The Unintended Destruction of the Human Race

The Unintended Destruction of the Human Race

By

Alex Roberto Hybel

Cambridge
Scholars
Publishing

The Unintended Destruction of the Human Race

By Alex Roberto Hybel

This book first published 2024

Cambridge Scholars Publishing

Lady Stephenson Library, Newcastle upon Tyne, NE6 2PA, UK

British Library Cataloguing in Publication Data
A catalogue record for this book is available from the British Library

ISBN: 978-1-0364-1022-3
ISBN (Ebook): 978-1-0364-1023-0

TABLE OF CONTENTS

PREFACE – ACKNOWLEDGMENT

Before deciding whether to read this book, potential readers may ask: Do we need another discourse on global warming and climate change, given the plethora of existing literature on the subject? What fresh insights can it provide that have not already been articulated?

The questions have merit. As a political scientist rather than a climate researcher, my understanding of the environmental challenges confronting humanity stems from the collective research of scientists across diverse disciplines.

Over time, as I absorbed the warnings and calls to take immediate action to forestall our demise, I found myself pondering: How did we arrive at this perilous crossroads?

My objective in this book is not to provide novel scientific findings about global warming and climate change. Instead, my goal is to construct an analytical framework that spans the period from 1450 to 2024. The framework aims to capture the intricate interplay of a myriad of factors, including technological advancements, scientific breakthroughs, the ascendance of individualism, colonial expansion, and pivotal revolutions such as the Scientific, Agricultural, Industrial, American, French, and Digital Communication. Furthermore, it delves into the emergence and spread of democracy, free-market, capitalism, consumerism, imperialism, and globalization. Specifically, I try to explain how each of these factors has woven through the centuries with our conception of progress and our commitment to it, and how they have generated highly costly unintended consequences.

I would not have been able to complete this work without the extensive help of several individuals. Once again, my mother-in-law, Barbara Peurifoy, edited every single chapter, at least twice. My brilliant brother-in-law, Steve Peurifoy, guided me through the scientific data and information I found cumbersome. Marc Johnson, a technologically proficient neighbor and good friend, encouraged me to write a chapter on the Digital Revolution, and helped me decipher some of its principal elements. My long-time Argentine compatriot, Hernán Martinez, patiently responded to some of my ideas and warned me when he thought my argument was moving astray. When all is said and done, however, no one has helped me more than my wife, Jan. She has been my anchor for more than forty years.

Without her love, understanding, companionship, and support, my journey would have been rudderless.

I dedicate this book to my grandson Lincoln and granddaughter Lennon, with the hope they may inherit a world brighter and more promising than the one I foresee.

Alex Roberto Hybel
September 5, 2024.
Marina del Rey, California, U.S.A.

INTRODUCTION

HUMANITY'S DESTRUCTIVE ADDICTION TO PROGRESS

"It is provided in the very essence of things that from any fruition of success, no matter what, shall come forth something to make a greater struggle necessary."[1]
Walt Whitman

Introduction

Though individuals are not immune to committing suicide, as a group, they possess the rational capacity to learn from past mistakes and, thus, avoid their complete demise. This capacity has led millions to recognize that humans have abused their natural environment and must take drastic measures to save it and regenerate it. Among those voicing the most substantial concerns are political, business, and technology leaders who contend that the unceasing application of emerging scientific discoveries and technological advancements will enable humans to continue enjoying the benefits of economic prosperity and avoid their own destruction.

I contest this argument. I maintain that our addiction to progress – the belief that we must always advance our scientific knowledge, create new sophisticated technologies, rely on free-market capitalism to generate greater economic growth and wealth, and craft more democracies to enlarge our freedoms – is unintentionally destroying us.

Structure of the Book

Discovery and the acquisition of knowledge are innate human attributes. Our better understanding of the natural, social, political, and economic environments has gradually strengthened our belief that we could control them better via new scientific and technological discoveries. As new scientific discoveries and technologies increased our capacity to satisfy our most basic needs, we created new ones. Our steady increase in knowledge

and control over the natural environment was accompanied by a change in our attitude about the role we, as individuals, could and must play. Through the centuries, we increasingly questioned autocratic authority and rejected our previous willingness to accept the beliefs and dictates of those in power.

As we enlarged our capacity to control our natural and economic environments, created and satisfied more extensive needs, and defined our destinies with limited governmental intervention, we increased our wealth and standard of living, albeit not equally. The growth in wealth and our right to determine our futures heightened our belief in our right to consume as much as our acquired wealth permitted. The long-term result of those processes was an addiction to consumerism.

Consumerism and the creation of new needs are two crucial forces behind capitalism. New needs and consumerism emerged from the increased labor productivity in capitalist societies. However, consumerism and the constant advent of previously unknown needs are not capitalism's sole foundations. An increase in consumption is only possible if preceded by another essential feature of capitalism: investment. Money and capital are not the same but are related. Money becomes capital when it is amassed to fund ongoing or new investments. The use of money to realize a profit is an old practice. The use of capital becomes capitalism when the entire economy becomes dependent on the investment of capital. In capitalist societies, goods and services are produced primarily to generate profit, which is then reinvested in further production. It is a straightforward, dynamic process. As explained by Karl Marx, M (money) is invested to produce C (commodities), which are then sold for more M (money). In a capitalist society, production and consumption are linked by the markets which mediate all economic activities. Herein lies the inherent destructive force of capitalism.

Without continuous profit growth, capitalism collapses. A continued increase in investments, production, and the sale of commodities spawn growth. This dynamic process occurs not just within developed states but also in the developing world. Though disparities in assumed needs, savings, investments, and consumerism are evident globally, the developing areas witness the conditions under which their counterparts in the developed world live and attempt to emulate them, albeit not always successfully. Global capitalism produces the perpetual growth of production propelled by constant investments; the persistent development of new technologies; the increasing belief, exalted in many countries by democracies, that individuals must have the freedom to use as much of their wealth as they can, even though they ensue at different rates; and the ceaseless extraction

of bounded resources from a planet with a limited capacity to absorb undamaged the toxic waste released on it.

Humans cannot alter the destructive process by developing a worldwide, ecologically responsible mindset and implementing environmentally enlightened policies. They can only stop via the radical conversion of what they have become as humans. Achieving such an end requires two things. First, it demands that we acknowledge that our insatiable craving to improve our lifestyle via the creation and adoption of new technologies and to invest and consume our wealth as much as possible are the core reasons we face an existential threat. Second, it necessitates that we transform ourselves entirely by renouncing the beliefs and behavior that have led us to where we are now. In the chapters that follow, via the analysis of the reinforcing interactions between technology, science, religion, free markets, capitalism, democracy, imperialism, and globalization during the past seven centuries, I explain how we became who we are and demonstrate why we will fail to create a new self, ultimately leading to our own destruction.

To develop an insightful understanding of what has transpired during the past seven centuries, I examine various developments separately, explain how they have impacted one another, and describe how they affected the human race and the ecosystem its members inhabit. To minimize the analysis's degree of complexity, in the last chapter I present a detailed assessment of the impact of the changes in the ecosystem throughout the centuries

The history of the human race's commitment to improving its personal, economic, social, and political environments began long before the middle of the 15th century. However, during that period, the interaction between humans and the way they perceived themselves began to undergo a remarkable transformation. Ten chapters follow this introduction.

In the first two chapters, I address the changes that ensued in two centuries, starting around the middle of the 15th century in Europe. In chapter one, I first discuss the creation of the printing press and its most immediate effects. I then examine the transformations in maritime navigation following the adoption of the compass. Additionally, I explore the ramifications of European explorations and the spread of Christianity on the indigenous populations of the Americas.

As Spain, Portugal, and England created new political, economic, and social landscapes in the Americas, Europe's non-Iberian environment underwent a makeover. The Renaissance, the Reformation, and the Scientific Revolution transformed the nature and structure of the modern world. In chapter two, I discuss the three periods, which at times overlapped one another.

Analysts do not concur on whether the Agricultural and Industrial Revolutions were revolutions and on whether they occurred at different times or overlapped. I do not attempt to postulate a firm argument in chapter three. My intent in that chapter is to single out the critical technological changes introduced in both arenas and to examine the effects they generated in humans' social and economic environments in parts of the European continent.

During the Age of Reason, often termed the 'long 18th century' (1685-1815), the political arena in the West underwent a major transformation. Enlightenment thinkers throughout Europe -- but principally in Great Britain, France, Germany, and eventually the United States -- questioned traditional authority and promoted the view that rationality would help improve the human condition and the quality of political systems. During my examinations of both revolutions, I discuss Adam Smith, the free market, the concept of the 'invisible hand', and the difference between the free market and capitalism. Because there is a tendency among certain economists and historians to argue that the free market is a Western creation, I retrace its reference to Muhammad, the father of Islam.

The American Revolution (1776-1783) and the French Revolution (1789-1799) proceeded during the Industrial Revolution. Though the American and French revolutions took place on different continents, and the conditions that generated each revolution differed substantially, they, like the Industrial Revolution, launched changes that would eventually compel other sovereign international actors to grapple with similarly related issues within their own political, economic, and social landscapes. In chapter four, I discuss the ideas advanced by various philosophers and political leaders during the Age of Reason and how those ideas influenced the leaders of the American and French revolutions.

The Industrial Revolution helped catapult the United States from a developing agricultural nation into one of the world's leading economic powers. As the Industrial Revolution gained momentum during the second half of the 19th century in the northeastern section of the United States, the conquering of the territories West of the Mississippi also fundamentally altered the structure of the republic. Of no less significance, toward the end of the 19th century, several leading political, intellectual, and bureaucratic leaders sought to reorganize the United States' administrative system to strengthen its competitive capabilities in the world system. Because one of the arguments I present is that individualism played a core role in the design of the United States, I move along distinct, sometimes complex, paths throughout chapter five.

First, I present some of the ideas advocated by the leading European thinkers of the 18th and 19th centuries and the way the principal American political figures interpreted them in their effort to gain independence from Britain and create the new republic. Second, I focus on the political and social transformations the United States experienced after its independence and during the 19th century. In the third section, I focus on the Industrial Revolution and its various components, the expansion of the American frontier, and the role individualism played in both sets of events.

To understand the economic and social changes that ensued in the United States during the 19th century, it is important to understand the differences between entrepreneurial individualism and rugged individualism. Both forms of individualism, which I discuss at some length, help illustrate the transformation the United States underwent during the Industrial Revolution and the expansion of its western frontier. Ultimately, however, banks and corporations became the forces that restructured the republic's domestic and international economies. I investigate their roles briefly in this chapter's fifth section, intending to address them in greater detail in chapter six, during the discussion of capitalism and Marxism. In the sixth and last section of chapter five, I examine the enlargement of the decision-making power of the federal government and its effects on the United States' domestic market and its status in the world economy.

During the time the Industrial Revolution helped transfigure the economic structures of Europe and the United States, its most afflicted people, the lower strata, created associations designed to reduce the human and material costs its members were absorbing, and elevate their own standing. As they reshaped their relationships with one another and with political and business leaders, voices expressing the rationales for change and advocating particular types of activities gained momentum. Though those voices typically concurred concerning the burdens workers were enduring and the identity of culprits of their plight, they often posited conflicting remedies. Amid the disputes amongst workers' advocates, a two-millennium-old idea re-emerged and gained strength at the close of the First World War. Two relatively new ideologies accompanied it.

Throughout chapter six, I focus on several related themes. I first identify some of the social gains and ills spawned by the Industrial Revolution. I then discuss in a somewhat abbreviated manner the drive by workers to create labor organizations and the successes and obstacles they encountered. I focus principally on Great Britain and France. In connection with the attempts by workers to unite, I analyze the critical roles Karl Marx, Frederick Engels, Mikhail Bakunin, Vladimir Lenin, and Joseph Stalin played. Next, I conduct an extensive discussion of democracy as a concept,

the way its emergence as a political system changed during the post-19th century, and how the United States, under Woodrow Wilson, sought to build a bridge between democracy and the free market in the global arena. I close the chapter with an analysis of two ideologies – Fascism and Nazism - both of which advocated alternatives to Liberalism and Communism.

Wars are not inevitable, but the tensions before the two world wars were so intense that the principal political leaders would have required extraordinary foresight to lessen them. The power aspirations of Europe's leading actors and nationalism engendered the First World War. The United States' involvement in the war accelerated the war's termination; revealed to the world in no uncertain terms that the United States had ascended to the top of the political and economic power pyramid; and provided a glimpse of the kind of market and political system Washington would try to globalize. However, the United States' involvement in the way also engendered a problem. Unprepared to assume the role its power status granted it, the United States acquiesced to its war allies' demands to force Germany to accept full responsibility for the war and to bear severe costs. Anguished by the death rate during the First World War, the United States and its allies failed to act as Nazism, and Fascism imbued the minds of the political leaders of Germany, Italy, and Japan. The deaths of over 50 million people during the Second World War and the use of nuclear weapons by the United States to defeat Japan convinced Washington that it had to lead in the restructuring of the world system.

Major powers capable of creating a new world order will try to fashion it to serve their interests best. The United States emerged as the globe's most robust entity, but its power was not absolute. The Soviet Union, though it absorbed the most significant number of casualties during the war, was determined to retain its hard-won status. For the next 35 years, Moscow and Washington fought one another in multiple arenas, never directly on the battlefield, to determine which would restructure the global arena according to its political-economic ideology.

As in several earlier chapters, in the seventh one I move along several paths. I first analyze the United States' and the Soviet Union's reliance on technological advancements to generate economic growth. I then explain why Moscow's economic model was markedly less effective than Washington's. The struggle between the two superpowers ended with the demise of the Soviet Union as a state. In the second part of the chapter, I discuss the measures initiated by the United States to propagate market democracy globally and assess its degree of success.

Today's social, political, and economic arenas could not be understood without a discussion of the Digital Communication Revolution. In chapter

eight I trace its evolution. In chapter nine, I summarize the horrific measures humans employed and endured in their quest to create a better world.

In chapter ten, I explain why we will fail to save the human species. I begin with an explanation of the difference between global warming and climate change. I then depict the environmental degradation Earth has undergone, primarily since the Industrial Revolution, and assess, albeit imperfectly, the ecological impact of human activities. I then discuss the various proposals humans have devised to stop the environment's deterioration, the policies they are implementing, and their effects. In the chapter's next-to-last section, I consider the diverse political, economic, social, and individual impediments humans must overcome to prevent their demise. In the last pages, I delineate my rationale for concluding that we cannot exit our destructive path.

I assert that to make a radical change in our course, we need to abandon the conviction that to continue progressing and building a better world, we must preserve our political and economic freedom as individuals. This freedom has compelled us to constantly develop new technologies, produce vast quantities of goods, accumulate as much wealth as our capabilities permit, and consume as much as we desire, all in the name of progress. And yet, that same conviction has made it harder for us to recognize that what we have created is, in addition, to enabling us to live a life much better than the one our ancestors ever lived, it is destroying us. In essence, to avert our self-destruction, we would have to forsake whom we have become.

Notes

[1] Walt Whitman, "Songs of the Open Road," *The Walt Whitman Archive.* https://whitmanarchive.org/published/LG/1881/poems/86. Accessed July 10, 2022.

CHAPTER ONE

THE EFFECTS OF TECHNOLOGY, EXPLORATION AND SCIENCE DURING THE EARLY RENAISSANCE YEARS

Early Technological Discoveries

Humans have always been technologists. For most of their history, they have created new technologies to improve their living conditions and satisfy their ever growing needs and desires. Technologists, however, have not always relied on science to create new machinery.

The utilitarian form of the science idea emerged in the 15th century in Europe. Artists and explorers like Leonardo da Vinci, Michelangelo, Vasco da Gama, and Christopher Columbus were animated by the belief "that knowledge finds its purpose in action and action its reason in knowledge."[1] Among those who had focused principally on science, interest in technology increased with the awareness that for science to develop, experiments and observation were necessary. The philosopher Francis Bacon saw merit in the relationship between the two when he stated in 1620: "The roads to human power and to human knowledge lie close together, and are nearly the same."[2]

Notwithstanding the recognition in scientific and technological circles that their respective endeavors could benefit substantially from a closer interaction, and that in fact sometimes closer collaboration between the two ensued, each continued to follow its own independent path for several centuries. The purpose of this chapter is not to pinpoint the instances in history in which each new scientific and technological accomplishment paved the path for sweeping political, economic, and social transformations. Some of them, however, do merit special consideration.

Through the period between 500 and 1500, the West derived parts of its technological knowledge from the East. Despite the transfer of technological proficiency from the East to the West, during that same period Europeans relied on their own ingenuity and creativity to address some of their own economic challenges. Unable to depend on large numbers of slave

laborers, they searched for labor-saving machinery.[3] The first instrument was the horse. During the Dark Ages in Europe, the invention of the horseshoe; the padded, rigid horse collar; and the stirrup; transformed the horse from a secondary beast, useful only for light duties, into a highly versatile source of energy for times of peace and war. Once the horse was harnessed to the heavy plow by means of the horse collar, it became a more efficient draft animal than the ox. The introduction of the stirrup made the mounted horse a supreme warrior in medieval warfare.[4]

Since ancient times, power harnessed from falling or fast-running water had been used as a renewable energy source for irrigation and for the operation of gristmills, sawmills, textile mills, trip hammers, dock cranes, domestic lifts, and ore mills. Although sails had been used to harness wind power for millennia, the windmill itself remained unknown in the West until the late 12th century, when its use became widespread. Notwithstanding the fact that it was less reliable than water power, wind power became an important substitute in areas that experienced drought and shortage of surface water, and where rivers offered little energy.[5]

The principal metallurgical innovation of the Middle Ages was the manufacture of cast iron. From the beginning of the Iron Age until late in the Middle Ages, the iron ore smelted in the furnaces was not completely converted into a liquid form. It has not yet been determined whether Europeans borrowed the technology from China or developed it on their own. Current evidence indicates that cast iron was first produced at two sites in Sweden, at some time between 1150 and 1350. This data hints at a potential link to the ancient Chinese practice of iron casting, perhaps facilitated through interactions with the Mongols and the Viking settlements situated in the Volga region.

Regardless of its origin, the development of the blast furnace made the fusion possible by enabling the molten metal to be poured directly into molds. The market for cast iron objects emerged in Europe late in the 14th century and was initially driven by the demand for cannonballs. Iron casting made possible the manufacturing of large quantities of cheap and uniform cannonballs. In short time, ironsmiths learned to produce and sell other simple objects for household use, and developed the skills to make different forms of steel from cast iron -- objects of high value when made into weapons. They also learned to make cannons out of cast iron, but most of the smelter's output was converted into wrought iron. However, it was not until 1855 that Henry Bessemer patented the Bessemer process, which made it possible to make steel in vast quantities and at prices that competed with wrought iron.[6]

For thousands of years, different types of devices have been used to measure and keep track of time. The prevailing method of time measurement during that period was the modified sexagesimal system, developed by Sumerians around 2,000 BCE. By the Middle Ages, multiple systems of keeping time had been created, but possibly the most useful technique, though not entirely efficient, was the mechanical clock.[7] It was a clock driven by weights and controlled by an oscillating arm that engaged with a gear wheel. Its origin has been dated to 1386, and it is still present in England at the Salisbury Cathedral. Clocks operated by springs appeared by the mid-15th century. Such innovations made it possible to construct more compact mechanisms and set the way for the portable clock. In addition to the claim that the original creation of the mechanical clock represented a new sense of inquiry into the possibilities and practical uses of mechanical devices, it is evident that its increased usage reflected the greater value being placed on timekeeping in business and other daily endeavors.[8]

It is always risky to contend that a particular invention initiated the transformation of the world system, but it is not uncommon for historians to argue that the adaptation of the printing press was the key to unlocking the modern age. Block printing carved on porcelain had existed for centuries in China before making its way to Europe. Around 1040, Bi Sheng used ceramic materials to develop the first known movable-type system for printing. Europeans did not copy his method, possibly because the Chinese writing system used thousands of characters that seemed unmanageable. Moreover, the longevity of wooden printing blocks was short when compared to the time it took to carve them.[9]

Johannes Gutenberg, a goldsmith from Mainz, Germany, started to experiment with printing techniques in the 1440s. By combining disparate elements of movable type, rag paper, the squeeze press, and oil-based inks, he created a durable and interchangeable metal type that allowed him to print many different pages, using the same letters over and over again in different combinations. In 1454, four years after he had invented the first printing press, he published the "Forty-Two Line" Bible, best known as the *Gutenberg Bible*. In short time, other printing presses emerged. Early on, the users of the new system focused on producing religious books. However, it was not long before they started to print a wider range of non-religious topics that appealed especially to the professional members of the middle class. By 1482, there were about 100 printing presses in Western Europe: 50 in Italy, 30 in Germany, 9 in France, 8 each in Spain and Holland, and 4 in England.[10]

Before the end of the 15th century, Aldus Manutius, a Venetian printer, concluded that he could enlarge the book market by printing smaller-sized

books. He and four associates established the Aldine Press in 1495, and within a three-year period it had printed a five-volume edition of Aristotle's work. The Aldine Press was the first to issue small printed books similar to the modern paperback.[11] It did not take long for the drive to publish smaller and less expensive books to materialize throughout Europe.

The effects of the emergence of the printing press were multiple.[12] The Italian Renaissance had started nearly a century before Gutenberg marketed his printing press. As David Roos explains, during the 14th century, political leaders in city-states like Rome and Florence had set out to revive the Ancient Roman educational system that had produced giants like Caesar, Cicero and Seneca. One of the central projects of the early Renaissance was finding long-lost works by figures like Plato and Aristotle and republishing them. Publishing those texts had been slow and expensive for anyone other than the wealthiest. However, suddenly, by the 1490s, "what had been a project to educate only the few wealthiest elite in this society could now become a project to put a library in every medium-sized town, and a library in the house of every reasonably wealthy merchant family."[13]

For millennia, science had been a largely solitary pursuit. With the newfound ability to publish and share scientific findings and experimental data with a wider audience, scientists made remarkable advances in knowledge and skills in the 16th and 17th centuries. Throughout Europe, scientists working on the same problem began to print the results of their work and share it. By the 1600s, what is presently referred to as the Scientific Revolution of the Enlightenment, began to radically alter the way Europeans viewed the world and the universe. As explained by Elizabeth Eisenstein: "The advantages of issuing identical images bearing identical labels to scattered observers who could feed back information to publishers enabled astronomers, geographers, botanists and zoologists to expand data pools far beyond all previous limits . . . The closed world of the ancients was opened, vast expanses of space (and later of time) previously associated with divine mysteries became subject to human calculation and exploration. The same cumulative cognitive advance which excited cosmological speculation also led to new concepts of knowledge. The closed sphere or single corpus, passed down from generation to generation, was replaced by an open-ended investigatory process pressing against ever advancing frontiers"[14]

Of no less significance, the printing press removed the copying of books from the hands of the Church, thus making it much harder for its leaders to control or censor what was written and what people could read. It was no accident that the breakup of Europe's religious unity brought about by the

Protestant Reformation corresponded with the spread of printing. The printing press, in Martin Luther's words became "the ultimate gift of God and the greatest one."[15] By mid-November, copies of his *95 Theses,* in which he questions the role and behavior of the Catholic Church, were being printed in London. Between 1515 and 1525, his work accounted for a third of all the books sold in Germany.

Luther was not the only one who voiced 'radical' opinions. Before the emergence of the printing press, censorship was not hard to handle – the heretic would be captured, and often burned along with her or his notes. The rapid growth of the printing press made it much harder to destroy all books that challenged the status quo. Every time an edict listing all the banned books was released, publishers printed them, aware that the demand for such books would increase.

In short, the expression of new ideas and their dissemination led to what could be referred to as an increase in the democratization of knowledge and ideas. Louis Sébastien Mercier, best known for his utopian novel *L'An 2440,* in which he engages in a critical review of every aspect of Paris during the pre-revolutionary period and imagines the way an enlightened Paris would look in the year 2440, rephrased and expanded Martin Luther's original commentary by writing: "[Printing] is the most beautiful gift from heaven. It soon will change the countenance of the universe . . . Printing was only born a short while ago, and already everything is heading toward perfection . . . Tremble, therefore, tyrants of the world! Tremble before the virtuous writer!"[16]

The Sail, the Compass, European Explorations, Imperialism, and Christianization

Scholars still debate whether knowledge about the compass was transferred from China to Europe, either directly or via the Middle East, or whether the Europeans invented it independently. What has been established is that the Chinese were the first to invent the magnetic compass as a device for divination in 206 BCE. Their military used it for land navigation in 1040, and for maritime navigation in 1111. The earliest reference to the use of the magnetic compass by the Europeans was made by Alexander Neckam between 1187 and 1202, when he mentions its use during cloudy days or at night.[17]

Along with dead-reckoning methods and Portolan charts (nautical charts of the Mediterranean Basin), the development of the maritime compass began to transform European commerce. During ancient times, travels between October and April were limited, partly because of the absence of

dependable, clear skies. The lengthening of the sailing season brought about a sustained, but gradual, increase in the transfer of goods by ship. The added sailing period enabled Venetian convoys to make two round trips a year to the Eastern Mediterranean region of Western Asia instead of just one.[18] As maritime traffic throughout the Mediterranean increased, so did passages across the English Channel and between northern and southern Europe.

The speed of such voyages would not have been augmented without the creation of reliable ships that depended entirely on wind power instead of a combination of wind and muscle. It started with the combination of the square sail, which had been used from Egyptian times through the Roman Empire period, with the Viking longboats' triangular lateen sail, which had been developed in the Arab dhow. The combination made it possible for ships to sail close to the wind. The adoption of the sternpost rudder, along with the combination of the two sails, enabled sailors to tack into winds blowing opposite to their paths. These changes were facilitated by the introduction of the magnetic compass, improvements in construction and equipment such as enhanced barrels for carrying water, more reliable ropes, sails, and anchors, the availability of navigational charts, and the astrolabe. The ability to sail large ships over greater distances in relative safety marked the end of the Middle Ages and the beginning of Europe's expansion.

Between the 8th and 15th centuries, Venice and neighboring maritime republics were the dominant traders with the Middle East of spices, incense, herbs, drugs and opium. Venetians relied on diplomacy and negotiation to secure favorable terms for building warehouses and consulates at major ports in the Muslim world. In 1403, determined to retain control of the Aegean, the Venetians reached an agreement with the Ottomans that required Venice to pay an annual fee in order to keep its colonies and trade in Ottoman territory. When the Ottomans took over Constantinople in 1453, Venice negotiated the continuation of its trading privileges there and the safeguarding of its colony. Throughout the rest of the 15th century, as several treaties between the Venetians and the rulers of the Ottoman Empire were reached, the latter enlarged its naval capacity, determined to strengthen its position in Europe. Between 1499 and 1503, Venice and the Ottoman Empire engaged in several battles that ultimately forced Venice to seek a peace agreement. Despite costly human and material encounters, trade between the two resumed.[19]

The Republic of Venice, however, was not the only actor in Southern Europe determined to enlarge its commercial power. By the end of the 13th century, the Emirate of Granada in southern Spain was all that remained of Hispanic Islam. The frontiers between Moors and Spaniards lingered in a fluid state for more than 200 years. During this period, relationships

between the bordering populations remained unclear, without war or peace being able to generate stable conditions. The obstacles to a solution favorable to the Spaniards began to crumble in the late 1460s, when Isabella, half-sister of the king of Castile, married Ferdinand, heir to the Aragonese throne. The married couple became the rulers of almost two-thirds of the peninsula's land and population after the death of Castile's king in 1474.[20]

With a substantial portion of Spain's territory still controlled by Moors, and with the presence of one of Europe's largest Jewish communities, Isabella and Ferdinand decided to transform their domains into true Christian kingdoms.[21] With assistance from the Portuguese, they launched the drive to expel Moors from Granada.[22] After a 10-year struggle, they succeeded. The victory had a monumental effect. As a historian noted in 1492: "[T]his is the end of the calamities of Spain. This is the term of the happiness of this barbarous people [Muslims], which, as they say, came from Mauritania some 800 years ago and inflicted its cruel and arrogant oppression on conquered Spain."[23] With the peninsula free of Moors, Isabella and Ferdinand concentrated their efforts on their second target – the "infidels," Jews.

In the summer of 1478, the two monarchs summoned a council to prepare a program designed to reform the Church in Spain. From early on, attendees launched a series of accusations against Jews who, in an attempt to avert violence and discrimination, had converted to Christianity. The council members claimed that the "new" Christians were reverting to the Jewish faith, and that this act threatened the fabric of Castilian society and its regime. Shortly thereafter, Pope Sixtus IV issued a Bull authorizing the start of inquisitions in Seville. In 1492, Isabella and Ferdinand released two edicts. The decrees stated that those who had not been baptized as Christians by the end of July would have to leave the kingdoms of Castile and Aragon, and would not be allowed to return. The implementation of diktats brought about the disintegration of what had been the largest Jewish community in Europe.[24]

With Castile and Aragon free of "infidels," the Spanish monarchs pressed on. Committed to transforming Spain into a geopolitical entity, they sought to revive Castile's economy, which had lost nearly two-thirds of its tax revenue since the beginning of the century. In addition to allowing municipal governments to employ craft guilds that benefited from wage, price, and production controls, they promoted the export of products that Castile could produce at competitive prices, and introduced mercantilist measures that prohibited the export of gold and the import of commodities that could undercut the national industry and agriculture.[25] As these measures were being implemented, the two monarchs wondered whether

their attempts would be enough to outpace the benefits generated by Portugal's latest maritime victories.

Portugal in the 15th century was a weak European entity. With a very small and poor population, the monarchy had searched for access to overseas commodities to sell to wealthier entities throughout Europe. During that period, it took over the uninhabited Madeira archipelago, began to colonize the Cape Verde islands, reached the Gulf of Guinea and created the settlement of Elmina, and rounded the tip of Africa.[26]

As those expeditions were being carried out, Christopher Columbus approached representatives of the Portuguese king with a unique proposal. As an alternative to reaching Asia, Columbus proposed a westward course to Cipango (Japan) and Cathay (China) based on the estimation that the distance separating Europe from East Asia was 2,400 nautical miles.[27] Initially, Portugal's king was excited by the idea, but before making a decision, he appointed a committee of scholars to analyze Columbus's plan.

The committee found the proposal unsound and recommended that it be rejected. The committee summarized its argument by contending that, according to their calculations, Asia could not be reached by sailing west because it was too far away from Europe. [28] Ironically, though the committee was correct in its assessment and the king of Portugal agreed to follow its advice, their estimation and decision denied Portugal the chance to become the first European entity to exploit the Americas. [29] Without a financial sponsor, Columbus turned to Spain's two leading monarchs.

In 1492, Isabella and Ferdinand agreed to finance three-quarters of the costs of the expeditions. Three ships departed from Palos de la Frontera on August 3, 1492. On September 2, the ships rendezvoused at La Gomera, where another ship had its fore and main lateen sails re-rigged to standard square sails. On September 6, the three departed La Gomera and reached the Bahamas on October 12.

The distance they covered was not exceptionally long. Millennia before, people whom we now refer to as Austronesians had sailed from present day Taiwan to reach the maritime islands of Southeast Asia and Melanesia. By about 900 BC, their descendants had covered nearly 4000 miles to reach Tonga and Samoa. A few centuries later, but long before Europeans had reached the Americas, they had landed in Hawaii, New Zealand, and Easter Island. Polynesian navigators relied on star navigation, the observation of birds, and the use of waves and swells to detect land. Moreover, as already noted, prior to Columbus's Atlantic journey, the Portuguese had conducted extensive explorations along the African coast. By 1488, four years before Columbus had reached America, Bartolomeu Dias had rounded the Cape of Good Hope on the southern tip of Africa. The event disproved the view

advanced centuries earlier by Ptolemy that the Indian Ocean was land-locked.

For an extended period, Columbus was credited with being the first to notice the magnetic declination. Subsequent studies demonstrated that the existence of magnetic declination had been observed in Europe as early as 1450. More importantly, at least for historians and geophysicists, it was later established that the Chinese had recorded multiple compass observations of declination between 720 and 1829.[30] Setting aside the fact that Columbus was not the first to realize that the magnetic compass was an imperfect instrument, what he learned during his voyage proved to be of great significance to subsequent sailors.

On September 13, seven days after the three ships had departed La Gomera, Columbus wrote in his journal that "at about nightfall the needle varied to the N.W. and on the following morning still more so."[31] The variation had not happened rapidly. For some days prior to the 13th, he had observed increases in the deflection of the magnetic needle. Shortly afterward, however, he noted that the variation had ceased and the magnetic point to the true North was in conjunction with the North Star. After the 13th, the variations resumed and moved from the northeast more and more westerly toward the pole.[32] Such variations generated consternation among Columbus's crew. To assuage their fears he explained that the lines of no deflection from the meridian line seemed to possess sufficient regularity to design a means and method to ascertain longitude. In short, Columbus was able to establish that the compass could not be regarded as an accurate instrument in running lines. He corrected the effect of the declination of the needle -- that is, its variations from the true meridian -- by allowing for the amount of this variation as established for the place and time, or as determined by observations made with that intent.

Spanish and Portuguese Colonization of the Americas

Columbus's arrival at the islands off the American eastern shore initiated the radical transformation of the political, economic, and social structure of the world system. His letter to his providers in Spain described what other explorers and adventurers would in short time seek. [33] He wrote: "On the thirty-third day after leaving Cadiz I came into the Indian Sea, where I discovered many islands inhabited by numerous people. I took possession of all of them for our most fortunate King by making public proclamation and unfurling his standard, no one making any resistance. The island called *Juana*, as well as the others in its neighborhood, treat itis exceedingly fertile . . . In the island, which I have said before was called *Hispania*, there

are very lofty and beautiful mountains, great farms, groves, and fields, most fertile both for cultivation and for pasturage, and well adapted for constructing buildings. Besides, this *Hispania* abounds in various kinds of species, gold, and metals. The inhabitants . . . are all, as I said before, unprovided with any sort of iron, and they are destitute of arms, which are entirely unknown to them, and for which they are not adapted; not on account of any bodily deformity, for they are well made, but because they are timid and full of terror . . . But when they see that they are safe, and all fear is banished, they are very guileless and honest, and very liberal of all they have. No one refuses the asker anything that he possesses; on the contrary they themselves invite us to ask for it."

After Columbus had informed Isabella and Ferdinand of the riches and opportunities he had encountered, the two monarchs, determined to enlarge their kingdoms' material power, relied extensively on Christianity to attain their goal. Their success against the Moors had convinced them that they had been expressly chosen by God to spread Christianity. This conviction was strengthened by Pope Alexander VI, who, following the eviction of Moors from Granada and the inquisition against Jews, had conferred on the royal couple the title "Catholic Kings." In praise for their commitment he released a bull that stated: "Among other works well-pleasing to the Divine Majesty and other things desirable to our heart, certainly the most outstanding is that the Catholic Faith and Christian Religion especially in our times is being exalted and spread everywhere and the salvation of souls subdued and brought under that faith."[34]

Alexander VI's formal statement elicited an ethical dilemma. During the Crusades and throughout the struggle against the Moors' occupation of Spain, the Church claimed that the wars were justified because they were against infidels who had wrongfully occupied Christ's land or had taken over territory (Spain) inhabited by Christians. To engage in war, the war had to be just; and for the war to be just, infidels had to act against Christians first. Equally important, all through the Crusades the Church's contention had been that because Muslims did not have Christian faith, reaching a negotiated compromise with them was unacceptable. The only alternative left to the Crusaders was to kill the "infidels." By the start of the 16th century the Spaniards had modified both standards. They designed their justification during the conquering and colonization of the Canary archipelago in the 1470s.

Since none of the inhabitants of the Canary archipelago had ever attempted to take over the "Holy Land" or any territory occupied by Christians, to claim a just title to it, the Spanish queen asserted that the extension of the faith principle justified wars against non-Christians and

seizure of their territory. The logic was that it was just for the Spaniards to rely on war because it was unlawful for the natives of the Canary archipelago to resist carriers of Christianity.[35] During the conquering of the archipelago, the Spaniards also had to resolve how they would treat its inhabitants. They presented three arguments. First, as just noted, they argued that it was the responsibility of the conquerors to convert the natives to the Holy Christian Faith. Second, they concluded that the subjugated inhabitants had to be compelled to work in services assigned to them by the conquerors at just wages. And third, they proposed that those who accepted Christian dominion and its faith had to be accepted as Castilian subjects and, thus, were entitled to full possession of liberty and property.[36]

Isabella placed great value on the three principles. In 1503, she ordered the first governor of Hispaniola that "the Indians be converted to our Holy Catholic Faith and their souls be saved and because this is the greatest benefit that we can desire for them, for this end it is necessary that they be instructed in the things of our faith, in order that they will come to a knowledge of it and you will take much care that this is accomplished." She added, "Because for mining gold and performing other works which we have ordered done, it will be necessary to make use of the service of the Indians, compelling them to work in things of our service, paying to each one a wage which appears just . . ." She also commanded that towns "be established in which the Indians can live together, as do persons who live in these our Kingdoms."[37]

The conquering and colonization of the American southern continent continued at a fervent pace for the next 40 years. In the 1550s, Charles V, who had become king of Spain in 1516 and emperor of the Holy Roman Empire and king of Austria in 1519, abdicated in favor of his son Philip II. By then, it was not uncommon for Charles V's advisors and myth creators to claim that God had granted him the "Empire, kingdoms, dominions, and lordships, and universal monarchy of all, and by His hand will be guided."[38] By the time Philip II had replaced his father, the Crown of Castile had divided its extensive American dominion into the Viceroyalty of New Spain and the Viceroyalty of Peru. Spain added two other viceroyalties to address changing conditions in the Americas and globally. The last one, the Viceroyalty of New Granada, was created in May 1717.

The relationship between the Crown and its American viceroyalties was defined by several principles. First, the viceroyalties belonged exclusively to the Crown, not to Spain. The Castilian crown possessed full sovereignty over them and all their offices and properties. Second, each viceroyalty had a viceroy who served as the King's representative in the colony (or, as has been stated, the "King's *alter ego*").[39] The viceroy was more than a civilian

and political leader -- he was also the, "vice-patron of the Catholic Church."[40] Third, the Crown's just right over the viceroyalties was a consequence of its obligation to evangelize the Native Americans, as dictated by Pope Alexander VI's bull.[41] To facilitate evangelization, Castile and the Church established the clerical estate, an ecclesiastical organization with the same status as the clergy of metropolitan Spain. The two established a contractual relationship whereby Catholicism would become the official religion but the Church would be subordinate to the Crown except on matters of dogma and the maintenance of religious discipline. The Church took extraordinary measures to protect its monopoly. It prohibited the immigration of individuals who practiced a different religion, and it established the Inquisition to punish religious heretics. The monarchs, in turn, granted the clergy *fueros* – special privileges -- just as they did for members of the military.[42] Fourth, to mobilize Native American labor systematically and legally, the Crown authorized the creation of encomiendas. With the encomienda, the Crown granted a person or corporation the right to collect stipulated dues and services from the inhabitants of towns, villages, and other populated places in a particular region for a specified period.[43]

Though the powers of the viceroy within the colonies were not unlimited, he faced very few restrictions. A quasi-legislative body responsible for addressing grievances against the viceroy, existed but was not fully independent institution. The system the Spaniards created did not have legislative institutions comparable to the ones the British created in their American colonies.[44] Moreover, because the Spanish crown allowed very little trade interaction between the colonies and other countries, and because there was a monopolistic relationship between Spain and the colonies, the latter were not able to develop their domestic economies. Thus, throughout the entire colonial period, the state, in the form of the authority of the Spanish monarch and his appointed viceroy in one of the viceroyalties, was always the leading entity. During that period, the idea of equating private property with freedom did not take root in Spanish America. The state was the dispenser of rights, and the power to challenge its dictates was almost nonexistent.

The absence of independent powers, however, did not signify that orders and rules were always executed. On the contrary, the tendency "to observe but not obey" became a very common practice.[45] As summarized by J. H. Elliot, the oligarchies of the Indies achieved "a kind of autonomy within the wider framework of a centralized government run from Madrid." The system fell far short of the aspirations of the monarch, but it also "left the Indies heavily dependent on the Spanish crown."[46]

Treasures from the Americas filled up the royal reserves of the Castilian kingdoms and private coffers until the 1570s. By the end of the 16th century, however, Castile could not produce enough grain to feed its own inhabitants, its textile and shipbuilding industries were faltering, and its American trade and silver extraction were declining. To make matters worse, around the turn of the century Castile was struck by a plague that killed vast numbers of people. New epidemics and famines would continue to batter various Spanish kingdoms through much of the 17th century.[47]

Portugal's colonization of Brazil differed measurably from Spain's. When Pedro Alvares Cabral landed at Coroa Vermelha in today's state of Bahia, he and his crew encountered conditions unlike those found by the Spaniards.[48] Most significant, they did not come across vast quantities of precious metals, and the Brazilian native populations they came upon were mainly hunter-gatherers who had not created highly structured societies similar to those built by the Aztecs and Incas. It was not long before the arriving Portuguese realized that they would have great difficulty employing the indigenous people as cheap labor. The original inhabitants refused to acquiesce to the demands of the invaders; escaped to, and hid in, areas away from the coast as soon they felt threatened; and experienced high rates of mortality when they became exposed to the Western pathogens.[49]

In 1532, Portugal established its first settlement at São Vicente in São Paulo. In contrast to Spanish colonial developments in New Spain and Peru that expanded from the coasts inland, Portugal settled mainly in the coastal area. The first attempt to colonize Brazil followed the system of hereditary captaincy. The captaincies were granted by royal decree, namely to merchants, soldiers, sailors, and petty nobility. This method enabled the Portuguese crown to limit the high costs of colonization.[50] Between 1534 and 1536, King John III divided the land into 15 captaincy colonies. The captains were granted ample powers to administer and profit from their possessions.

Unable to use the indigenous population to address its labor needs, Portugal set its eyes on Africa. Unlike Spain's colonies, Brazil became dependent on African slavery from very early on. Demand for sugar in Europe had enticed Arabs to cultivate sugarcane in Northern Africa and to use slaves to supply the intense labor needed to carry out the cutting and milling processes. The Portuguese adopted their method to grow sugarcane in their Atlantic islands and to use their outposts in western and southern Africa to capture or buy slaves.[51]

During their first century as a colonial power in the Americas, the Portuguese held a monopoly on the importation of slaves for the Spanish colonies and Brazil. It has been estimated that around 35 percent of all

Africans captured in the Atlantic slave trade were sent to Brazil. The slave trade in Brazil continued for nearly two hundred years and lasted the longest of any country in the Americas. African slaves served the interests of the Portuguese colonists in three distinct ways. First, because many of them came from agricultural societies and were already familiar with the work needed to maintain the profitable sugar plantations, they had a higher monetary value than indigenous workers. Second, most African slaves were already immune to several of the Old World diseases that killed many indigenous people. And third, African slaves were less likely to flee than the indigenous slaves, since their place of origin was far away. Those African slaves who actually fled, created their own communities of runaway slaves called *quilombos*, which often became established political and economic entities.[52]

Coffee, which was introduced in São Paulo during the mid-1700s and soon spread to other regions, surpassed sugar as Brazil's most valuable export by the 1830s. To satisfy growing labor demands, an estimated one million African slaves disembarked in Brazil between 1801 and 1825, and another million between 1826 and 1850. Together they made up 42 percent of the entire volume of the slave trade. In summary, of the estimated 5.5 million African slaves that were shipped to Brazil, 4.9 million disembarked during the three centuries of the Atlantic slave trade. By 1800, approximately 65 percent of the Brazilian population was Black or of mixed race, while about 30 percent was white.[53]

British Colonization of Parts of North America

It took another century for another powerful European actor to turn its eyes West. Until the second half of the 16th century, neither the English Crown nor Parliament estimated that it was imperative for England to replicate Castile's and Portugal's western maritime adventures. England's population and market had been growing steadily and sharing in the general economic prosperity of Europe. London, moreover, was rapidly becoming an attractive metropolis. But then England's fortunes took a turn for the worse. Exports of cloth began to decline, generating an economic depression that resulted in the widespread displacement of workers. The continuing rise in population, in turn, helped spawn increases in food prices, unemployment, and landlessness.[54]

Those ills were compounded by the religious turmoil that followed the passage of the 1533 Submission of the Clergy Law, which placed the monarch at the head of the state and the church. This statute meant that the Church of England gave up its power and authority to formulate Church

laws without the king's approval. It also signified that any form of religious dissent could be construed as both treason and heresy. Of equal import was the king's decision to divorce his kingdom fully from papal authority. In the Restraint of Appeals Act, Henry VIII's chief minister, Thomas Cromwell, wrote: "[I]t is manifestly declared and expressed that this realm of England is an Empire, and so hath been accepted in the world, governed by one Supreme Head and King having the dignity and royal estate of the Imperial crown of the same, into whom a body politic compact of all sorts and degrees of people divided in terms and by names of Spirituality and Temporality, be bounded and owed to bear next to God a natural and humble obedience."[55] By declaring England an empire, Cromwell declared it a sovereign entity, no longer under the jurisdiction of the pope. Both acts had additional political intents. As the ruler of the newly created Anglican Church, the monarch sought to promote religious and political conformity. To underscore his dual authority, King Charles I declared in the 1620s that "People are governed by the pulpit more than the sword in time of peace."[56] The Anglican Church thus became one of the central supporters of regal authority.[57]

The increase in regal authority did not cultivate an outflow of civil harmony. The most unyielding and determined Protestants in England were the "Calvinist/Perkins' Puritans," who, in their resolve to change the Anglican Church, wanted to transform society as well. This commitment to changing both the Church and society was inspired by Jean Calvin and modelled on the teachings of William Perkins.

Calvin published the first edition of his Institutes of the Christian Religion in 1536. In the French-speaking Geneva, Switzerland, he and his supporters created a system in which the church, though separate from the state, ruled on all moral and religious matters. The system's governing body – the Consistory – was composed of ministers and laymen elders elected by the city council. The Consistory imposed a strict religious and moral code on the citizens of Geneva and turned every conceivable sin into a crime. Excommunication and banishment from the community became common practices, and so did the execution of apostates, heretics, adulterers, pregnant single women, and rebellious children. Calvinism became an ideology based on the claim that Rome's Church had become corrupt, and on the Renaissance assumption that "inspired" individuals, working as members of a "Reformed Church," could create a good society, one committed to serving God.

In England, the most influential Protestant doctrine was closely associated with the school of thought advocated by William Perkins. His teachings were respected by both the clergy and the laity, and were studied