a growing liability risk for banks. The



Figure 10.4: Drilling for oil in the Arctic.

fossil fuel industry has been repeatedly linked to human rights abuses, including violations of the rights of Indigenous peoples and at-risk communities, and continues to face an ever-growing onslaught of lawsuits, resistance, delays, and political uncertainty.

The IPCC's 2018 report on the impacts of a 1.5°C increase in global temperature showed clearly the direction the nations of the world need to take, and the emissions trajectory we need to get there. Banks must align with that trajectory by ending financing for expansion, as well as for these particular spotlight fossil fuels - while committing overall to phase out all financing for fossil fuels on a Paris Agreement-compliant timeline.



Figure 10.5: Indigenous protests against Arctic drilling.







Figure 10.6: A coal-fired power plant.

10.5 Fossil fuel industry's disinformation campaign

The Wikipedia article on climate change denial describes it with the following words: “Although scientific opinion on climate change is that human activity is extremely likely to be the primary driver of climate change, the politics of global warming have been affected by climate change denial, hindering efforts to prevent climate change and adapt to the warming climate. Those promoting denial commonly use rhetorical tactics to give the appearance of a scientific controversy where there is none.”

It is not surprising that the fossil fuel industry supports, on a vast scale, politicians and mass media that deny the reality of climate change. The amounts of money at stake are vast. If catastrophic climate change is to be avoided, coal, oil and natural gas “assets” worth trillions of dollars must be left in the ground. Giant fossil fuel corporations are desperately attempting to turn these “assets” into cash.

According to a recent article published in “The Daily Kos”⁴, companies like Shell and Exxon, knew, as early as the 1970s, how their combustible products were contributing to irreversible warming of the planet, became public knowledge over the last few years.

A series of painstakingly researched articles⁵ published in 2015 by the Pulitzer-prize

⁴www.dailykos.com/stories/2018/9/23/1797888/-The-Oil-Companies-not-only-knew-fossil-fuels-caused-climate-change-they-knew-how-bad-it-would-get?detail=emaildkre

⁵<https://insideclimatenews.org/news/15092015/Exxons-own-research-confirmed-fossil-fuels-role-in-global-warming>

winning Inside Climate News revealed an industry totally aware and informed for decades about the inevitable warming certain to occur as more and more carbon dioxide from the burning of fossil fuels was released into the atmosphere.

The article states that “In fact, the oil industry, and Exxon in particular, had the best climate models available, superior to those relied on by scientific community.⁶ And armed with the foreknowledge developed through those models, Exxon and the other oil companies planned and executed an elaborate, cynical long term strategy: to invest hundreds of millions of dollars in a comprehensive propaganda effort designed to raise doubts about the existence and cause of climate change, a phenomenon they well knew was irrefutable, based on their own research. By 2016 the industry’s lobbying to discredit the science of climate change had surpassed two billion dollars.

“Meanwhile, as newly discovered documents reported in The Guardian⁷ attest, the same companies were preparing projections of what type of world they would be leaving for the rest of humanity. In the 1980s, oil companies like Exxon and Shell carried out internal assessments of the carbon dioxide released by fossil fuels, and forecast the planetary consequences of these emissions. In 1982, for example, Exxon predicted that by about 2060, CO₂ levels would reach around 560 parts per million - double the preindustrial level - and that this would push the planet’s average temperatures up by about 2°C over then-current levels (and even more compared to pre-industrial levels).”⁸

The Fossil Free MIT report, 2014

Here are some excerpts from a report entitled “**The Fossil Fuel Industry’s Role in Hindering Climate Change Action: Lobbying and Disinformation Against Science and Scientists**”⁹:

In response to the unprecedented urgency of global climate change, Fossil Free MIT’s petition, signed by more than 2,400 MIT members, is calling on MIT to divest its \$11 billion endowment from the 200 fossil fuel companies with the world’s largest publicly traded carbon reserves.

⁶<https://insideclimatenews.org/news/18092015/exxon-confirmed-global-warming-consensus-in-1982-with-in-house-climate-models>

⁷<https://www.theguardian.com/environment/climate-consensus-97-per-cent/2018/sep/19/shell-and-exxons-secret-1980s-climate-change-warnings>

⁸See also <https://truthout.org/articles/self-immolation-as-the-world-burns-an-earth-day-report/>
<https://countercurrents.org/2018/04/29/the-methane-time-bomb-and-the-future-of-the-biosphere/>
<https://countercurrents.org/2018/08/07/hothouse-earth-evidence-for-ademise-of-the-planetary-life-support-system/>
<https://www.independent.co.uk/environment/global-warming-temperature-rise-climate-change-end-century-science-a8095591.html>
<http://www.lifeworth.com/deepadaptation.pdf>
<https://www.independent.co.uk/news/business/news/bp-shell-oil-global-warming-5-degree-paris-climate-agreement-fossil-fuels-temperature-rise-a8022511.html>

⁹<https://www.fossilfreemit.org/wp-content/uploads/2014/08/FossilFreeMIT-Lobbying-Disinformation.pdf>

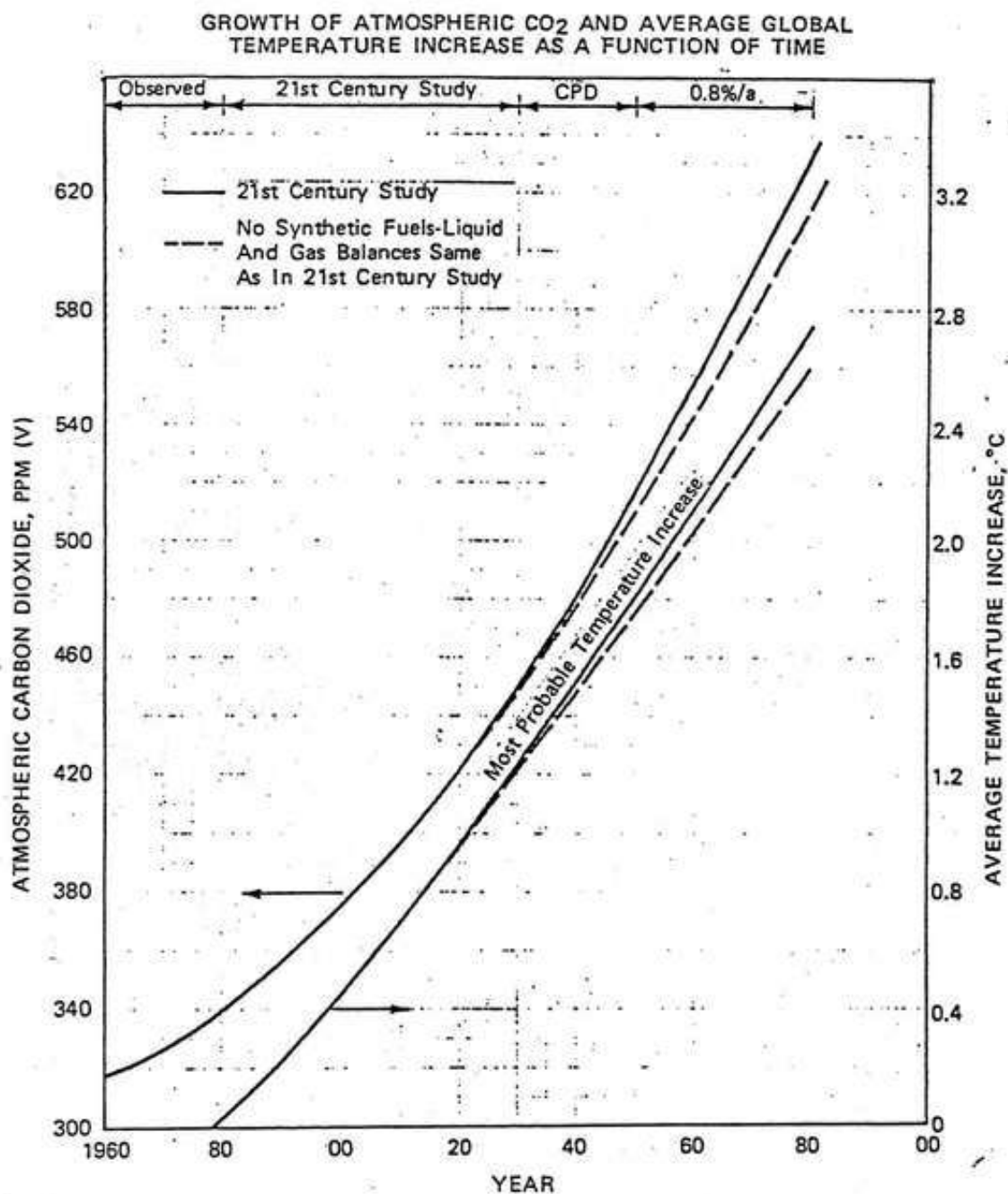


Figure 10.7: Exxon's 1982 internal projections of the future increase in carbon dioxide levels shows CO₂ percentages increasing to 600 ppm and temperature increases of up to 3°C.

Fossil Free MIT believes that divestment from the fossil fuel industry presents MIT with a unique opportunity to lead the global effort to combat climate change. We wholeheartedly support our Institute's cutting-edge climate science and renewable energy technology research, as well as MIT's campus sustainability initiatives, and we propose divestment as a highly complementary strategy that will bring MIT's investments in line with the goals of its research and sustainability activities. There are three central reasons why we urge MIT to divest from the fossil fuel industry:

- The fossil fuel industry's business practice is fundamentally inconsistent with the science of climate change mitigation. A 66% chance of limiting global warming to less than 2°C above pre-industrial temperatures demands that no more than 35% of proven fossil fuel reserves can be burned prior to 2100. Yet in 2012, the fossil fuel industry spent \$674 billion developing new reserves.
- The fossil fuel industry spends hundreds of millions of dollars lobbying and donating in Washington, D.C. against legislation for climate change action.
- Many fossil fuel companies are responsible for funding or orchestrating targeted anti-science disinformation campaigns that confuse the public, sabotage science, and slander scientists.

Disinformation from fossil fuel and tobacco industries

Here are some excerpts from a February 19 2019 article by Mat Hope entitled “**Revealed: How the Tobacco and Fossil Fuel Industries Fund Disinformation Campaigns Around the World**”¹⁰:

Fossil fuel companies have a long history of adopting public relations strategies straight from the tobacco industry's playbook. But a new analysis shows the two industries' relationship goes much deeper - right down to funding the same organizations to do their dirty work.

MIT Associate Professor David Hsu analyzed organizations in DeSmog's disinformation database and the Guardian's tobacco database and found 35 thinktanks based in the US, UK, Australia, and New Zealand that promote both the tobacco and fossil fuel industries' interests.

Of these organizations, DeSmog can reveal that 32 have taken direct donations from the tobacco industry, 29 have taken donations from the fossil fuel industry, and 28 have received money from both. Two key networks, based

¹⁰<https://www.desmogblog.com/2019/02/19/how-tobacco-and-fossil-fuel-companies-fund-disinformation-campaigns-around-world>



Figure 10.8: Smoke destroys human health, regardless of whether it is from cigarettes or coal-fired power plants. Fossil fuel corporations and tobacco companies have exhibited an astonishing degree of cynicism and lack of social responsibility.

around the Koch brothers and Atlas Network, are involved in coordinating or funding many of the thinktanks.

10.6 The UK declares a climate emergency

Introducing the motion in the House of Commons, Labour leader Jeremy Corbyn said: “We have no time to waste. We are living in a climate crisis that will spiral dangerously out of control unless we take rapid and dramatic action now. This is no longer about a distant future. We’re talking about nothing less than the irreversible destruction of the environment within our lifetimes of members of this house.”

Here are some excerpts from an article by Amy Goodman and Nermeen Shaikh of Democracy now published in Truthout on May 2, 2019.¹¹:

On Wednesday, the House of Commons became the first parliament in the world to declare a climate emergency. The resolution came on the heels of the recent Extinction Rebellion mass uprising that shut down Central London last month in a series of direct actions. Activists closed bridges, occupied public landmarks and even superglued themselves to buildings, sidewalks and trains

¹¹<https://truthout.org/video/george-monbiot-on-the-uk-climate-emergency/>



to demand urgent action to combat climate change. Police arrested more than 1,000 protesters. Labour Party Leader Jeremy Corbyn told Parliament, “We are witnessing an unprecedented upsurge of climate activism, with groups like Extinction Rebellion forcing the politicians in this building to listen. For all the dismissive and defensive column inches the processes have provoked, they are a massive and, I believe, very necessary wake-up call. Today we have the opportunity to say, ‘We hear you.’” We speak with George Monbiot, British journalist, author and columnist with *The Guardian*. His recent piece for *The Guardian* is headlined “Only rebellion will prevent an ecological apocalypse.” Monbiot says capitalism “is like a gun pointed at the heart of the planet. It will essentially, necessarily destroy our life-support systems. Among those characteristics is the drive for perpetual economic growth on a finite planet.”

10.7 The 2018 IPCC report

Excerpts from an article summarizing the report

Here are excerpts from an article entitled **UN Experts Warn of ‘Climate Catastrophe’ by 2040** by Jessica Corbett. The article was published in *Common Dreams* on Monday, October 8, 2018.¹²

¹²<https://www.commondreams.org/news/2018/10/08/un-experts-warn-climate-catastrophe-2040-without-rapid-and-unprecedented-global>

“The climate crisis is here and already impacting the most vulnerable,” notes 350.org’s program director. “Staying under 1.5°C is now a matter of political will.”

Underscoring the need for “rapid, far-reaching, and unprecedented” changes to life as we know it to combat the global climate crisis, a new report from the Intergovernmental Panel on Climate Change (IPCC) - the United Nations’ leading body for climate science - details what the world could look like if the global temperature rises to 1.5°C versus 2°C (2.7°F versus 3.6°F) above pre-industrial levels, and outlines pathways to reducing greenhouse gas emissions in the context of sustainable development and efforts to eradicate poverty.

“Climate change represents an urgent and potentially irreversible threat to human societies and the planet,” the report reads. “Human-induced warming has already reached about 1°C (1.8°F) above pre-industrial levels at the time of writing of this Special Report... If the current warming rate continues, the world would reach human-induced global warming of 1.5°C around 2040.”

Approved by the IPCC in South Korea on Saturday ahead of COP24 in Poland in December, *Global Warming of 1.5°C* was produced by 91 authors and reviewers from 40 countries. Its release has elicited calls to action from climate campaigners and policymakers the world over.

“This is a climate emergency. The IPCC 1.5 report starkly illustrates the difference between temperature rises of 1.5°C and 2°C - for many around the world this is a matter of life and death,” declared Karin Nansen, chair of Friends of the Earth International (FOEI). “It is crucial to keep temperature rise well below 1.5 degrees ... but the evidence presented by the IPCC shows that there is a narrow and shrinking window in which to do so.”

The report was requested when the international community came together in December of 2015 for the Paris agreement, which aims to keep global warming within this century “well below” 2°C, with an ultimate target of 1.5°C. President Donald Trump’s predecessor supported the accord, but Trump has vowed to withdraw the United States, even as every other nation on the planet has pledged their support for it. In many cases, however, sworn support hasn’t led to effective policy.

“It’s a fresh reminder, if one was needed, that current emissions reduction pledges are not enough to meet the long-term goals of the Paris agreement. Indeed, they are not enough for any appropriately ambitious temperature target, given what we know about dangerous climate impacts already unfolding even at lower temperature thresholds,” Rachel Cleetus, lead economist and climate policy manager for the Union of Concerned Scientists (UCS), wrote ahead of its release.

“The policy implications of the report are obvious: We need to implement a suite of policies to sharply limit carbon emissions and build climate resilience, and we must do all this in a way that prioritizes equitable outcomes particularly for the world’s poor and marginalized communities,” Cleetus added.

“We want a just transition to a clean energy system that benefits people not corporations,” Nansen emphasized. “Only with a radical transformation of our energy, food and economic systems, embracing environmental, social, gender and economic justice, can we prevent climate catastrophe and temperature rises exceeding 1.5°C.”

Today we are faced with multiple interrelated crises, for example the threat of catastrophic climate change or equally catastrophic thermonuclear war, and the threat of widespread famine. These threats to human existence and to the biosphere demand a prompt and rational response; but because of institutional and cultural inertia, we are failing to take the steps that are necessary to avoid disaster.

10.8 Greta Thunberg

Only immediate climate action can save the future

Immediate action to halt the extraction of fossil fuels and greatly reduce the emission of CO₂ and other greenhouse gasses is needed to save the long-term future of human civilization and the biosphere.

At the opening ceremony of United Nations-sponsored climate talks in Katowice, Poland, Sir David Attenborough said “Right now, we are facing a man-made disaster of global scale. Our greatest threat in thousands of years. Climate change. If we don’t take action, the collapse of our civilizations and the extinction of much of the natural world is on the horizon. The world’s people have spoken. Their message is clear. Time is running out. They want you, the decision-makers, to act now.”

Antonio Guterres, UN Secretary-General, said climate change was already “a matter of life and death” for many countries. He added that the world is “nowhere near where it needs to be” on the transition to a low-carbon economy.

Swedish student Greta Thunberg, is a 16-year-old who has launched a climate protest movement in her country. She said, in a short but very clear speech after that of UN leader Antonio Guterres: “Some people say that I should be in school instead. Some people say that I should study to become a climate scientist so that I can ‘solve the climate crisis’. But the climate crisis has already been solved. We already have all the facts and solutions.”

She added: “Why should I be studying for a future that soon may be no more, when no one is doing anything to save that future? And what is the point of learning facts when the most important facts clearly mean nothing to our society?”

Thunberg continued: “Today we use 100 million barrels of oil every single day. There are no politics to change that. There are no rules to keep that oil in the ground. So we can’t save the world by playing by the rules. Because the rules have to be changed.”

She concluded by saying that “since our leaders are behaving like children, we will have to take the responsibility they should have taken long ago.”

Appearing among billionaires, corporate CEO’s and heads of state at the Davos Economic Forum in Switzerland, like a new Joan of Arc, 16-year-old Swedish climate activist

Greta Thunberg called on decision-makers to fulfil their responsibilities towards future generations. Here are some excerpts from her speech:

Greta's speech at Davos

Our house is on fire. I am here to say, our house is on fire. According to the IPCC, we are less than 12 years away from not being able to undo our mistakes. In that time, unprecedented changes in all aspects of society need to have taken place, including a reduction of our CO₂ emissions by at least 50%...

Here in Davos - just like everywhere else - everyone is talking about money. It seems money and growth are our only main concerns.

And since the climate crisis has never once been treated as a crisis, people are simply not aware of the full consequences on our everyday life. People are not aware that there is such a thing as a carbon budget, and just how incredibly small that remaining carbon budget is. That needs to change today.

No other current challenge can match the importance of establishing a wide, public awareness and understanding of our rapidly disappearing carbon budget, that should and must become our new global currency and the very heart of our future and present economics.

We are at a time in history where everyone with any insight of the climate crisis that threatens our civilization - and the entire biosphere - must speak out in clear language, no matter how uncomfortable and unprofitable that may be.

We must change almost everything in our current societies. The bigger your carbon footprint, the bigger your moral duty. The bigger your platform, the bigger your responsibility.



Figure 10.9: Greta Thunberg on the cover of Time Magazine, The Intergovernmental Panel on Climate Change, in their October 2018 report, used strong enough language to wake up at least part of the public: the children whose future is at stake. Here is an excerpt from a speech which 16-year-old Swedish climate activist Greta Thunberg made at the Davos Economic Forum in January, 2019: “Our house is on fire. I am here to say, our house is on fire. According to the IPCC, we are less than 12 years away from not being able to undo our mistakes. In that time, unprecedented changes in all aspects of society need to have taken place, including a reduction of our CO2 emissions by at least 50%...”

10.9 Worldwide school strike, 15 March, 2019

Inspired by Greta Thunberg, over 1.4 million young students across all continents took to the streets on Friday March 15th for the first ever global climate strike. Messages in more than 40 languages were loud and clear: world leaders must act now to address the climate crisis and save our future. The school strike was the largest climate action in history. Nevertheless it went almost unmentioned in the media,

Here are some of the statements by the students explaining why they took part in the strikes:

In India, no one talks about climate change. You don't see it on the news or in the papers or hear about it from government. We want global leaders to declare a climate emergency. If we don't act today, then we will have no tomorrow. - Vidit Baya, 17, Udaipur, India.

We face heartbreaking loss due to increasingly extreme weather events. We urge the Taiwanese government to implement mitigation measures and face up to the vulnerability of indigenous people, halt construction projects in the indigenous traditional realm, and recognize the legal status of Plains Indigenous People, in order to implement environmental protection as a bottom-up approach - Kaisanan Ahuan, Puli City, Taiwan.

We have reached a point in history when we have the technical capacities to solve poverty, malnutrition, inequality and of course global warming. The deciding factors for whether we take advantage of our potential will be our activism, our international unity and our ability to develop the art of making the impossible possible. Whether we succeed or not depends on our political will - Eyal Weintraub, 18, and Bruno Rodriguez, 18, Argentina.

The damage done by multinationals is enormous: the lack of transparency, dubious contracts, the weakening of the soil, the destruction of flora and fauna, the lack of respect for mining codes, the contamination of groundwater. In Mali, the state exercises insufficient control over the practices of the multinationals, and it is us, the citizens, who suffer the consequences. The climate alarm has sounded, and the time has come for us all to realize that there is still time to act locally, in our homes, our villages, our cities - Mone Fousseny, 22, Mali.

10.10 Forms of renewable energy

Solar energy

Before the start of the industrial era, human society relied exclusively on renewable energy sources - but can we do so again, with our greatly increased population and greatly increased demands? Will we ultimately be forced to reduce the global population or our per capita use of energy, or both? Let us now try to examine these questions.

Biomass, wind energy, hydropower and wave power derive their energy indirectly from the sun, but in addition, various methods are available for utilizing the power of sunlight directly. These include photovoltaic panels, solar designs in architecture, solar systems for heating water and cooking, concentrating photovoltaic systems, and solar thermal power plants.

Photovoltaic cells and concentrating photovoltaic systems

Solar power was the fastest-growing source of new energy in 2016, surpassing the net growth of all other energy sources including coal, according to a new report from the International Energy Agency (IEA).

The IEA report found new solar capacity increased by 50 percent in 2016, and IEA executive director Fatih Birol hailed solar's rapid growth. "What we are witnessing is the birth of a new era in solar photovoltaics [PV]. We expect that solar PV capacity growth will be higher than any other renewable technology up to 2022."¹³

The report also shows renewables as a whole accounted for two-thirds of all new energy capacity in 2016. "We see renewables growing by about 1,000 GW (gigawatts) by 2022, which equals about half of the current global capacity in coal power, which took 80 years to build," Birol said in a statement accompanying the report.¹⁴

Solar photovoltaic cells¹⁵ are thin coated wafers of a semiconducting material (usually silicon). The coatings on the two sides are respectively charge donors and charge acceptors. Cells of this type are capable of trapping solar energy and converting it into direct-current electricity. The electricity generated in this way can be used directly (as it is, for example, in pocket calculators) or it can be fed into a general power grid. Alternatively it can be used to split water into hydrogen and oxygen. The gases can then be compressed and stored, or exported for later use in fuel cells. In the future, we may see solar photovoltaic arrays in sun-rich desert areas producing hydrogen as an export product. As their petroleum reserves become exhausted, the countries of the Middle East and Africa may be able to shift to this new technology and still remain energy exporters.

¹³<https://www.theguardian.com/environment/2017/oct/04/solar-power-renewables-international-energy-agency>

¹⁴<https://www.iea.org/newsroom/news/2017/october/solar-pv-grew-faster-than-any-other-fuel-in-2016-opening-a-new-era-for-solar-pow.html>

¹⁵<https://www.iea.org/renewables/>

It is interesting to notice that the primary process of photosynthesis in plants is closely similar to the mechanism by which solar cells separate charges and prevent the back-reaction. We can see why a back-reaction must be prevented if we consider the excitation of a single atom. An absorbed photon lifts an electron from a filled atomic orbital to an empty one, leaving a positively-charged hole in the orbital from which the electron came. However, a back-reaction occurs almost immediately: The excited electron falls back into the orbital from which it came, and the absorbed energy is re-emitted. One can say that the electron and hole have recombined.

In higher plants, the back reaction is prevented because the photon is absorbed in a membrane which has a sandwich-like structure. Dye molecules (usually chlorophyll molecules) are sandwiched between a layer of charge donor molecules on one side of the membrane, and a layer of charge acceptor molecule on the other side. The electron quickly migrates to the acceptors, which are molecules with low-lying unfilled orbitals. Meanwhile the hole has quickly moved to the opposite side of the membrane, where it combines with an electron from a donor molecule. A donor molecule is a molecule whose highest filled orbital is high in energy. In this process, the back-reaction is prevented. The electron and hole are on opposite sides of the membrane, and they can only recombine after they have driven the metabolism of the plant.

In a photovoltaic solar cell, the mechanism by which the back-reaction is prevented is exactly similar. It too has a sandwich-like structure, with charge donors on one side, charge-acceptors on the other, and photon absorbers in the middle. Here too, the electron and hole quickly migrate to opposite sides. They can only recombine by traveling through the external circuit, which is analogous to a plant's metabolism, and performing useful work.

The cost of manufacturing photovoltaics continues to fall rapidly. In 2017, a homeowner paid approximately \$3,360 per kilowatt to have rooftop solar panels installed. Usually photovoltaic panels are warranted for a life of 20 years, but they are commonly still operational after 30 years or more. Using the fact that there are 8760 hours in a year, and thus 175200 hours in 20 years, we can calculate that the cost of electricity to a solar-using homeowner today is about 1.92 cents per kilowatt hour. This can be compared with electricity generated from coal, which in 2011 cost 3.23 cents per kilowatt hour, while electricity generated from natural gas cost 4.51 cents per kilowatt hour. We must also remember that photovoltaics are falling rapidly in price, and that the fossil fuel costs do not include externalities, such as their contribution to climate change.

Concentrating photovoltaic systems are able to lower costs still further by combining silicon solar cells with reflectors that concentrate the sun's rays. The most inexpensive type of concentrating reflector consists of a flat piece of aluminum-covered plastic material bent into a curved shape along one of its dimensions, forming a trough-shaped surface. (Something like this shape results when we hold a piece of paper at the top and bottom with our two hands, allowing the center to sag.) The axis of the reflector can be oriented so that it points towards the North Star. A photovoltaic array placed along the focal line will then receive concentrated sunlight throughout the day.

Photovoltaic efficiency is defined as the ratio of the electrical power produced by a cell

to the solar power striking its surface. For commercially available cells today, this ratio is between 9% and 14%. If we assume 5 hours of bright sunlight per day, this means that a photo cell in a desert area near to the equator (where 1 kW/m^2 of peak solar power reaches the earth's surface) can produce electrical energy at the average rate of 20-30 W_e/m^2 , the average being taken over an entire day and night. The potential power per unit area for photovoltaic systems is far greater than for biomass. However, the mix of renewable energy sources most suitable for a particular country depends on many factors. We will see below that biomass is a promising future source of energy for Sweden, because of Sweden's low population density and high rainfall. By contrast, despite the high initial investment required, photovoltaics are undoubtedly a more promising future energy source for southerly countries with clear skies.

In comparing photovoltaics with biomass, we should be aware of the difference between electrical energy and energy contained in the chemical bonds of a primary fuel such as wood or rapeseed oil. If Sweden (for example) were to supply all its energy needs from biomass, part of the biomass would have to be burned to generate electricity. The efficiency of energy conversion in electricity generation from fuel is 20%-35%. Of course, in dual use power plants, part of the left-over heat from electrical power generation can be used to heat homes or greenhouses. However, hydropower, wind power and photovoltaics have an advantage in generating electrical power, since they do so directly and without loss, whereas generation of electricity from biomass involves a loss from the inefficiency of the conversion from fuel energy to electrical energy. Thus a rational renewable energy program for Sweden should involve a mixture of biomass for heating and direct fuel use, with hydropower and wind power for generation of electricity. Perhaps photovoltaics will also play a role in Sweden's future electricity generation, despite the country's northerly location and frequently cloudy skies.

The global market for photovoltaics is expanding at the rate of 30% per year. This development is driven by rising energy prices, subsidies to photovoltaics by governments, and the realization of the risks associated with global warming and consequent international commitments to reduce carbon emissions. The rapidly expanding markets have resulted in lowered photovoltaic production costs, and hence further expansion, still lower costs, etc. - a virtuous feedback loop.

Solar thermal power plants

Solar Parabolic Troughs can be used to heat a fluid, typically oil, in a pipe running along the focal axis. The heated fluid can then be used to generate electrical power. The liquid that is heated in this way need not be oil. In a solar thermal power plant in California, reflectors move in a manner that follows the sun's position and they concentrate solar energy onto a tower, where molten salt is heated to a temperature of 1050 degrees F (566 °C). The molten salt stores the heat, so that electricity can be generated even when the sun is not shining. The California plant generates 10 MW_e .



Figure 10.10: A rooftop array of photovoltaic cells.



Figure 10.11: A solar thermal power plant. Arrays of heliostatic reflectors concentrate the sun's rays onto molten salt in the tower. The plant produces electricity at night because the salt remains hot..



Figure 10.12: A solar cooker.



Figure 10.13: A rooftop solar thermal array for domestic water heating.

Solar designs in architecture

At present, the average global rate of use of primary energy is roughly 2 kW_t per person. In North America, the rate is 12 kW_t per capita, while in Europe, the figure is 6 kW_t . In Bangladesh, it is only 0.2 kW_t . This wide variation implies that considerable energy savings are possible, through changes in lifestyle, and through energy efficiency.

Important energy savings can be achieved through solar design in architecture. For example, insulation can be improved in walls, and insulating shutters can be closed at night.

In double envelope construction, a weatherproof shell surrounds the inner house. Between the outer shell and the house, sun-heated air circulates. A less extreme example of this principle is the construction of south-facing conservatories. The sun-heated air in the conservatories acts as a thermal buffer, and reduces heat loss from the house.

Solar design aims at making houses cool in the summer and warm in the winter. Awnings can be spread out in the summer to shade windows, and rolled together in the winter to allow sunshine to enter the house. Alternatively, deciduous trees can be planted in front of south-facing windows. During the summer, the leaves of the trees shade the windows, while in the winter, the leaves fall, allowing the sun to enter.

During daylight hours, houses can be illuminated by fiber optic light pipes, connected to a parabolic collector on the roof. The roof can also contain arrays of solar photovoltaic cells and solar water heaters.

Houses can be heated in the winter by heat pumps connected to a deeply buried network of pipes. Heat pumps function in much the same way as refrigerators or air conditioners. When they are used to warm houses in the winter, a volatile liquid such as ammonia is evaporated underground, where the temperature is relatively constant, not changing much between summer and winter. In the evaporation process, heat is absorbed from the ground. The gas is then compressed and re-liquefied within the house, and in this process, it releases the heat that was absorbed underground. Electricity is of course required to drive a heat pump, but far less electrical power is needed to do this than would be required to heat the house directly.

In general, solar design of houses and other buildings requires an initial investment, but over time, the investment is amply repaid through energy savings.

Solar systems for heating water and cooking

Solar heat collectors are already in common use to supply hot water for families or to heat swimming pools. A common form of the solar heat collector consists of a flat, blackened heat-collecting plate to which tubes containing the fluid to be heated are connected. The plate is insulated from the atmosphere by a layer of air (in some cases a partial vacuum) above which there is a sheet of glass. Water flowing through the tubes is collected in a tank whenever it is hotter than the water already there. In cases where there is a danger of freezing, the heated fluid may contain antifreeze, and it may then exchange heat with water in the collection tank. Systems of this kind can function even in climates



Figure 10.14: **Rows of wind turbines.**

as unfavorable as that of Northern Europe, although during winter months they must be supplemented by conventional water-heaters.

In the developing countries, wood is often used for cooking, and the result is sometimes deforestation, soil erosion and desertification. In order to supply an alternative, many designs for solar cooking have been developed. Often the designs are very simple, and many are both easy and inexpensive to build, the starting materials being aluminum foil and cardboard boxes.

Wind energy

Wind parks in favorable locations, using modern wind turbines, are able to generate $10 \text{ MW}_e/\text{km}^2$ or $10 \text{ W}_e/\text{m}^2$. Often wind farms are placed in offshore locations. When they are on land, the area between the turbines can be utilized for other purposes, for example for pasturage. For a country like Denmark, with good wind potential but cloudy skies, wind turbines can be expected to play a more important future role than photovoltaics. Denmark is already a world leader both in manufacturing and in using wind turbines. Today, on windy days, 100% of all electricity used in Denmark is generated by wind power, and the export of wind turbines makes a major contribution to the Danish economy. The use of wind power is currently growing at the rate of 38% per year. In the United States, it is the fastest-growing form of electricity generation.

The location of wind parks is important, since the energy obtainable from wind is proportional to the cube of the wind velocity. We can understand this cubic relationship by remembering that the kinetic energy of a moving object is proportional to the square



Figure 10.15: **Vertical axis wind turbines.**

of its velocity multiplied by the mass. Since the mass of air moving past a wind turbine is proportional to the wind velocity, the result is the cubic relationship just mentioned.

Before the decision is made to locate a wind park in a particular place, the wind velocity is usually carefully measured and recorded over an entire year. For locations on land, mountain passes are often very favorable locations, since wind velocities increase with altitude, and since the wind is concentrated in the passes by the mountain barrier. Other favorable locations include shorelines and offshore locations on sand bars. This is because onshore winds result when warm air rising from land heated by the sun is replaced by cool marine air. Depending on the season, the situation may be reversed at night, and an offshore wind may be produced if the water is warmer than the land.

The cost of wind-generated electrical power is currently lower than the cost of electricity generated by burning fossil fuels.

The “energy payback ratio” of a power installation is defined as the ratio of the energy produced by the installation over its lifetime, divided by the energy required to manufacture, construct, operate and decommission the installation. For wind turbines, this ratio is 17-39, compared with 11 for coal-burning plants. The construction energy of a wind turbine is usually paid back within three months.

Besides the propeller-like design for wind turbines there are also designs where the rotors turn about a vertical shaft. One such design was patented in 1927 by the French aeronautical engineer Georges Jean Marie Darrieus. The blades of a Darrieus wind turbine are airfoils similar to the wings of an aircraft. As the rotor turns in the wind, the stream of air striking the airfoils produces a force similar to the “lift” of an airplane wing. This



Figure 10.16: **Wind turbines on the Danish island of Samsø** The island was the first in the world to achieve 100% renewable energy.

force pushes the rotor in the direction that it is already moving. The Darrieus design has some advantages over conventional wind turbine design, since the generator can be placed at the bottom of the vertical shaft, where it may be more easily serviced. Furthermore, the vertical shaft can be lighter than the shaft needed to support a conventional wind turbine.

One problem with wind power is that it comes intermittently, and demand for electrical power does not necessarily come at times when the wind is blowing most strongly. To deal with the problem of intermittency, wind power can be combined with other electrical power sources in a grid. Alternatively, the energy generated can be stored, for example by pumped hydroelectric storage or by using hydrogen technology, as will be discussed below.

Bird lovers complain that birds are sometimes killed by rotor blades. This is true, but the number killed is small. For example, in the United States, about 70,000 birds per year are killed by turbines, but this must be compared with 57 million birds killed by automobiles and 97.5 million killed by collisions with plate glass.

The aesthetic aspects of wind turbines also come into the debate. Perhaps in the future, as wind power becomes more and more a necessity and less a matter of choice, this will be seen as a “luxury argument”.

A Danish island reaches 100% renewable energy

The Danish island of Samsø is only 112 square kilometers in size, and its population numbers only 4,300. Nevertheless, it has a unique distinction. Samsø was the first closed land area to declare its intention of relying entirely on renewable energy, and it has now achieved this aim, provided that one stretches the definitions slightly.



Figure 10.17: **Hydroelectric power does not suffer from the problem of intermittency, but may sometimes produce undesirable social and ecological impacts.**

In 1997, the Danish Ministry of Environment and Energy decided to sponsor a renewable-energy contest. In order to enter, communities had to submit plans for how they could make a transition from fossil fuels to renewable energy. An engineer (who didn't live there) thought he knew how Samsø could do this, and together with the island's mayor he submitted a plan which won the contest. As a result, the islanders became interested in renewable energy. They switched from furnaces to heat pumps, and formed cooperatives for the construction of windmill parks in the sea near to the island. By 2005, Samsø was producing, from renewable sources, more energy than it was using. The islanders still had gasoline-driven automobiles, but they exported from their windmill parks an amount of electrical energy that balanced the fossil fuel energy that they imported. This is a story that can give us hope for the future, although a farming community like Samsø cannot serve as a model for the world.

Hydroelectric power

In 2015, hydroelectric power supplied 16.6% of all electrical power, and 70% of the electrical power generated from renewable energy. In the developed countries, the potential for increasing this percentage is small, because most of the suitable sites for dams are already in use. Mountainous regions of course have the greatest potential for hydroelectric power, and this correlates well with the fact that virtually all of the electricity generated in Norway comes from hydro, while in Iceland and Austria the figures are respectively 83% and 67%. Among the large hydroelectric power stations now in use are the La Grande complex in Canada (16 GW_e) and the Itapú station on the border between Brazil and Paraguay (14 GW_e). The Three Gorges Dam in China produces 18.2 GW_e .

Table 10.1: Technical potential and utilization of hydropower. (Data from World Energy Council, 2003.)

Region	Technical potential	Annual output	Percent used
Asia	0.5814 TW _e	0.0653 TW _e	11%
S. America	0.3187 TW _e	0.0579 TW _e	18%
Europe	0.3089 TW _e	0.0832 TW _e	27%
Africa	0.2155 TW _e	0.0091 TW _e	4%
N. America	0.1904 TW _e	0.0759 TW _e	40%
Oceania	0.0265 TW _e	0.0046 TW _e	17%
World	1.6414 TW _e	0.2960 TW _e	18%

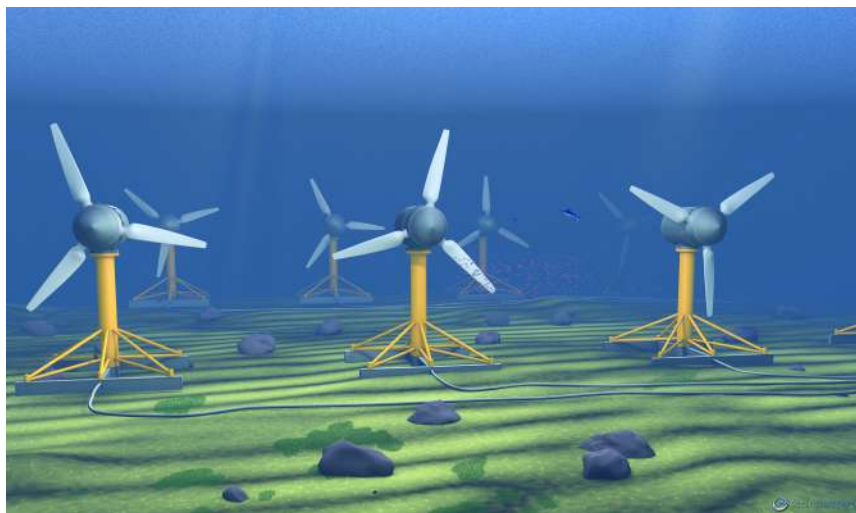


Figure 10.18: **Underwater turbines can make use of the energy of ocean currents.**

Even in regions where the percentage of hydro in electricity generation is not so high, it plays an important role because hydropower can be used selectively at moments of peak demand. Pumping of water into reservoirs can also be used to store energy.

The creation of lakes behind new dams in developing countries often involves problems, for example relocation of people living on land that will be covered by water, and loss of the land for other purposes¹⁶. However the energy gain per unit area of lake can be very large - over $100 \text{ W}_e/\text{m}^2$. Fish ladders can be used to enable fish to reach their spawning grounds above dams. In addition to generating electrical power, dams often play useful roles in flood control and irrigation.

At present, hydroelectric power is used in energy-intensive industrial processes, such as the production of aluminum. However, as the global energy crisis becomes more severe, we can expect that metals derived from electrolysis, such as aluminum and magnesium, will be very largely replaced by other materials, because the world will no longer be able to afford the energy needed to produce them.

Energy from the ocean

Tidal power

The twice-daily flow of the tides can be harnessed to produce electrical power. Ultimately tidal energy comes from the rotation of the earth and its interaction with the moon's gravitational field. The earth's rotation is very gradually slowing because of tidal friction, and the moon is gradually receding from the earth, but this process will take such an extremely long time that tidal energy can be thought of as renewable.

¹⁶Over a million people were displaced by the construction of the Three Gorges Dam in China, and many sites of cultural value were lost

There are two basic methods for harnessing tidal power. One can build barriers that create level differences between two bodies of water, and derive hydroelectric power from the head of water thus created. Alternatively it is possible to place the blades of turbines in a tidal stream. The blades are then turned by the tidal current in much the same way that the blades of a wind turbine are turned by currents of air.

There are plans for using the second method on an extremely large scale in Cook Strait, near New Zealand. A company founded by David Beach and Chris Bathurst plans to anchor 7,000 turbines to the sea floor of Cook Strait in such a way that they will float 40 meters below the surface. Beach and Bathurst say that in this position, the turbines will be safe from the effects of earthquakes and storms. The tidal flow through Cook Strait is so great that the scheme could supply all of New Zealand's electricity if the project is completed on the scale visualized by its founders.

Choosing the proper location for tidal power stations is important, since the height of tides depends on the configuration of the land. For example, tides of 17 meters occur in the Bay of Fundy, at the upper end of the Gulf of Maine, between New Brunswick and Nova Scotia. Here tidal waves are funneled into the bay, creating a resonance that results in the world's greatest level difference between high and low tides. An 18 MW_e dam-type tidal power generation station already exists at Annapolis River, Nova Scotia, and there are proposals to increase the use of tidal power in the Bay of Fundy. Some proposals involve turbines in the tidal stream, similar to those proposed for use in the Cook Strait.

In the future, favorable locations for tidal power may be exploited to their full potentialities, even though the output of electrical energy exceeds local needs. The excess energy can be stored in the form of hydrogen (see below) and exported to regions deficient in renewable energy resources.

Wave energy

At present, the utilization of wave energy is in an experimental stage. In Portugal, there are plans for a wave farm using the Pelamis Wave Energy Converter. The Pelamis is a long floating tube with two or more rigid sections joined by hinges. The tube is tethered with its axis in the direction of wave propagation. The bending between sections resulting from passing waves is utilized to drive high pressure oil through hydraulic motors coupled to electrical generators. Each wave farm in the Portuguese project is planned to use three Pelamis converters, each capable of producing 750 kW_e. Thus the total output of each wave farm will be 2.25 MW_e.

Another experimental wave energy converter is Salter's Duck, invented in the 1970's by Prof. Stephen Salter of the University of Edinburgh, but still being developed and improved. Like the Pelamis, the Duck is also cylindrical in shape, but the axis of the cylinder is parallel to the wave front, i.e. perpendicular to the direction of wave motion. A floating cam, attached to the cylinder, rises and falls as a wave passes, driving hydraulic motors within the cylinder. Salter's Duck is capable of using as much as 65% of the wave's energy.

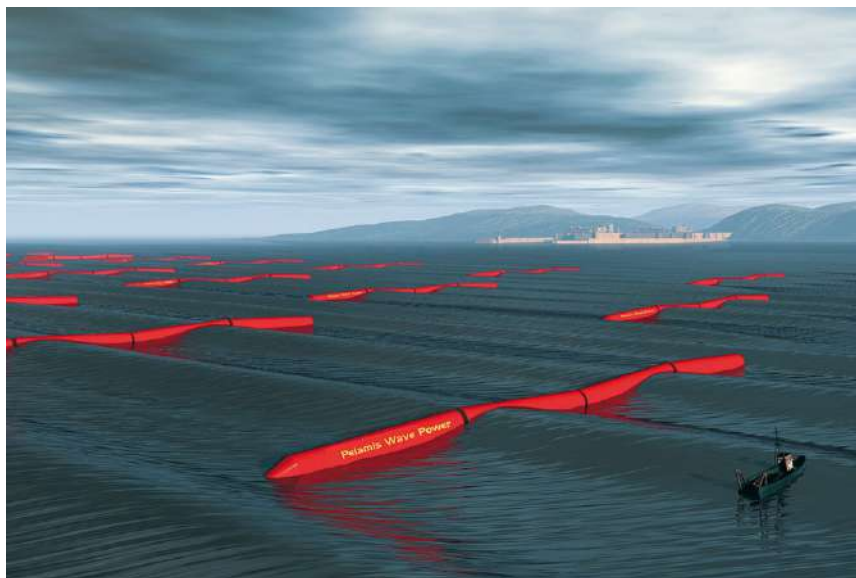


Figure 10.19: The Pelamis wave energy transformer floats on the ocean like a giant sea snake. It consists of several segments which move against each other and build up hydraulic pressure. This in turn drives a turbine. A new Pelamis generation is currently under construction.

The energy potentially available from waves is very large, amounting to as much as 100 kilowatts per meter of wave front in the best locations.

Ocean thermal energy conversion

In tropical regions, the temperature of water at the ocean floor is much colder than water at the surface. In ocean thermal energy conversion, cold water is brought to the surface from depths as great as 1 km, and a heat engine is run between deep sea water at a very low temperature and surface water at a much higher temperature.

According to thermodynamics, the maximum efficiency of a heat engine operating between a cold reservoir at the absolute temperature T_C and a hot reservoir at the absolute temperature T_H is given by $1 - T_C/T_H$. In order to convert temperature on the centigrade scale to absolute temperature (degrees Kelvin) one must add 273 degrees. Thus the maximum efficiency of a heat engine operating between water at the temperature of 25 °C and water at 5 °C is $1 - (5 + 273)/(25 + 273) = 0.067 = 6.7\%$. The efficiency of heat engines is always less than the theoretical maximum because of various losses, such as the loss due to friction. The actual overall efficiencies of existing ocean thermal energy conversion (OTEC) stations are typically 1-3%. On the other hand, the amount of energy potentially available from differences between surface and bottom ocean temperatures is extremely large.

Since 1974, OTEC research has been conducted by the United States at the Natural Energy Laboratory of Hawaii. The Japanese government also supports OTEC research,

and India has established a 1 MW_e OTEC power station floating in the ocean near to Tamil Nadu.

Renewable energy from evaporation

A September 26, 2017 article by Ahmet-Hamdi Cavusoglu et al. in *Nature Communications* points to evaporation as a future source of renewable energy. Here are some excerpts from the article:

“About 50% of the solar energy absorbed at the Earth’s surface drives evaporation, fueling the water cycle that affects various renewable energy resources, such as wind and hydropower. Recent advances demonstrate our nascent ability to convert evaporation energy into work, yet there is little understanding about the potential of this resource.

“Here we study the energy available from natural evaporation to predict the potential of this ubiquitous resource. We find that natural evaporation from open water surfaces could provide power densities comparable to current wind and solar technologies while cutting evaporative water losses by nearly half. We estimate up to 325 GW of power is potentially available in the United States. Strikingly, water’s large heat capacity is sufficient to control power output by storing excess energy when demand is low, thus reducing intermittency and improving reliability. Our findings motivate the improvement of materials and devices that convert energy from evaporation...

“Recent advances in water responsive materials and devices demonstrate the ability to convert energy from evaporation into work. These materials perform work through a cycle of absorbing and rejecting water via evaporation. These water-responsive materials can be incorporated into evaporation-driven engines that harness energy when placed above a body of evaporating water. With improvements in energy conversion efficiency, such devices could become an avenue to harvest energy via natural evaporation from water reservoirs.”

Ozgur Sahin, a biophysicist at Columbia, has developed technology that uses spores from the harmless soil-dwelling bacterium *B. subtilis* to absorb and release water when the relative humidity of the surrounding air changes. At high humidity, the spores take in water and expand, and at low humidity they release water and contract, acting like a muscle.

Biomass

Biomass is defined as any energy source based on biological materials produced by photosynthesis - for example wood, sugar beets, rapeseed oil, crop wastes, dung, urban organic wastes, processed sewage, etc. Using biomass for energy does not result in the net emission of CO₂, since the CO₂ released by burning the material had previously been absorbed from the atmosphere during photosynthesis. If the biological material had decayed instead of being burned, it would released the same amount of CO₂ as in the burning process.

The solar constant has the value 1.4 kilowatts/m². It represents the amount of solar



Figure 10.20: Rapeseed is grown in several countries, including Denmark and the UK. Experimental Danish buses are already running on rapeseed oil.

energy per unit area¹⁷ that reaches the earth, before the sunlight has entered the atmosphere. Because the atmosphere reflects 6% and absorbs 16%, the peak power at sea level is reduced to 1.0 kW/m^2 . Clouds also absorb and reflect sunlight. Average cloud cover reduces the energy of sunlight a further 36%. Also, we must take into account the fact that the sun's rays do not fall perpendicularly onto the earth's surface. The angle that they make with the surface depends on the time of day, the season and the latitude.

In Sweden, which lies at a northerly latitude, the solar energy per unit of horizontal area is less than for countries nearer the equator. Nevertheless, Göran Persson, during his term as Prime Minister of Sweden, announced that his government intends to make the country independent of imported oil by 2020 through a program that includes energy from biomass.

In his thesis, *Biomass in a Sustainable Energy System*, the Swedish researcher Pål Börjesson states that of various crops grown as biomass, the largest energy yields come from short-rotation forests (*Salix viminalis*, a species of willow) and sugar beet plantations. These have an energy yield of from 160 to 170 GJ_t per hectare-year. (The subscript t means "thermal". Energy in the form of electricity is denoted by the subscript e). One can calculate that this is equivalent to about $0.5 \text{ MW}_t/\text{km}^2$, or $0.5 \text{ W}_t/\text{m}^2$. Thus, although 1.0 kW/m^2 of solar energy reaches the earth at noon at the equator, the trees growing in northerly Sweden can harvest a day-and-night and seasonal average of only 0.5 Watts of thermal energy per horizontal square meter¹⁸. Since Sweden's present primary energy use is approximately 0.04 TW_t , it follows that if no other sources of energy were used, a square area of *Salix* forest 290 kilometers on each side would supply Sweden's present energy needs. This corresponds to an area of $84,000 \text{ km}^2$, about 19% of Sweden's total area¹⁹.

¹⁷The area is assumed to be perpendicular to the sun's rays.

¹⁸In tropical regions, the rate of biomass production can be more than double this amount.

¹⁹Additional land area would be needed to supply the energy required for planting, harvesting, trans-

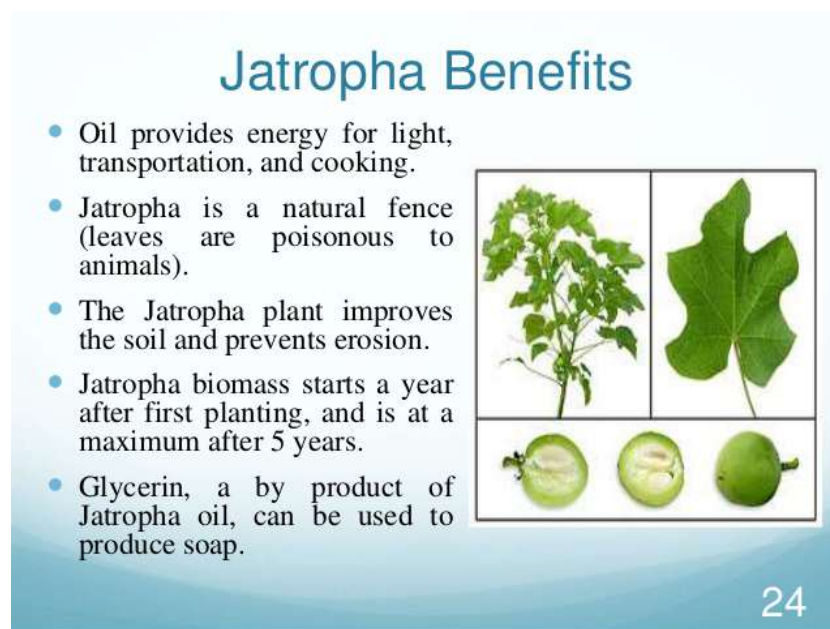


Figure 10.21: In some countries, Jatropha is a promising source of biomass..

Of course, Sweden's renewable energy program will not rely exclusively on energy crops, but on a mixture of sources, including biomass from municipal and agricultural wastes, hydropower, wind energy and solar energy.

At present, both Sweden and Finland derive about 30% of their electricity from biomass, which is largely in the form of waste from the forestry and paper industries of these two countries.

Despite their northerly location, the countries of Scandinavia have good potentialities for developing biomass as an energy source, since they have small population densities and adequate rainfall. In Denmark, biodiesel oil derived from rapeseed has been used as fuel for experimental buses. Rapeseed fields produce oil at the rate of between 1,000 and 1,300 liters per hectare-crop. The energy yield is 3.2 units of fuel product energy for every unit of fuel energy used to plant the rapeseed, and to harvest and process the oil. After the oil has been pressed from rapeseed, two-thirds of the seed remains as a protein-rich residue which can be fed to cattle.

Miscanthus is a grassy plant found in Asia and Africa. Some forms will also grow in Northern Europe, and it is being considered as an energy crop in the United Kingdom. Miscanthus can produce up to 18 dry tonnes per hectare-year, and it has the great advantage that it can be cultivated using ordinary farm machinery. The woody stems are very suitable for burning, since their water content is low (20-30%).

For some southerly countries, honge oil, derived from the plant *Pongamia pinnata* may prove to be a promising source of biomass energy. Studies conducted by Dr. Udishi Shrinivasa at the Indian Institute of Sciences in Bangalore indicate that honge oil can be

portation and utilization of the wood.

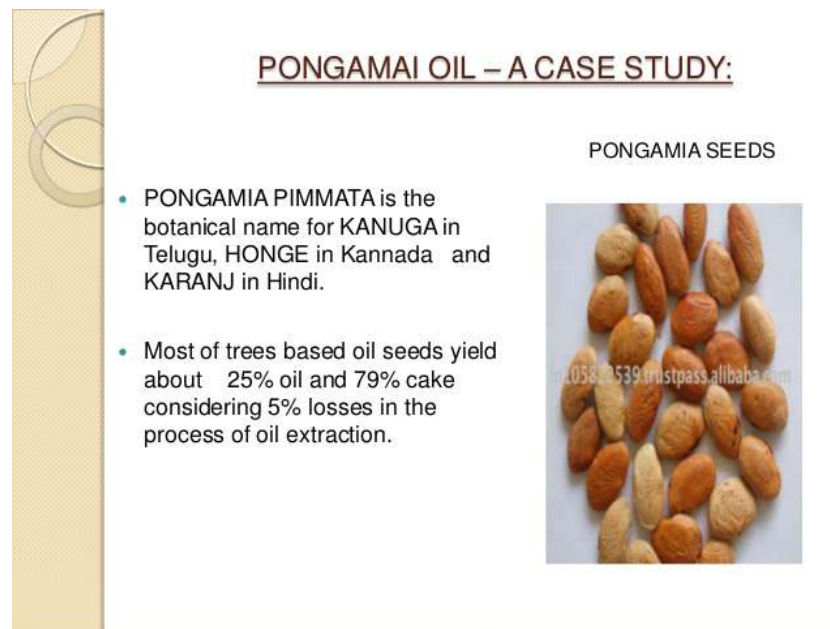


Figure 10.22: **The price of honge oil is quite competitive with other forms of oil.**

produced at the cost of \$150 per ton. This price is quite competitive when compared with other potential fuel oils.

Recent studies have also focused on a species of algae that has an oil content of up to 50%. Algae can be grown in desert areas, where cloud cover is minimal. Farm waste and excess CO₂ from factories can be used to speed the growth of the algae.

It is possible that in the future, scientists will be able to create new species of algae that use the sun's energy to generate hydrogen gas. If this proves to be possible, the hydrogen gas may then be used to generate electricity in fuel cells, as will be discussed below in the section on hydrogen technology. Promising research along this line is already in progress at the University of California, Berkeley.

Biogas is defined as the mixture of gases produced by the anaerobic digestion of organic matter. This gas, which is rich in methane (CH₄), is produced in swamps and landfills, and in the treatment of organic wastes from farms and cities. The use of biogas as a fuel is important not only because it is a valuable energy source, but also because methane is a potent greenhouse gas, which should not be allowed to reach the atmosphere. Biogas produced from farm wastes can be used locally on the farm, for cooking and heating, etc. When biogas has been sufficiently cleaned so that it can be distributed in a pipeline, it is known as "renewable natural gas". It may then be distributed in the natural gas grid, or it can be compressed and used in internal combustion engines. Renewable natural gas can also be used in fuel cells, as will be discussed below in the section on Hydrogen Technology.

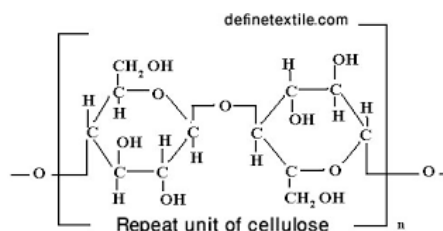


Figure 10.23: Cellulose is a polysaccharide. In other words, it is a long polymer whose subunits are sugars. The links between the sugar subunits in the chain can be broken, for example by the action of enzymes or acids. After this has been done, the resulting sugars can be fermented into alcohols, and these can be used to fuel motor vehicles or aircraft.

Cellulostic ethanol

The fact that alcohols such as ethanol can be produced from cellulose has long been known.²⁰ In 1819, the French chemist Henri Braconnot demonstrated that cellulose could be broken down into sugars by treating it with sulfuric acid. The sugars thus produced could then be fermented into alcohols which could be used as liquid fuels.

In 1898, Germany built factories to commercialize this process, and shortly afterwards the same was done in the United States using a slightly different technique. These plants producing cellulostic ethanol operated during World War I, but the plants closed after the end of the war because of the cheapness and easy availability of fossil fuels. The production of cellulostic ethanol was revived during World War II.

During the last two decades, development of enzymatic techniques has supplied a better method of breaking the long cellulose polymer chain into sugars. In fact, it has recently become possible to use microbial enzymes both for this step and for the fermentation step.

In a September 9, 2008 article in the *MIT Technology Review*, Prachi Patal wrote: “New genetically modified bacteria could slash the costs of producing ethanol from cellulostic biomass, such as corn cobs and leaves, switchgrass, and paper pulp. The microbes produce ethanol at higher temperatures than are possible using yeast, which is currently employed to ferment sugar into the biofuel. The higher temperature more than halves the quantity of the costly enzymes needed to split cellulose into the sugars that the microbes can ferment. What’s more, while yeast can only ferment glucose, ‘this microorganism is good at using all the different sugars in biomass and can use them simultaneously and rapidly,’ says Lee Lynd, an engineering professor at Dartmouth College, who led the microbe’s development...

“Lynd wants to create microbes that would do it all: efficiently break down the cellulose and hemicellulose, and then ferment all the resulting sugars. Lynd, a cofounder of Mascoma, is working with colleagues at the startup, based in Cambridge, MA, to develop a simple one-step process for making cellulostic ethanol. In the combined process, a mixture of biomass and the microbes would go into a tank, and ethanol would come out.”

Cellulostic ethanol has several advantages over alcohol derived from grain;

²⁰See the Wikipedia article on *Cellulostic Ethanol*

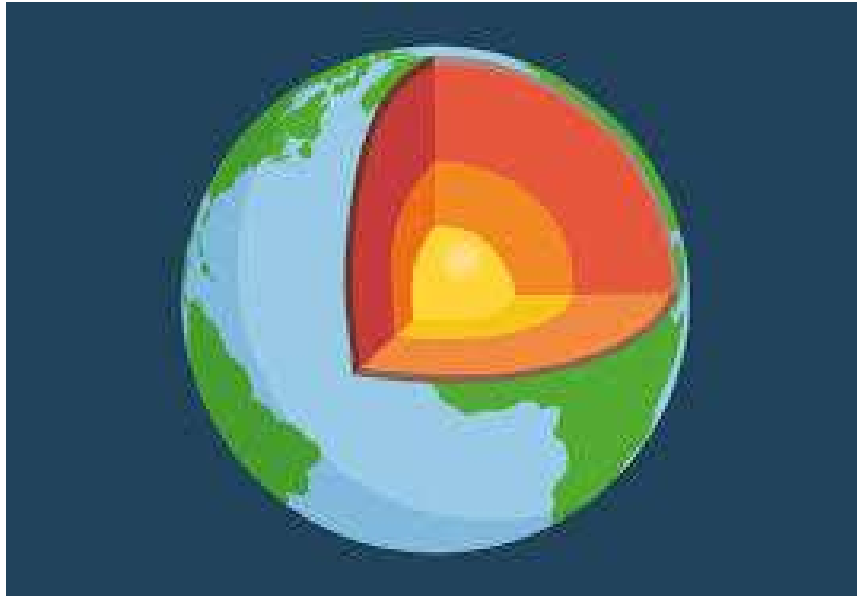


Figure 10.24: **The source of geothermal energy is the radioactive decay of elements deep within the earth.**

- Cellulostic ethanol avoids the food-fuel competition.
- The net greenhouse-gas-reducing effect of ethanol derived from grain is questionable.
- Cellulostic ethanol can use cardboard and paper waste as starting substances, thus reducing the quantity of trash in waste dumps.

Geothermal energy

The ultimate source of geothermal energy is the decay of radioactive nuclei in the interior of the earth. Because of the heat produced by this radioactive decay, the temperature of the earth's core is $4300\text{ }^{\circ}\text{C}$. The inner core is composed of solid iron, while the outer core consists of molten iron and sulfur compounds. Above the core is the mantle, which consists of a viscous liquid containing compounds of magnesium, iron, aluminum, silicon and oxygen. The temperature of the mantle gradually decreases from $3700\text{ }^{\circ}\text{C}$ near the core to $1000\text{ }^{\circ}\text{C}$ near the crust. The crust of the earth consists of relatively light solid rocks and it varies in thickness from 5 to 70 km.

The outward flow of heat from radioactive decay produces convection currents in the interior of the earth. These convection currents, interacting with the earth's rotation, produce patterns of flow similar to the trade winds of the atmosphere. One result of the currents of molten conducting material in the interior of the earth is the earth's magnetic field. The crust is divided into large sections called "tectonic plates", and the currents of molten material in the interior of the earth also drag the plates into collision with each other. At the boundaries, where the plates collide or split apart, volcanic activity



Figure 10.25: The “ring of fire” is especially favorable for geothermal energy installations. The ring follows the western coasts of South America and North America to Alaska. After crossing the Bering Sea, it runs southward past Japan and Indonesia to New Zealand. Earthquakes and volcanic activity along this ring are produced by the collision of tectonic plates. Another strip-like region very favorable for geothermal installations follows Africa’s Rift Valley northward through Turkey and Greece to Italy, while a third pass through Iceland.

occurs. Volcanic regions near the tectonic plate boundaries are the best sites for collection of geothermal energy.

The entire Pacific Ocean is ringed by regions of volcanic and earthquake activity, the so-called Ring of Fire. This ring extends from Tierra del Fuego at the southernmost tip of South America, northward along the western coasts of both South America and North America to Alaska. The ring then crosses the Pacific at the line formed by the Aleutian Islands, and it reaches the Kamchatka Peninsula in Russia. From there it extends southward along the Kurile Island chain and across Japan to the Philippine Islands, Indonesia and New Zealand. Many of the islands of the Pacific are volcanic in nature. Another important region of volcanic activity extends northward along the Rift Valley of Africa to Turkey, Greece and Italy. In the Central Atlantic region, two tectonic plates are splitting apart, thus producing the volcanic activity of Iceland. All of these regions are very favorable for the collection of geothermal power.

The average rate at which the energy created by radioactive decay in the interior of the earth is transported to the surface is $0.06 \text{ W}_t/\text{m}^2$. However, in volcanic regions near the boundaries of tectonic plates, the rate at which the energy is conducted to the surface is much higher - typically $0.3 \text{ W}_t/\text{m}^2$. If we insert these figures into the thermal conductivity law

$$q = K_T \frac{\Delta T}{z}$$

we can obtain an understanding of the types of geothermal resources available throughout

the world. In the thermal conductivity equation, q is the power conducted per unit area, while K_T is the thermal conductivity of the material through the energy is passing. For sandstones, limestones and most crystalline rocks, thermal conductivities are in the range 2.5-3.5 $\text{W}_t/(\text{m } ^\circ\text{C})$. Inserting these values into the thermal conductivity equation, we find that in regions near tectonic plate boundaries we can reach temperatures of 200 $^\circ\text{C}$ by drilling only 2 kilometers into rocks of the types named above. If the strata at that depth contain water, it will be in the form of highly-compressed steam. Such a geothermal resource is called a *high-enthalpy* resource²¹.

In addition to high-enthalpy geothermal resources there are *low-enthalpy* resources in nonvolcanic regions of the world, especially in basins covered by sedimentary rocks. Clays and shales have a low thermal conductivity, typically 1-2 $\text{W}_t/(\text{m } ^\circ\text{C})$. When we combine these figures with the global average geothermal power transmission, $q = 0.06 \text{ W}_t/\text{m}^2$, the thermal conduction equation tells us that $\Delta T/z = 0.04 ^\circ\text{C}/\text{m}$. In such a region the geothermal resources may not be suitable for the generation of electrical power, but nevertheless adequate for heating buildings. The Creil district heating scheme north of Paris is an example of a project where geothermal energy from a low enthalpy resource is used for heating buildings.

The total quantity of geothermal electrical power produced in the world today is 8 GW_e , with an additional 16 GW_t used for heating houses and buildings. In the United States alone, 2.7 GW_e are derived from geothermal sources. In some countries, for example Iceland and Canada, geothermal energy is used both for electrical power generation and for heating houses.

There are three methods for obtaining geothermal power in common use today: Deep wells may yield dry steam, which can be used directly to drive turbines. Alternatively water so hot that it boils when brought to the surface may be pumped from deep wells in volcanic regions. The steam is then used to drive turbines. Finally, if the water from geothermal wells is less hot, it may be used in binary plants, where its heat is exchanged with an organic fluid which then boils. In this last method, the organic vapor drives the turbines. In all three methods, water is pumped back into the wells to be reheated. The largest dry steam field in the world is The Geysers, 145 kilometers north of San Francisco, which produces 1,000 MW_e .

There is a fourth method of obtaining geothermal energy, in which water is pumped down from the surface and is heated by hot dry rocks. In order to obtain a sufficiently large area for heat exchange the fissure systems in the rocks must be augmented, for example by pumping water down at high pressures several hundred meters away from the collection well. The European Union has established an experimental station at Soultz-sous-Forêts in the Upper Rhine to explore this technique. The experiments performed at Soultz will determine whether the “hot dry rock” method can be made economically viable. If so, it can potentially offer the world a very important source of renewable energy.

The molten lava of volcanoes also offers a potential source of geothermal energy that

²¹Enthalpy $\equiv H \equiv U + PV$ is a thermodynamic quantity that takes into account not only the internal energy U of a gas, but also energy PV that may be obtained by allowing it to expand.

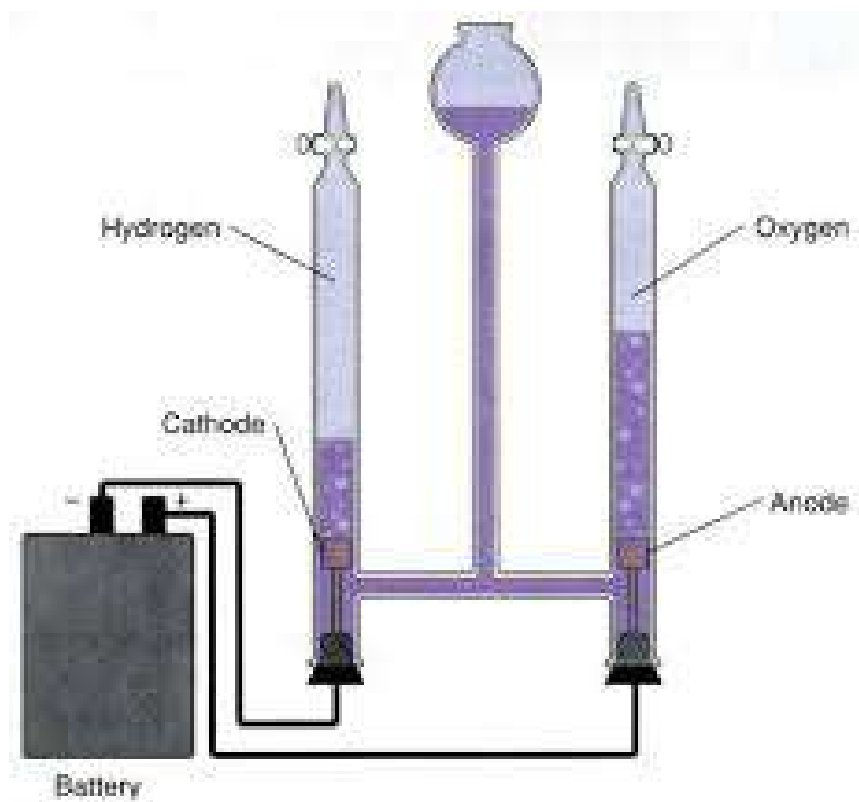


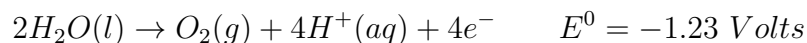
Figure 10.26: **Electrolysis of water.**

may become available in the future, but at present, no technology has been developed that is capable of using it.

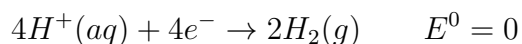
Hydrogen technologies

Electrolysis of water

When water containing a little acid is placed in a container with two electrodes and subjected to an external direct current voltage greater than 1.23 Volts, bubbles of hydrogen gas form at one electrode (the cathode), while bubbles of oxygen gas form at the other electrode (the anode). At the cathode, the half-reaction



takes place, while at the anode, the half-reaction



occurs.

Half-reactions differ from ordinary chemical reactions in containing electrons either as reactants or as products. In electrochemical reactions, such as the electrolysis of water,

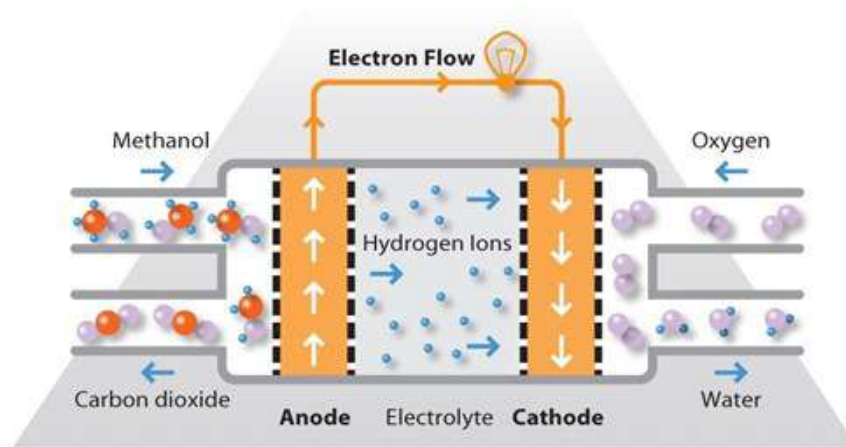
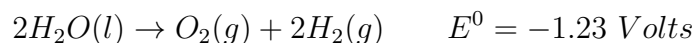


Figure 10.27: A methanol fuel cell.

these electrons are either supplied or removed by the external circuit. When the two half-reactions are added together, we obtain the total reaction:



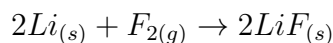
Notice that $4H^+$ and $4e^-$ cancel out when the two half-reactions are added. The total reaction does not occur spontaneously, but it can be driven by an external potential E , provided that the magnitude of E is greater than 1.23 volts.

When this experiment is performed in the laboratory, platinum is often used for the electrodes, but electrolysis of water can also be performed using electrodes made of graphite.

Electrolysis of water to produce hydrogen gas has been proposed as a method for energy storage in a future renewable energy system. For example, it might be used to store energy generated by photovoltaics in desert areas of the world. Compressed hydrogen gas could then be transported to other regions and used in fuel cells. Electrolysis of water and storage of hydrogen could also be used to solve the problem of intermittency associated with wind energy or solar energy.

Half reactions

Chemical reactions in which one or more electrons are transferred are called *oxidation-reduction reactions*. Any reaction of this type can be used in a fuel cell. As an example, we can consider the oxidation-reduction reaction in which solid lithium metal reacts with fluorine gas;



This reaction can be split into two half-reactions,



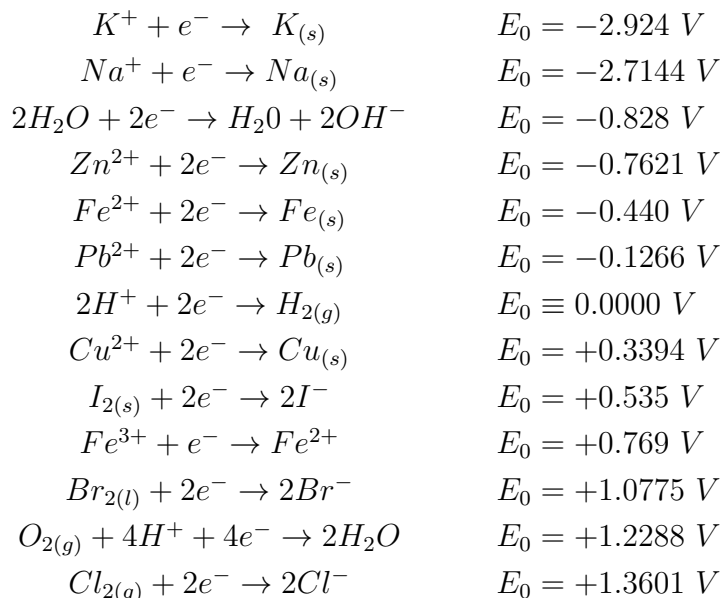
and



The quantity E_0 which characterizes these half-reactions is called *standard potential* of the half-reaction, and it is measured in Volts. If the oxidation-reduction reaction is used as the basis of a fuel cell, the voltage of the cell is the difference between the two standard potentials. In the lithium fluoride example, it is

$$2.87 \text{ V} - (-3.040 \text{ V}) = 5.91 \text{ V}$$

Here are a few more half-reactions and their standard potentials:



Fuel cells are closely related to storage batteries. Essentially, when we recharge a storage battery we are just running a fuel cell backwards, applying an electrical potential which is sufficient to make a chemical reaction run in a direction opposite to the way that it would run spontaneously. When the charged battery is afterwards used to drive a vehicle or to power an electronic device, the reaction runs in the spontaneous direction, but the energy of the reaction, instead of being dissipated as heat, drives electrons through an external circuit and performs useful work.

10.11 Renewables are now much cheaper than fossil fuels!

According to an article written by Megan Darby and published in *The Guardian* on 26 January, 2016, “Solar power costs are tumbling so fast the technology is likely to fast outstrip mainstream energy forecasts.

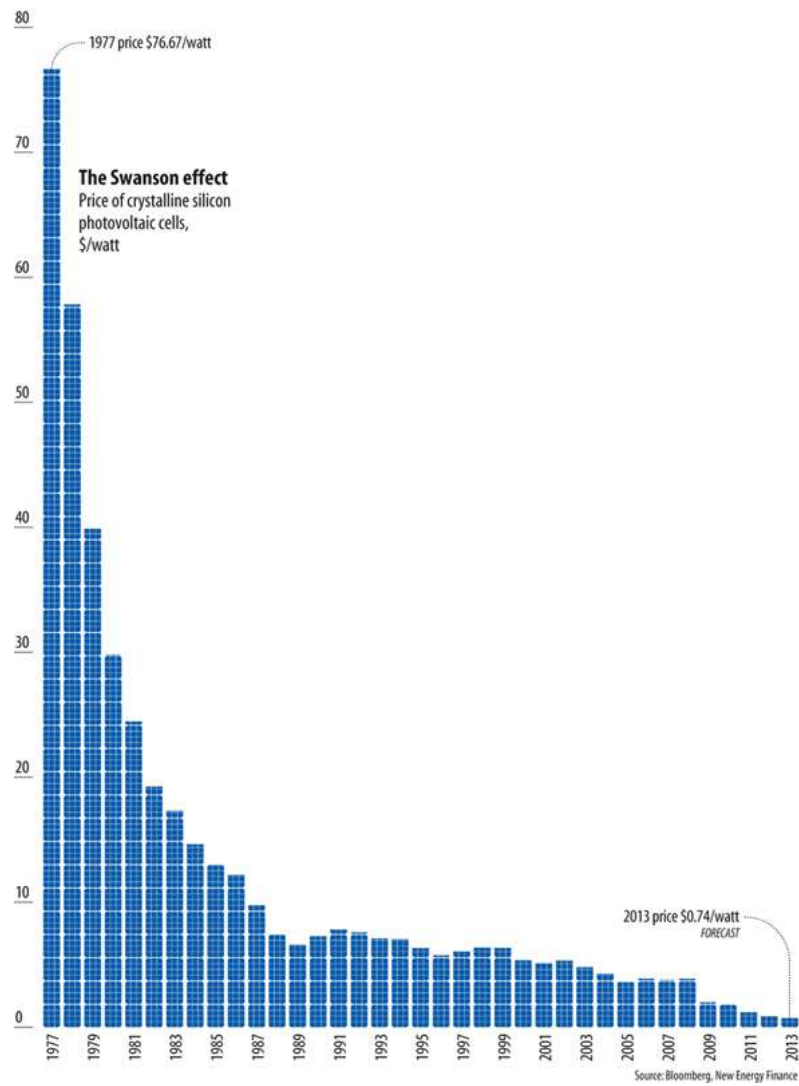


Figure 10.28: The cost of photovoltaic cell panels is falling rapidly

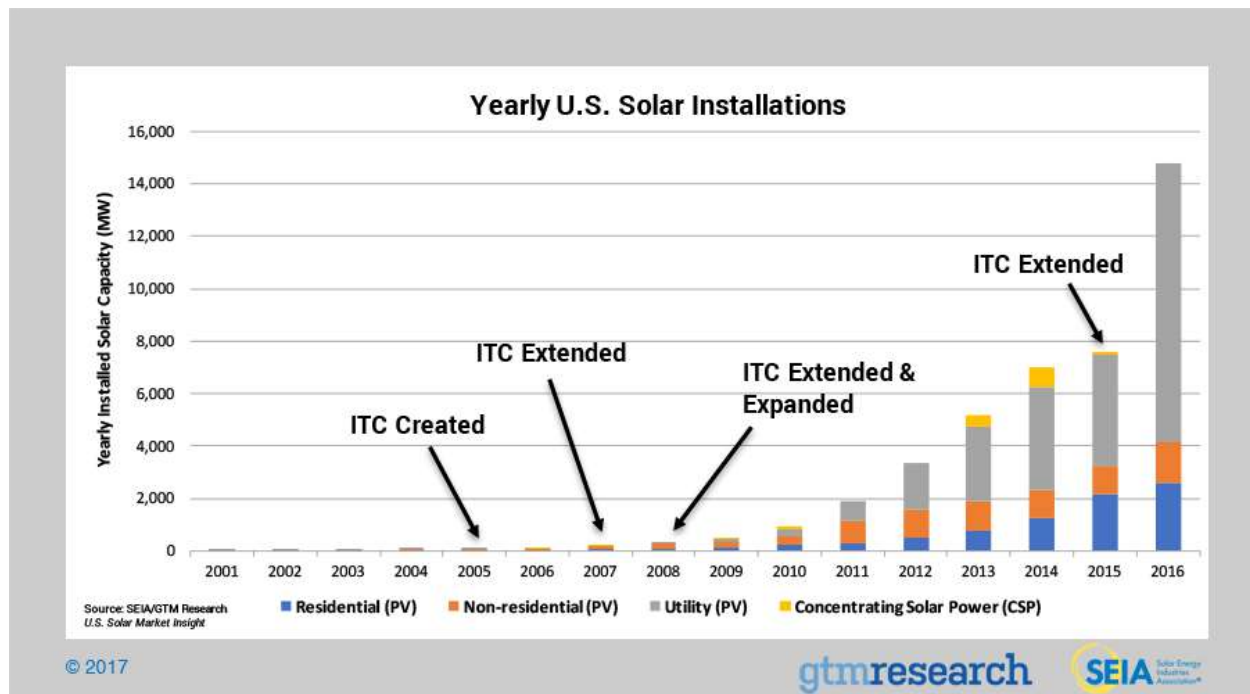


Figure 10.29: Driven by falling prices, new solar installations in the United States are increasing rapidly. The acronym ITC stands for Solar Investment Tax Credit. Commercial prices have fallen by 58% since 2012 and by 16% in the last year

“That is the conclusion of Oxford University researchers, based on a new forecasting model published in Research Policy²².

“Commercial prices have fallen by 58% since 2012 and by 16

“Since the 1980s, panels to generate electricity from sunshine have got 10% cheaper each year. That is likely to continue, the study said, putting solar on course to meet 20% of global energy needs by 2027.’ ’

10.12 Lester R. Brown

In December 2008, Lester R. Brown called attention to the following facts:

- The renewable energy industry - wind, solar, geothermal - are expanding by over 30 percent yearly;
- There are now, in the U.S., 24,000 megawatts of wind generating capacity online, but there is a staggering 225,000 megawatts of planned wind farms;

²²<http://www.sciencedirect.com/science/article/pii/S0048733315001699>

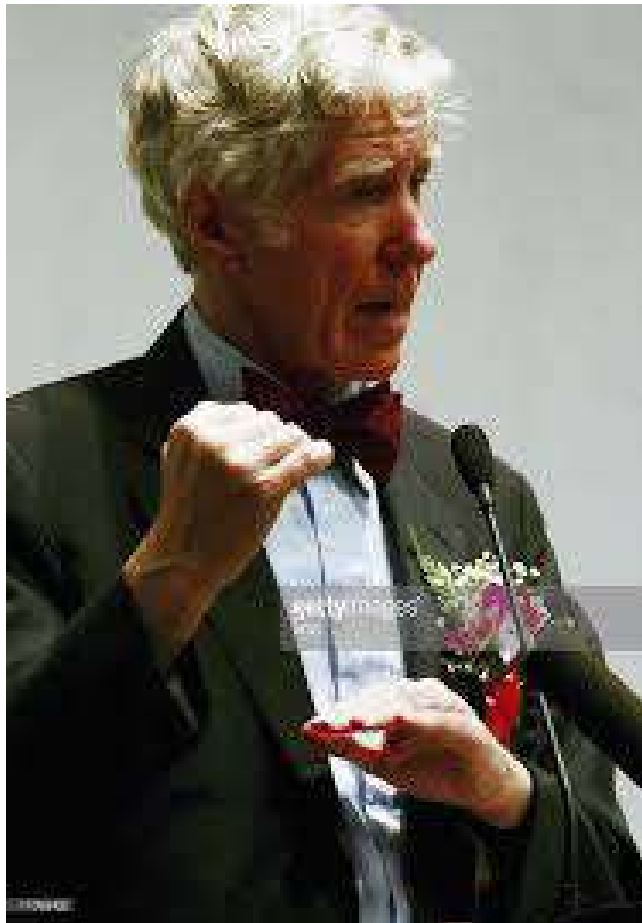


Figure 10.30: Lester R. Brown, born in 1934, is the author of more than 50 books, and he has been called “...one of the world’s most influential thinkers” (Washington Post). He is the founder of the Worldwatch Institute and the Earth Policy Institute. Books produced by Brown and his coworkers at the EPI can be freely downloaded and circulated. The 2015 book *The Great Transition: Shifting From Fossil Fuels to Solar and Wind Energy* can be freely downloaded from the following link: <http://www.earth-policy.org/books/tgt>

- What is needed is a World War II-type mobilization to produce electric-powered cars that will operate at an equivalent gas cost of \$1 per gallon (Replacing each SUV with a plug-in hybrid could save \$20,000 of oil imports over its lifetime);

10.13 Reforming our food and agricultural systems

The medical journal *The Lancet* recently published a report which aimed at changing the diets of people throughout the world. The commission which produced the report brought together 37 experts in agriculture, environmental sustainability, human health, and political science from 16 countries. Over three years, they developed the “planetary health diet,” which aims to address the global food system’s devastating environmental impact as well as mass malnutrition.

“The food we eat and how we produce it determines the health of people and the planet, and we are currently getting this seriously wrong,” declared Tim Lang, a co-author of the EAT-Lancet Commission and professor at City, University of London. “We need a significant overhaul, changing the global food system on a scale not seen before in ways appropriate to each country’s circumstances.”

“To be healthy,” he explained, “diets must have an appropriate calorie intake and consist of a variety of plant-based foods, low amounts of animal-based foods, unsaturated rather than saturated fats, and few refined grains, highly processed foods, and added sugars.”

“Humanity now poses a threat to the stability of the planet,” co-lead commissioner Johan Rockström of the Stockholm Resilience Center told the *Guardian*. “[This requires] nothing less than a new global agricultural revolution.”

Here are some of the commission’s recommendations:

1. Seek international and national commitment to shift toward healthy diets that feature more plant-based foods - including fruits, vegetables, nuts, seeds, and whole grains - and less animal products.
2. Reorient agricultural priorities from producing high quantities of food to producing healthy food that nurtures human health and supports environmental sustainability.
3. Sustainably intensify food production to increase high-quality output with a series of reforms that include becoming a net carbon sink from 2040 forward to align with the goals of the Paris climate agreement.
4. Strong and coordinated governance of land and oceans, including by implementing a “Half Earth” strategy for biodiversity conservation.
5. At least halve food losses and waste, in line with the U.N. Sustainable Development Goals (SDGs), on both the production side and the consumption side.



Figure 10.31: We should eat more vegetables, fruits, whole grains and nuts, while consuming much less meat and dairy products. Beef is especially damaging to the global environment.



Here are some excerpts from a 16 January 2019 article in The Guardian by Damian Cammeron:

Globally, the diet requires red meat and sugar consumption to be cut by half, while vegetables, fruit, pulses and nuts must double. But in specific places the changes are stark. North Americans need to eat 84% less red meat but six times more beans and lentils. For Europeans, eating 77% less red meat and 15 times more nuts and seeds meets the guidelines.

The diet is a “win-win”, according to the scientists, as it would save at least 11 million people a year from deaths caused by unhealthy food, while preventing the collapse of the natural world that humanity depends upon. With 10 billion people expected to live on Earth by 2050, a continuation of today’s unsustainable diets would inevitably mean even greater health problems and severe global warming.

Unhealthy diets are the leading cause of ill health worldwide, with 800 million people currently hungry, 2 billion malnourished and further 2 billion people overweight or obese. The world’s science academies recently concluded that the food system is broken. Industrial agriculture is also devastating the environment, as forests are razed and billions of cattle emit climate-warming methane.

Future agriculture

When the major glaciers in the Himalayas have melted, they will no longer be able to give India and China summer water supplies; rising oceans will drown much agricultural land; and aridity will reduce the output of many regions that now produce much of the world’s grain. Falling water tables in overdrawn aquifers, and loss of topsoil will add to the problem. We should be aware of the threat of a serious global food crisis in the 21st century if we are to have a chance of avoiding it.

The term *ecological footprint* was introduced by William Rees and Mathis Wackernagel in the early 1990’s to compare demands on the environment with the earth’s capacity to regenerate. In 2015, humanity used environmental resources at such a rate that it would take 1.6 earths to renew them. In other words, we have already exceeded the earth’s carrying capacity. Since eliminating the poverty that characterizes much of the world today will require more resources per capita, rather than less, it seems likely that in the era beyond fossil fuels, the optimum global population will be considerably less than the present population of the world.

Limitations on cropland

In 1944 the Norwegian-American plant geneticist Norman Borlaug was sent to Mexico by the Rockefeller Foundation to try to produce new wheat varieties that might increase Mexico’s agricultural output. Borlaug’s dedicated work on this project was spectacularly successful. He remained with the project for 16 years, and his group made 6,000 individual crossings of wheat varieties to produce high-yield disease-resistant strains.

In 1963, Borlaug visited India, bringing with him 100 kg. of seeds from each of his most promising wheat strains. After testing these strains in Asia, he imported 450 tons of the Lerma Rojo and Sonora 64 varieties: 250 tons for Pakistan and 200 for India. By 1968, the success of these varieties was so great that school buildings had to be commandeered to store the output. Borlaug's work began to be called a "Green Revolution". In India, the research on high-yield crops was continued and expanded by Prof. M.S. Swaminathan and his co-workers. The work of Green Revolution scientists, such Norman Borlaug and M.S. Swaminathan, has been credited with saving the lives of as many as a billion people.

Despite these successes, Borlaug believes that the problem of population growth is still a serious one. "Africa and the former Soviet republics", Borlaug states, "and the Cerrado, are the last frontiers. After they are in use, the world will have no additional sizable blocks of arable land left to put into production, unless you are willing to level whole forests, which you should not do. So, future food-production increases will have to come from higher yields. And though I have no doubt that yields will keep going up, whether they can go up enough to feed the population monster is another matter. Unless progress with agricultural yields remains very strong, the next century will experience human misery that, on a sheer numerical scale, will exceed the worst of everything that has come before."

With regard to the prospect of increasing the area of cropland, a report by the United Nations Food and Agricultural Organization (Provisional Indicative World Plan for Agricultural Development, FAO, Rome, 1970) states that "In Southern Asia,... in some countries of Eastern Asia, in the Near East and North Africa... there is almost no scope for expanding agricultural area... In the drier regions, it will even be necessary to return to permanent pasture the land that is marginal and submarginal for cultivation. In most of Latin America and Africa south of the Sahara, there are still considerable possibilities for expanding cultivated areas; but the costs of development are high, and it will often be more economical to intensify the utilization of areas already settled." Thus there is a possibility of increasing the area of cropland in Africa south of the Sahara and in Latin America, but only at the cost of heavy investment and at the additional cost of destruction of tropical rain forests.

Rather than an increase in the global area of cropland, we may encounter a future loss of cropland through soil erosion, salination, desertification, loss of topsoil, depletion of minerals in topsoil, urbanization and failure of water supplies. In China and in the Southwestern part of the United States, water tables are falling at an alarming rate. The Ogallala aquifer (which supplies water to many of the plains states in the central and southern parts of the United States) has a yearly overdraft of 160%.

In the 1950's, both the U.S.S.R and Turkey attempted to convert arid grasslands into wheat farms. In both cases, the attempts were defeated by drought and wind erosion, just as the wheat farms of Oklahoma were overcome by drought and dust in the 1930's. If irrigation of arid lands is not performed with care, salt may be deposited, so that the land is ruined for agriculture. This type of desertification can be seen, for example, in some parts of Pakistan. Another type of desertification can be seen in the Sahel region of Africa, south of the Sahara. Rapid population growth in the Sahel has led to overgrazing, destruction of trees, and wind erosion, so that the land has become unable to support even

its original population.

Especially worrying is a prediction of the International Panel on Climate Change concerning the effect of global warming on the availability of water: According to Model A1 of the IPCC, global warming may, by the 2050's, have reduced by as much as 30% the water available in large areas of world that now a large producers of grain.

Added to the agricultural and environmental problems, are problems of finance and distribution. Famines can occur even when grain is available somewhere in the world, because those who are threatened with starvation may not be able to pay for the grain, or for its transportation. The economic laws of supply and demand are not able to solve this type of problem. One says that there is no "demand" for the food (meaning demand in the economic sense), even though people are in fact starving.²³

Energy-dependence of modern agriculture

A very serious problem with Green Revolution plant varieties is that they require heavy inputs of pesticides, fertilizers and irrigation. Because of this, the use of high-yield varieties contributes to social inequality, since only rich farmers can afford the necessary inputs. Monocultures, such as the Green Revolution varieties may also prove to be vulnerable to future epidemics of plant diseases, such as the epidemic that caused the Irish Potato Famine in 1845. Even more importantly, pesticides, fertilizers and irrigation all depend on the use of fossil fuels. One must therefore ask whether high agricultural yields can be maintained in the future, when fossil fuels are expected to become prohibitively scarce and expensive.

Modern agriculture has become highly dependent on fossil fuels, especially on petroleum and natural gas. This is especially true of production of the high-yield grain varieties introduced in the Green Revolution, since these require especially large inputs of fertilizers, pesticides and irrigation. Today, fertilizers are produced using oil and natural gas, while pesticides are synthesized from petroleum feedstocks, and irrigation is driven by fossil fuel energy. Thus agriculture in the developed countries has become a process where inputs of fossil fuel energy are converted into food calories.

The ratio of the fossil fuel energy inputs to the food calorie outputs depends on how many energy-using elements of food production are included in the accounting. David Pimental and Mario Giampietro of Cornell University estimated in 1994 that U.S. agriculture required 0.7 kcal of fossil fuel energy inputs to produce 1.0 kcal of food energy. However, this figure was based on U.N. statistics that did not include fertilizer feedstocks, pesticide feedstocks, energy and machinery for drying crops, or electricity, construction and maintenance of farm buildings. A more accurate calculation, including these inputs, gives an

²³<http://www.independent.co.uk/environment/climate-change/society-will-collapse-by-2040-due-to-catastrophic-food-shortages-says-study-10336406.html>
<http://www.truth-out.org/news/item/32131-the-new-climate-normal-abrupt-sea-level-rise-and-predictions-of-civilization-collapse>
<http://www.commondreams.org/views/2015/08/13/dignity-democracy-and-food-interview-frances-moore-lappe>

input/output ratio of approximately 1.0. Finally, if the energy expended on transportation, packaging and retailing of food is included, Pimental and Giampietro found that the input/output ratio for the U.S. food system was approximately 10, and this figure did not include energy used for cooking.

The Brundtland Report's estimate of the global potential for food production assumes "that the area under food production can be around 1.5 billion hectares (3.7 billion acres - close to the present level), and that the average yields could go up to 5 tons of grain equivalent per hectare (as against the present average of 2 tons of grain equivalent)." In other words, the Brundtland Report assumes an increase in yields by a factor of 2.5. This would perhaps be possible if traditional agriculture could everywhere be replaced by energy-intensive modern agriculture using Green Revolution plant varieties. However, Pimental and Giampietro's studies show that modern energy-intensive agricultural techniques cannot be maintained after fossil fuels have been exhausted or after their use has been discontinued to avoid catastrophic climate change.

At the time when the Brundtland Report was written (1987), the global average of 2 tons of grain equivalent per hectare included much higher yields from the sector using modern agricultural methods. Since energy-intensive petroleum-based agriculture cannot be continued in the post-fossil-fuel era, future average crop yields will probably be much less than 2 tons of grain equivalent per hectare.

The 1987 global population was approximately 5 billion. This population was supported by 3 billion tons of grain equivalent per year. After fossil fuels have been exhausted, the total world agricultural output is likely to be considerably less than that, and therefore the population that it will be possible to support sustainably will probably be considerably less than 5 billion, assuming that our average daily per capita use of food calories remains the same, and assuming that the amount of cropland and pasturage remains the same (1.5 billion hectares cropland, 3.0 billion hectares pasturage).

The Brundtland Report points out that "The present (1987) global average consumption of plant energy for food, seed and animal feed amounts to 6,000 calories daily, with a range among countries of 3,000-15,000 calories, depending on the level of meat consumption." Thus there is a certain flexibility in the global population that can survive on a given total agricultural output. If the rich countries were willing to eat less meat, more people could be supported.²⁴

²⁴<http://www.truth-out.org/news/item/32354-environmentalists-sue-epa-over-dead-zone-in-gulf-of-mexico>

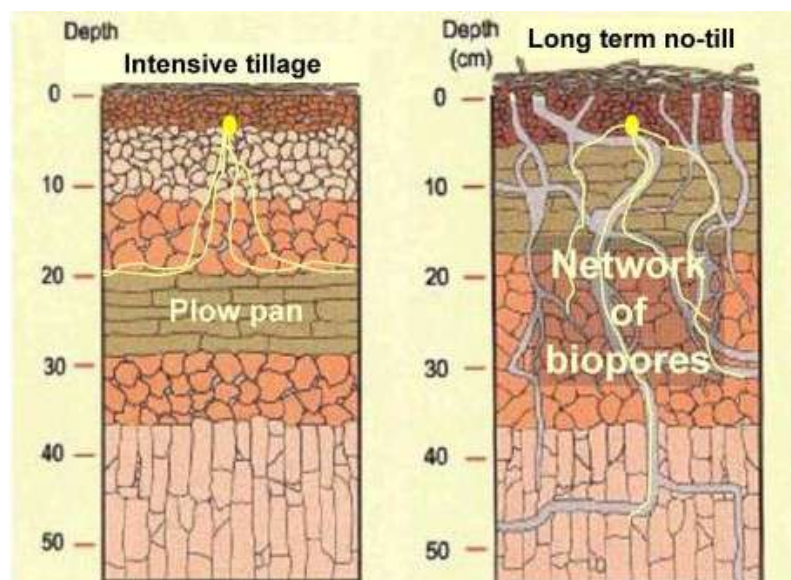


Figure 10.32: Recent research on No-Till Agriculture points to many benefits that could result from this practice, especially higher CO₂ content in the topsoil.

Effects of climate change on agriculture

a) The effect of temperature increase

There is a danger that when climate change causes both temperature increases and increased aridity in regions like the US grain belt, yields will be very much lowered. Of the three main grain types (corn, wheat and rice) corn is the most vulnerable to the direct effect of increases in temperature. One reason for this is the mechanism of pollination of corn: A pollen grain lands on one end of a corn-silk strand, and the germ cell must travel the length of the strand in order to fertilize the kernel. At high temperatures, the corn silk becomes dried out and withered, and is unable to fulfill its biological function. Furthermore, heat can cause the pores on the underside of the corn leaf to close, so that photosynthesis stops.

According to a study made by Mohan Wali and coworkers at Ohio State University, the photosynthetic activity of corn increases until the temperature reaches 20°C. It then remains constant until the temperature reaches 35°C, after which it declines. At 40°C and above, photosynthesis stops altogether.

Scientists in the Phillipines report that the pollination of rice fails entirely at 40°C, leading to crop failures. Wheat yields are also markedly reduced by temperatures in this range.²⁵

b) The effect of decreased rainfall

According to the Stern Report, some of the major grain-producing areas of the world

²⁵<http://ecowatch.com/2015/08/03/heat-wave-iran/>

might lose up to 30% of their rainfall by 2050. These regions include much of the United States, Brazil, the Mediterranean region, Eastern Russia and Belarus, the Middle East, Southern Africa and Australia. Of course possibilities for agriculture may simultaneously increase in other regions, but the net effect of climate change on the world's food supply is predicted to be markedly negative.

c) Unsustainable use of groundwater

It may seem surprising that fresh water can be regarded as a non-renewable resource. However, groundwater in deep aquifers is often renewed very slowly. Sometimes renewal requires several thousand years. When the rate of withdrawal of groundwater exceeds the rate of renewal, the carrying capacity of the resource has been exceeded, and withdrawal of water becomes analogous to mining a mineral. However, it is more serious than ordinary mining because water is such a necessary support for life.

In many regions of the world today, groundwater is being withdrawn faster than it can be replenished, and important aquifers are being depleted. In China, for example, groundwater levels are falling at an alarming rate. Considerations of water supply in relation to population form the background for China's stringent population policy. At a recent lecture, Lester Brown of the Worldwatch Institute was asked by a member of the audience to name the resource for which shortages would most quickly become acute. Most of the audience expected him to name oil, but instead he replied "water".

Lester Brown then cited China's falling water table. He predicted that within decades, China would be unable to feed itself. He said that this would not cause hunger in China itself: Because of the strength of China's economy, the country would be able to purchase grain on the world market. However Chinese purchases of grain would raise the price, and put world grain out of reach of poor countries in Africa. Thus water shortages in China will produce famine in parts of Africa, Brown predicted.

Under many desert areas of the world are deeply buried water tables formed during glacial periods when the climate of these regions was wetter. These regions include the Middle East and large parts of Africa. Water can be withdrawn from such ancient reservoirs by deep wells and pumping, but only for a limited amount of time.

In oil-rich Saudi Arabia, petroenergy is used to drill wells for ancient water and to bring it to the surface. Much of this water is used to irrigate wheat fields, and this is done to such an extent that Saudi Arabia exports wheat. The country is, in effect, exporting its ancient heritage of water, a policy that it may, in time, regret. A similarly short-sighted project is Muammar Qaddafi's enormous pipeline, which will bring water from ancient sub-desert reservoirs to coastal cities.

In the United States, the great Ogallala aquifer is being overdrawn. This aquifer is an enormous stratum of water-saturated sand and gravel under-lying parts of northern Texas, Oklahoma, New Mexico, Kansas, Colorado, Nebraska, Wyoming and South Dakota. The average thickness of the aquifer is about 70 meters. The rate of water withdrawal from the aquifer exceeds the rate of recharge by a factor of eight.

Thus we can see that in many regions, the earth's present population is living on its inheritance of water, rather than its income. This fact, coupled with rapidly increasing pop-

ulations and climate change, may contribute to a very serious food crisis partway through the 21st century.

d) Glacial melting and summer water supplies

The summer water supplies of both China and India are threatened by the melting of glaciers. The Gangotri glacier, which is the principle glacier feeding India's great Ganges River, is reported to be melting at an accelerating rate, and it could disappear within a few decades. If this happens, the Ganges could become seasonal, flowing only during the monsoon season. Chinese agriculture is also threatened by disappearing Himalayan glaciers, in this case those on the Tibet-Quinghai Plateau. The respected Chinese glaciologist Yao Tandong estimates that the glaciers feeding the Yangtze and Yellow Rivers are disappearing at the rate of 7% per year.²⁶

The Indus and Mekong Rivers will be similarly affected by the melting of glaciers. Lack of water during the summer season could have a serious impact on the irrigation.

Mature forests contain vast amounts of sequestered carbon, not only in their trees, but also in the carbon-rich soil of the forest floor. When a forest is logged or burned to make way for agriculture, this carbon is released into the atmosphere.

One fifth of the global carbon emissions are at present due to destruction of forests. This amount is greater than the CO₂ emissions for the world's transportation systems. An intact forest pumps water back into the atmosphere, increasing inland rainfall and benefiting agriculture. By contrast, deforestation, for example in the Amazonian rainforest, accelerates the flow of water back into the ocean, thus reducing inland rainfall. There is a danger that the Amazonian rainforest may be destroyed to such an extent that the region will become much more dry. If this happens, the forest may become vulnerable to fires produced by lightning strikes. This is one of the feedback loops against which the Stern Report warns: the drying and burning of the Amazonian rainforest may become irreversible, greatly accelerating climate change, if destruction of the forest proceeds beyond a certain point.

e) Erosion of topsoil.

Besides depending on an adequate supply of water, food production also depends on the condition of the thin layer of topsoil that covers the world's croplands. This topsoil is being degraded and eroded at an alarming rate: According to the World Resources Institute and the United Nations Environment Programme, "It is estimated that since World War II, 1.2 billion hectares... has suffered at least moderate degradation as a result of human activity. This is a vast area, roughly the size of China and India combined." This area is 27% of the total area currently devoted to agriculture. The report goes on to say that the degradation is greatest in Africa. The risk of topsoil erosion is greatest when marginal land is brought into cultivation, since marginal land is usually on steep hillsides which are vulnerable to water erosion when wild vegetation is removed.

²⁶<http://www.commondreams.org/news/2015/08/04/global-glaciers-melting-three-times-rate-20th-century>

David Pimental and his associates at Cornell University pointed out in 1995 that “Because of erosion-associated loss of productivity and population growth, the per capita food supply has been reduced over the past 10 years and continues to fall. The Food and Agricultural Organization reports that the per capita production of grains which make up 80% of the world’s food supply, has been declining since 1984...During the past 40 years nearly one-third of the world’s cropland (1.5 billion hectares) has been abandoned because of soil erosion and degradation. Most of the replacement has come from marginal land made available by removing forests. Agriculture accounts for 80% of the annual deforestation.”

Topsoil can also be degraded by the accumulation of salt when irrigation water evaporates. The worldwide area of irrigated land has increased from 8 million hectares in 1800 to more than 100 million hectares today. This land is especially important to the world food supply because it is carefully tended and yields are large in proportion to the area. To protect this land from salination, it should be irrigated in such a way that evaporation is minimized.

Finally cropland with valuable topsoil is being lost to urban growth and highway development, a problem that is made more severe by growing populations and by economic growth.

Every year, more than 100,000 square kilometers of rain forest are cleared and burned, an area which corresponds to that of Switzerland and the Netherlands combined. Almost half of the world’s tropical forests have already been destroyed. Ironically, the land thus cleared often becomes unsuitable for agriculture within a few years. Tropical soils may seem to be fertile when covered with luxuriant vegetation, but they are usually very poor in nutrients because of leeching by heavy rains. The nutrients which remain are contained in the vegetation itself; and when the forest cover is cut and burned, the nutrients are rapidly lost.

Often the remaining soil is rich in aluminum oxide and iron oxide. When such soils are exposed to oxygen and sun-baking, a rock-like substance called Laterite is formed.

10.14 Alexandria Ocasio-Cortez and the Green New Deal

Alexandra Ocasio-Cortez (born in 1989) won a stunning victory in the Democratic Party primary election of June 26, 2018. Although outspent by a factor of 18 to 1 by her opponent (Democratic Caucus Chair, Joseph Crowley), she won the primary by 57% to 42%. Her campaign contributions came from small individual donors, while his came in large blocks, from corporations. Ocasio-Cortez calls for the United States to transition by 2035 to an electrical grid running on 100% renewable-energy production and end the use of fossil fuels. She calls healthcare “a human right”, and says: “Almost every other developed nation in the world has universal healthcare. It’s time the United States catch up to the rest of the world in ensuring all people have real healthcare coverage that doesn’t break the bank”.

The Guardian called her victory “one of the biggest upsets in recent American political

history”, and Senator Bernie Sanders commented “She took on the entire local Democratic establishment in her district and won a very strong victory. She demonstrated once again what progressive grassroots politics can do”. The lesson that the US Democratic Party must learn from this is that in order to overthrow Donald Trump’s openly racist and climate-change-denying Republican Party, they must free themselves from the domination of corporate oligarchs, and instead stand for honest government and progressive values.

Even before taking her place in the US House of Representatives, with its newly-won Democratic majority, Alexandria Ocasio-Cortez became the leader of a campaign for a Green New Deal. This program takes its inspiration from the massive Federal government program by which Franklin Delano Roosevelt ended the depression of the 1930’s. FDR’s New Deal built dams, planted forests, and in general to create much needed infrastructure, while at the same time addressing the problem of unemployment by providing jobs. Wikipedia describes FDR’s New Deal as follows:

“The New Deal was a series of programs, public work projects, financial reforms and regulations enacted by President Franklin D. Roosevelt in the United States between 1933 and 1936. It responded to needs for relief, reform and recovery from the Great Depression. Major federal programs included the Civilian Conservation Corps (CCC), the Civil Works Administration (CWA), the Farm Security Administration (FSA), the National Industrial Recovery Act of 1933 (NIRA) and the Social Security Administration (SSA). They provided support for farmers, the unemployed, youth and the elderly. The New Deal included new constraints and safeguards on the banking industry and efforts to re-inflate the economy after prices had fallen sharply. New Deal programs included both laws passed by Congress as well as presidential executive orders during the first term of the presidency of Franklin D. Roosevelt. The programs focused on what historians refer to as the ‘3 Rs’: relief for the unemployed and poor, recovery of the economy back to normal levels and reform of the financial system to prevent a repeat depression.”

Alexandria Ocasio-Cortez believes that the climate emergency that the world now faces is a much more severe emergency than the great depression. Indeed, if quick action is not taken immediately, the long-term effects of catastrophic climate change pose existential threats to human civilization and the biosphere. Therefore she advocates a massive governmental program to create renewable energy infrastructure. Such a program, like FDR’s New Deal, would simultaneously solve the problem of unemployment. Money for the program could be taken from the Pentagon’s obscenely bloated budget. Ocasio-Cortez has also proposed a 70% income tax for the ultra-wealthy.

According to a January 24 2019 article by Robert R. Raymond, “When polled, 92 percent of registered Democratic voters say they support the Green New Deal. But perhaps more importantly, a full 81 percent of all registered voters support it - a number that includes both Republicans and Democrats.”²⁷

²⁷<https://truthout.org/articles/the-democratic-party-is-further-to-the-right-than-most-voters/>



Figure 10.33: Alexandria Ocasio-Cortez. At 29 she is the youngest woman ever to be elected to the US House of Representatives.



Figure 10.34: The Green New Deal advocated by Ocasio-Cortez proposes to use jobs creating renewable energy infrastructure to ensure full employment, in a manner analogous to Roosevelt's New Deal.



Figure 10.35: Members of the Sunrise movement in the office of House Majority Leader Nancy Pelosi, protesting against her lack of support for the Green New Deal.





Figure 10.36: Award-winning author Naomi Klein, speaking at the Sanders Institute in January, 2019.

Naomi Klein on the urgency of the Green New Deal

A recent article by journalist Naomi LaChance describes a meeting at the Sanders Institute (founded by Senator Bernie Sanders and his wife Jane) at which the famous author and activist Naomi Klein and others spoke about the scope and urgency of the Green New Deal. Here are some excerpts from the article:

Progressive journalist and activist Naomi Klein urged sweeping change that tackles the climate crisis, capitalism, racism and economic inequality in tandem on Friday in Burlington, Vt. If that seems challenging, add the fact that the clock is ticking²⁸ and there might not be another chance.

“We need to have started yesterday”, *Klein said at the three-day Sanders Institute Gathering on a panel moderated by environmental activist Bill McKibben. “What all of us who follow the science know is that we just can’t lose these four years”, she said, referring to the presidency of climate change denier Donald Trump. The conference, organized by the think tank founded by Vermont Sen. Bernie Sanders’ wife, Jane, is aimed*

²⁸<https://www.theguardian.com/environment/2018/oct/08/global-warming-must-not-exceed-15c-warns-landmark-un-report>

at forming bold progressive agendas for the future.

Progressives are looking to incoming Democratic New York Rep. Alexandria Ocasio-Cortez for leadership as she galvanizes a grassroots effort by the youth-led climate change group Sunrise Movement²⁹ to reduce fossil fuel dependence. Eighteen members of Congress support the idea of creating a House select committee to look at making a realistic plan by January 2020.

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Chapter 11

THE VIETNAM WAR

11.1 McNamara's Evil Lives On

Here are some quotations from an article by Robert Sheer entitled *McNamara's Evil Lives On*, published in The Nation on July 8, 2008.¹

Why not speak ill of the dead?

Robert McNamara, who died this week, was a complex man - charming even, in a blustery way, and someone I found quite thoughtful when I interviewed him. In the third act of his life he was often an advocate for enlightened positions on world poverty and the dangers of the nuclear arms race. But whatever his better nature, it was the stark evil he perpetrated as secretary of defense that must indelibly frame our memory of him.

To not speak out fully because of respect for the deceased would be to mock the memory of the millions of innocent people McNamara caused to be maimed and killed in a war that he later freely admitted never made any sense. Much has been made of the fact that he recanted his support for the war, but that came 20 years after the holocaust he visited upon Vietnam was over.

Is holocaust too emotionally charged a word? How many millions of dead innocent civilians does it take to qualify labels like holocaust, genocide or terrorism? How many of the limbless victims of his fragmentation bombs and land mines whom I saw in Vietnam during and after the war? Or are America's leaders always to be exempted from such questions? Perhaps if McNamara had been held legally accountable for his actions, the architects of the Iraq debacle might have paused.

Instead, McNamara was honored with the Medal of Freedom by President Lyndon Johnson, to whom he had written a private memo nine months earlier offering this assessment of their Vietnam carnage: 'The picture of the world's greatest superpower killing or seriously injuring 1,000 noncombatants a week,

¹<https://www.thenation.com/article/archive/mcnamaras-evil-lives/>

while trying to pound a tiny backward nation into submission on an issue whose merits are hotly disputed, is not a pretty one.'

He knew it then, and, give him this, the dimensions of that horror never left him. When I interviewed him for the Los Angeles Times in 1995, after the publication of his confessional memoir, his assessment of the madness he had unleashed was all too clear:

'Look, we dropped three to four times the tonnage on that tiny little area as were dropped by the Allies in all of the theaters in World War II over a period of five years. It was unbelievable. We killed - there were killed - 3,200,000 Vietnamese, excluding the South Vietnamese military. My God! The killing, the tonnage - it was fantastic. The problem was that we were trying to do something that was militarily impossible - we were trying to break the will; I don't think we can break the will by bombing short of genocide.'

We - no, he - couldn't break their will because their fight was for national independence. They had defeated the French and would defeat the Americans who took over when French colonialists gave up the ghost. The war was a lie from the first. It never had anything to do with the freedom of the Vietnamese (we installed one tyrant after another in power), but instead had to do with our irrational cold war obsession with 'international communism.' Irrational, as President Richard Nixon acknowledged when he embraced detente with the Soviet communists, toasted China's fierce communist Mao Tse-tung and then escalated the war against 'communist' Vietnam and neutral Cambodia.

It was always a lie and our leaders knew it, but that did not give them pause. Both Johnson and Nixon make it quite clear on their White House tapes that the mindless killing, McNamara's infamous body count, was about domestic politics and never security.

The lies are clearly revealed in the Pentagon Papers study that McNamara commissioned, but they were made public only through the bravery of Daniel Ellsberg. Yet when Ellsberg, a former Marine who had worked for McNamara in the Pentagon, was in the docket facing the full wrath of Nixon's Justice Department, McNamara would lift not a finger in his defense. Worse, as Ellsberg reminded me this week, McNamara threatened that if subpoenaed to testify at the trial by Ellsberg's defense team, 'I would hurt your client badly.'

Not as badly as those he killed or severely wounded. Not as badly as the almost 59,000 American soldiers killed and the many more horribly hurt. One of them was the writer and activist Ron Kovic, who as a kid from Long Island was seduced by McNamara's lies into volunteering for two tours in Vietnam. Eventually, struggling with his mostly paralyzed body, he spoke out against the war in the hope that others would not have to suffer as he did (and still does). Meanwhile, McNamara maintained his golden silence, even as Richard Nixon managed to kill and maim millions more. What McNamara did was evil - deeply so.

11.2 The Pentagon Papers

Wikipedia states that:

The Pentagon Papers, officially titled *Report of the Office of the Secretary of Defense Vietnam Task Force*, is a United States Department of Defense history of the United States' political and military involvement in Vietnam from 1945 to 1967. The papers were released by Daniel Ellsberg, who had worked on the study; they were first brought to the attention of the public on the front page of The New York Times in 1971. A 1996 article in The New York Times said that the Pentagon Papers had demonstrated, among other things, that the Johnson Administration 'systematically lied, not only to the public but also to Congress.'

More specifically, the papers revealed that the U.S. had secretly enlarged the scope of its actions in the Vietnam War with the bombings of nearby Cambodia and Laos, coastal raids on North Vietnam, as well as Marine Corps attacks, none of which were reported in the mainstream media. For his disclosure of the Pentagon Papers, Ellsberg was initially charged with conspiracy, espionage, and theft of government property, but the charges were later dismissed after prosecutors investigating the Watergate scandal discovered that the staff members in the Nixon White House had ordered the so-called White House Plumbers to engage in unlawful efforts to discredit Ellsberg...

To ensure the possibility of public debate about the papers' content, on June 29, US Senator Mike Gravel, an Alaska Democrat, entered 4,100 pages of the papers into the record of his Subcommittee on Public Buildings and Grounds. These portions of the papers, which were edited for Gravel by Howard Zinn and Noam Chomsky, were subsequently published by Beacon Press, the publishing arm of the Unitarian Universalist Association of Congregations. A federal grand jury was subsequently empaneled to investigate possible violations of federal law in the release of the report. Leonard Rodberg, a Gravel aide, was subpoenaed to testify about his role in obtaining and arranging for publication of the Pentagon Papers. Gravel asked the court (in *Gravel v. United States*) to quash the subpoena on the basis of the Speech or Debate Clause in Article I, Section 6 of the United States Constitution.

Daniel Ellsberg believed that when U.S. citizens discovered that the Vietnam War was based on lies, the war would end. However, it continued for many more years.



Figure 11.1: Victims of the Mai Lai Massacre.



Figure 11.2: Napalm burn victims during the war being treated at the 67th Combat Support Hospital. 1967-1968 Innocent children become burn victims in the Vietnam War.



Figure 11.3: **Frightened children flee from an air attack in Vietnam.**

11.3 Effects of Agent Orange

Wikipedia states that:

“Up to four million people in Vietnam were exposed to the defoliant. The government of Vietnam says as many as three million people have suffered illness because of Agent Orange,[4] and the Red Cross of Vietnam estimates that up to one million people are disabled or have health problems as a result of Agent Orange contamination. The United States government has described these figures as unreliable, while documenting higher cases of leukemia, Hodgkin’s lymphoma, and various kinds of cancer in exposed US military veterans. An epidemiological study done by the Centers for Disease Control and Prevention showed that there was an increase in the rate of birth defects of the children of military personnel as a result of Agent Orange. Agent Orange has also caused enormous environmental damage in Vietnam. Over 3,100,000 hectares (31,000 km² or 11,969 mi²) of forest were defoliated. Defoliants eroded tree cover and seedling forest stock, making reforestation difficult in numerous areas. Animal species diversity sharply reduced in contrast with unsprayed areas.”



Figure 11.4: Nguyen Xuan Minh lies in a crib at the Tu Du Hospital May 2, 2005 in Ho Chi Minh City, Vietnam.



Figure 11.5: A disabled and malformed victim of foliant Agent Orange, begs on the streets of Saigon to make a living, 1996.

11.4 Bombing of Cambodia and Laos

According to an article by Jessica Pearce Rotondi entitled *Why Laos Has Been Bombed More Than Any Other Country*²,

“The U.S. bombing of Laos (1964-1973) was part of a covert attempt by the CIA to wrest power from the communist Pathet Lao, a group allied with North Vietnam and the Soviet Union during the Vietnam War.

“The officially neutral country became a battleground in the Cold War between the United States and Soviet Union, with American bombers dropping over two million tons of cluster bombs over Laos - more than all the bombs dropped during WWII combined. Today, Laos is the most heavily bombed nation in history. Here are facts about the so-called secret war in Laos.

“Laos is a landlocked country bordered by China and Myanmar to the North, Vietnam to the East, Cambodia to the South and Thailand and the Mekong River to the West.

“Its proximity to Mao Zedong’s China made it critical to Dwight D. Eisenhower’s Domino Theory of keeping communism at bay. ‘If Laos were lost, the rest of Southeast Asia would follow,’ Eisenhower told his National Security Council. On the day of his farewell address in 1961, President Eisenhower approved the CIA’s training of anti-communist forces in the mountains of Laos. Their mission: To disrupt communist supply routes across the Ho Chi Minh Trail to Vietnam.

“Eisenhower’s successors in the White House: John F. Kennedy, Lyndon B. Johnson and Richard Nixon, all approved escalating air support for the guerrilla fighters, but not publicly. The 1962 International Agreement on the Neutrality of Laos, signed by China, the Soviet Union, Vietnam, the United States and 10 other countries, forbid signers from directly invading Laos or establishing military bases there. The secret war in Laos had begun...

“In Laos, the legacy of U.S. bombs continues to wreak havoc. Since 1964, more than 50,000 Lao have been killed or injured by U.S. bombs, 98 percent of them civilians. An estimated 30 percent of the bombs dropped on Laos failed to explode upon impact, and in the years since the bombing ended, 20,000 people have been killed or maimed by the estimated 80 million bombs left behind.”

By 1975, one tenth of the population of Laos had been killed by the bombs, and a quarter of the population were refugees.

²<https://www.history.com/news/laos-most-bombed-country-vietnam-war>

Cambodia

Here are some quotations from an article by Maximillian Wechsler entitled *America's 'Secret War' and the Bombing of Southeast Asia*³:

“On March 18, 1969, USAF Strategic Air Command (SAC) B-52 bombers began carpet bombing Cambodia on the order of President Nixon. The overall covert operation was code-named ‘Operation Menu’, with various phases named ‘Breakfast’, ‘Lunch’, ‘Dinner’, ‘Snack’, ‘Supper’ and ‘Dessert’.

“President Nixon ordered the campaign without consulting Congress and even kept it secret from top military officials. Five members of Congress were informed several months after the start of Operation Menu, but it was kept secret from the American people until The New York Times broke the story in May 1969. Henry Kissinger, President Nixon’s National Security Adviser, was reportedly outraged over the leaked information in the story and ordered the FBI to wiretap the phones of top White House aides and reporters to find the source.

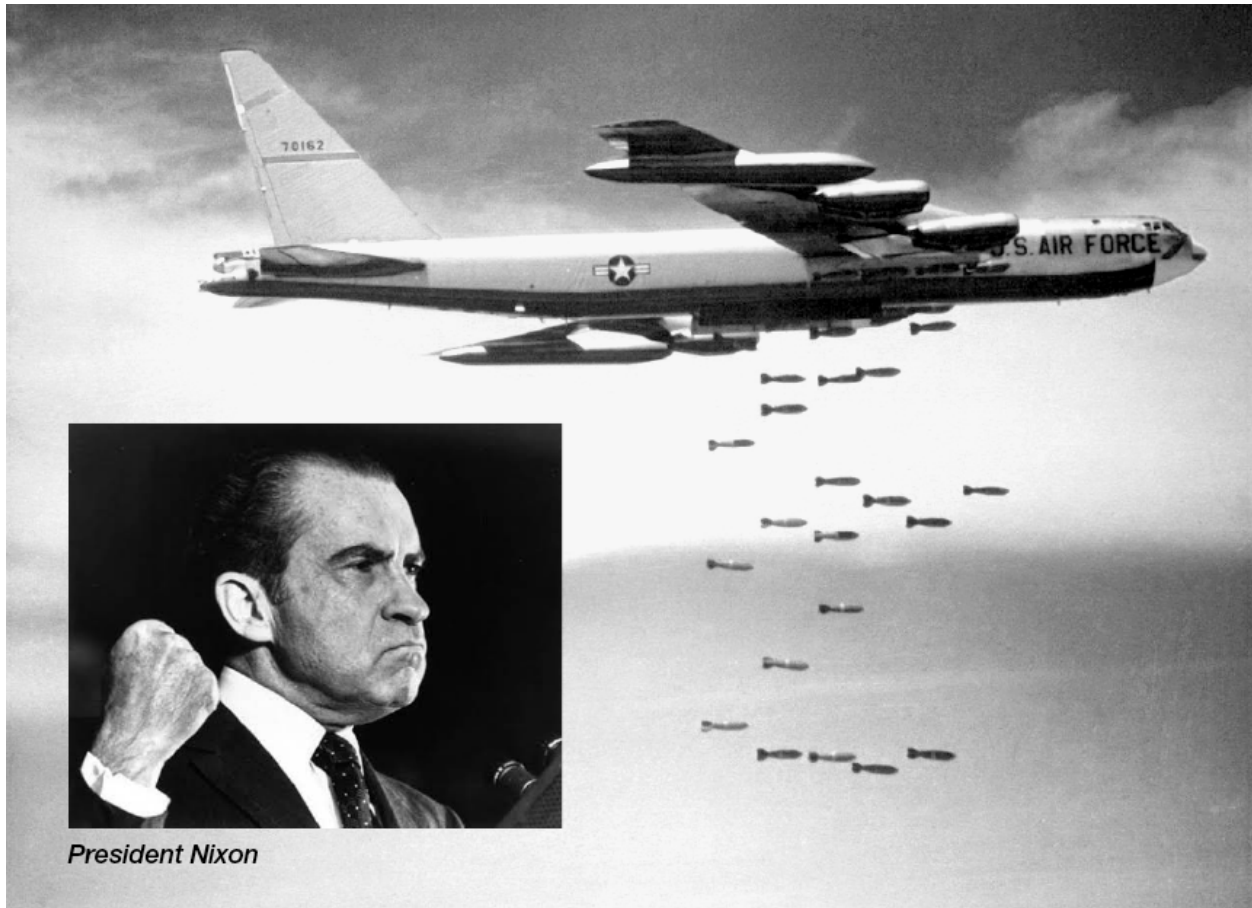
“More reports of the secret bombing campaign surfaced in the press and records of Congressional proceedings, but it was not until 2000 that official the USAF records of US bombing activity over Indochina from 1964 to 1973 were declassified by President Bill Clinton.

“Some sources say that during the first phase of the bombings lasting until April 1970, ‘Operation Breakfast’, the SAC conducted 3,630 sorties and dropped 110,000 tons of bombs and that in the entire four-year campaign the US dropped about 540,000 tons of bombs. In the book *Bombs Over Cambodia*, historians Ben Kiernan and Taylor Owen state that, based on their analysis of the declassified documents, 2,756,941 tons of ordnance was dropped during Operation Menu, more than the US dropped on Japan during World War II.

“The authors also say that US planes flew 230,516 sorties over 113,716 sites. Estimates of casualties vary widely as well, but it is believed that somewhere between 100,000 and 600,000 civilians died in the bombing and two million became homeless. Some sources say that hundreds of thousands more Cambodians died from the effects of displacement, illness or starvation as a direct result of the bombings.

“The carpet bombing of Cambodia lasted until August 1973. It devastated the countryside and the chaos and upheaval it unleashed played a big part in the installation of the genocidal Khmer Rouge regime led by Pol Pot. The Khmer Rouge was responsible for the deaths of up to two million Cambodians through executions, forced labour and starvation.”

³<https://www.thebigchilli.com/feature-stories/americas-secret-war-and-the-bombing-of-southeast-asia>



What is Air War?

From a handbook published under the name of Project Air War and the Indochina Resources Center in 1972: "Air war, by its very nature, means destroying everything below: homes, schools, gardens, pagodas, rice fields forests, animal like, and of course, any people caught in the open."

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Chapter 12

RESOURCE WARS

12.1 Our greed-based economic system today

Today our greed-based, war addicted, and growth-obsessed economic system poses even greater threats than it did during the early phases of the Industrial Revolution. Today it threatens to destroy human civilization and much of the biosphere.

According to a recently-published study by Oxfam, just 1 percent of the world's population controls nearly half of the planet's wealth. The study says that this tiny slice of humanity controls 110 trillion US dollars, or 65 times the total wealth of the poorest 3.5 billion people. The world's 85 richest people own as much as the poorest 50 percent of humanity. 70 percent of the world's people live in a country where income inequality has increased in the past three decades.

This shocking disparity in wealth has led to the decay of democracy in many countries, because the very rich have used their money to control governments, and also to control the mass media and hence to control public opinion. The actions of many governments today tend not to reflect what is good for the people (or more crucially, what is good for the future of our planet), but rather what is good for special interest groups, for example, the fossil fuel industry and the military-industrial complex.

Today the world spends roughly 1,700,000,000,000 US dollars on armaments, almost 2 trillion. This vast river of money, almost too great to be imagined, flows into the pockets of arms manufacturers, and is used by them to control governments, which in turn vote for bloated military budgets and aggressive foreign policies which provoke the endless crises and conflicts that are necessary to justify the diversion of such vast sums of money from urgently-needed social goals into the bottomless pit of war.

The reelection of the slave-like politicians is ensured by the huge sums made available for their campaigns by the military-industrial complex. This pernicious circular flow of money, driving endless crises, has sometimes been called "The Devil's Dynamo". Thus the world is continually driven to the brink of thermonuclear war by highly dangerous interventions such as the recent ones in North Africa, the Middle East, Ukraine, South and



Figure 12.1: An oxymoron: The vultures of greed never protect the dove of peace.

Central America, and the Korean Peninsula.

It is doubtful that any of the political or military figures involved with this arrogant risking of human lives and the human future have any imaginative idea of what a thermonuclear war would be like. In fact it would be an ecological catastrophe of huge proportions, making large areas of the world permanently uninhabitable through long-lived radioactive contamination. The damage to global agriculture would be so great as to produce famine leading to a billion or more deaths from starvation. All the nations of the earth would suffer, neutrals as well as belligerents.

Besides supporting the appalling war machine, our bought-and-paid-for politicians also fail to take the actions that would be needed to prevent the worst effects of climate change. The owners of the fossil fuel industries have even mounted advertising campaigns to convince the public that the threat of anthropogenic climate change is not real. Sadly, the threat of catastrophic climate change is all too real, as 99 percent the worlds climate scientists have warned.

The world has recently passed a dangerous landmark in atmospheric CO₂ concentration, 400 ppm. The last time that the earth experienced such high concentrations of this greenhouse gas were several million years ago. At that time the Arctic was free from ice, and sea levels were 40 meters higher than they are today. Global warming is a slow and long-term effect, so such high sea levels will be slow in arriving, but ultimately we must expect that coastal cities and much of the world's low-lying land will be under water. We must also expect many tropical regions of the world to become uninhabitable because of high temperatures. Finally there is a threat of famine because agriculture will be hit by high temperatures and aridity.

There are several very dangerous feedback loops that may cause the earth's temperatures to rise much faster than has been predicted by the International Panel on Climate Change. By far the most dangerous of these comes from the melting of methane hydrate crystals that are currently trapped in frozen tundra and on the floor of seabeds.

At high pressures, methane combines with water to form crystals called hydrates or clathrates. These crystals are stable at the temperatures currently existing on ocean floors, but whenever the water temperature rises sufficiently, the crystals become unstable and methane gas bubbles to the surface. This effect has already been observed in the Arctic seas north of Russia. The total amount of methane clathrates on ocean floors is not precisely known, but it is estimated to be very large indeed, corresponding to between 3,000 and 11,000 gigatons of carbon. The release of even a small fraction of this amount of methane into our atmosphere would greatly accelerate rising temperatures, leading to the release of still more methane, in a highly dangerous feedback loop. We must at all costs avoid global temperatures which will cause this feedback loop to trigger in earnest.

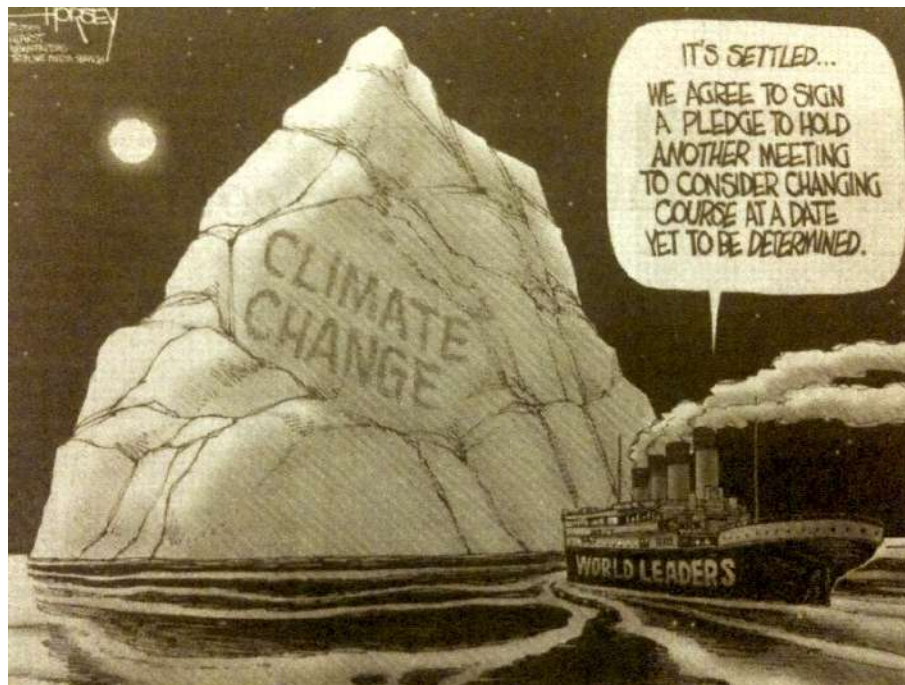


Figure 12.2: The ship in the cartoon is drawn so as to resemble the Titanic.

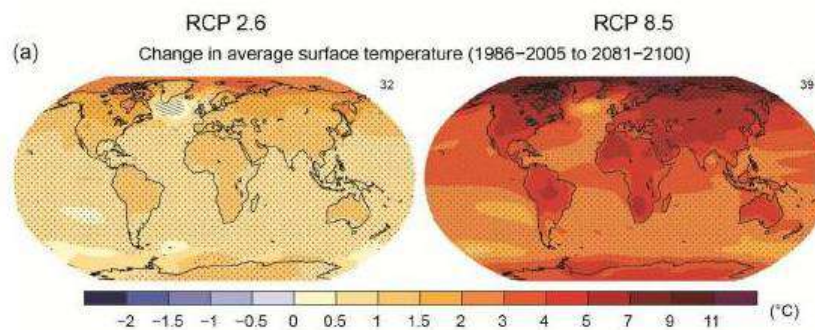


Figure 12.3: Temperature changes will be greatest in the polar regions. Far greater changes in global temperatures are to be expected in the 22nd and 23rd centuries and in subsequent centuries, because the thermal inertia of the oceans makes climate change a very slow and long-term effect.

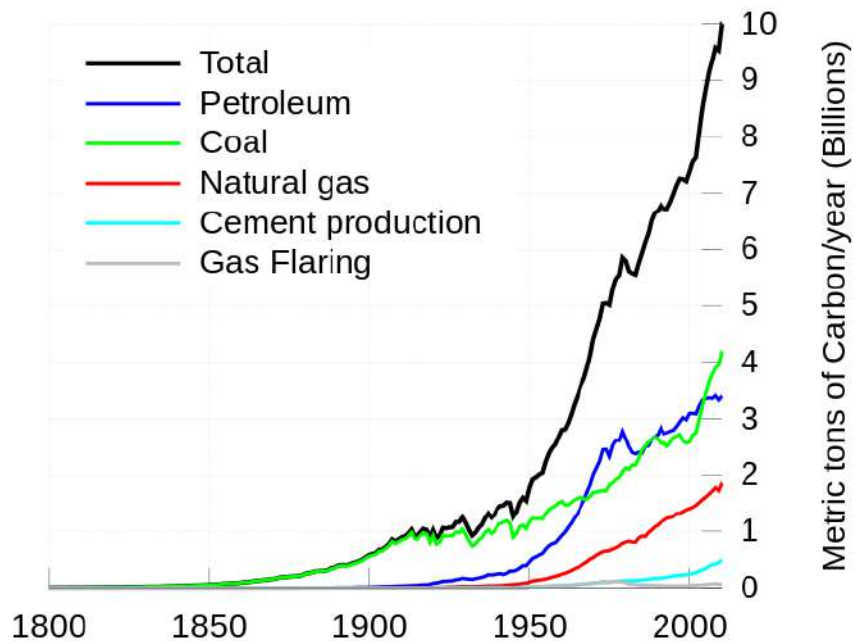


Figure 12.4: The isotope ratios in ice cores from the Greenland ice sheet allow us to see the close correlation between atmospheric CO₂ concentration and temperatures over a very long period of time. Thus regardless of questions of cause and effect, we can expect rising concentrations of CO₂ to be accompanied by rising temperatures. As we can see from the graphs, the rate of increase in carbon emissions has shown no sign of slowing in recent years.

12.2 Human motivations were not always so selfish

For the reasons mentioned above, we can see that an economic system where selfishness and greed are exalted as the mainspring for human actions lacks both a social conscience and an ecological conscience. Both these dimensions are needed for the long-term survival of human civilization and the biosphere.

We must remember, however, that the worship of the free market and the exaltation of selfishness are relatively recent developments in human history. During most of their million-year history, humans lived in small groups, not in great cities or nations, and sharing was part of their lifestyle. Perhaps that lifestyle is the one to which we should return if we wish the human future to stretch out for another million years.

12.3 Neocolonialism

In his book, “Neocolonialism, The Last Stage of Imperialism” (Thomas Nielsen, London, 1965), Kwamai Nkrumah defined neocolonialism with the following words: “The essence of neocolonialism is that the State which is subject to it is, in theory, independent, and has all the outward trappings of international sovereignty. In reality its economic system and thus its political policy is directed from the outside. The methods and form of this direction can take various shapes. For example, in an extreme case, the troops of the imperial power may garrison the territory of the neocolonial State and control the government of it. More often, however, neocolonial control is exercised through monetary means...”

“The struggle against neocolonialism is not aimed at excluding the capital of the developed world from operating in less developed countries. It is aimed at preventing the financial power of the developed countries from being used in such a way as to impoverish the less developed.”

12.4 The resource curse

The way in which the industrialized countries maintain their control over less developed nations can be illustrated by the “resource curse”, i.e. the fact that resource-rich developing countries are no better off economically than those that lack resources, but are cursed with corrupt and undemocratic governments. This is because foreign corporations extracting local resources under unfair agreements exist in a symbiotic relationship with corrupt local officials.

One might think that taxation of foreign resource-extracting firms would provide developing countries with large incomes. However, there is at present no international law governing multinational tax arrangements. These are usually agreed to on a bilateral basis, and the industrialized countries have stronger bargaining powers in arranging the bilateral agreements.

12.5 Confessions of an economic hit-man

1

A book by John Perkins, “Confessions of an Economic Hit-Man”, can give us an idea of the way in which our economic system operates to further enrich wealthy nations and impoverish poor ones. Here are some excerpts:

“Economic hit men (EHMs) are highly paid professionals who cheat countries around the globe out of trillions of dollars. They funnel money from the World Bank, the U.S. Agency for International Development (USAID), and other foreign ‘aid’ organizations into the coffers of huge corporations and the pockets of a few wealthy families who control the planet’s natural resources.”

“Their tools included fraudulent financial reports, rigged elections, payoffs, extortion, sex, and murder. They play a game as old as empire, but one that has taken on new and terrifying dimensions during this time of globalization. I was initially recruited while I was in business school back in the late sixties by the National Security Agency, the nation’s largest and least understood spy organization; but ultimately I worked for private corporations.”

“The first real economic hit man was back in the early 1950s, Kermit Roosevelt, Jr., the grandson of Teddy, who overthrew the government of Iran, a democratically elected government, Mossadegh’s government, who was Time magazine’s person of the year; and he was so successful at doing this without any bloodshed, well, there was a little bloodshed, but no military intervention, just spending millions of dollars and replaced Mossadegh with the Shah of Iran.”

“At that point understood that this idea of economic hit man was an extremely good one. We didn’t have to worry about the threat of war with Russia when we did it this way. The problem with that was that Roosevelt was a C.I.A. agent. He was a government employee. Had he been caught, we would have been in a lot of trouble. It would have been very embarrassing. So, at that point, the decision was made to use organizations like the C.I.A. and the N.S.A. to recruit potential economic hit men like me and then send us to work for private consulting companies, engineering firms, construction companies, so that if we were caught, there would be no connection with the government.”

¹<http://techrig.blogspot.dk/2013/11/confessions-of-economic-hit-man.html>
<https://www.youtube.com/watch?v=yTbdnNgqfs8>
<https://en.wikipedia.org/wiki/Corporatocracy>



12.6 Debt slavery

At the moment, the issue of debt slavery is in the news because of the predicament of Greece and the intended fate of Ukraine, but the problem is a very general one.

If any quantity, for example indebtedness, is growing at the rate of 7% per year, the doubling time is only 9.9 years. At higher rates of interest, the doubling time is still less. If a debt remains unpaid for so long that it more than doubles, most of the repayments will go for interest, rather than for reducing the amount of the debt.

In the case of the debts of third world countries to private banks in the industrialized parts of the world and to the IMF, many of the debts were incurred in the 1970's for purposes which were of no benefit to local populations, for example purchase of military hardware. Today the debts remain, although the amount paid over the years by the developing countries is very many times the amount originally borrowed.

Third world debt can be regarded as a means by which the industrialized nations extract raw materials from developing countries without any repayment whatever. In fact, besides extracting raw materials, they extract money. The injustice of this arrangement was emphasized recently by Pope Francis in his wonderful encyclical *Laudato Si'*.²

Dr. Michael Klare holds the post of Five Colleges Professor of Peace and World Security Studies at Hampshire College, Amherst College, Smith College, Mount Holyoke College, and the University of Massachusetts Amherst. He has written 16 books exploring the relationship between natural resources and war.³

Like Naomi Klein, Prof. Klare believes that the peace movement and the climate movement ought to join forces.⁴

12.7 Blood for oil

There is a close relationship between petroleum and war. James A. Paul, Executive Director of the Global Policy Forum, has described this relationship very clearly in the following words:

“Modern warfare particularly depends on oil, because virtually all weapons systems rely on oil-based fuel - tanks, trucks, armored vehicles, self-propelled artillery pieces, airplanes, and naval ships. For this reason, the governments and general staffs of powerful nations seek to ensure a steady supply of oil during wartime, to fuel oil-hungry military forces in far-flung operational theaters.”

²<http://dissidentvoice.org/2015/07/a-revolutionary-pope-calls-for-rethinking-the-outdated-criteria-that-rule-the-world/>

<http://www.globalissues.org/issue/28/third-world-debt-undermines-development>

³<https://www.youtube.com/watch?v=PCXgNbTdhNo>

<https://www.youtube.com/watch?v=S-cdHIGFrF0>

<https://www.youtube.com/watch?v=LIdlm4ywAlc>

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<https://www.youtube.com/watch?v=S-cdHIGFrF0>

⁴<https://www.youtube.com/watch?v=LIdlm4ywAlc>

“Just as governments like the US and UK need oil companies to secure fuel for their global war-making capacity, so the oil companies need their governments to secure control over global oilfields and transportation routes. It is no accident, then, that the world’s largest oil companies are located in the world’s most powerful countries.”

“Almost all of the world’s oil-producing countries have suffered abusive, corrupt and undemocratic governments and an absence of durable development. Indonesia, Saudi Arabia, Libya, Iraq, Iran, Angola, Colombia, Venezuela, Kuwait, Mexico, Algeria - these and many other oil producers have a sad record, which includes dictatorships installed from abroad, bloody coups engineered by foreign intelligence services, militarization of government and intolerant right-wing nationalism.”

Iraq, in particular, has been the scene of a number of wars motivated by the West’s thirst for oil. During World War I, 1914-1918, the British captured the area (then known as Mesopotamia) from the Ottoman Empire after four years of bloody fighting. Although Lord Curzon denied that the British conquest of Mesopotamia was motivated by oil, there is ample evidence that British policy was indeed motivated by a desire for control of the region’s petroleum. For example, Curzon’s Cabinet colleague Sir Maurice Hankey stated in a private letter that oil was “a first-class war aim”. Furthermore, British forces continued to fight after the signing of the Mudros Armistice. In this way, they seized Mosul, the capital of a major oil-producing region, thus frustrating the plans of the French, who had been promised the area earlier in the secret Sykes-Picot Agreement.

Lord Curzon was well aware of the military importance of oil, and following the end of the First World War he remarked: “The Allied cause has floated to victory on a wave of oil”.

During the period between 1918 and 1930, fierce Iraqi resistance to the occupation was crushed by the British, who used poison gas, airplanes, incendiary bombs, and mobile armored cars, together with forces drawn from the Indian Army. Winston Churchill, who was Colonial Secretary at the time, regarded the conflict in Iraq as an important test of modern military-colonial methods.

In 1932, Britain granted nominal independence to Iraq, but kept large military forces in the country and maintained control of it through indirect methods. In 1941, however, it seemed likely that Germany might try to capture the Iraqi oilfields, and therefore the British again seized direct political power in Iraq by means of military force. It was not only Germany that Britain feared, but also US attempts to gain access to Iraqi oil.

The British fear of US interest in Iraqi oil was soon confirmed by events. In 1963 the US secretly backed a military coup in Iraq that brought Saddam Hussein’s Ba’ath Party to power. In 1979 the western-backed Shah of Iran was overthrown, and the United States regarded the fundamentalist Shi’ite regime that replaced him as a threat to supplies of oil from Saudi Arabia. Washington saw Saddam’s Iraq as a bulwark against the militant Shi’ite extremism of Iran that was threatening oil supplies from pro-American states such as Kuwait and Saudi Arabia.

In 1980, encouraged to do so by the fact that Iran had lost its US backing, Saddam Hussein’s government attacked Iran. This was the start of a extremely bloody and destructive war that lasted for eight years, inflicting almost a million casualties on the two



nations. Iraq used both mustard gas and the nerve gases Tabun and Sarin against Iran, in violation of the Geneva Protocol.

Both the United States and Britain helped Saddam Hussein's government to obtain chemical weapons. A chemical plant, called Falluja 2, was built by Britain in 1985, and this plant was used to produce mustard gas and nerve gas. Also, according to the Riegel Report to the US Senate, May 25, (1994), the Reagan Administration turned a blind eye to the export of chemical weapon precursors to Iraq, as well as anthrax and plague cultures that could be used as the basis for biological weapons. According to the Riegel Report, "records available from the supplier for the period 1985 until the present show that during this time, pathogenic (meaning disease producing) and toxigenic (meaning poisonous), and other biological research materials were exported to Iraq pursuant to application and licensing by the US Department of Commerce."

In 1984, Donald Rumsfeld, Reagan's newly appointed Middle East Envoy, visited Saddam Hussein to assure him of America's continuing friendship, despite Iraqi use of poison gas. When (in 1988) Hussein went so far as to use poison gas against civilian citizens of his own country in the Kurdish village of Halabja, the United States worked to prevent international condemnation of the act. Indeed US support for Saddam was so unconditional that he obtained the false impression that he had a free hand to do whatever he liked in the region.

On July 25, 1990, US Ambassador April Glaspie met with Saddam Hussein to discuss oil prices and how to improve US-Iraq relations. According to the transcript of the meeting, Ms Glaspie assured Saddam that the US "had no opinion on the Arab-Arab conflicts, like your border disagreement with Kuwait." She then left on vacation. Mistaking this conversation for a green light, Saddam invaded Kuwait eight days later.

By invading Kuwait, Hussein severely worried western oil companies and governments, since Saudi Arabia might be next in line. As George Bush senior said in 1990, at the time of the Gulf War, "Our jobs, our way of life, our own freedom and the freedom of friendly countries around the world would all suffer if control of the world's great oil reserves fell into the hands of Saddam Hussein."

On August 6, 1990, the UN Security Council imposed comprehensive economic sanctions against Iraq with the aim of forcing Iraq to withdraw from Kuwait. Meanwhile, US

Secretary of State James A. Baker III used arm-twisting methods in the Security Council to line up votes for UN military action against Iraq. In Baker's own words, he undertook the process of "cajoling, extracting, threatening and occasionally buying votes".

On November 29, 1990, the Council passed Resolution 678, authorizing the use of "all necessary means" (by implication also military means) to force Iraq to withdraw from Kuwait. There was nothing at all wrong with this, since the Security Council had been set up by the UN Charter to prevent states from invading their neighbors. However, one can ask whether the response to Saddam Hussein's invasion of Kuwait would have been so wholehearted if oil had not been involved.

There is much that can be criticized in the way that the Gulf War of 1990-1991 was carried out. Besides military targets, the US and its allies bombed electrical generation facilities with the aim of creating postwar leverage over Iraq. The electrical generating plants would have to be rebuilt with the help of foreign technical assistance, and this help could be traded for postwar compliance. In the meantime, hospitals and water-purification plants were without electricity. Also, during the Gulf War, a large number of projectiles made of depleted uranium were fired by allied planes and tanks. The result was a sharp increase in cancer in Iraq. Finally, both Shi'ites and Kurds were encouraged by the Allies to rebel against Saddam Hussein's government, but were later abandoned by the allies and slaughtered by Saddam.

The most terrible misuse of power, however, was the US and UK insistence the sanctions against Iraq should remain in place after the end of the Gulf War. These two countries used their veto power in the Security Council to prevent the removal of the sanctions. Their motive seems to have been the hope that the economic and psychological impact would provoke the Iraqi people to revolt against Saddam. However that brutal dictator remained firmly in place, supported by universal fear of his police and by massive propaganda. The effect of the sanctions was to produce more than half a million deaths of children under five years of age, as is documented by UNICEF data. The total number of deaths that the sanctions produced among Iraqi civilians probably exceeded a million, if older children and adults are included.

Ramsey Clark, who studied the effects of the sanctions in Iraq from 1991 onwards, wrote to the Security Council that most of the deaths "are from the effects of malnutrition including marasmas and kwashiorkor, wasting or emaciation which has reached twelve per cent of all children, stunted growth which affects twenty-eight per cent, diarrhea, dehydration from bad water or food, which is ordinarily easily controlled and cured, common communicable diseases preventable by vaccinations, and epidemics from deteriorating sanitary conditions. There are no deaths crueller than these. They are suffering slowly, helplessly, without simple remedial medication, without simple sedation to relieve pain, without mercy."

On the morning of September 11, 2001, two hijacked airliners were deliberately crashed into New York's World Trade Center, causing the collapse of three skyscrapers and the deaths of more than three thousand people. Almost simultaneously, another hijacked airliner was driven into the Pentagon in Washington DC, and a fourth hijacked plane crashed in a field in Pennsylvania. The fourth plane probably was to have made a suicide

attack on the White House or the Capitol, but passengers on the airliner became aware what was happening through their mobile telephones, and they overpowered the hijackers.

Blame for the September 11 attacks soon centered on the wealthy Saudi Arabian Islamic extremist, Osama bin Laden, and on his terrorist organization, al-Qaeda. In a later statement acknowledging responsibility for the terrorist attacks, bin Laden gave as his main reasons firstly the massive US support for Israel, a country that, in his view, was committing atrocities against the Palestinians, and secondly the presence of US troops in Saudi Arabia.

Like Saddam Hussein, Osama bin Laden was an ex-protegé of the CIA, by whom he had previously been armed, trained, and supported. The history of bin Laden's relationship with the CIA began in 1979, when the CIA, acting through Pakistan's Inter-Services Intelligence Agency, began to train and arm the Mujaheddin, an international force of Islamic fundamentalists who were encouraged to attack Afghanistan's secular socialist government.

US National Security Advisor Zbigniew Bryzinski anticipated that the Soviets would respond by sending troops to protect the socialist government of Afghanistan, and he believed that the resulting war would be the Soviet Union's version of Viet Nam: It would be a war that would fatally weaken the Soviet Union. Thus he saw the war that he was provoking in Afghanistan as an important step in the liberation of Eastern Europe. "What is most important in the history of the world?", Polish-born Bryzinski asked in a 1998 interview, "The Taliban, or the collapse of the Soviet empire? Some stirred-up Muslims, or the liberation of central Europe...?" It was, in fact, these same "stirred-up Muslims" who guided two hijacked aircraft into the Twin Towers on September 11, 2001.

During the spring of 2003, our television and newspapers presented us with the spectacle of an attack by two technologically superior powers on a much less industrialized nation, a nation with an ancient and beautiful culture. The ensuing war was one-sided. Missiles guided by laser beams and signals from space satellites were more than a match for less sophisticated weapons.

Speeches were made to justify the attack. It was said to be needed because of weapons of mass destruction (some countries are allowed to have them, others not). It was said to be necessary to get rid of a cruel dictator (whom the attacking powers had previously supported and armed). But the suspicion remained that the attack was resource-motivated. It was about oil.

Looking at the present and threatened conflicts in the Middle East against the background of this history, must we not ask: To what extent are they too about oil?

12.8 Concluding remarks

From the discussion presented above, we can see that our present economic system produces an endless series of resource-motivated wars. In addition to the enormous suffering, waste, injustice and ecological destruction produced by modern wars, we must recognize that in

an era of thermonuclear weapons, war has become prohibitively dangerous. Therefore we need a new economic system.

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Chapter 13

THE THREATS AND COSTS OF WAR

13.1 The training of soldiers

Within individual countries, murder is rightly considered to be the worst of crimes. But the institution of war tries to convince us that if a soldier murders someone from another country, whom the politicians have designated as an “enemy”, it is no longer a crime, no longer a violation of the common bonds of humanity. It is “heroic”.

In their hearts, soldiers know that this is nonsense. Murder is always murder. The men, women and children who are supposed to be the “enemy”, are just ordinary people, with whom the soldier really has no quarrel. Therefore when the training of soldiers wears off a little, so that they realize what they have done, they have to see themselves as murderers, and many commit suicide.

A recent article in the journal “Epidemiology” pointed out a startling statistic: for every American soldier killed in combat this year, 25 will commit suicide. The article also quotes the Department of Veterans Affairs, which says that 18 veterans commit suicide every day.

Obviously, the training of soldiers must overwrite fundamental ethical principles. This training must make a soldier abandon his or her individual conscience and sense of responsibility. It must turn the soldier from a compassionate human being into an automaton, a killing machine. How is this accomplished? Through erosion of the soldier’s self-respect. Through the endless repetition of senseless rituals where obedience is paramount and from which rational thought and conscience are banished.

In his book on fanaticism, *The True Believer* (1951), the American author Eric Hoffer gives the following description of the factors promoting self-sacrifice:

“To ripen a person for self-sacrifice, he must be stripped of his individual identity. He must cease to be George, Hans, Ivan or Tado - a human atom with an existence bounded by birth and death. The most drastic way to achieve this end is by the complete assimilation of the individual into a collective body. The fully assimilated individual does not see himself

and others as human beings. When asked who he is, his automatic response is that he is a German, a Russian, a Japanese, a Christian, a Muslim, a member of a certain tribe or family. He has no purpose, worth or destiny apart from his collective body, and as long as that body lives, he cannot really die. ...”

“The effacement of individual separateness must be thorough. In every act, however trivial, the individual must, by some ritual, associate himself with the congregation, the tribe, the party, etcetera. His joys and sorrows, his pride and confidence must spring from the fortunes and capacities of the group, rather than from his individual prospects or abilities. Above all, he must never feel alone. Though stranded on a desert island, he must feel that he is under the eyes of the group. To be cast out from the group must be equivalent to being cut off from life.”

“This is undoubtedly a primitive state of being, and its most perfect examples are found among primitive tribes. Mass movements strive to approximate this primitive perfection, and we are not imagining things when the anti-individualist bias of contemporary mass movements strikes us as being a throwback to the primitive.”

The conditioning of a soldier in a modern army follows the pattern described in Eric Hoffer’s book. The soldier’s training aims at abolishing his sense of individual separateness, individual responsibility, and moral judgment. It is filled with rituals, such as saluting, by which the soldier identifies with his tribe-like army group. His uniform also helps to strip him of his individual identity and to assimilate him into the group. The result of this psychological conditioning is that the soldier’s mind reverts to a primitive state. He surrenders his moral responsibility, and when the politicians tell him to kill, he kills.

13.2 Killing civilians

Between 2 September and 5 September, 1807, the civilian population of Copenhagen was subjected to a bombardment by British military forces, without any declaration of war. The purpose of the bombardment was to induce terror in the population, and to thereby force the surrender of the Danish fleet, which the British feared might otherwise fall into the hands of Napoleon. It was one of the first occasions on which civilians were deliberately targeted in this manner.

Copenhagen was almost undefended, since the Danish army was positioned at the southern boundary of the country, ready to repel a possible attack by Napoleon’s army. British troops and artillery were thus easily able to surround the city, while the British fleet occupied the harbor. On the first night of the bombardment, 5000 rounds were fired into the city, on the second night 2000, and on the third night 7000. New incendiary rockets developed by William Congreve were also used. More than 2000 civilians were killed by the bombardment, and about 30 percent of Copenhagen’s buildings were destroyed. The bicentenary of this barbaric event might be an appropriate time to think about state-sponsored terror, in which innocent civilians are deliberately targeted.



The erosion of ethical principles during World War II

When Hitler invaded Poland in September, 1939, US President Franklin Delano Roosevelt appealed to Great Britain, France, and Germany to spare innocent civilians from terror bombing. "The ruthless bombing from the air of civilians in unfortified centers of population during the course of the hostilities", Roosevelt said (referring to the use of air bombardment during World War I) "...has sickened the hearts of every civilized man and woman, and has profoundly shocked the conscience of humanity." He urged "every Government which may be engaged in hostilities publicly to affirm its determination that its armed forces shall in no event, and under no circumstances, undertake the bombardment from the air of civilian populations or of unfortified cities."

Two weeks later, British Prime Minister Neville Chamberlain responded to Roosevelt's appeal with the words: "Whatever the lengths to which others may go, His Majesty's Government will never resort to the deliberate attack on women and children and other civilians for purposes of mere terrorism."

Much was destroyed during World War II, and among the casualties of the war were the ethical principles that Roosevelt and Chamberlain announced at its outset. At the time of Roosevelt and Chamberlain's declarations, terror bombing of civilians had already begun in the Far East. On 22 and 23 September, 1937, Japanese bombers attacked civilian populations in Nanjing and Canton. The attacks provoked widespread protests. The British Under Secretary of State for Foreign Affairs, Lord Cranborne, wrote: "Words cannot express the feelings of profound horror with which the news of these raids has been received by the whole civilized world. They are often directed against places far from the actual area of hostilities. The military objective, where it exists, seems to take a completely second place. The main object seems to be to inspire terror by the indiscriminate slaughter of civilians..."

On the 25th of September, 1939, Hitler's air force began a series of intense attacks on Warsaw. Civilian areas of the city, hospitals marked with the Red Cross symbol, and fleeing refugees all were targeted in a effort to force the surrender of the city through terror. On the 14th of May, 1940, Rotterdam was also devastated. Between the 7th of September

1940 and the 10th of May 1941, the German Luftwaffe carried out massive air attacks on targets in Britain. By May, 1941, 43,000 British civilians were killed and more than a million houses destroyed.

Although they were not the first to start it, by the end of the war the United States and Great Britain were bombing of civilians on a far greater scale than Japan and Germany had ever done. For example, on July 24-28, 1943, British and American bombers attacked Hamburg with an enormous incendiary raid whose official intention "the total destruction" of the city.

The result was a firestorm that did, if fact, lead to the total destruction of the city. One airman recalled, that "As far as I could see was one mass of fire. 'A sea of flame' has been the description, and that's an understatement. It was so bright that I could read the target maps and adjust the bomb-sight." Another pilot was "...amazed at the awe-inspiring sight of the target area. It seemed as though the whole of Hamburg was on fire from one end to the other and a huge column of smoke was towering well above us - and we were on 20,000 feet! It all seemed almost incredible and, when I realized that I was looking at a city with a population of two millions, or about that, it became almost frightening to think of what must be going on down there in Hamburg."

Below, in the burning city, temperatures reached 1400 degrees Fahrenheit, a temperature at which lead and aluminum have long since liquefied. Powerful winds sucked new air into the firestorm. There were reports of babies being torn by the high winds from their mothers' arms and sucked into the flames. Of the 45,000 people killed, it has been estimated that 50 percent were women and children and many of the men killed were elderly, above military age. For weeks after the raids, survivors were plagued by "...droves of vicious rats, grown strong by feeding on the corpses that were left unburied within the rubble as well as the potatoes and other food supplies lost beneath the broken buildings."

The German cities Kassel, Pforzheim, Mainz, Dresden and Berlin were similarly destroyed, and in Japan, US bombing created firestorms in many cities, for example Tokyo, Kobe and Yokohama. In Tokyo alone, incendiary bombing caused more than 100,000 civilian casualties.

Hiroshima and Nagasaki

On August 6, 1945, at 8.15 in the morning, a nuclear fission bomb was exploded in the air over the civilian population of Hiroshima in an already virtually defeated Japan. The force of the explosion was equivalent to fifteen thousand tons of TNT. Out of a city of two hundred and fifty thousand, one hundred thousand were killed immediately, and another hundred thousand were hurt. Many of the injured died later from radiation sickness. A few days later, Nagasaki was similarly destroyed.

The tragic destruction of the two Japanese cities was horrible enough in itself, but it also marked the start of a nuclear arms race that continues to cast a very dark shadow over the future of civilization. Not long afterwards, the Soviet Union exploded its own atomic





bomb, creating feelings of panic in the United States. President Truman authorized an all-out effort to build superbombs based on thermonuclear reactions, the reactions that heat the sun and stars.

In March, 1954, the US tested a thermonuclear bomb at Bikini Atoll in the Pacific Ocean. It was 1000 times more powerful than the Hiroshima bomb. The Japanese fishing boat, Lucky Dragon, was 135 kilometers from the Bikini explosion, but radioactive fallout from the explosion killed one crew member and made all the others seriously ill. The distance to the Marshall Islands was equally large, but even today, islanders continue to suffer from the effects of fallout from the test, for example frequent birth defects.

Driven by the paranoia of the Cold War, the number of nuclear weapons on both sides reached truly insane heights. At the worst point, there were 50,000 nuclear weapons in the world, with a total explosive power roughly a million times the power of the Hiroshima bomb. This was equivalent to 4 tons of TNT for every person on the planet - enough to destroy human civilization many times over - enough to threaten the existence of all life on earth.

At the end of the Cold War, most people heaved a sigh of relief and pushed the problem of nuclear weapons away from their minds. It was a threat to life too horrible to think about. People felt that they could do nothing in any case, and they hoped that the problem had finally disappeared.

Today, however, many thoughtful people realize that the problem of nuclear weapons has by no means disappeared, and in some ways it is even more serious now than it was during the Cold War. There are still over 15,000 nuclear weapons in the world, many of them hydrogen bombs, many on hair-trigger alert, ready to be fired with only a few minutes warning. The world has frequently come extremely close to accidental nuclear war. If nuclear weapons are allowed to exist for a long period of time, the probability for such a catastrophic accident to happen will grow into a certainty.

Current dangers also come from proliferation. Recently, more and more nations have come to possess nuclear weapons, and thus the danger that they will be used increases. For example, if Pakistan's less-than-stable government should fall, its nuclear weapons might find their way into the hands of terrorists, and against terrorism deterrence has no effect.

Thus we live at a special time in history - a time of crisis for civilization. We did not ask to be born at a moment of crisis, but such is our fate. Every person now alive has a special responsibility: We owe it, both to our ancestors and to future generations, to build a stable and cooperative future world. It must be a war-free world, from which nuclear weapons have been completely abolished. No person can achieve these changes alone, but together we can build the world that we desire. This will not happen through inaction, but it can happen through the dedicated work of large numbers of citizens.

Civilians have for too long played the role of passive targets, hostages in the power struggles of politicians. It is time for civil society to make its will felt. If our leaders continue to enthusiastically support the institution of war, if they will not abolish nuclear weapons, then let us have new leaders.

13.3 The direct and indirect costs of war

The costs of war, both direct and indirect, are so enormous that they are almost beyond comprehension. We face a direct threat because a thermonuclear war may destroy human civilization and much of the biosphere, and an indirect threat because the institution of war interferes seriously with the use of tax money for constructive and peaceful purposes.

Today, despite the end of the Cold War, the world spends roughly 1.7 trillion (i.e. 1.7 million million) US dollars each year on armaments. This colossal flood of money could have been used instead for education, famine relief, development of infrastructure, or on urgently needed public health measures.

The World Health Organization lacks funds to carry through an antimalarial program on as large a scale as would be desirable, but the entire program could be financed for less than our military establishments spend in a single day. Five hours of world arms spending is equivalent to the total cost of the 20-year WHO campaign that resulted in the eradication of smallpox. For every 100,000 people in the world, there are 556 soldiers, but only 85 doctors. Every soldier costs an average of \$20,000 per year, while the average spent on education is only \$380 per school-aged child. With a diversion of funds consumed by three weeks of military spending, the world could create a sanitary water supply for all its people, thus eliminating the cause of almost half of all human illness.

A new drug-resistant form of tuberculosis has recently become widespread in Asia and in the former Soviet Union. In order to combat this new and highly dangerous form of tuberculosis and to prevent its spread, WHO needs \$500 million, an amount equivalent to 1.2 hours of world arms spending.

Today's world is one in which roughly ten million children die every year from starvation or from diseases related to poverty. Besides this enormous waste of young lives through malnutrition and preventable disease, there is a huge waste of opportunities through inadequate education. The rate of illiteracy in the 25 least developed countries is 80%, and the total number of illiterates in the world is estimated to be 800 million. Meanwhile every 60 seconds the world spends \$6.5 million on armaments.

It is plain that if the almost unbelievable sums now wasted on the institution of war were used constructively, most of the pressing problems of humanity could be solved, but today the world spends more than 20 times as much on war as it does on development.

13.4 Medical and psychological consequences; loss of life

While in earlier epochs it may have been possible to confine the effects of war mainly to combatants, in the 20th century the victims of war were increasingly civilians, and especially children. For example, according to Quincy Wright's statistics, the First and Second World Wars cost the lives of 26 million soldiers, but the toll in civilian lives was much larger: 64 million.

Since the Second World War, despite the best efforts of the UN, there have been over 150 armed conflicts; and, if civil wars are included, there are on any given day an average of 12 wars somewhere in the world. In the conflicts in Indo-China, the proportion of civilian victims was between 80% and 90%, while in the Lebanese civil war some sources state that the proportion of civilian casualties was as high as 97%.

Civilian casualties often occur through malnutrition and through diseases that would be preventable in normal circumstances. Because of the social disruption caused by war, normal supplies of food, safe water and medicine are interrupted, so that populations become vulnerable to famine and epidemics.¹

13.5 Effects of war on children

According to UNICEF figures, 90% of the casualties of recent wars have been civilians, and 50% children. The organization estimates that in recent years, violent conflicts have driven 20 million children from their homes. They have become refugees or internally displaced persons within their own countries.

During the last decade 2 million children have been killed and 6 million seriously injured or permanently disabled as the result of armed conflicts, while 1 million children have been orphaned or separated from their families. Of the ten countries with the highest rates of death of children under five years of age, seven are affected by armed conflicts. UNICEF estimates that 300,000 child soldiers are currently forced to fight in 30 armed conflicts throughout the world. Many of these have been forcibly recruited or abducted.

Even when they are not killed or wounded by conflicts, children often experience painful psychological traumas: the violent death of parents or close relatives, separation from their families, seeing family members tortured, displacement from home, disruption of ordinary life, exposure to shelling and other forms of combat, starvation and anxiety about the future.²

13.6 Refugees

Human Rights Watch estimates that in 2001 there were 15 million refugees in the world, forced from their countries by war, civil and political conflict, or by gross violations of human rights. In addition, there were an estimated 22 million internally displaced persons, violently forced from their homes but still within the borders of their countries.

In 2001, 78% of all refugees came from ten areas: Afghanistan, Angola, Burma, Burundi, Congo-Kinshasa, Eritrea, Iraq, the Palestinian territories, Somalia and Sudan. A quarter of all refugees are Palestinians, who make up the world's oldest and largest refugee

¹<http://www.cadmusjournal.org/article/volume-2/issue-2-part-3/lessons-world-war-i>
<http://www.truth-out.org/opinion/item/27201-the-leading-terrorist-state>

²<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2080482/>

population. 45% of the world's refugees have found sanctuaries in Asia, 30% in Africa, 19% in Europe and 5% in North America.

Refugees who have crossed an international border are in principle protected by Article 14 of the Universal Declaration of Human Rights, which affirms their right "to seek and to enjoy in other countries asylum from persecution". In 1950 the Office of the High Commissioner for Refugees was created to implement Article 14, and in 1951 the Convention Relating to the Status of Refugees was adopted by the UN. By 2002 this legally binding treaty had been signed by 140 nations. However the industrialized countries have recently adopted a very hostile and restrictive attitude towards refugees, subjecting them to arbitrary arrests, denial of social and economic rights, and even forcible return to countries in which they face persecution.

The status of internally displaced persons is even worse than that of refugees who have crossed international borders. In many cases the international community simply ignores their suffering, reluctant to interfere in the internal affairs of sovereign states. In fact, the United Nations Charter is self-contradictory in this respect, since on the one hand it calls for non-interference in the internal affairs of sovereign states, but on the other hand, people everywhere are guaranteed freedom from persecution by the Charter's Universal Declaration of Human Rights.³

13.7 Damage to infrastructure

Most insurance policies have clauses written in fine print exempting companies from payment of damage caused by war. The reason for this is simple. The damage caused by war is so enormous that insurance companies could never come near to paying for it without going bankrupt.

We mentioned above that the world spends 1.7 trillion dollars each year on preparations for war. A similarly colossal amount is needed to repair the damage to infrastructure caused by war. Sometimes this damage is unintended, but sometimes it is intentional.

During World War II, one of the main aims of air attacks by both sides was to destroy the industrial infrastructure of the opponent. This made some sense in a war expected to last several years, because the aim was to prevent the enemy from producing more munitions. However, during the Gulf War of 1990, the infrastructure of Iraq was attacked, even though the war was expected to be short. Electrical generating plants and water purification facilities were deliberately destroyed with the apparent aim of obtaining leverage over Iraq after the war.

In general, because war has such a catastrophic effect on infrastructure, it can be thought of as the opposite of development. War is the greatest generator of poverty.⁴

³<https://www.hrw.org/topic/refugees>

⁴<https://www.wsws.org/en/articles/2002/11/iraq-n04.html>
<http://www.globalresearch.ca/crimes-against-humanity-the-destruction-of-iraqs-electricity-infrastructure-the-social-economic-and-environmental-impacts/5355665>
<http://www.afdb.org/fileadmin/uploads/afdb/Documents/Publications/00157630-EN-ERP-48.PDF>

13.8 Ecological damage

Warfare during the 20th century has not only caused the loss of 175 million lives (primarily civilians) - it has also caused the greatest ecological catastrophes in human history. The damage takes place even in times of peace. Studies by Joni Seager, a geographer at the University of Vermont, conclude that “a military presence anywhere in the world is the single most reliable predictor of ecological damage”.

Modern warfare destroys environments to such a degree that it has been described as an “environmental holocaust.” For example, herbicides use in the Vietnam War killed an estimated 6.2 billion board-feet of hardwood trees in the forests north and west of Saigon, according to the American Association for the Advancement of Science. Herbicides such as Agent Orange also made enormous areas of previously fertile land unsuitable for agriculture for many years to come. In Vietnam and elsewhere in the world, valuable agricultural land has also been lost because land mines or the remains of cluster bombs make it too dangerous for farming.

During the Gulf War of 1990, the oil spills amounted to 150 million barrels, 650 times the amount released into the environment by the notorious Exxon Valdez disaster. During the Gulf War an enormous number of shells made of depleted uranium were fired. When the dust produced by exploded shells is inhaled it often produces cancer, and it will remain in the environment of Iraq for decades.

Radioactive fallout from nuclear tests pollutes the global environment and causes many thousands of cases of cancer, as well as birth abnormalities. Most nuclear tests have been carried out on lands belonging to indigenous peoples. Agent Orange also produced cancer, birth abnormalities and other serious forms of illness both in the Vietnamese population and among the foreign soldiers fighting in Vietnam⁵

13.9 Links between poverty and war

There are several relationships between intolerable economic inequality and war. Today 2.7 billion people live on less than 2 dollars a day - 1.1 billion on less than 1 dollar per day. 18 million of our fellow humans die each year from poverty-related causes. In 2006, 1.1 billion people lacked safe drinking water, and waterborne diseases killed an estimated 1.8 million people. The developing countries are also the scene of a resurgence of other infectious diseases, such as malaria, drug-resistant tuberculosis and HIV/AIDS.

Meanwhile, in 2011, world military budgets reached 1,700,000,000,000 dollars (i.e. 1.7 million million dollars). This amount of money is almost too large to be imagined. The fact that it is being spent means that many people are making a living from the institution of war. Wealthy and powerful lobbies from the military-industrial complex are able to influence mass media and governments. Thus the institution of war persists, although we

⁵<http://www.dailymail.co.uk/news/article-2401378/Agent-Orange-Vietnamese-children-suffering-effects-herbicide-sprayed-US-Army-40-years-ago.html>

know very well that it is a threat to civilization and that it responsible for much of the suffering that humans experience.

Today's military spending of almost two trillion US dollars per year would be more than enough to finance safe drinking water for the entire world, and to bring primary health care and family planning advice to all. If used constructively, the money now wasted (or worse than wasted) on the institution of war could also help the world to make the transition from fossil fuel use to renewable energy systems.

Military might is used by powerful industrialized nations to maintain economic hegemony over less developed countries. This is true today, even though the colonial era is supposed to be over (as has been amply documented by Professor Michael Klare in his books on "Resource Wars").

The way in which the industrialized countries maintain their control over less developed nations can be illustrated by the "resource curse", i.e. the fact that resource-rich developing countries are no better off economically than those that lack resources, but are cursed with corrupt and undemocratic governments. This is because foreign corporations extracting local resources under unfair agreements exist in a symbiotic relationship with corrupt local officials.

One might think that taxation of foreign resource-extracting firms would provide developing countries with large incomes. However, there is at present no international law governing multinational tax arrangements. These are usually agreed to on a bilateral basis, and the industrialized countries have stronger bargaining powers in arranging the bilateral agreements.

Another important poverty-generating factor in the developing countries is war - often civil war. The five permanent members of the U.N. Security Council are, ironically, the five largest exporters of small arms. Small arms have a long life. The weapons poured into Africa by both sides during the Cold War are still there, and they contribute to political chaos and civil wars that block development and cause enormous human suffering.

The United Nations website on Peace and Security through Disarmament states that "Small arms and light weapons destabilize regions; spark, fuel and prolong conflicts; obstruct relief programmes; undermine peace initiatives; exacerbate human rights abuses; hamper development; and foster a 'culture of violence'."

An estimated 639 million small arms and light weapons are in circulation worldwide, one for every ten people. Approximately 300,000 people are killed every year by these weapons, many of them women and children.

There is also another, less obvious, link between intolerable economic inequality war: Abolition of the institution of war will require the replacement of "might makes right" by the rule international law. It will require development of effective global governance. But reform and strengthening of the United Nations is blocked by wealthy countries because they are afraid of loosing their privileged positions. If global economic inequality were less enormous, the problem of unifying the world would be simplified.

Let us work to break the links between poverty and war! To do that, we must work for laws that will restrict the international sale of small arms; we must work for a fair relationship between developing countries and multinational corporations; and above all,

we must question the need for colossal military budgets. By following this path we can free the world from the intolerable suffering caused by poverty and from the equally intolerable suffering caused by war.

13.10 The threat of nuclear war

As bad as conventional arms and conventional weapons may be, it is the possibility of a catastrophic nuclear war that poses the greatest threat to humanity. There are today roughly 16,000 nuclear warheads in the world. The total explosive power of the warheads that exist or that could be made on short notice is approximately equal to 500,000 Hiroshima bombs.

To multiply the tragedy of Hiroshima by a factor of half a million makes an enormous difference, not only quantitatively, but also qualitatively. Those who have studied the question believe that a nuclear catastrophe today would inflict irreversible damage on our civilization, genetic pool and environment.

Thermonuclear weapons consist of an inner core where the fission of uranium-235 or plutonium takes place. The fission reaction in the core is able to start a fusion reaction in the next layer, which contains isotopes of hydrogen. It is possible to add a casing of ordinary uranium outside the hydrogen layer, and under the extreme conditions produced by the fusion reaction, this ordinary uranium can undergo fission. In this way, a fission-fusion-fission bomb of almost limitless power can be produced.

For a victim of severe radiation exposure, the symptoms during the first week are nausea, vomiting, fever, apathy, delirium, diarrhoea, oropharyngeal lesions and leukopenia. Death occurs during the first or second week.

We can perhaps be helped to imagine what a nuclear catastrophe means in human terms by reading the words of a young university professor, who was 2,500 meters from the hypocenter at the time of the bombing of Hiroshima: "Everything I saw made a deep impression: a park nearby covered with dead bodies... very badly injured people evacuated in my direction... Perhaps most impressive were girls, very young girls, not only with their clothes torn off, but their skin peeled off as well. ... My immediate thought was that this was like the hell I had always read about. ... I had never seen anything which resembled it before, but I thought that should there be a hell, this was it."

One argument that has been used in favor of nuclear weapons is that no sane political leader would employ them. However, the concept of deterrence ignores the possibility of war by accident or miscalculation, a danger that has been increased by nuclear proliferation and by the use of computers with very quick reaction times to control weapons systems.

Recent nuclear power plant accidents remind us that accidents frequently happen through human and technical failure, even for systems which are considered to be very "safe." We must also remember the time scale of the problem. To assure the future of humanity, nuclear catastrophe must be avoided year after year and decade after decade. In the long run, the safety of civilization cannot be achieved except by the abolition of nuclear weapons, and ultimately the abolition of the institution of war.

In 1985, International Physicians for the Prevention of Nuclear War received the Nobel Peace Prize. IPPNW had been founded in 1980 by six physicians, three from the Soviet Union and three from the United States. Today, the organization has wide membership among the world's physicians. Professor Bernard Lowen of the Harvard School of Public Health, one of the founders of IPPNW, said in a recent speech:

"...No public health hazard ever faced by humankind equals the threat of nuclear war. Never before has man possessed the destructive resources to make this planet uninhabitable... Modern medicine has nothing to offer, not even a token benefit, in the event of nuclear war..."

"We are but transient passengers on this planet Earth. It does not belong to us. We are not free to doom generations yet unborn. We are not at liberty to erase humanity's past or dim its future. Social systems do not endure for eternity. Only life can lay claim to uninterrupted continuity. This continuity is sacred."

The danger of a catastrophic nuclear war casts a dark shadow over the future of our species. It also casts a very black shadow over the future of the global environment. The environmental consequences of a massive exchange of nuclear weapons have been treated in a number of studies by meteorologists and other experts from both East and West. They predict that a large-scale use of nuclear weapons would result in fire storms with very high winds and high temperatures, which would burn a large proportion of the wild land fuels in the affected nations. The resulting smoke and dust would block out sunlight for a period of many months, at first only in the northern hemisphere but later also in the southern hemisphere.

Temperatures in many places would fall far below freezing, and much of the earth's plant life would be killed. Animals and humans would then die of starvation. The nuclear winter effect was first discovered as a result of the Mariner 9 spacecraft exploration of Mars in 1971. The spacecraft arrived in the middle of an enormous dust-storm on Mars, and measured a large temperature drop at the surface of the planet, accompanied by a heating of the upper atmosphere. These measurements allowed scientists to check their theoretical models for predicting the effect of dust and other pollutants distributed in planetary atmospheres.

Using experience gained from the studies of Mars, R.P. Turco, O.B. Toon, T. Ackerman, J.B. Pollack and C. Sagan made a computer study of the climatic effects of the smoke and dust that would result from a large-scale nuclear war. This early research project is sometimes called the TTAPS Study, after the initials of the authors.

In April 1983, a special meeting was held in Cambridge, Massachusetts, where the results of the TTAPS Study and other independent studies of the nuclear winter effect were discussed by more than 100 experts. Their conclusions were presented at a forum in Washington, D.C., the following December, under the chairmanship of U.S. Senators Kennedy and Hatfield. The numerous independent studies of the nuclear winter effect all agreed of the following main predictions:

High-yield nuclear weapons exploded near the earth's surface would put large amounts of dust into the upper atmosphere. Nuclear weapons exploded over cities, forests, oilfields and refineries would produce fire storms of the type experienced in Dresden and Hamburg

after incendiary bombings during the Second World War. The combination of high-altitude dust and lower altitude soot would prevent sunlight from reaching the earth's surface, and the degree of obscuration would be extremely high for a wide range of scenarios.

A baseline scenario used by the TTAPS study assumes a 5,000-megaton nuclear exchange, but the threshold for triggering the nuclear winter effect is believed to be much lower than that. After such an exchange, the screening effect of pollutants in the atmosphere might be so great that, in the northern and middle latitudes, the sunlight reaching the earth would be only 1% of ordinary sunlight on a clear day, and this effect would persist for many months. As a result, the upper layers in the atmosphere might rise in temperature by as much as 100 °C, while the surface temperatures would fall, perhaps by as much as 50 °C.

The temperature inversion produced in this way would lead to superstability, a condition in which the normal mixing of atmospheric layers is suppressed. The hydrological cycle (which normally takes moist air from the oceans to a higher and cooler level, where the moisture condenses as rain) would be strongly suppressed. Severe droughts would thus take place over continental land masses. The normal cleansing action of rain would be absent in the atmosphere, an effect which would prolong the nuclear winter.

In the northern hemisphere, forests would die because of lack of sunlight, extreme cold, and drought. Although the temperature drop in the southern hemisphere would be less severe, it might still be sufficient to kill a large portion of the tropical forests, which normally help to renew the earth's oxygen.

The oxygen content of the atmosphere would then fall dangerously, while the concentration of carbon dioxide and oxides of nitrogen produced by firestorms would remain high. The oxides of nitrogen would ultimately diffuse to the upper atmosphere, where they would destroy the ozone layer.

Thus, even when the sunlight returned after an absence of many months, it would be sunlight containing a large proportion of the ultraviolet frequencies which are normally absorbed by the ozone in the stratosphere, and therefore a type of light dangerous to life. Finally, after being so severely disturbed, there is no guarantee that the global climate would return to its normal equilibrium.

Even a nuclear war below the threshold of nuclear winter might have climatic effects very damaging to human life. Professor Paul Ehrlich, of Stanford University, has expressed this in the following words:

"...A smaller war, which set off fewer fires and put less dust into the atmosphere, could easily depress temperatures enough to essentially cancel grain production in the northern hemisphere. That in itself would be the greatest catastrophe ever delivered upon *Homo Sapiens*, just that one thing, not worrying about prompt effects. Thus even below the threshold, one cannot think of survival of a nuclear war as just being able to stand up after the bomb has gone off."⁶

⁶<http://www.voanews.com/content/pope-francis-calls-for-nuclear-weapons-ban/2909357.html>
<http://www.cadmusjournal.org/article/issue-4/flaws-concept-nuclear-deterrence>
<http://www.countercurrents.org/avery300713.htm>
<https://www.wagingpeace.org/author/john-avery/>



Figure 13.1: U.N. Secretary General Antonio Guterres addressed the Human Rights Council at the United Nations in Geneva, Switzerland February 26, 2018.

Speaking to the Conference on Disarmament at the U.N. complex in Geneva, Guterres said many states still wrongly thought that nuclear weapons made the world safer.

“There is great and justified anxiety around the world about the threat of nuclear war,”

<http://www.commondreams.org/news/2015/08/06/70-years-after-bombing-hiroshima-calls-abolish-nuclear-weapons>

<http://www.informationclearinghouse.info/article42488.htm>

<http://www.informationclearinghouse.info/article42492.htm>

<http://www.commondreams.org/views/2015/08/06/hiroshima-and-nagasaki-remembering-power>

<http://human-wrongs-watch.net/2015/07/22/israel-iran-and-the-nuclear-non-proliferation-treaty/>

<http://human-wrongs-watch.net/2015/06/25/militarisms-hostages/>

<http://human-wrongs-watch.net/2015/05/24/the-path-to-zero-dialogues-on-nuclear-dangers-by-richard-falk-and-david-krieger/>

<http://human-wrongs-watch.net/2015/03/30/europe-must-not-be-forced-into-a-nuclear-war-with-russia/>

<http://www.truth-out.org/opinion/item/32073-the-us-should-eliminate-its-nuclear-arsenal-not-modernize-it>

<http://www.cadmusjournal.org/article/issue-4/flaws-concept-nuclear-deterrence>

<http://www.cadmusjournal.org/article/issue-6/arms-trade-treaty-opens-new-possibilities-u>

<http://eruditio.worldacademy.org/issue-6/article/remember-your-humanity>

<http://www.informationclearinghouse.info/article42568.htm>

<https://firstlook.org/theintercept/2014/09/23/nobel-peace-prize-fact-day-syria-7th-country-bombed-obama/>

<http://www.informationclearinghouse.info/article42577.htm>

<http://www.informationclearinghouse.info/article42580.htm>

<http://human-wrongs-watch.net/2015/08/06/us-unleashing-of-atomic-weapons-against-civilian-populations-was-a-criminal-act-of-the-first-order/>

<http://human-wrongs-watch.net/2015/08/06/hiroshima-and-nagasaki-remembering-the-power-of-peace/>

<http://human-wrongs-watch.net/2015/08/04/atomic-bombing-hear-the-story-setsuko-thurlow/>

<http://human-wrongs-watch.net/2015/08/04/atomic-bombing-hear-the-story-yasuaki-yamashita/>

<http://human-wrongs-watch.net/2015/08/03/why-nuclear-weapons/>

he said.

“Countries persist in clinging to the fallacious idea that nuclear arms make the world safer ... At the global level, we must work towards forging a new momentum on eliminating nuclear weapons.”

Two World War I poems by Wilfred Owen

Wilfred Owen and his mentor, Siegfried Sassoon were two poets who eloquently described the horrors of World War I. They met in a military hospital, after both had been wounded in the war. Owen had been writing poetry since the age of 11, but not about war. When he became friends with Sassoon during their hospital stay, Owen was inspired by Sassoon's example and realized that the horrors of trenches and gas warfare deserved to be described realistically in poetry. Against the strong advice of Sassoon, Owen insisted on returning to active duty in France, where he wrote the eloquent and bitter war poems for which he is remembered.

Owen was killed in action exactly one week before the end of the war. His mother received the telegram informing her of his death on Armistice Day, as the church bells were ringing out in celebration. Here are two of Owen's poems:

Dulce et decorum Est

*Bent double, like old beggars under sacks,
Knock-kneed, coughing like hags, we cursed through sludge,
Till on the haunting flares we turned our backs,
And towards our distant rest began to trudge.
Men marched asleep. Many had lost their boots,
But limped on, blood-shod. All went lame, all blind;
Drunk with fatigue; deaf even to the hoots
Of gas-shells dropping softly behind.*

*Gas! GAS! Quick, boys! - An ecstasy of fumbling
Fitting the clumsy helmets just in time,
But someone still was yelling out and stumbling
And flound'ring like a man in fire or lime.
Dim through the misty panes and thick green light,
As under a green sea, I saw him drowning.
In all my dreams before my helpless sight
He plunges at me, guttering, choking, drowning.*

*If in some smothering dreams, you too could pace
Behind the wagon that we flung him in,
And watch the white eyes writhing in his face,
His hanging face, like a devil's sick of sin,*

*If you could hear, at every jolt, the blood
 Come gargling from the froth-corrupted lungs
 Obscene as cancer, bitter as the cud
 Of vile, incurable sores on innocent tongues,
 My friend, you would not tell with such high zest
 To children ardent for some desperate glory,
 The old Lie: Dulce et decorum est
 Pro patria mori.*

The parable of the old man and the young

*So Abram rose, and clave the wood, and went,
 And took the fire with him, and a knife.
 And as they sojourned both of them together,
 Isaac the first-born spake and said, My Father,
 Behold the preparations, fire and iron,
 But where the lamb for this burnt-offering?
 Then Abram bound the youth with belts and straps,
 and builded parapets and trenches there,
 And stretchèd forth the knife to slay his son.
 When lo! an angel called him out of heaven,
 Saying, Lay not thy hand upon the lad,
 Neither do anything to him. Behold,
 A ram, caught in a thicket by its horns;
 Offer the Ram of Pride instead of him.*

*But the old man would not so, but slew his son,
 And half the seed of Europe, one by one.*

We condemn human sacrifice in primitive cultures, but does not our modern industrial society also practice this abominable custom? We sacrifice countless young men and women in endless and unnecessary wars.

World War II: a continuation of World War I

In the Second World War, the number of soldiers killed was roughly the same as in World War I, but the numbers of civilian deaths was much larger. In the USSR alone, about 20 million people are thought to have been killed, directly or indirectly, by World War II, and of these only 7.5 million were battle deaths. Many of the USSR's civilian deaths were caused by starvation, disease or exposure. Civilian populations also suffered greatly in the devastating bombings of cities such as London, Coventry, Rotterdam, Warsaw, Dresden, Cologne, Berlin, Tokyo, Hiroshima and Nagasaki. In World War II, the total number of deaths, civilian and military, is estimated to have been between 62 and 78 million.

Do Benjamin Netanyahu and Ehud Barak, who are contemplating starting what might develop into World War III, have any imaginative concept of what it would be like? Netanyahu has told the Israeli people that only 500 of their citizens would be killed, and that the conflict would be over in a month. One is reminded of the Austrian leaders in 1914, who started a what they thought would be a small action to punish the Serbian nationalists for their Pan-Slavic ambitions. When the result was a world-destroying war, they said "That is not what we intended." Of course it is not what they intended, but nobody can control the escalation of conflicts. The astonishing unrealism of the Netanyahu-Barak statements also reminds one of Kaiser Wilhelm's monumentally unrealistic words to his departing troops: "You will be home before the leaves are off the trees."

The planned attack on Iran would not only violate international law, but would also violate common sense and the wishes of the people of Israel. The probable result would be a massive Iranian missile attack on Tel Aviv, and Iran would probably also close the Straits of Hormuz. If the United States responded by bombing Iranian targets, Iran would probably use missiles to sink one or more of the US ships in the Persian Gulf. One can easily imagine other steps in the escalation of the conflict: a revolution in Pakistan; the entry of nuclear-armed Pakistan into the war on the side of Iran; a preemptive nuclear strike by Israel against Pakistan's nuclear weapons; and Chinese-Russian support of Iran. In the tense atmosphere of such a war, the danger of a major nuclear exchange, due to accident or miscalculation, would be very great.

Today, because the technology of killing has continued to develop, the danger of a catastrophic war with hydrogen bombs hangs like a dark cloud over the future of human civilization. The total explosive power of today's weapons is equivalent to roughly half a million Hiroshima bombs. To multiply the tragedy of Hiroshima and Nagasaki by a factor of half a million changes the danger qualitatively. What is threatened today is the complete breakdown of human society.

There are more than 15,000 nuclear weapons in the world today, about 4,000 of them on hair-trigger alert. The phrase "hair trigger alert" means that the person in charge has only 15 minutes to decide whether the warning from the radar system was true or false, and to decide whether or not to launch a counterattack. The danger of accidental nuclear war continues to be high. Technical failures and human failures have many times brought the world close to a catastrophic nuclear war. Those who know the system of "deterrence" best describe it as "an accident waiting to happen".

No one can win a nuclear war, just as no one can win a natural catastrophe like an earthquake or a tsunami. The effects of a nuclear war would be global, and all the nations of the world would suffer - also neutral nations.

Recent studies by atmospheric scientists have shown that the smoke from burning cities produced by even a limited nuclear war would have a devastating effect on global agriculture. The studies show that the smoke would rise to the stratosphere, where it would spread globally and remain for a decade, blocking sunlight, blocking the hydrological cycle and destroying the ozone layer. Because of the devastating effect on global agriculture, darkness from even a small nuclear war could result in an estimated billion deaths from famine. This number corresponds to the fact that today, a billion people are chronically



undernourished. If global agriculture were sufficiently damaged by a nuclear war, these vulnerable people might not survive. A large-scale nuclear war would be an even greater global catastrophe, completely destroying all agriculture for a period of ten years.

The tragedies of Chernobyl and Fukushima remind us that a nuclear war would make large areas of the world permanently uninhabitable because of long-lasting radioactive contamination.

The First World War was a colossal mistake. Today, the world stands on the threshold of an equally enormous disaster. Must we again be lead into a world-destroying war by a few blind individuals who do not have the slightest idea of what such a war would be like?

13.11 Atoms for peace?

“Atoms for Peace”, the title of U.S. President Dwight D. Eisenhower’s 1953 speech to the U.N. General Assembly, may be regarded by future generations as being tragically self-contradictory. Nuclear power generation has led not only to dangerous proliferation of nuclear weapons, but also to disasters which have made large areas of the world permanently uninhabitable because of long-lived radioactive contamination.

According to Wikipedia, “...Under Atoms for Peace related programs, the US exported 25 tons of highly enriched uranium to 30 countries, mostly to fuel research reactors....The Soviet Union also exported 11 tons of HEU under a similar program.” This enormous quantity of loose weapons-usable highly enriched uranium, is now regarded as very worrying because of proliferation and terrorism risks.

A recent article in “The Examiner” (<http://www.examiner.com/article/nuclear-security-u-s-fails-to-protect-its-nuclear-materials-overseas>) pointed out that “...NRC and DOE could not account for the current location and disposition of U.S. HEU overseas in response to a 1992 congressional mandate. U.S. agencies, in a 1993 report produced in response to the mandate, were able to verify the location of only 1.160 kilograms out of 17,500 kilograms of U.S. HEU estimated to have been exported.”

The dangers of nuclear power generation are exemplified by the Chernobyl disaster: On the 26th of April, 1986, during the small hours of the morning, the staff of the Chernobyl nuclear reactor in Ukraine turned off several safety systems in order to perform a test. The result was a core meltdown in Reactor 4, causing a chemical explosion that blew off the reactor’s 1,000-ton steel and concrete lid. 190 tons of highly radioactive uranium and graphite were hurled into the atmosphere.

The resulting radioactive fallout was 200 times greater than that caused by the nuclear bombs that destroyed Hiroshima and Nagasaki. The radioactive cloud spread over Belarus, Ukraine, Russia, Finland, Sweden and Eastern Europe, exposing the populations of these regions to levels of radiation 100 times the normal background. Ultimately, the radioactive cloud reached as far as Greenland and parts of Asia.

The exact number of casualties resulting from the Chernobyl meltdown is a matter of controversy, but according to a United Nations report, as many as 9 million people have been adversely affected by the disaster. Since 1986, the rate of thyroid cancer in affected areas has increased ten-fold. An area of 155,000 square kilometers (almost half the size of Italy) in Belarus, Ukraine and Russia is still severely contaminated. Even as far away as Wales, hundreds of farms are still under restrictions because of sheep eating radioactive grass.

The more recent disaster of 11 March, 2011, may prove to be very much worse than Chernobyl. According to an article by Harvey Wasserman (<http://www.commondreams.org/view/2014/02/03-3>), the ongoing fallout from the Fukushima catastrophe is already far in excess of that from Chernobyl. Ecosystems of the entire Pacific ocean are being contaminated by the 300 tons of radioactive water from Fukushima that continue to pour into the Pacific every day.

Meanwhile, the increasingly militaristic government of Japan’s Prime Minister Shinzo Abe has passed a State Secrets Act that makes it an offense punishable by 5 year’s imprisonment for journalists to report on the situation. Under this cloak of secrecy, attempts are being made to remove highly radioactive used fuel rods balanced precariously in a partially destroyed container hanging in the air above the stricken Unit Four. If an accident should occur, the released radioactivity could dwarf previous disasters.

Public opinion turned against nuclear power generation as a result of the Chernobyl and Fukushima catastrophes. Nevertheless, many governments insist on pushing forward



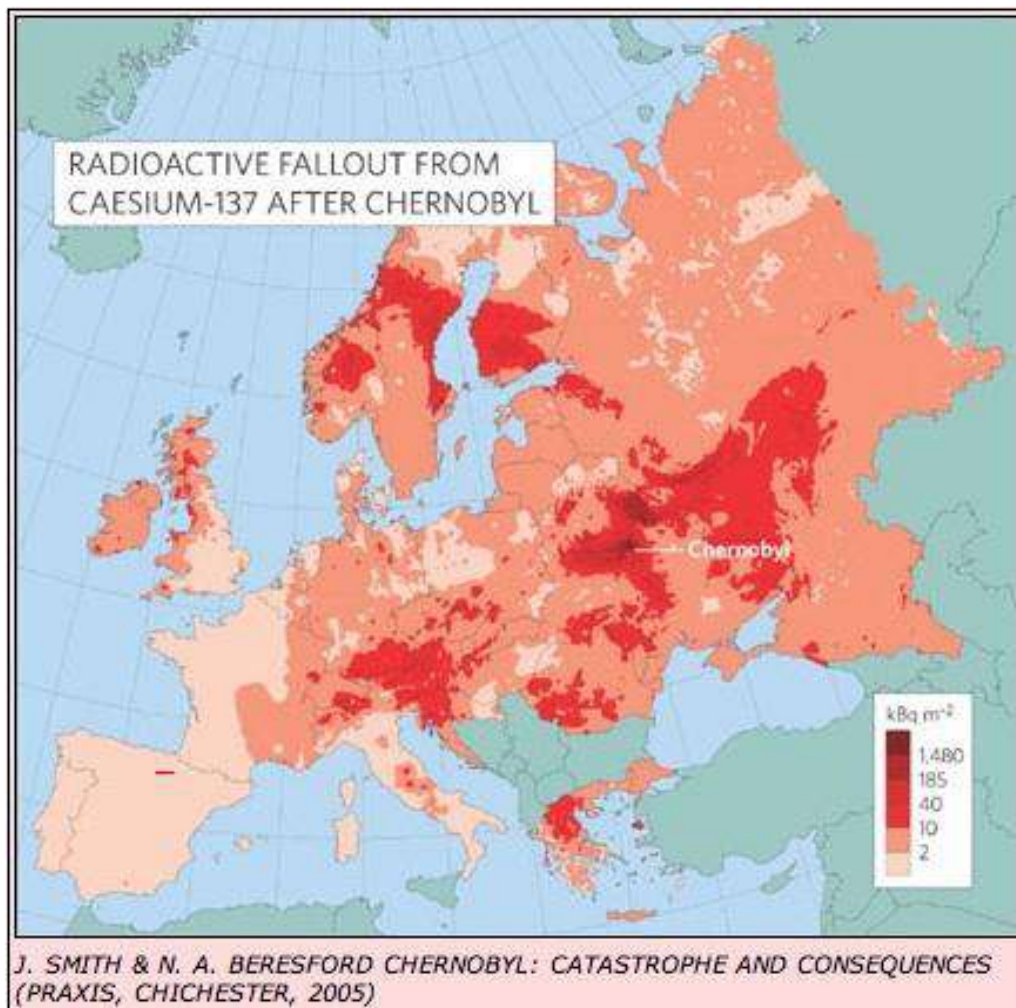
their plans for opening new nuclear power plants, despite popular opposition. Nuclear power could never compete in price with solar energy or wind energy if it were not heavily subsidized by governments. Furthermore, if a careful accounting is made of the CO₂ released in the construction of nuclear power plants, the mining, refining and transportation of uranium ore, and the final decommissioning of the plants, the amount of CO₂ released is seen to be similar to that of coal-fired plants.

There are three basic reasons why nuclear power generation is one of the worst ideas ever conceived: First is the danger of proliferation of nuclear weapons, which will be discussed in detail below. Secondly, there is the danger of catastrophic accidents, such as the ones that occurred at Chernobyl and Fukushima. Finally, the problem of how to safely dispose of or store used fuel rods has not been solved.

In thinking about the dangers posed by radioactive waste, we should remember that many of the dangerous radioisotopes involved have half-lives of hundreds of thousands of years. Thus, it is not sufficient to seal them in containers that will last for a century, or even a millennium. We must find containers that will last for a hundred thousand years or more, longer than any human structure has ever lasted.

Of the two bombs that destroyed Hiroshima and Nagasaki, one made use of the rare isotope of uranium, U-235, while the other used plutonium. Both of these materials can be made by a nation with a nuclear power generation program.

Uranium has atomic number 92, i.e., a neutral uranium atom has a nucleus containing 92 positively-charged protons, around which 92 negatively-charged electrons circle. All of the isotopes of uranium have the same number of protons and electrons, and hence the same chemical properties, but they differ in the number of neutrons in their nuclei. For example, the nucleus of U-235 has 143 neutrons, while that of U-238 has 146. Notice that $92+143=235$, while $92+146=238$. The number written after the name of an element to





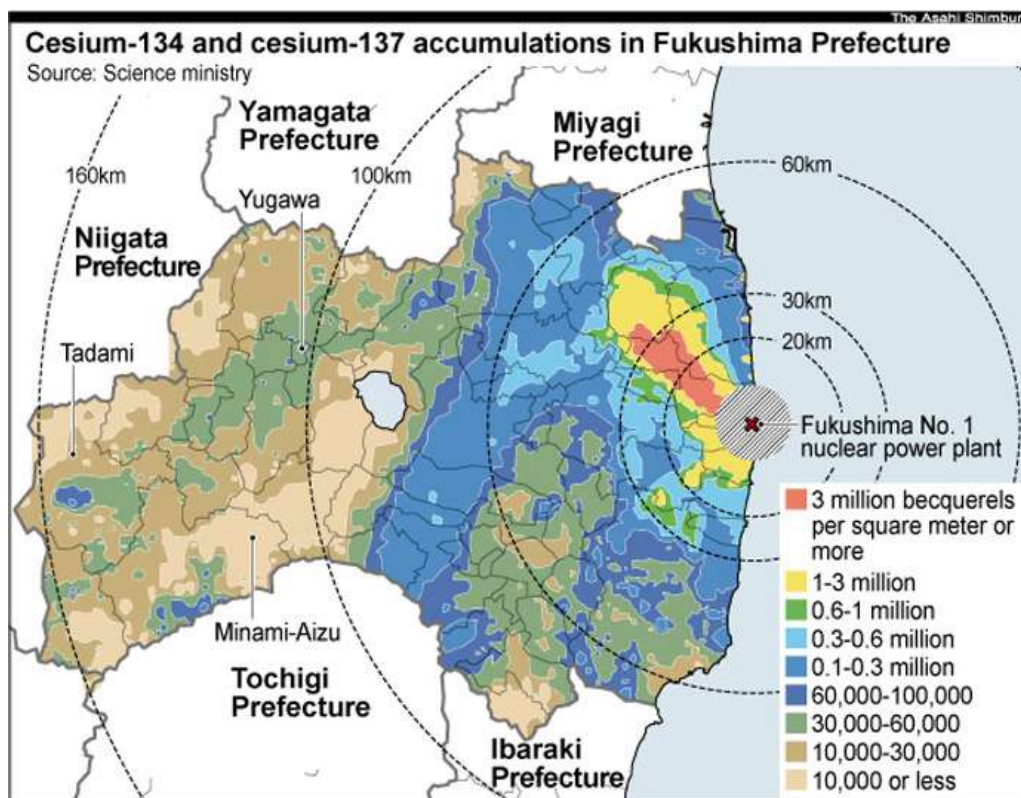


Figure 13.2: People evacuated from the region near to Fukushima wonder when they will be able to return to their homes. The honest answer is “never”.

specify a particular isotope is the number of neutrons plus the number of protons. This is called the “nucleon number”, and the weight of an isotope is roughly proportional to it. This means that U-238 is slightly heavier than U-235. If the two isotopes are to be separated, difficult physical methods dependent on mass must be used, since their chemical properties are identical. In natural uranium, the amount of the rare isotope U-235 is only 0.7 percent.

A paper published in 1939 by Niels Bohr and John A. Wheeler indicated that it was the rare isotope of uranium, U-235, that undergoes fission. A bomb could be constructed, they pointed out, if enough highly enriched U-235 could be isolated from the more common isotope, U-238. Calculations later performed in England by Otto Frisch and Rudolf Peierls showed that the “critical mass” of highly enriched uranium needed is quite small: only a few kilograms.

The Bohr-Wheeler theory also predicted that an isotope of plutonium, Pu-239, should be just as fissionable as U-235. Both U-235 and Pu-239 have odd nucleon numbers. When U-235 absorbs a neutron, it becomes U-236, while when Pu-239 absorbs a neutron it becomes Pu-240. In other words, absorption of a neutron converts both these species to nuclei with even nucleon numbers.

According to the Bohr-Wheeler theory, nuclei with even nucleon numbers are especially tightly-bound. Thus absorption of a neutron converts U-235 to a highly-excited state of U-236, while Pu-239 is similarly converted to a highly excited state of Pu-240. The excitation energy distorts the nuclei to such an extent that fission becomes possible. Instead of trying to separate the rare isotope, U-235, from the common isotope, U-238, physicists could just operate a nuclear reactor until a sufficient amount of Pu-239 accumulated, and then separate it out by ordinary chemical means.

Thus in 1942, when Enrico Fermi and his coworkers at the University of Chicago produced the world's first controlled chain reaction within a pile of cans containing ordinary (nonenriched) uranium powder, separated by blocks of very pure graphite, the chain-reacting pile had a double significance: It represented a new source of energy, but it also had a sinister meaning. It represented an easy path to nuclear weapons, since one of the by-products of the reaction was a fissionable isotope of plutonium, Pu-239. The bomb dropped on Hiroshima in 1945 used U-235, while the Nagasaki bomb used Pu-239.

By reprocessing spent nuclear fuel rods, using ordinary chemical means, a nation with a power reactor can obtain weapons-usable Pu-239. Even when such reprocessing is performed under international control, the uncertainty as to the amount of Pu-239 obtained is large enough so that the operation might superficially seem to conform to regulations while still supplying enough Pu-239 to make many bombs.

The enrichment of uranium, i.e. production of uranium with a higher percentage of U-235 than is found in natural uranium is also linked to reactor use. Many reactors of modern design make use of low enriched uranium (LEU) as a fuel. Nations operating such a reactor may claim that they need a program for uranium enrichment in order to produce LEU for fuel rods. However, by operating their ultracentrifuges a little longer, they can easily produce highly enriched uranium (HEU), i.e. uranium containing a high percentage of the rare isotope U-235, and therefore usable in weapons.

Nuclear power generation is not a solution to the problem of obtaining energy without producing dangerous climate change: Known reserves of uranium are only sufficient for the generation of about 25 terawatt-years of electrical energy (Craig, J.R., Vaughn, D.J. and Skinner, B.J., "Resources of the Earth: Origin, Use and Environmental Impact, Third Edition", page 210). This can be compared with the world's current rate of energy use of over 14 terrawatts. Thus, if all of our energy were obtained from nuclear power, existing reserves of uranium would only be sufficient for about 2 years.

It is sometimes argued that a larger amount of electricity could be obtained from the same amount of uranium through the use of fast breeder reactors, but this would involve totally unacceptable proliferation risks. In fast breeder reactors, the fuel rods consist of highly enriched uranium. Around the core, is an envelope of natural uranium. The flux of fast neutrons from the core is sufficient to convert a part of the U-238 in the envelope into Pu-239, a fissionable isotope of plutonium.

Fast breeder reactors are prohibitively dangerous from the standpoint of nuclear proliferation because both the highly enriched uranium from the fuel rods and the Pu-239 from the envelope are directly weapons-usable. It would be impossible, from the standpoint of equity, to maintain that some nations have the right to use fast breeder reactors, while others do not. If all nations used fast breeder reactors, the number of nuclear weapons states would increase drastically.

It is interesting to review the way in which Israel, South Africa, Pakistan, India and North Korea obtained their nuclear weapons, since in all these cases the weapons were constructed under the guise of "atoms for peace", a phrase that future generations may someday regard as being tragically self-contradictory.

Israel began producing nuclear weapons in the late 1960's (with the help of a "peaceful" nuclear reactor provided by France, and with the tacit approval of the United States) and the country is now believed to possess 100-150 of them, including neutron bombs. Israel's policy is one of visibly possessing nuclear weapons while denying their existence.

South Africa, with the help of Israel and France, also weaponized its civil nuclear program, and it tested nuclear weapons in the Indian Ocean in 1979. In 1991 however, South Africa destroyed its nuclear weapons and signed the Nuclear Non-Proliferation Treaty.

India produced what it described as a "peaceful nuclear explosion" in 1974. By 1989 Indian scientists were making efforts to purify the lithium-6 isotope, a key component of the much more powerful thermonuclear bombs. In 1998, India conducted underground tests of nuclear weapons, and is now believed to have roughly 60 warheads, constructed from Pu-239 produced in "peaceful" reactors.

Pakistan's efforts to obtain nuclear weapons were spurred by India's 1974 "peaceful nuclear explosion". As early as 1970, the laboratory of Dr. Abdul Qadeer Khan, (a metallurgist who was to become Pakistan's leading nuclear bomb maker) had been able to obtain from a Dutch firm the high-speed ultracentrifuges needed for uranium enrichment. With unlimited financial support and freedom from auditing requirements, Dr. Khan purchased restricted items needed for nuclear weapon construction from companies in Europe and the United States. In the process, Dr. Khan became an extremely wealthy man. With additional help from China, Pakistan was ready to test five nuclear weapons in 1998.

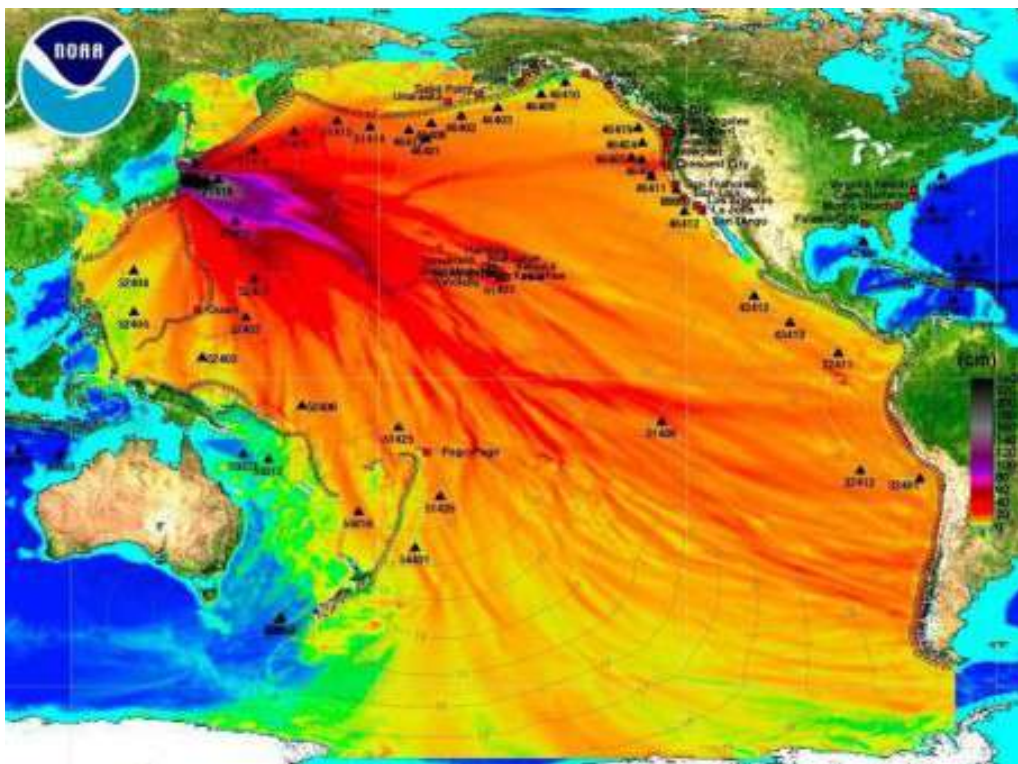


Figure 13.3: Radioactive contamination from the Fukushima disaster is spreading through the food chain of marine life throughout the Pacific region.



Figure 13.4: The Israeli nuclear technician and whistleblower Mordechai Vanunu called public attention to Israel's nuclear weapons while on a trip to England. He was lured to Italy by a Mossad "honey trap", where he was drugged, kidnapped and transported to Israel by Mossad.



Figure 13.5: Vanunu was imprisoned for 18 years, during 11 of which he was held in solitary confinement and subjected to psychological torture, such as not being allowed to sleep for long periods.

The Indian and Pakistani nuclear bomb tests, conducted in rapid succession, presented the world with the danger that these devastating weapons would be used in the conflict over Kashmir. Indeed, Pakistan announced that if a war broke out using conventional weapons, Pakistan's nuclear weapons would be used "at an early stage".

In Pakistan, Dr. A.Q. Khan became a great national hero. He was presented as the person who had saved Pakistan from attack by India by creating Pakistan's own nuclear weapons. In a Washington Post article (1 February, 2004) Pervez Hoodbhoy wrote: "Nuclear nationalism was the order of the day as governments vigorously promoted the bomb as the symbol of Pakistan's high scientific achievement and self-respect..." Similar manifestations of nuclear nationalism could also be seen in India after India's 1998 bomb tests.

Early in 2004, it was revealed that Dr. Khan had for years been selling nuclear secrets and equipment to Libya, Iran and North Korea, and that he had contacts with Al Qaeda. However, observers considered that it was unlikely that Khan would be tried, since a trial might implicate Pakistan's army as well as two of its former prime ministers.

There is a danger that Pakistan's unpopular government may be overthrown, and that the revolutionists might give Pakistan's nuclear weapons to a subnational organization. This type of danger is a general one associated with nuclear proliferation. As more and more countries obtain nuclear weapons, it becomes increasingly likely that one of them will undergo a revolution, during the course of which nuclear weapons will fall into the hands of criminals or terrorists.

There is also a possibility that poorly-guarded fissionable material could fall into the hands of subnational groups, who would then succeed in constructing their own nuclear weapons. Given a critical mass of highly-enriched uranium, a terrorist group, or an organized criminal (Mafia) group, could easily construct a crude gun-type nuclear explosive device. Pu-239 is more difficult to use since it is highly radioactive, but the physicist Frank Barnaby believes that a subnational group could nevertheless construct a crude nuclear bomb (of the Nagasaki type) from this material.

We must remember the remark of U.N. Secretary General Kofi Annan after the 9/11/2001 attacks on the World Trade Center. He said, "This time it was not a nuclear explosion". The meaning of his remark is clear: If the world does not take strong steps to eliminate fissionable materials and nuclear weapons, it will only be a matter of time before they will be used in terrorist attacks on major cities, or by organized criminals for the purpose of extortion. Neither terrorists nor organized criminals can be deterred by the threat of nuclear retaliation, since they have no territory against which such retaliation could be directed. They blend invisibly into the general population. Nor can a "missile defense system" prevent criminals or terrorists from using nuclear weapons, since the weapons can be brought into a port in any one of the hundreds of thousands of containers that enter on ships each year, a number far too large to be checked exhaustively.

Finally we must remember that if the number of nations possessing nuclear weapons becomes very large, there will be a greatly increased chance that these weapons will be used in conflicts between nations, either by accident or through irresponsible political decisions.

The slogan “Atoms for Peace” has proved to be such a misnomer that it would be laughable if it were not so tragic. Nuclear power generation has been a terrible mistake. We must stop before we turn our beautiful earth into a radioactive wasteland.

13.12 Cancer threat from radioactive leaks at Hanford

On August 9, 1945, a nuclear bomb was dropped on the Japanese city of Nagasaki. Within a radius of one mile, destruction was total. People were vaporized so that the only shadows on concrete pavements were left to show where they had been. Many people outside the radius of total destruction were trapped in their collapsed houses, and were burned alive by the fire that followed. By the end of 1945, an estimated 80,000 men, women, young children, babies and old people had died as a result of the bombing. As the years passed more people continued to die from radiation sickness.

Plutonium for the bomb that destroyed Nagasaki had been made at an enormous nuclear reactor station located at Hanford in the state of Washington. During the Cold War, the reactors at Hanford produced enough weapons-usable plutonium for 60,000 nuclear weapons. The continued existence of plutonium and highly-enriched uranium-235 in the stockpiles of nuclear weapons states hangs like a dark cloud over the future of humanity. A full scale thermonuclear war would be the ultimate ecological catastrophe, threatening to make the world permanently uninhabitable.

Besides playing a large role in the tragedy of Nagasaki, the reactor complex at Hanford has damaged the health of many thousands of Americans. The prospects for the future are even worse. Many millions of gallons of radioactive waste are held in Hanford's aging storage tanks, the majority of which have exceeded their planned lifetimes. The following quotations are taken from a Wikipedia article on Hanford, especially the section devoted to ecological concerns:

“A huge volume of water from the Columbia River was required to dissipate the heat produced by Hanford's nuclear reactors. From 1944 to 1971, pump systems drew cooling water from the river and, after treating this water for use by the reactors, returned it to the river. Before being released back into the river, the used water was held in large tanks known as retention basins for up to six hours. Longer-lived isotopes were not affected by this retention, and several tetrabecquerels entered the river every day. These releases were kept secret by the federal government. Radiation was later measured downstream as far west as the Washington and Oregon coasts.”

“The plutonium separation process also resulted in the release of radioactive isotopes into the air, which were carried by the wind throughout southeastern Washington and into parts of Idaho, Montana, Oregon and British Columbia. Downwinders were exposed to radionuclides, particularly Iodine 131... These radionuclides filtered into the food chain via contaminated fields where dairy cows grazed; hazardous fallout was ingested by communities who consumed the radioactive food and drank the milk. Most of these

airborne releases were a part of Hanford's routine operations, while a few of the larger releases occurred in isolated incidents."

"In response to an article in the Spokane Spokesman Review in September 1985, the Department of Energy announced its intent to declassify environmental records and in February, 1986 released to the public 19,000 pages of previously unavailable historical documents about Hanford's operations. The Washington State Department of Health collaborated with the citizen-led Hanford Health Information Network (HHIN) to publicize data about the health effects of Hanford's operations. HHIN reports concluded that residents who lived downwind from Hanford or who used the Columbia River downstream were exposed to elevated doses of radiation that placed them at increased risk for various cancers and other diseases."

"The most significant challenge at Hanford is stabilizing the 53 million U.S. Gallons (204,000 m³) of high-level radioactive waste stored in 177 underground tanks. About a third of these tanks have leaked waste into the soil and groundwater. As of 2008, most of the liquid waste has been transferred to more secure double-shelled tanks; however, 2.8 million U.S. Gallons (10,600 m³) of liquid waste, together with 27 million U.S. gallons (100,000 m³) of salt cake and sludge, remains in the single-shelled tanks. That waste was originally scheduled to be removed by 2018. The revised deadline is 2040. Nearby aquifers contain an estimated 270 billion U.S. Gallons (1 billion m³) of contaminated groundwater as a result of the leaks. As of 2008, 1 million U.S. Gallons (4,000 m³) of highly radioactive waste is traveling through the groundwater toward the Columbia River."

The documents made public in 1986 revealed that radiation was intentionally and secretly released by the plant and that people living near to it acted as unknowing guinea pigs in experiments testing radiation dangers. Thousands of people who live in the vicinity of the Hanford Site have suffered an array of health problems including thyroid cancers, autoimmune diseases and reproductive disorders that they feel are the direct result of these releases and experiments.

In thinking about the dangers posed by leakage of radioactive waste, we should remember that many of the dangerous radioisotopes involved have half-lives of hundreds of thousands of years. Thus, it is not sufficient to seal them into containers that will last for a century or even a millennium. We must find containers that will last for a hundred thousand years or more, longer than any human structure has ever lasted. This logic has lead Finland to deposit its radioactive waste in a complex of underground tunnels carved out of solid rock. But looking ahead for a hundred thousand years involves other problems: If humans survive for that long, what language will they speak? Certainly not the languages of today. How can we warn them that the complex of tunnels containing radioactive waste is a death trap? The reader is urged to see a film exploring these problems, "Into Eternity", by the young Danish film-maker Michael Madsen. Here is the link: <http://dotsub.com/view/8e40ebda-5966-4212-9b96-6abbce3c6577>.

We have already gone a long way towards turning our beautiful planet earth into a nuclear wasteland. In the future, let us be more careful, as guardians of a precious heritage, the natural world and the lives of all future generations.

13.13 An accident waiting to happen

In Stanley Kubrick's film, "Dr. Strangelove", a paranoid ultra-nationalist brigadier general, Jack D. Ripper, orders a nuclear attack on the Soviet Union because he believes that the Soviets are using water fluoridation as a means to rob Americans of their "precious bodily fluids". Efforts are made to recall the US bombers, but this proves to be impossible, and the attack triggers the Soviet "Doomsday Machine". The world is destroyed.

Kubrick's film is a black comedy, and we all laugh at it, especially because of the brilliant performance of Peter Sellers in multiple roles. Unfortunately, however, the film comes uncomfortably close to reality. An all-destroying nuclear war could very easily be started by an insane or incompetent person whose hand happens to be on the red button.

This possibility (or probability) has recently come to public attention through newspaper articles revealing that 11 of the officers responsible for launching US nuclear missiles have been fired because of drug addiction. Furthermore, a larger number of missile launch officers were found to be cheating on competence examinations. Three dozen officers were involved in the cheating ring, and some reports state that an equal number of others may have known about it, and remained silent. Finally, it was shown that safety rules were being deliberately ignored. The men involved, were said to be "burned out".

According to an article in *The Guardian* (Wednesday, 15 January, 2014), "Revelations of misconduct and incompetence in the nuclear missile program go back at least to 2007, when six nuclear-tipped cruise missiles were accidentally loaded onto a B-52 bomber in Minot, North Dakota, and flown to a base in Louisiana."

"Last March, military inspectors gave officers at the ICBM base in Minot the equivalent of a 'D' grade for launch mastery. A month later, 17 officers were stripped of their authority to launch the missiles."

"In October, a senior air force officer in charge of 450 ICBM's, major general Michael Carey, was fired after accusations of drunken misconduct during a summer trip to Moscow. An internal investigation found that Carey drank heavily, cavorted with two foreign women and visited a nightclub called La Cantina, where Maj. Gen. Carey had alcohol and kept trying to get the band to let him play with them."

The possibility that a catastrophic nuclear war could be triggered by a madman gains force from the recent statements of Benjamin Netanyahu, who has said repeatedly that, with or without US help, Israel intends to attack Iran. Such an attack, besides being a war crime, would be literally insane.

If Netanyahu believes that a war with Iran would be short or limited, he is ignoring several very obvious dangers. Such a war would most probably escalate into a widespread general war in the Middle East. It could cause a revolution in Pakistan, and the new revolutionary government of Pakistan would be likely to enter the war on the side of Iran, bringing with it Pakistan's nuclear weapons. Russia and China, both staunch allies of Iran, might be drawn into the conflict. There is a danger that the conflict could escalate into a Third World War, where nuclear weapons might easily be used, either by accident or intentionally.



Figure 13.6: Peter Sellers (left) listens while Brigadier General Jack D. Ripper tells him about the Soviet conspiracy to steal his “precious bodily fluids”.



Figure 13.7: Peter Sellers as Dr. Strangelove. He has to restrain his black-gloved crippled hand, which keeps trying to give a Nazi salute.



Figure 13.8: General Buck Turgidson (George C. Scott) struggles with the Russian Ambassador. Peter Sellers (right) playing the US President, rebukes them for fighting in the War Room.



Figure 13.9: Major T. “King” Kong rides a nuclear bomb on its way down, where it will trigger the Soviet Doomsday Machine and ultimately destroy the world.



Figure 13.10: Benjamin Netanyahu has stated repeatedly that, with or without US support, Israel will attack Iran, an action that could escalate uncontrollably into World War III.



China could do grave economic damage to the United States through its large dollar holdings. Much of the world's supply of petroleum passes through the Straits of Hormuz, and a war in the region could greatly raise the price of oil, triggering a depression that might rival or surpass the Great Depression of the 1920's and 1930's. Å

The probability of a catastrophic nuclear war occurring by accident is made greater by the fact that several thousand nuclear weapons are kept on "hair-trigger alert" with a quasi-automatic reaction time measured in minutes. There is a constant danger that a nuclear war will be triggered by an error in evaluating a signal on a radar screen.

13.14 Nuclear weapons are criminal! Every war is a crime!

War was always madness, always immoral, always the cause of unspeakable suffering, economic waste and widespread destruction, and always a source of poverty, hate, barbarism

and endless cycles of revenge and counter-revenge. It has always been a crime for soldiers to kill people, just as it is a crime for murderers in civil society to kill people. No flag has ever been wide enough to cover up atrocities.

But today, the development of all-destroying modern weapons has put war completely beyond the bounds of sanity and elementary humanity.

Today, war is not only insane, but also a violation of international law. Both the United Nations Charter and the Nuremberg Principles make it a crime to launch an aggressive war. According to the Nuremberg Principles, every soldier is responsible for the crimes that he or she commits, even while acting under the orders of a superior officer.

Nuclear weapons are not only insane, immoral and potentially omnicidal, but also criminal under international law. In response to questions put to it by WHO and the UN General Assembly, the International Court of Justice ruled in 1996 that “the threat and use of nuclear weapons would generally be contrary to the rules of international law applicable in armed conflict, and particularly the principles and rules of humanitarian law.” The only possible exception to this general rule might be “an extreme circumstance of self-defense, in which the very survival of a state would be at stake”. But the Court refused to say that even in this extreme circumstance the threat or use of nuclear weapons would be legal. It left the exceptional case undecided. In addition, the Court added unanimously that “there exists an obligation to pursue in good faith and bring to a conclusion negotiations leading to nuclear disarmament in all its aspects under strict and effective international control.”

Can we not rid ourselves of both nuclear weapons and the institution of war itself? We must act quickly and resolutely before our beautiful world and everything that we love are reduced to radioactive ashes.

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Chapter 14

AGAINST NEOLIBERALISM AND CORPORATE RULE

14.1 Why corporations are socially and ecologically destructive

The nations of the world urgently need to give their economic systems both a social conscience and an ecological conscience. However, in many nations, corporations control political systems; and the rules that govern corporations prevent them from having a conscience of any kind.

As the famous linguist and public intellectual Professor Noam Chomsky has pointed out, the overriding duty of the Chief Executive Officer of a corporation is to deliver a profit to the stockholders. If the CEO deviates from this duty out of respect for the environment or social justice, the CEO must be fired, according to the rules, and replaced by someone who follows the profit motive more strictly.

Because of the rules that govern them, corporations are intrinsically both antisocial and environmentally destructive. To save the ecosphere, and to save human society, we must rid the world of corporate rule.

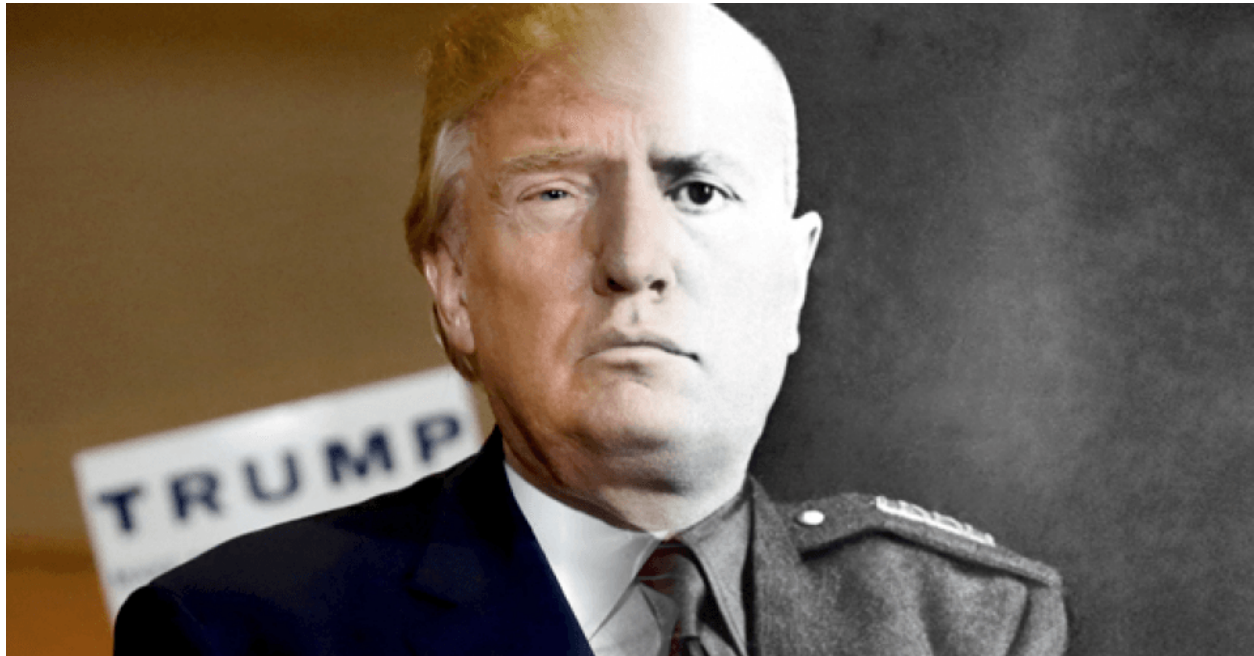


Figure 14.1: Mussolini defined fascism as “corporatism”. It unites the corporate state and the mob.

14.2 An article in The Guardian by George Monbiot

Here are some quotations from the article:

“Imagine if the people of the Soviet Union had never heard of communism. The ideology that dominates our lives has, for most of us, no name. Mention it in conversation and you’ll be rewarded with a shrug. Even if your listeners have heard the term before, they will struggle to define it. Neoliberalism: do you know what it is?”

“Its anonymity is both a symptom and cause of its power. It has played a major role in a remarkable variety of crises: the financial meltdown of 2007-8, the offshoring of wealth and power, of which the Panama Papers offer us merely a glimpse, the slow collapse of public health and education, resurgent child poverty, the epidemic of loneliness, the collapse of ecosystems, the rise of Donald Trump. But we respond to these crises as if they emerge in isolation, apparently unaware that they have all been either catalyzed or exacerbated by the same coherent philosophy; a philosophy that has - or had - a name. What greater power can there be than to operate namelessly?”

“So pervasive has neoliberalism become that we seldom even recognize it as an ideology. We appear to accept the proposition that this utopian, millenarian faith describes a neutral force; a kind of biological law, like Darwin’s theory of evolution. But the philosophy arose as a conscious attempt to reshape human

life and shift the locus of power.

“Neoliberalism sees competition as the defining characteristic of human relations. It redefines citizens as consumers, whose democratic choices are best exercised by buying and selling, a process that rewards merit and punishes inefficiency. It maintains that ‘the market’ delivers benefits that could never be achieved by planning.

“Attempts to limit competition are treated as inimical to liberty. Tax and regulation should be minimized, public services should be privatized. The organization of labour and collective bargaining by trade unions are portrayed as market distortions that impede the formation of a natural hierarchy of winners and losers. Inequality is recast as virtuous: a reward for utility and a generator of wealth, which trickles down to enrich everyone. Efforts to create a more equal society are both counterproductive and morally corrosive. The market ensures that everyone gets what they deserve.

“We internalize and reproduce its creeds. The rich persuade themselves that they acquired their wealth through merit, ignoring the advantages - such as education, inheritance and class - that may have helped to secure it. The poor begin to blame themselves for their failures, even when they can do little to change their circumstances.

“Never mind structural unemployment: if you don’t have a job it’s because you are unenterprising. Never mind the impossible costs of housing: if your credit card is maxed out, you’re feckless and improvident. Never mind that your children no longer have a school playing field: if they get fat, it’s your fault. In a world governed by competition, those who fall behind become defined and self-defined as losers...

“The term neoliberalism was coined at a meeting in Paris in 1938. Among the delegates were two men who came to define the ideology, Ludwig von Mises and Friedrich Hayek. Both exiles from Austria, they saw social democracy, exemplified by Franklin Roosevelt’s New Deal and the gradual development of Britain’s welfare state, as manifestations of a collectivism that occupied the same spectrum as nazism and communism.

“In *The Road to Serfdom*, published in 1944, Hayek argued that government planning, by crushing individualism, would lead inexorably to totalitarian control. Like Mises’s book *Bureaucracy*, *The Road to Serfdom* was widely read. It came to the attention of some very wealthy people, who saw in the philosophy an opportunity to free themselves from regulation and tax. When, in 1947, Hayek founded the first organisation that would spread the doctrine of neoliberalism - the Mont Pelerin Society - it was supported financially by millionaires and their foundations.

“With their help, he began to create what Daniel Stedman Jones describes in *Masters of the Universe* as ‘a kind of neoliberal international’: a transatlantic network of academics, businessmen, journalists and activists. The movement’s rich backers funded a series of thinktanks which would refine and pro-

mote the ideology. Among them were the American Enterprise Institute, the Heritage Foundation, the Cato Institute, the Institute of Economic Affairs, the Centre for Policy Studies and the Adam Smith Institute. They also financed academic positions and departments, particularly at the universities of Chicago and Virginia.

“As it evolved, neoliberalism became more strident. Hayek’s view that governments should regulate competition to prevent monopolies from forming gave way - among American apostles such as Milton Friedman - to the belief that monopoly power could be seen as a reward for efficiency.

“Something else happened during this transition: the movement lost its name. In 1951, Friedman was happy to describe himself as a neoliberal. But soon after that, the term began to disappear. Stranger still, even as the ideology became crisper and the movement more coherent, the lost name was not replaced by any common alternative...”

14.3 Pinochet’s terror, and the boys from Chicago

Pinochet’s U.S.-backed coup

Here are some quotations from Wikipedia’s article on Augusto Pinochet:

“Augusto Pinochet rose through the ranks of the Chilean Army to become General Chief of Staff in early 1972 before being appointed its Commander-in-Chief on 23 August 1973 by President Salvador Allende. On 11 September 1973, Pinochet seized power in Chile in a U.S.-backed coup d’état that toppled Allende’s democratically elected Unidad Popular government and ended civilian rule. In December 1974, the ruling military junta appointed Pinochet Supreme Head of the nation by joint decree, although without the support of one of the coup’s instigators, Air Force General Gustavo Leigh. After his rise to power, Pinochet persecuted leftists, socialists, and political critics, resulting in the executions of from 1,200 to 3,200 people, the internment of as many as 80,000 people, and the torture of tens of thousands. According to the Chilean government, the number of executions and forced disappearances was 3,095. Operation Condor was founded at the behest of the Pinochet regime in late November 1975, his 60th birthday.

“Under the influence of the free market-oriented ‘Chicago Boys,’ Pinochet’s military government implemented economic liberalization, including currency stabilization, removed tariff protections for local industry, banned trade unions, and privatized social security and hundreds of state-owned enterprises. Some of the government properties were sold below market price to politically connected buyers, including Pinochet’s own son-in-law. The regime used censorship of entertainment as a way to reward supporters of the regime and punish

opponents. These policies produced high economic growth, but critics state that economic inequality dramatically increased and attribute the devastating effects of the 1982 monetary crisis on the Chilean economy to these policies.”

The “Chicago Boys” were Chilean economists who had studied under or were influenced by the neoliberal ideas of Milton Friedman, who taught economics at the University of Chicago,

Torture methods used by the Pinochet dictatorship

Here are some quotations for the Wikipedia article on Pinochet’s torture methods:

“One torture method which was very commonly used was the ‘grill’ or ‘La Parrilla.’ In this torture, electricity was fed from a standard wall outlet through a control box into two wires each terminating in electrodes. The control box gave the torturers the option of adjusting the voltage being administered to the prisoner. The naked prisoner was stretched out and strapped onto a metal bedframe, or a set of bedsprings, and tied down. He or she was subjected to electrical shocks on several parts of the body, especially on sensitive areas like the genitals and on open wounds. The Valech Report includes a testimony of a Chilean man who was interrogated by prison captors. They took off his clothes and ‘attached electrodes to his chest and testicles. They put something in his mouth so he would bite his tongue while they shocked him.’ In another method, one of the wires would be fixed to the prisoner (typically to the victim’s genitalia) while another wire could be applied to other parts of the body. This caused an electric current to pass through the victim’s body, with a strength inversely proportional to the distance between the two electrodes. A smaller distance between the electrodes led to a stronger current and thus more intense pain for the prisoner. A particularly barbaric version of the ‘grill’ was the use of a metal bunk bed; the victim was placed on the bottom bunk while a relative or friend was simultaneously tortured on the top bunk.

“Most prisoners suffered from severe beatings, and broken or even amputated limbs. At Villa Grimaldi, DINA forced non-compliant prisoners to lie down on the ground. The captors ran over their legs with a large vehicle, and crushed the prisoners’ bones. The assailants also beat prisoners in the ear until they became deaf, and entirely unconscious; this torture method was called the ‘telephone.’ Most of the acts of punishment were intended to severely humiliate the prisoners. At the Pisagua Concentration Camp, captors intimidated prisoners by forcing them to crawl on the ground and lick the dirt off the floors. If the prisoners complained or even collapsed from exhaustion, they were promptly executed. Prisoners were also immersed into vats of excrement, and were occasionally forced to ingest it...

“Women were the primary targets of gruesome acts of sexual abuse. Ac-

According to the Valech Commission, almost every single female prisoner was a victim of repeated rape. Not only would military men rape women, they would also use foreign objects and even animals to inflict more pain and suffering. Women (and occasionally men) reported that spiders and live rats were often implanted on their genitals. One woman testified that she had been ‘raped and sexually assaulted with trained dogs and with live rats.’ She was forced to have sex with her father and brother - who were also detained...”

Operation Condor

Below are some quotations from the Wikipedia article on Operation Condor:

“Operation Condor... was a United States-backed campaign of political repression and state terror involving intelligence operations and assassination of opponents, officially and formally implemented in November 1975 by the right-wing dictatorships of the Southern Cone of South America.

“Due to its clandestine nature, the precise number of deaths directly attributable to Operation Condor is highly disputed. Some estimates are that at least 60,000 deaths can be attributed to Condor, roughly 30,000 of these in Argentina, and the so-called ‘Archives of Terror’ list 50,000 killed, 30,000 disappeared and 400,000 imprisoned...”

14.4 *The Shock Doctrine*, by Naomi Klein

Below are some quotations from the Wikipedia article on *The Shock Doctrine*:

“...The book is divided into seven parts with a total of 21 chapters.

“Part 1 begins with a chapter on psychiatric shock therapy and the covert experiments conducted by the psychiatrist Ewen Cameron in collusion with the Central Intelligence Agency. The second chapter introduces Milton Friedman and his Chicago school of economics, whom Klein describes as leading a laissez-faire capitalist movement committed to creating free markets that are even less regulated than those that existed before the Great Depression.

“Part 2 discusses the use of ‘shock doctrine’ to transform South American economies in the 1970s, focusing on the 1973 coup in Chile led by General Augusto Pinochet and influenced by a prominent group of Chilean economists who had been trained at the University of Chicago in the Economics department, funded by the CIA, and advised by Milton Friedman. Klein connects torture with economic shock therapy.

“Part 3 covers attempts to apply the shock doctrine without the need for extreme violence against sections of the population. Klein says that Margaret Thatcher applied mild shock ‘therapy’ facilitated by the Falklands War, while free market reform in Bolivia was possible due to a combination of pre-existing economic crises and the charisma of Jeffrey Sachs.

“Part 4 reports on how Klein thinks the shock doctrine was applied in Poland, China, South Africa, Russia, and the Four Asian Tigers. In Poland she discusses how the left-leaning trade union Solidarity won the country’s 1989 legislative elections, but subsequently employed the shock doctrine as result of IMF pressure. The section on China discusses the 1989 Tienanmen Square Protests, and the liberalization of China’s economy. In South Africa she explains that the negotiations to end apartheid resulted in economic policy that went against the core of the Freedom Charter. In Russia she describes how Boris Yeltsin took power after the collapse of the soviet union and crafted economic policy that made the Russian oligarchs of 2020 possible. Finally she shows that during the 1997 Asian financial crisis the Tiger Nations were forced to sell of numerous state enterprises to private, foreign, companies.

“Part 5 introduces the ‘Disaster Capitalism Complex,’ a complex series of networks and influence employed by private companies that allows them to profit off of disasters. She mirrors this new Disaster Capitalism Complex with the Military Industrial Complex and explains that both employ the blurring of the line between private and public, through tactics like the revolving door.

“Part 6 discusses the use of ‘Shock and awe’ in the 2003 invasion of Iraq and the subsequent occupation of Iraq, which Klein describes as the most comprehensive and full-scale implementation of the shock doctrine ever attempted.

“Part 7 is about winners and losers of economic shock therapy - how small groups will often do very well by moving into luxurious gated communities while large sections of the population are left with decaying public infrastructure, declining incomes and increased unemployment. Klein describes economic policy after Hurricane Katrina, the 2004 Sri Lanka Tsunami, and the Apartheid-style policy of the Israeli government toward Palestinians...”

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APPENDIX

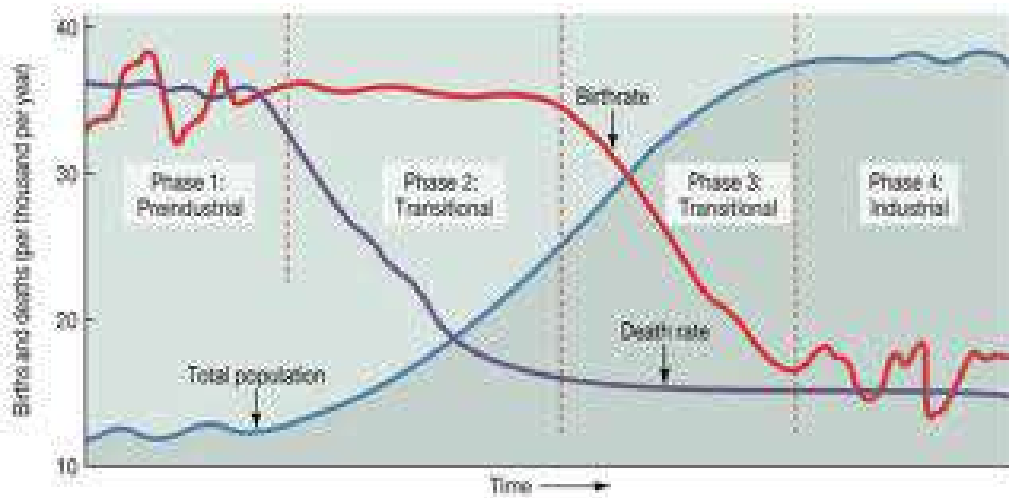


THE WORLD AS IT IS
AND THE WORLD AS IT COULD BE



In the world as it is, 1.7 trillion US dollars are spent each year on armaments.

In the world as it could be, the enormous sums now wasted on war would be used to combat famine, poverty, illiteracy, and preventable disease.



In the world as it is, population is increasing so fast that it doubles every thirty-nine years. Most of this increase is in the developing countries, and in many of these, the doubling time is less than twenty-five years. Famine is already present, and it threatens to become more severe and widespread in the future.

In the world as it could be, population would be stabilized at a level that could be sustained comfortably by the world's food and energy resources. Each country would be responsible for stabilizing its own population.



In the world as it is, the nuclear weapons now stockpiled are sufficient to kill everyone on earth several times over. Nuclear technology is spreading, and many politically unstable countries have recently acquired nuclear weapons or may acquire them soon. Even terrorist groups or organized criminals may acquire such weapons, and there is an increasing danger that they will be used.

In the world as it could be, both the manufacture and the possession of nuclear weapons would be prohibited. The same would hold for other weapons of mass destruction.



In the world as it is, 40% of all research funds are used for projects related to armaments.

In the world as it could be, research in science and engineering would be redirected towards solving the urgent problems now facing humanity, such as the development of better methods for treating tropical diseases, new energy sources, and new agricultural methods. An expanded UNESCO would replace national military establishments as the patron of science and engineering.



In the world as it is, gross violations of human rights are common. These include genocide, torture, summary execution, and imprisonment without trial.

In the world as it could be, the International Human Rights Commission would have far greater power to protect individuals against violations of human rights.



In the world as it is, armaments exported from the industrial countries to the Third World amount to a value of roughly 17 billion dollars per year. This trade in arms increases the seriousness and danger of conflicts in the less developed countries, and diverts scarce funds from their urgent needs.

In the world as it could be, international trade in arms would be strictly limited by enforceable laws.



In the world as it is, an estimated 10 million children die each year from starvation or from diseases related to malnutrition.

In the world as it could be, the international community would support programs for agricultural development and famine relief on a much larger scale than at present.



In the world as it is, diarrhoea spread by unsafe drinking water kills an estimated 6 million children every year.

In the world as it could be, the installation of safe and adequate water systems and proper sanitation in all parts of the world would have a high priority and would be supported by ample international funds.



In the world as it is, malaria, tuberculosis, AIDS, cholera, schistosomiasis, typhoid fever, typhus, trachoma, sleeping sickness and river blindness cause the illness and death of millions of people each year. For example, it is estimated that 200 million people now suffer from schistosomiasis and that 500 million suffer from trachoma, which often causes blindness. In Africa alone, malaria kills more than a million children every year.

In the world as it could be, these preventable diseases would be controlled by a concerted international effort. The World Health Organization would be given sufficient funds to carry out this project.



In the world as it is, the rate of illiteracy in the 25 least developed countries is 80%. The total number of illiterates in the world is estimated to be 800 million.

In the world as it could be, the international community would aim at giving all children at least an elementary education. Laws against child labour would prevent parents from regarding very young children as a source of income, thus removing one of the driving forces behind the population explosion. The money invested in education would pay economic dividends after a few years.



In the world as it is, there is no generally enforceable system of international law, although the International Criminal Court is a step in the right direction.

In the world as it could be, the General Assembly of the United Nations would have the power to make international laws. These laws would be binding for all citizens of the world community, and the United Nations would enforce its laws by arresting or fining individual violators, even if they were heads of states. However, the laws of the United Nations would be restricted to international matters, and each nation would run its own internal affairs according to its own laws.



In the world as it is, each nation considers itself to be “sovereign”. In other words, every country considers that it can do whatever it likes, without regard for the welfare of the world community. This means that at the international level we have anarchy.

In the world as it could be, the concept of national sovereignty would be limited by the needs of the world community. Each nation would decide most issues within its own boundaries, but would yield some of its sovereignty in international matters.



In the world as it is, the system of giving “one nation one vote” in the United Nations General Assembly means that Monaco, Liechtenstein, Malta and Andorra have as much voting power as China, India, the United States and Russia combined. For this reason, UN resolutions are often ignored.

In the world as it could be, the voting system of the General Assembly would be reformed. One possible plan would be for final votes to be cast by regional blocks, each block having one vote. The blocks might be. 1) Latin America 2) Africa 3) Europe 4) North America 5) Russia and Central Asia 6) China 7) India and Southeast Asia 8) The Middle East and 9) Japan, Korea and Oceania.



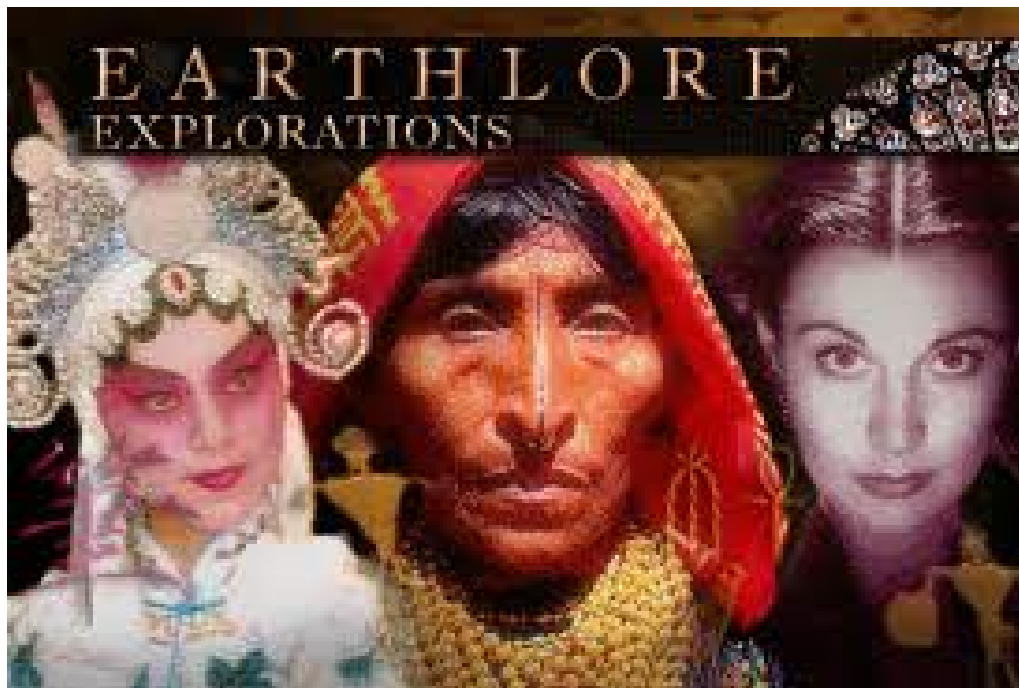
In the world as it is, the United Nations has no reliable means of raising revenues.

In the world as it could be, the United Nations would have the power to tax international business transactions, such as exchange of currencies. Each member state would also pay a yearly contribution, and failure to pay would mean loss of voting rights.



In the world as it is, young men are forced to join national armies, where they are trained to kill their fellow humans. Often, if they refuse for reasons of conscience, they are thrown into prison.

In the world as it could be, national armies would be very much reduced in size. A larger force of volunteers would be maintained by the United Nations to enforce international laws. The United Nations would have a monopoly on heavy armaments, and the manufacture or possession of nuclear weapons would be prohibited.



In the world as it is, young people are indoctrinated with nationalism. History is taught in such a way that one's own nation is seen as heroic and in the right, while other nations are seen as inferior or as enemies.

In the world as it could be, young people would be taught to feel loyalty to humanity as a whole. History would be taught in such a way as to emphasize the contributions that all nations and all races have made to the common cultural heritage of humanity.



In the world as it is, young people are often faced with the prospect of unemployment. This is true both in the developed countries, where automation and recession produce unemployment, and in the developing countries, where unemployment is produced by overpopulation and by lack of capital.

In the world as it could be, the idealism and energy of youth would be fully utilized by the world community to combat illiteracy and disease, and to develop agriculture and industry in the Third World. These projects would be financed by the UN using revenues derived from taxing international currency transactions.



In the world as it is, women form more than half of the population, but they are not proportionately represented in positions of political and economic power or in the arts and sciences. In many societies, women are confined to the traditional roles of childbearing and housekeeping.

In the world as it could be, women in all cultures would take their place beside men in positions of importance in government and industry, and in the arts and sciences. The reduced emphasis on childbearing would help to slow the population explosion.



In the world as it is, pollutants are dumped into our rivers, oceans and atmosphere. Some progress has been made in controlling pollution, but far from enough.

In the world as it could be, a stabilized and perhaps reduced population would put less pressure on the environment. Strict international laws would prohibit the dumping of pollutants into our common rivers, oceans and atmosphere. The production of greenhouse gasses would also be limited by international laws.



In the world as it is, there are no enforceable laws to prevent threatened species from being hunted to extinction. Many indigenous human cultures are also threatened.

In the world as it could be, an enforceable system of international laws would protect threatened species. Indigenous human cultures would also be protected.



In the world as it is, large areas of tropical rain forest are being destroyed by excessive timber cutting. The cleared land is generally unsuitable for farming.

In the world as it could be, it would be recognized that the conversion of carbon dioxide into oxygen by tropical forests is necessary for the earth's climatic stability. Tropical forests would also be highly valued because of their enormous diversity of plant and animal life, and large remaining areas of forest would be protected.



In the world as it is, opium poppies and other drug-producing plants are grown with little official hindrance in certain parts of Asia, the Middle East, and Latin America. Hard drugs refined from these plants are imported illegally into the developed countries, where they become a major source of high crime rates and human tragedy.

In the world as it could be, all nations would work together in a coordinated world-wide program to prevent the growing, refinement and distribution of harmful drugs,



In the world as it is, modern communications media, such as television, films and newspapers, have an enormous influence on public opinion. However, this influence is only rarely used to build up international understanding and mutual respect.

In the world as it could be, mass communications media would be more fully used to bridge human differences. Emphasis would be shifted from the sensational portrayal of conflicts to programs that widen our range of sympathy and understanding.



In the world as it is, international understanding is blocked by language barriers.

In the world as it could be, an international language would be selected, and every child would be taught it as a second language.



In the world as it is, power and material goods are valued more highly than they deserve to be. “Civilized” life often degenerates into a struggle of all against all for power and possessions. However, the industrial complex on which the production of goods depends cannot be made to run faster and faster, because we will soon encounter shortages of energy and raw materials.

In the world as it could be, nonmaterial human qualities, such as kindness, politeness, and knowledge, and musical, artistic or literary ability would be valued more highly, and people would derive a larger part of their pleasure from conversation, and from the appreciation of unspoiled nature.



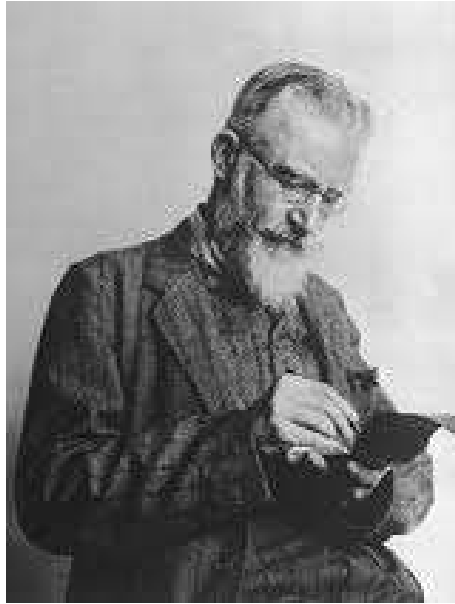
In the world as it is, the institution of slavery existed for so many millennia that it seemed to be a permanent part of human society. Slavery has now been abolished in almost every part of the world. However war, an even greater evil than slavery, still exists as an established human institution.

In the world as it could be, we would take courage from the abolition of slavery, and we would turn with energy and resolution to the great task of abolishing war.



In the world as it is, people feel anxious about the future, but unable to influence it. They feel that as individuals they have no influence on the large-scale course of events.

In the world as it could be, ordinary citizens would realize that collectively they can shape the future. They would join hands and work together for a better world. They would give as much of themselves to peace as peace is worth.



As George Bernard Shaw once said, “Most people look at the world as it is and ask ‘Why?’. We should look at the world as it could be and ask, ‘Why not?’”







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