

COLUMBIAN EXCHANGE DATA ANALYSIS

Each of the three students in your group will create one clearly designed map portraying the diffusion of 1. disease and population decline, 2. plants and animals, and 3. silver. You will share and explain your (one) map and charts with the other students in your group, then determine the final conclusions as a group. Use the maps in the Hammond Atlas of World History.

1. DISEASE DIFFUSION AND POPULATION CHANGE (DEMOGRAPHY)

- Draw the general diffusion routes of the following diseases on the world map provided. The width of the arrows should reflect the number of disease diffused. (The arrow portraying diseases diffusing from Europe to the Americas should be three times wider than diseases from the Americas to Europe.) See the text map on p. 472 for examples of variable width flow lines/arrows.

Europe to Americas

small pox
measles
diphtheria
typhus
influenza
tuberculosis

Americas to Europe

syphilis
hepatitis

Europe to Africa

syphilis

Africa to Americas

malaria
yellow fever

- Draw the basic outline of European peripheries/colonies in the Western Hemisphere and Africa by 1600 - Atlas map # 1, p. 67.
- Identify and locate on your map other European territories and colonies in Southeast Asia and Oceania (Pacific Ocean region) by around 1800 - Atlas maps pp. 70, 71, 112
- Use the charts and graphs provided to draw bar charts of estimated populations in 1000 and 1700 for Europe, Africa, the Americas, and Oceania on the map provided.
- Draw the bar charts on the continent or region, using the textbook chart, p. 461 as an example of bar charts. (You will create two bars showing population change for each region.)
- Each of the bar charts should be proportional to the other bar charts.
- Create an additional bar chart for population decline in New Spain in 1520 and 1600, using the **line graph** provided.
- Create your own symbol/s to clearly portray the impact of disease diffusion to each continent.
- Create an appropriate map title, with historical time period years, and a key portraying your symbols.

2. PLANTS AND ANIMAL (LIVESTOCK) DIFFUSION

- Use symbols, arrows, a key, the data sheet, and your knowledge of historic trade and diffusion routes to locate and draw the diffusion of sugar, potatoes, horses, and maize/corn on the map provided. First, put the key events of each of the four agricultural products above in chronological order.
- Use the maps and data provided, and Atlas maps pp.6, 13, 60, 69, 83 to create your map.
- Draw the European peripheries in the Western Hemisphere and Africa, using the Atlas map # 1, p. 67
- Identify and locate on your map other key states, nations, or regions of world plant and animal diffusion
- Create your own symbol/s to clearly portray the impact of the most important events of the plant and animal diffusion to each region (ie., a chain to portray slavery to grow and produce sugar).
- Create an appropriate map title, with historical time period years, and a key portraying your symbols.
- Answer the questions below on a separate sheet of paper.

PLANTS AND LIVESTOCK DIFFUSION QUESTIONS

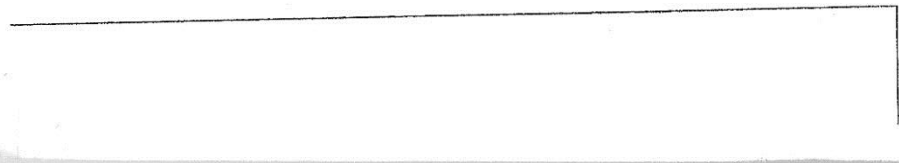
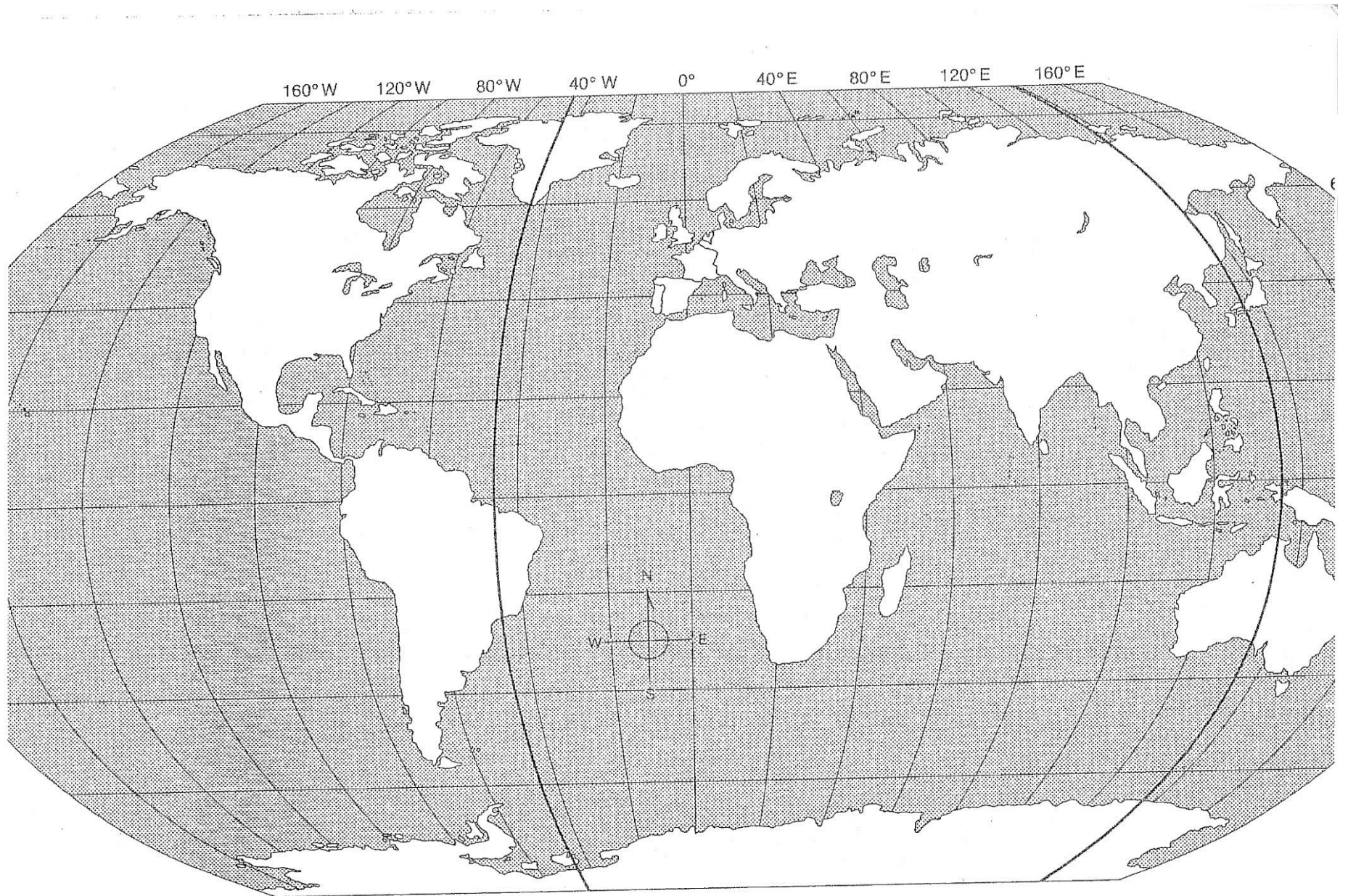
- a. What do you think were the four most important types of livestock animals that diffused from Europe to the Americas? Why?
- b. Which two of those four types of livestock are the most widely dispersed throughout the Americas today?
- c. Why do you think there was so little diffusion of animals from the Americas to Europe?
- d. Why was planting wheat and grapes in the Americas so important to the Spanish and Portuguese?
- e. What do you think were the three most important plants diffused from the Americas to Europe? Why?
- f. What were the two most important plants diffused from the Americas to Africa? Why?
- g. What were the three most important plants diffused from Europe to the Americas? Why?

3. SILVER TRADE AND DIFFUSION

- Draw the general amount of silver traded to and from each of the states, peripheries, or regions described on the map provided, using the information in the readings. The width of the arrows should reflect the approximate amount of silver traded.
 - Draw the European peripheries in the Western Hemisphere and Africa, using the Atlas map # 1, p. 67.
 - Identify and locate on your map other key states, nations, or regions of the silver trade, using Atlas maps pp 66-71, 106 #2.
 - Create your own symbol/s to clearly portray the impact of silver mining and diffusion in Peru and Mexico, China, Europe, and one other region or state/country (ie., deforestation, inflation).
 - Create an appropriate map title, with historical time period years, and a key portraying your symbols.
 - Answer the questions below on a separate sheet of paper.
- a. Was the silver trade truly global?
 - b. What were the most significant impacts of silver production and trade from 1550-1650 on Peru, Mexico, Spain, China, Japan, and one other region/state of your choice?
 - c. What were the most significant long term consequences of silver production and trade AFTER 1650 on Peru, Mexico, Spain, China, and one other region/state of your choice?
 - d. How and where might historians find and research information on this trade?
 - e. Why might historians come to different conclusions regarding the impacts of the silver trade?

COMBINED, FINAL CONCLUSIONS

Using and discussing the three maps and charts you have created and analyzed as a group, what do you think were the two most important short term consequences from 1450 -1600 and the two most important long term consequences of the “Columbian Exchange” after 1600? Briefly explain your reasoning on a separate sheet of paper.



Population Trends

Questions: What do these population charts show about relationships in population size, and comparative trends in population size, among the major inhabited regions of the world? Population pressure did not drive European expansion in the 15th century, because population was falling temporarily, but were there longer-term trends, from the year 1000, that might have encouraged the expansionist

effort? What societies show the greatest changes in population levels between 1000 and 1800? What might have caused these changes? Finally, what do the charts suggest about the demographic position of Europe in the 20th century compared to the world as a whole?

Reading population statistics provides vital information, but it also raises questions, including ones about causation, which numbers alone cannot answer. What other data would be most helpful to put these figures in appropriate world history contexts? Which figures are more revealing: absolute numbers or percentages? Why?

Population Levels (Millions)

Years

Continents	1000	1700	1800	1900	1975
Europe	36	120	180	390	635
Asia (includes Middle East)	185	415	625	970	2300
Africa	33	61	70	110	385
Americas	39	13	24	145	545
Oceania (includes Australia)	1.5	2.25	2.5	6.75	23
Totals	294.56	1125.90	1516	2175	3888

Note: Earlier figures are only estimates; they are fairly accurate indicators of relative size.

Source: Adapted from Dennis H. Wrong, ed., *Population and Society* (1977).

Percentages or Proportions of Total World Population

Years

Continents	1000	1700	1800	1900	1975
Europe	12.2	19.6	19.7	24	16.3
Asia	62.9	67.6	69.3	59.8	59.2
Africa	11.2	10.0	7.8	6.8	-9.9
Americas	13.4	2.1	2.7	8.9	14.0
Oceania	0.4	0.4	0.3	0.3	0.6

Source: Adapted from Dennis H. Wrong, ed., *Population and Society* (1977).



Figure 23.3. A 16th-century print of Aztec Indians suffering from smallpox during the Cortés invasion (1518-1519).

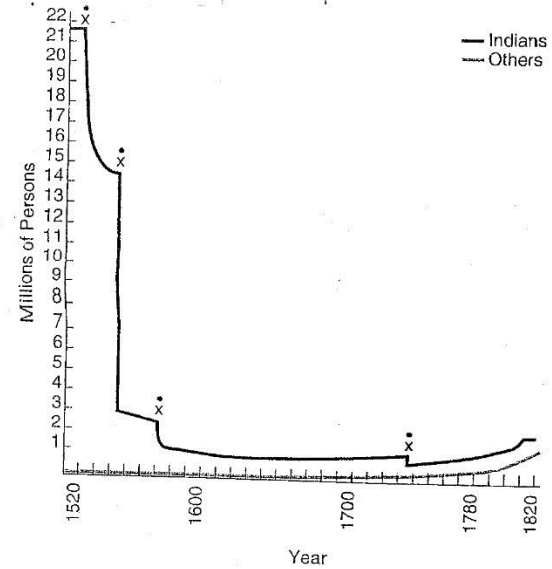


Figure 25.4. Population decline in New Spain.

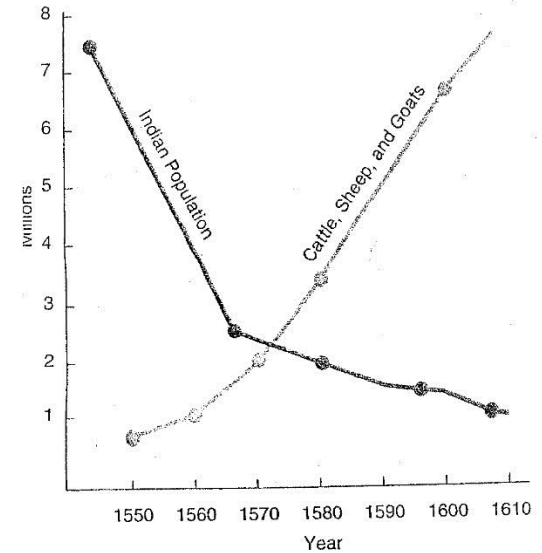


Figure 25.5. A comparison of human and livestock populations in central Mexico.

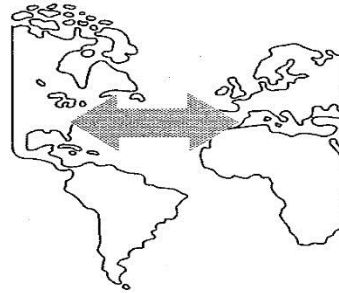
Diseases Transferred as a Result of Exploration 1492-1610

When the first European expeditions reached the Caribbean in the 1490s, contact was established between the populations of the Americas and the rest of the world. Americans, separated by oceans from the rest of humanity for thousands of years, had developed some immunity to the diseases endemic to their part of the world. Europeans unwittingly carried the germs of diseases common in Europe to the Americas; they also carried the germs of diseases common in the Americas back to Europe. Millions died as a result of this sudden exposure to unfamiliar pathogens.

MAJOR DISEASES

Imported to the Americas from Europe

- **Smallpox** Viral disease spread by air. Causes scarring, blindness, and (commonly) death.
- **Measles** Highly contagious viral disease spread by contact. Causes risk of secondary infection and death in weak and undernourished victims.
- **Influenza** Highly contagious viral disease spread by air. Causes risk of secondary infection, particularly pneumonia, which can kill already weak victims.
- **Tuberculosis** Bacterial disease spread by air. Causes severe damage to lungs and (commonly) death.



Imported to Europe from the Americas

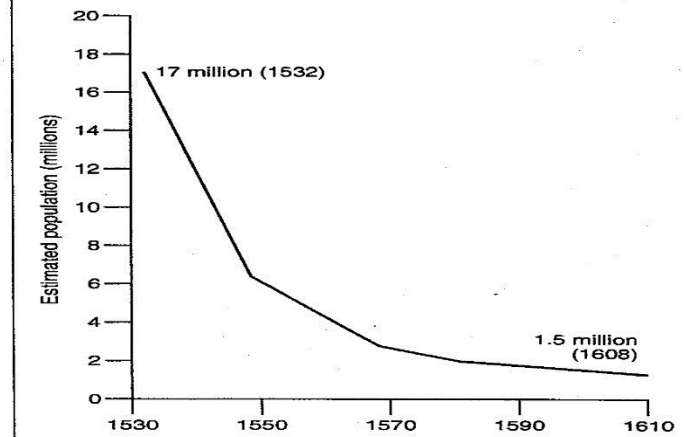
- **Syphilis** Bacterial disease usually spread by sexual contact. Causes blindness, deafness, heart disease, mental illness, paralysis, and death (up to 30 years after initial infection).
- **Hepatitis** Viral disease spread by contact or contaminated foodstuffs. Causes liver damage, incapacity, and (rarely) death.

IMPACT OF NEW DISEASES

- **Death of millions of Native Americans** On some Caribbean islands, native populations were wiped out completely (e.g., Arawak tribe reduced from a population of 500,000 in 1490s to 11,000 in 1517; within 50 years of first European landings all were dead). Epidemics raged across the mainland, affecting populations as far north as the Great Lakes.
- **Collapse of American civilizations** Death of so many people weakened the ability of established kingdoms to resist European invaders and contributed to the collapse of religions and cultures.
- **Labor shortage** Death of so many Native Americans meant that European plantation owners in the Americas could not find enough workers to employ, leading to mass importation of African slaves.
- **Death of millions of Europeans** A syphilis epidemic swept across Europe in the decades following Columbus' return from the Americas. It spread to India by 1498 and reached China by 1503. Syphilis replaced the plague as the most feared and deadly disease in Europe.
- **Advances in medicine** Arrival of syphilis in Italy prompted Girolamo Fracastoro, a physician at Verona, to postulate microscopic transmission of disease by direct or indirect contact. It also prompted development of pioneering plastic surgery by Gasparo Tagliacozzo of Bologna, who repaired noses disfigured by the disease.

- **Changes in sexual behaviour** As syphilis advanced through Europe, the disfigurements caused by the disease and the high mortality rate among its victims created such fear that new codes of sexual abstinence and purity became fashionable. Medieval tales of unconsummated courtly love became popular and versions appear in much of the literature of the time.

Example of Population Decline in the Americas
Population of Central Mexico 1532-1608



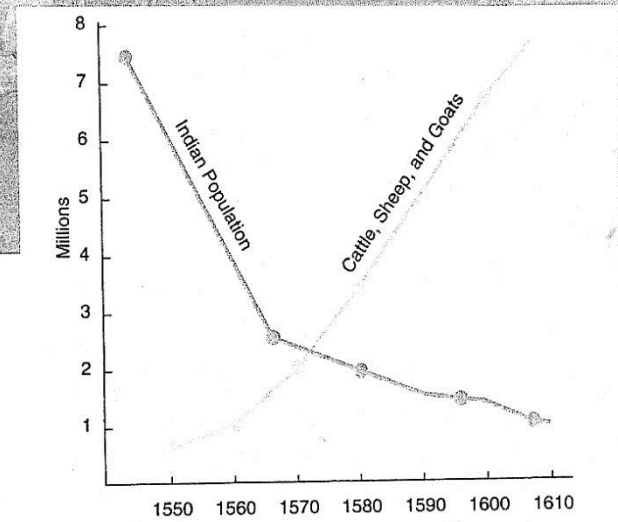
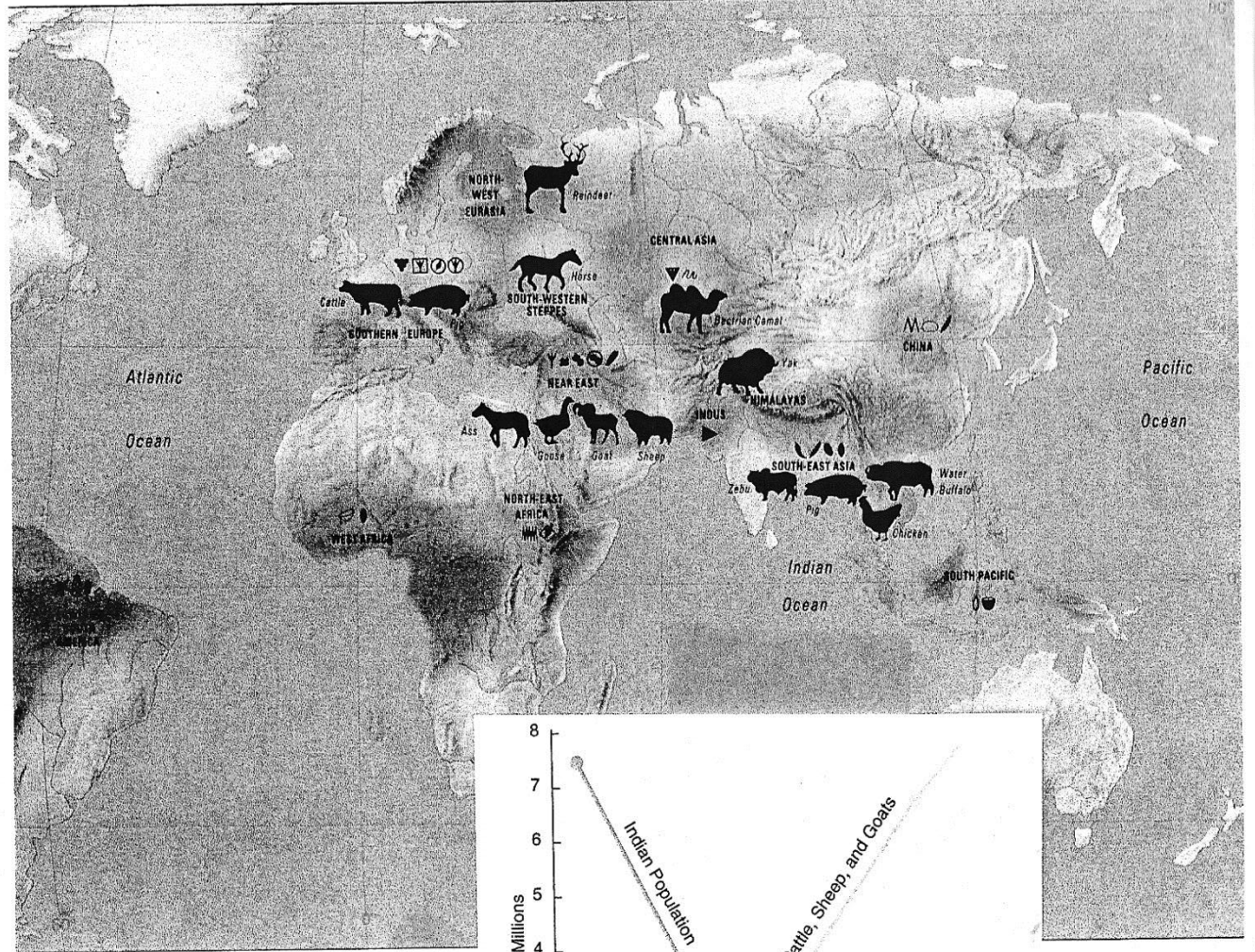
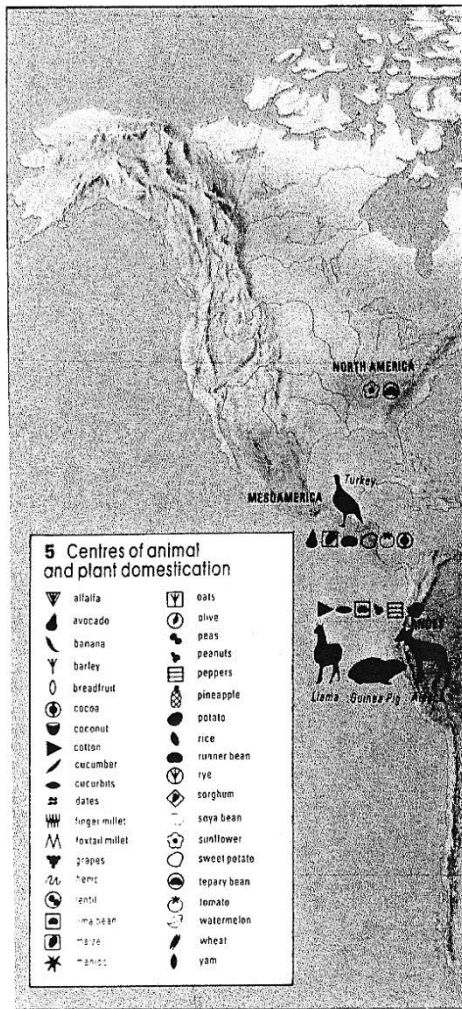


Figure 19.5 A comparison of human and livestock populations in central Mexico.

A. Put the diffusion (movement) of each in correct chronological order.

Sugar
1st sugar reached England in 1300s from north Africa.

Sugarcane first domesticated in New Guinea about 8,000 B.C.

By 1500 spread to Sicily, Italy and Europe from north Africa.

Use of sugar spread to India and Africa from New Guinea by 1,000.

Sugarcane brought to Santo Domingo from Spain by Columbus in 1493. Indians were enslaved to work on sugar plantations.

Portuguese began sugar production in Brazil in 1526.

1st used as medicine, then as sweetener and a food in 1500s and Europe.

After Indians died, Europeans brought Africans across Atlantic Ocean to work on sugar plantations in Caribbean by 1600s.

By 1500 Portugal controlled sugar production on islands off west coast of Africa.

Potatoes
Spread England in 1580s, to Belgium and France in 1600s.

Spread to Germany and eastern Europe in 1700s.

Introduced in New England (Massachusetts) in 1718 by Scotch-Irish immigrants.

Late 1760s, govt of Catherine the Great of Russia encouraged potato production.

Probably first grown in Peru about 6,000 BC.

By 1600, it was introduced into Ireland from England and became the primary food crop.

Potatoes came to be used for cheap food for Spanish sailors and brought back to Spain from Peru on Spanish ships in 1540s.

Introduced into China 1560 and Japan by 1615. ^{from Spanish in Philippines}
Grown in India by late 1600s.

Horses
Horses domesticated in central Asia about 5,000 BC.

Use of horses spread to China, India, Middle East and Europe by 1,000 B.C..

Cortez brought 1st horses to Mexico from Spain in 1519.

Pizarro brought horses to Peru from Spain in 1532.

By 1620 England began to import horses into its colonies in North America like Virginia.

By 1750 horses spread to Canada from England and France.

By 1750 spread to Plains Indians of (Kansas, Okla.) from Mexico and changed their lives by giving them more mobility and hunting ability.

Columbus brought horses to islands of Caribbean in 1493 from Spain.

In 1523 Ponce de Leon brought horses to Florida from Spain.

In 1629 Dutch (from Netherlands) brought horses to Brazil.

Maize/Corn
Corn grown in East Africa by 1561. Became major factor in Africa's population explosion.

Corn (maize) reached Spain by 1493 in Columbus' ship. It probably came from Cuba.

Spread to central and South America and islands by 1492. It was the major food crop Latin America.

Spread through North America and into Canada by 1492.

Scientists discovered corn cobs in central Mexico back to 5,000 BC

Grown throughout Spain and Portugal by 1800s.

In 1700s spread to rest of western and eastern Europe, India and China.

Corn grown in Middle East and west Africa by 1500s.

Used as cheap food for slaves chained to European ships for voyages to the Americas 1600s and 1700s.

- B. Draw the diffusion routes of each on the blank world map in correct chronological order.
C. Use different style arrows/routes for each of the four.

The history and culture of both the Old World and The New World have been influenced greatly by plants and animals. Unlike disease, their introduction has been deliberate. Bread and wine were part of the Spaniards' daily diet. Moreover, the Spaniards were Catholic and were required to take bread and wine as part of their Holy Communion. The New World did not have wheat to make bread, or grapes to make wine. The early Spanish explorers and settlers brought the seeds from Spain. Today, wheat is a staple of the American diet and excellent wines are produced in Argentina, California, and Chile.



Sugar was introduced to the New World in the same way. Spaniards were also accustomed to riding horses, eating beef, goat and pork, and wearing clothes made from wool. These habits led to the importation of cows, goats, horses, pigs, and sheep. Traditionally, these animals were domesticated, but oftentimes they reproduced in the wild. An example of this is on the Argentine Pampas, where cattle reproduced quickly and continue to do so. To this day, cattle ranching is an important industry in Argentina. This was also the case in the North American Southwest, where wild horses reproduced rapidly. Eventually, the Apache domesticated them. The Apache became formidable warriors, due to the mobility the horses gave them. This proved to be very important to the Apache, as early American settlers in the United States moved westward in the nineteenth century.

Animals were often the first Old World settlers to reach a region. The Spaniards traveled in small numbers during their initial exploration of the Caribbean. Frequently, they left pigs and other animals on individual islands so that there would be a food supply for future explorers and for future settlements. This worked well for the Spaniards, but it also proved invaluable for other Europeans who began to prey on the Spanish trade as privateers, pirates, corsairs, and buccaneers. This meant they no longer had to get supplies from Europe. The word "buccaneer" comes from the French word "boucan," which refers to the large wooden pits French pirates used to grill the wild cows they found on deserted islands.

The Columbian Exchange has had an equally profound influence on the Old World and indeed on the entire world. As one studies history, one can see how quickly the New World grew as immigration from the Old World took place at a rapid pace. One might wonder why the population in the Old World did not decrease, if so many people were leaving the Old World to join those in the New World. The answer to this mystery is "New World crops." New World crops such as: beans, corn, manioc, and potatoes, grew remarkably well in the Old World. In fact, the Old World found that many of these crops grew far better than the traditional crops that had been raised for centuries by Old World farmers, because the soil proved to be better suited for the new seeds from the New World. The Old World welcomed these new crops.



An eighteenth-century engraving depicts work on a plantation: African slaves prepare flour and bread from manioc (left) while others hang tobacco leaves to dry in a shed (right). A male turkey—a fowl native to the Americas—ignores the bustle and displays his feathers (right foreground).

The Columbian Exchange greatly increased the food supply in the Old World. An increased food supply, in turn, increased the human reproductive rate. More food meant more people survived to the reproductive age, thereby increasing the population in the Old World. The population increased swiftly enough so that immigration to the New World did not reduce the population in the Old World. Both Africa and Ireland are good examples of how The Columbian Exchange moved the world. Because of the potato, the population in Ireland grew overwhelmingly. Also, from 1650-1850, the



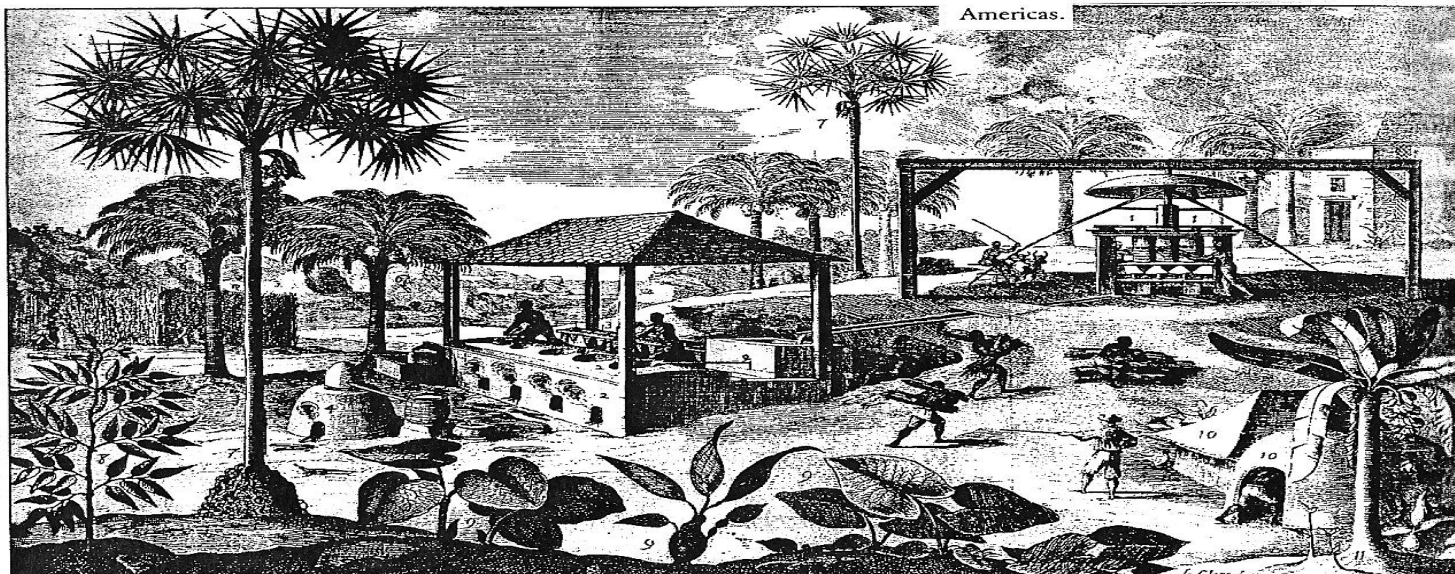
world's population doubled. In less than half that time, from 1754-1845, the population of Ireland boomed from 3.2 million to 8.2 million. If one considers the two million Irishmen who immigrated to the United States during this time, the population explosion is even more impressive. However, in 1846, life in Ireland took a dramatic turn. The "potato blight" hit Ireland, devastated the potato crops, and left millions of people starving.

Africa has a similar story. The trans-Atlantic slave trade drained Africa of millions of its people. Astonishingly, the African population reproduced quickly enough that it almost kept pace with the slave trade. From 1650-1850, Africa's population decreased from approximately 100 million to 95 million. This decrease seems very small, when one considers that between 20-50 million Africans had been forced into slavery during these same years. As the slave trade ended in the 19th century, Africa's population exploded. By 1950, one hundred years later, Africa's population grew to 198 million. Without New World crops, Africa's population would have been almost completely devastated by the slave trade. Without New World crops, Africa's population would never have grown so quickly after the slave trade ended. Today, it is estimated that 490 of 640 crops (77%) grown in Africa are of American and Asian origin.

The examples presented clearly show how The Columbian Exchange transformed the demography of the world. It indeed made possible many historical events and trends. Little did Christopher Columbus know what an influence he would have on the world for centuries to come. Columbus not only showed humankind that the world was larger than imagined, but he also showed that it was smaller at the same time. The Columbian Exchange has permanently transformed the world, making it a more homogenous place. This phenomenon influences even small details of our daily lives. No other event has had such a widespread and lasting effect on the life of humankind and on the life of this planet.]



European moralists often denounced tobacco as a noxious weed, and they associated its use with vices like drunkenness, gambling, and prostitution. Nevertheless, its popularity surged in Europe, and later in Africa and Asia as well, after its introduction from the Americas.



In an engraving of 1667, a European supervisor (lower right) directs slaves on a sugar plantation in Barbados as they haul cane, crush it to extract its juice, boil it to produce molasses, and distill the product into rum. • Arents Collection. Rare Books Division, New York Public Library. Astor, Lenox and Tilden Foundations

The Advantages of the Potato: American Food Crops in the Old World

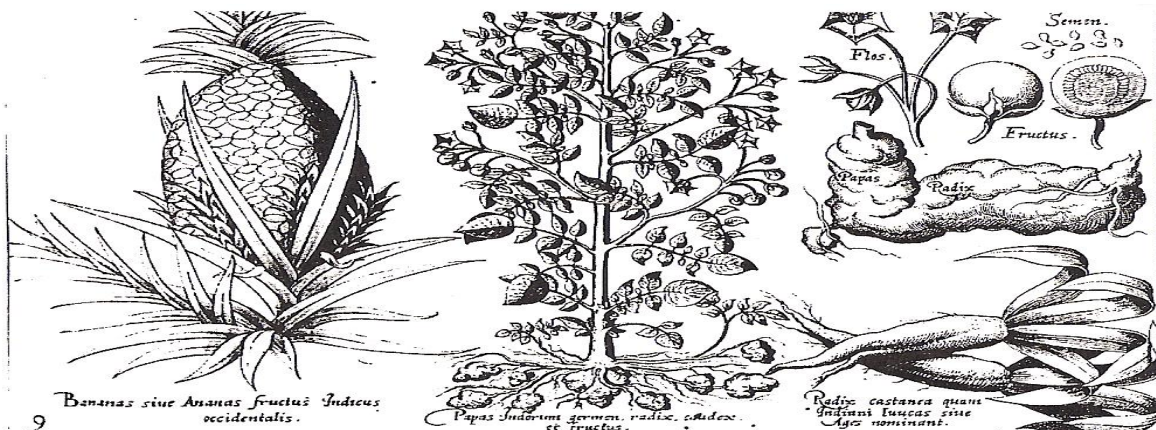
... Why should farmers give up familiar routines and crop rotations to make room for strange plants that looked very different from what they already knew...? Why start to eat something unfamiliar that might be poisonous and that had to be prepared differently from the foods already tried, tested, and available? ... Population Growth, putting pressure on available land and creating a pool of underemployed labor that could usefully be put to work hoeing fields of corn and potatoes during the growing season, was the usual trigger for bringing in American field crops. The reason is this: maize and potatoes had a fundamental advantage over different sorts of grain that Old World farmers already knew. With suitable growing conditions, they produced more calories per acre – sometimes very many more. Take the north European plain for example. Throughout the region, extending from the coast of the North Sea to the Ural Mountains, rye was the only grain that could be depended on to ripen in the short and often rainy summers that prevail there. But potatoes thrived in such a climate and could ordinarily produce about four times the number of calories per acre that rye did. This meant that across the vast plain of northern Europe four times as many people could live on the produce of the soil when they learned to eat potatoes instead of rye bread. The advantages of raising the new crop were even greater than this remarkable ratio suggests because potatoes could be planted on the fallow fields required for successful cultivation of rye. To begin with, therefore, the new crop did not reduce the production of grain in the slightest. Instead, it occupied fields that had previously produced nothing but self-seeded weeds. Potatoes had another advantage, which in fact triggered their initial acceptance in Europe. Ripe grain must be harvested and then stored in a barn, where it constituted a convenient target for tax and rent collectors in peacetime and for plundering soldiers in time of war. European peasants had learned to live with rent collectors, but wartime requisitioning threatened disaster because hungry soldiers were likely to take everything. ... Potatoes, on the other hand, could be left in the ground through the winter and dug only as needed for daily consumption. Soldiers usually could not take the time to dig a field to get their food, and they certainly would never do so if stores of grain were ready and waiting in neighboring barns.]

The Origin of the Horse

... The history of the land bridge area (the Bering Strait) has been one of successive submergences and emergences. During the former periods (submergences) the Old and New World developed independently and divergently. During the latter (periods of emergence), biological revolutions swept both worlds, as life forms native to one, foreign to the other, crossed over into virgin territory.

It is probable that these cross-migrations usually affected the New World more profoundly than the Old, because the latter, being periods of separation and isolation. But America, too, developed unique and long-lived life forms. The modern camel and horse, for instance, are North American in origin. The camels migrated west to become the dromedaries and Bactrian camels of Asia and Africa, and south to become the llamas of Peru. The horses trotted along with them into Asia and thence to Africa and Europe. Both animals disappeared in their homeland, the last of them dying the latter millennia of the last epoch of the Cenozoic, the Pleistocene.

The demise of the horse and camel in North America is part of one of the most important mysterious chapters of the last million years.



Illustrations in an early-seventeenth-century book depict pineapple, potatoes, and cassava—all plants native to the Americas and unknown to Europeans before the sixteenth century.

The Return of the Horse

The three animals which played the leading roles in that conquest were the hidalgo (the Spanish nobleman), the pig, and the horse. The hidalgo led the way – that is clear – but it is difficult to say which of the other two was the more important.

It is possible to imagine the conquistador without his pig, but who can imagine him without his horse? The conquistador came from the most equestrian society in Europe. Medieval Iberia (Spain/Portugal) was the one section of Western Europe where horses were so plentiful and cheap that they were not the exclusive possession of the nobility. This is not to say that every Sancho Panza owned a horse, but it does mean that Iberians of all classes were more accustomed to viewing the world from horseback and more skilled as riders than any other European people with easy access to the Atlantic. The languages of western Europe confirm this: Caballero means knight, nobleman, rider, horseman, gentleman, sir, or mister; Chevalier, from the other side of Pyrenees, also means knight or nobleman, but cannot be so easily stretched to mean also rider or mister.

The first horses to exist in America since the Pleistocene arrived with Columbus in 1493. The transatlantic voyage was not an easy one for horses. ... so many horses died and had to be thrown overboard. ... But the price for getting horses to America was worth paying, and numbers of them were loaded on vessels bound for Hispaniola. By ... 1503 (that island) had not fewer than sixty or seventy.

The enormous value of the horse came not merely from the fact that he provided the conquistador with the services of an excellent beast of burden. In the early years, he was chiefly valuable as an instrument of war. The sight of a man on horseback was so frightening to the Indians... The Indians of South America had never seen an animal as big as the horse. No Indian anywhere had ever seen an animal, which at one time, was as strong, fast, and obedient to the orders of man. The Arawaks suspected that horses fed on human flesh, and a single man on horseback could and did terrify whole crowds of those Indians...

Again and again, the Spanish cavalry turned massacre of Europeans into massacre of Indians...

After the conquest, the horse played a role of a less spectacular but no less significant nature. The conquistador could never have been able to keep the vast sullen Indian populations under control if the horse had not enabled him to transfer information, orders, and soldiers from one point to another swiftly. The horse was a very important carrier and hauler of freight... The horse made possible the great cattle industry of colonial America, which in the final analysis, affected much larger areas of the New World than did any other European endeavor in that period. A swineherd can operate effectively on foot: a vaquero, or cowboy, needs a horse.

Interhemispherical Exchange of Plants and Animals 1492–1610

European explorers were introduced to many new kinds of edible plants by inhabitants of the North and South American continents. Some of these plants were taken to Europe and became a fundamental part of the European diet. Crops introduced to America were taken there by colonists to be grown for profit on plantations and to provide them with familiar food. Animals imported to the Americas created fundamental changes in the lifestyles of the native inhabitants.

PLANTS: EUROPE TO THE AMERICAS

CROPS	DATE INTRODUCED	ORIGINS AND IMPACT
Coffee	Brazil c. 1650 Caribbean c. 1700	Originally from Arabia and Ethiopia. Grown in Mediterranean region during Middle Ages. Became important on American slave plantations.
Oranges	Central America and South America c. 1500 Florida 1700s	Originally from China. Grown in Mediterranean region during Middle Ages. Became an economically important crop in Florida.
Rice	South and Central America c. 1500	Originally from Asia. Grown in Mediterranean region during Middle Ages. Quickly became an important crop in Americas.
Sugarcane	Caribbean c. 1493 Central and South America c. 1500	Originally from Indonesia. Grown in Mediterranean region by 700. Introduced by Columbus to Caribbean, where it became most important crop on slave plantations during period of European domination.
Wheat	Brazil c. 1550 North America c. 1600	Staple European grain crop. Eventually dominated inland prairies of Americas.

OTHER CROPS Bananas, Cabbage, Cauliflower, Chickpeas, Lettuce, Melons, Onions, Yams

PLANTS: THE AMERICAS TO EUROPE

CROPS	DATE INTRODUCED	ORIGINS AND IMPACT
Corn (Maize)	c. 1550	Staple grain crop of South and Central American civilizations. Quickly spread across Europe, producing far higher quantity of grain per acre (hectare) than similarly hardy European grain crops such as barley or millet; soon regarded as second only to wheat.
Potatoes	c. 1550	Staple food of civilizations of the high South American plateau. Easily cultivated in Europe, thriving on poor soil. Provided more carbohydrate per acre than any European root vegetable. Became staple diet of peasants in northern Europe. Introduced to North America by Irish settlers in c. 1700.
Tobacco	c. 1550	Originally from South and Central America. Grown commercially in Europe in Mediterranean region. Introduced to North America in c. 1600, where it became a principal crop grown on slave plantations.
Tomatoes	c. 1550	Originally from South America. Introduced to Europe as a decorative plant. Regarded as highly poisonous in c. 1600. Later became a staple part of southern European diet. Introduced to North America in c. 1700.

ANIMALS: EUROPE TO THE AMERICAS

HORSES

Columbus brought the first horses to the Americas in 1493, on his second voyage of exploration. They were first taken to the mainland in 1519 by Hernán Cortés on his expedition to conquer the Aztec Empire.

Impact

- **Military advantage for explorers** Horses allowed men to move quickly and cover longer distances. They created fear among Native Americans who had never seen horses before.
- **Transport** Life for nomadic, hunter-gatherer groups of North and South America was revolutionized by the introduction of the horse. Horses allowed much greater mobility and made it easier to hunt buffalo.

CATTLE

Columbus also took cattle to America on his second voyage in 1493. The Spanish introduced cattle into Mexico in the 1500s.

Impact

- **Beef industry** Spanish cattle had reached Texas by the early 1700s and raising cattle became an important business in Argentina and Texas by the 1800s.
- **Use of the horse in cattle rearing** Growth of the American cattle industry during the 17th and 18th centuries depended on the use of horses for managing large herds of cattle on grasslands of North and South America.

Who's Driving? The Birth of World Trade: Silver and 1571

(The arguments of Flynn and Giráldez are summarized in this article.)

Why Silver?

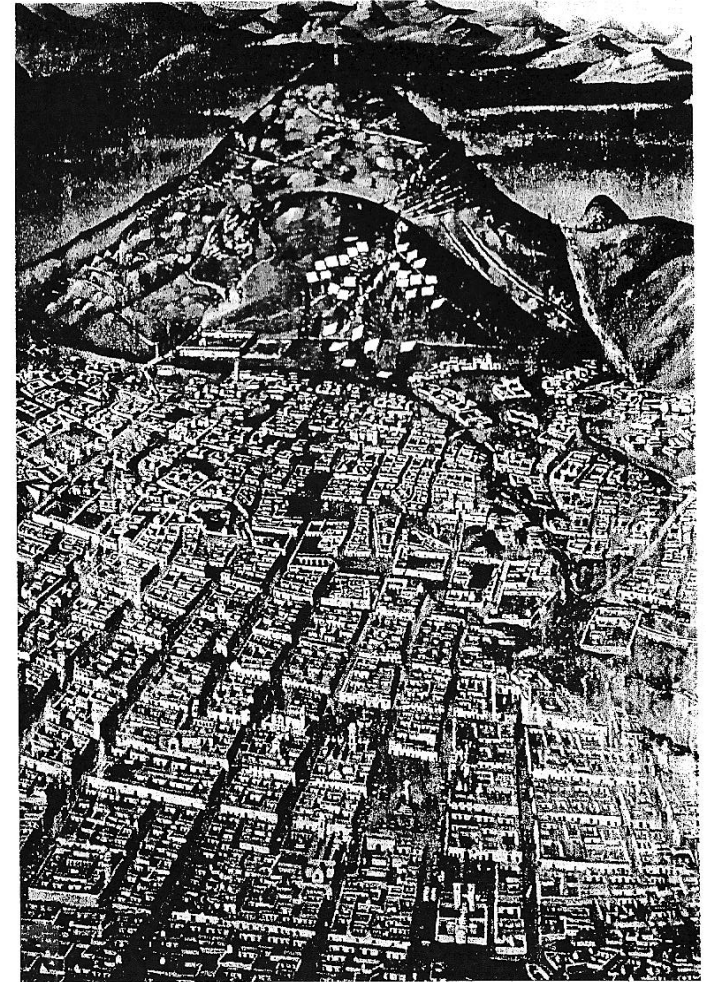
After Hernán Cortés gained control of what is today Mexico in 1519 and Francisco Pizarro gained control of Peru in 1532, huge amounts of silver began to be mined in both regions. This silver enriched the Spanish Empire, but more importantly, it drove world trade in general. Silver was the first global commodity.

Many historians have focused on the use of silver by Catholic Spain to pay for weapons and armies in its efforts to defeat Protestant Europe (primarily part of the Netherlands and the German princely states). The Spanish and Dutch were fighting, but that didn't keep the Spanish merchants from purchasing Chinese export goods from the Dutch who took control of much of this export trade from Portugal. Both the Spanish and the Dutch had silver. Silver also went to Russia via the Baltic Route, to the Middle East, and to the Indian Ocean. Silver as a hard currency was traded for goods in many regions of Afro-Eurasia. Did silver just float around? It was used as the accepted medium of exchange for goods. Where did many of these goods come from? China. Where did the silver go? Much of it ended up in China.

Who's Driving?

The emphasis on Europe and its role in silver trade long encouraged historians to conclude that silver as a commodity and Europe as a region were driving the first global market. China was a sinkhole into which silver was poured by Europeans, because China did not want or need what Europe produced. China was the "Middle Kingdom," self-sufficient and leery of all outsiders, the "barbarians." If Europeans wanted goods, they had to pay for them in silver. From this perspective, Spain was taking silver from Mexico and Peru back to Spain; from there the silver made its way by various routes to China in exchange for luxury goods. Spain was in the "driver's seat."

Is this, however, the whole story? Indeed, is it the accurate story? Dennis O. Flynn and Arturo Giráldez are two economic historians who have looked into current historical literature and have studied data from primary records of the sixteenth and seventeenth centuries. They suggest two points in the article on "Silver and World Trade." First, that China, not Europe, was driving global trade. Second, that China's



Plan of Potosí and the Cerro Rico (Rich Hill), Upper Peru. This seventeenth-century painting shows Potosí and the hills in which the lucrative silver mines were located. The mines at Potosí employed some 40,000 poorly paid Indian laborers and tens of thousands of horses—shown in this painting ascending and descending the hills—to transport the material and drive the machinery.

need for silver was fed in significant part by silver from Mexico and Peru, via Manila, as well as by silver from Japan. Silver coming from Japan demonstrated that Europeans were not the only major suppliers of this global commodity.

Silver coming through Manila indicated that silver was used to establish the first global trading network. Silver was sent from Mexico and Peru across the Atlantic to Spain and across the Pacific to Manila, and on to China.

Producers, Traders, and Entrepôts: Connecting the Global Trade

It is estimated that between 1500 and 1800, Mexico and Peru were responsible for 80 percent of world silver production. China was the main buyer of that silver. From 1615 to 1625, Japanese silver contributed an estimated 30 to 40 percent of world production to foreign trade. In the sixteenth century, the Portuguese were the main distributors of silver from Europe into Asia by sea around the Cape of Good Hope. In the seventeenth century, it was the Dutch.

In 1571, the Spanish established Manila as an entrepôt, or trading port, which gave them a direct link to trade with China. The port connected American silver and Asian goods on a continuous basis for an extended period of time. In 1597, twice as much silver went to China from Manila as from Europe. At the beginning of the seventeenth century, only 15 percent less silver reached China from Manila than from Europe during the same time period. Global trade meant that silver flowed into China from both hemispheres.

Nagasaki was established as an entrepôt in 1571. Indeed, Japan might have been the primary exporter of silver to China in the late sixteenth and early seventeenth centuries.

Why Did People in China Want Silver?

In the late sixteenth and early seventeenth centuries, the price of silver in China was double that in any other place in the world. From 1592 to the early seventeenth century, the gold exchange for silver in Canton ranged from 1:5.5 (one ounce of gold for 5.5 ounces of silver) to 1:7 while in Spain it was 1:12.5 to 1:14. Silver was twice as valuable in China as in Spain. The opportunity for profit centered in China, but not as a result of a deficit of European or even Japanese trade with China. Gold, silk, and porcelain were the main goods exchanged, and China needed silver.

But why did people in China want silver? Paper money had been used in China until the middle of the fifteenth century when it became worthless. The Ming dynasty needed a new currency in order to collect taxes. Silver became the medium of choice for exchange in part because it could be assayed (accurately weighed) for its value. Copper was less reliable, and gold was too rare and expensive. Around 1570, China instituted a single tax system called the Single Whip tax. Taxes were now to be paid in silver. China had one-fourth of the world's population, thus a large amount of silver was required.

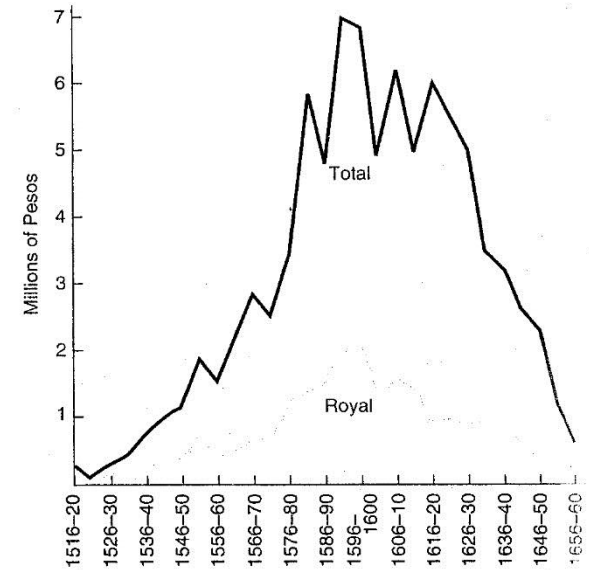


Figure 19.6 Silver production in Spanish America, 1516-1660.

Why was the demand for silver by China important? It drove global trade. Scholars have suggested that superior Western firepower fueled European strength in the Pacific. Flynn and Giráldez suggest, however, that it was the Chinese demand for silver that financed the Spanish push for empire and enriched Portuguese and Dutch traders.

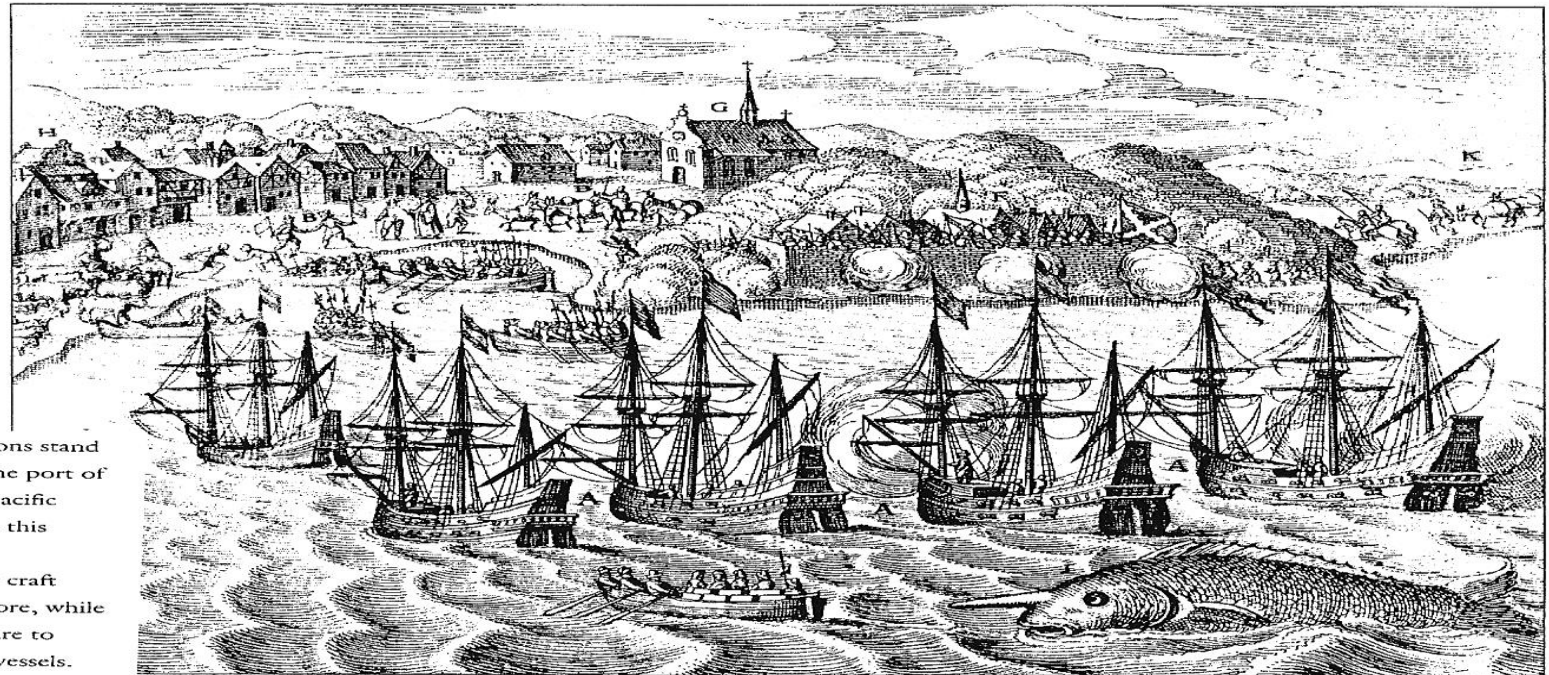
Long-Term Global Effects

The global effect of silver demand was reflected in the prices of many products in the market. The price of Chinese gold, silk, and porcelain rose. As more silver entered China, the value of silver declined and silver's purchasing price decreased. This resulted in an inflationary increase in the price of all commodities in China.

Eventually, the value of silver fell in China despite its vast market. By the late sixteenth century, inflation took hold and the demand for silver fell. This in turn weakened the Ming Dynasty and may have led, in 1644, to its overthrow and loss of the "Mandate of Heaven."

Spain in turn had used its profits to attack emerging capitalist powers in Northwest Europe, including the attack of the Spanish Armada on England in 1588. The result of the decrease in the Chinese demand for silver was the decline of the Spanish Empire, as the weakened value of silver lessened profit to the empire. Other parts of Europe came to the fore. Tokugawa Japan, on the other hand, used its profits to become economically stronger and to withdraw from China's tributary system. Dutch and Chinese merchants could trade at certain Japanese ports, while trade by all others at any Japanese ports was forbidden. Therefore, to trade silver, the Japanese replaced the Portuguese as middlemen with the Dutch and Chinese. Hence, Japan became more isolated from Europeans.

Finally, Africa became connected to the global silver trade because apparently slaves smuggled by the Portuguese into Brazil on the Rio del Plata were received in exchange for silver. These slaves were important on the Brazilian plantations and also as domestic slaves in urban centers like Mexico City. The African slave trade connection to global trade is related therefore to the Ming dynasty, because the Chinese demand for silver created profitable trade in the New World, which in turn created a demand for African slaves.



Five Spanish galleons stand in the waters off the port of Acapulco on the Pacific coast of Mexico in this sixteenth-century engraving. Smaller craft ferry crewmen ashore, while dockworkers prepare to load cargo on the vessels.

The Origins of Global Trade

From the Spanish perspective, the most valuable products of the Americas throughout the sixteenth century were gold and silver. The mine at Potosí, discovered in 1545, was the largest silver mine in the world. Smaller mines were opened in Mexico in 1545 and 1558. In 1556 a new method of separating silver from ore by using mercury, available from Almaden in Spain, was discovered. Between 1550 and 1800 Mexico and South America produced more than 80 percent of the world's silver and more than 70 percent of its gold. The precious metals were exported each year from Latin America eastward to Europe and westward to the Philippines, where the Spanish had captured Manila in 1571 and established their chief trade center for East Asia.



The Manila Galleons

The experience of the Manila galleons illustrates the early workings of the global economy in the Pacific Ocean basin. For 250 years, from 1565 to 1815, Spanish galleons—sleek, fast, heavily armed ships capable of carrying large cargoes—regularly plied the waters of the Pacific Ocean between Manila in the Philippines and Acapulco on the west coast of Mexico. From Manila they took Asian luxury goods to Mexico and exchanged them for silver. Most of the precious metal made its way to China, where a thriving domestic economy demanded increasing quantities of silver, the basis of Chinese currency. In fact, the demand for silver was so high in China that European merchants exchanged it for Chinese gold, which they later traded profitably for more silver as well as luxury goods in Japan. Meanwhile, some of the Asian luxury goods from Manila remained in Mexico or went to Peru, where they contributed to a comfortable way of life for Spanish ruling elites. Most, however, went overland across Mexico and then traveled by ship across the Atlantic to Spain and European markets. [

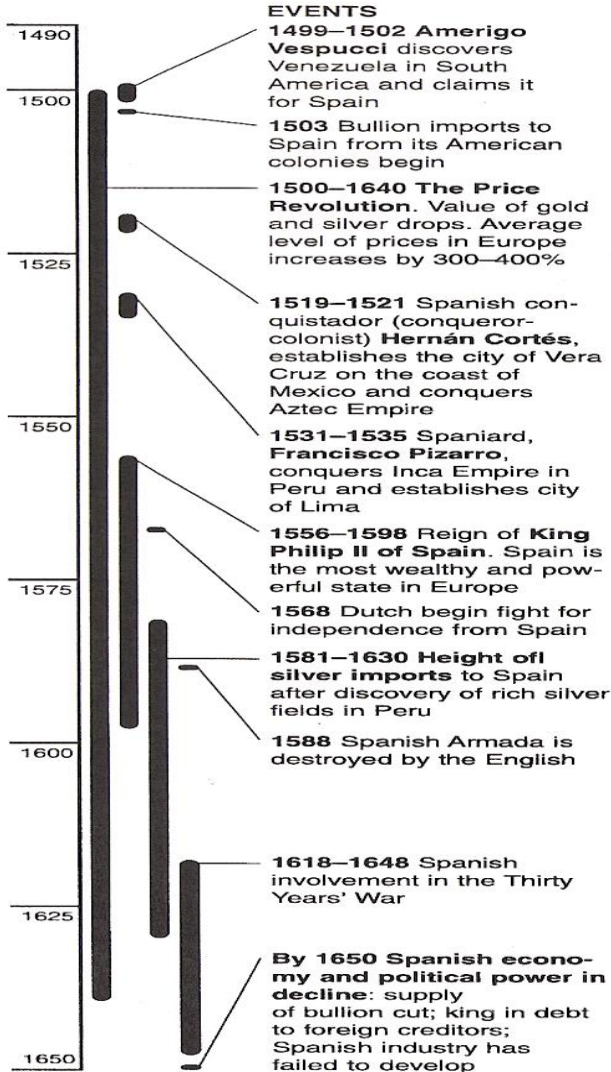
MERCHANT PROFITS

The gold and silver mines of the Americas brought virtual enslavement to the Native Americans, and they benefited the Spaniards less than the merchants of Antwerp, Genoa, Amsterdam, London, and Paris. The Spanish did not have the commercial infrastructure to employ the new resources in profitable investments, and they lacked the ships to carry the trade generated by the new finds of gold and silver. Indeed, they often lacked even the ships to carry the precious metals themselves in the armed and escorted flotillas that set sail each year from the Caribbean to Europe, and from the west coast of Mexico to Manila.

The experienced merchants of the trade cities of Europe organized the necessary commercial services. They exchanged the raw metals for cash and bills of exchange, provided loans to tide over the period from the arrival of one shipment of silver to the next, arranged the purchase of goods needed by the Spanish, and supplied the necessary shipping. The most important of these commercial centers was Antwerp (Belgium), with its extraordinarily skilled and wealthy merchant families, such as the Welsers and the Fuggers.

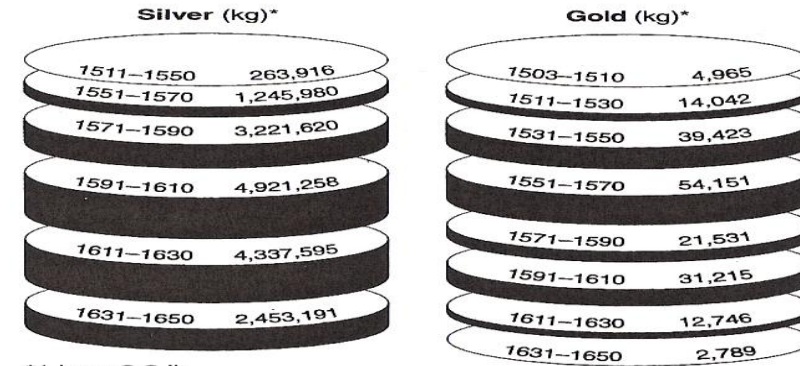
Impact of American Gold and Silver Imports on Europe 1499-1650

During the 16th and 17th centuries, Spain imported boatloads of bullion from its South American colonies. These riches provided currency for Spain to finance wars in support of Catholicism and to purchase consumer and capital goods. Spain imported so much bullion that it created an oversupply of gold and silver in Europe, leading to a fall in the value of gold and silver coins, and an increase in prices (inflation). During the "Price Revolution" of 1500 to 1640, the average level of prices in Europe increased by 300 to 400 percent. Eventually, the supply of bullion dried up, depriving Spain of its main source of wealth.



- IMPACT OF GOLD AND SILVER IMPORTS**
- Increased purchasing power of Spain
 - Expansion of demand for goods and services
 - Expansion of international trade (gold and silver were accepted all over the world as a means of payment)
 - Stimulation of industry throughout Europe (in particular northern Netherlands, England, and France, which competed for Spanish custom)
 - Innovations in industries in northern Netherlands, England, and France, leading to rapid development of these countries.
 - Oversupply of gold and silver, leading to devaluation of currency and spiralling prices (inflation)
 - Inflation throughout Europe as Spanish gold and silver flowed from Spain to other countries in payment for goods
 - Prices rose faster than wages, creating poverty among wage earners and higher profits for entrepreneurs

GOLD AND SILVER IMPORTS 1503-1650



- CAUSES OF DECLINE OF SPAIN**
- Over reliance on bullion for wealth and on other countries to supply goods and services; resulting failure to develop industries during the economic expansion of the 16th century
 - Cut in the supply of bullion, due to diminished production and increasing independence of colonies
 - High taxes to pay for costly wars, cramping business and enterprise
 - Lack of a powerful middle class (such as existed in France and England) to stimulate trade and manufacturing; lack of skilled labor; ruling class contempt toward industry

IN DEPTH

The Great Exchange

The arrival of the Spaniards and the Portuguese in the Americas began one of the most extensive and profound changes in the history of humankind. The New World, which had existed in isolation since the end of the last Ice Age, was now brought into continual contact with the Old World. The peoples and cultures of Europe and Africa came to the Americas through voluntary or forced immigration. Between 1500 and 1850, perhaps to 10 to 15 million Africans and 5 million Europeans crossed the Atlantic and settled in the Americas as part of the great migratory movement. Contact also initiated a broader biological and ecological exchange that changed the face of both the Old World and the New World—the way people lived, what they ate, and how they died—as the animals, plants, and diseases of the two hemispheres were transferred. Historian Alfred Crosby has called this process the *Columbian exchange*, and he has pointed out its profound effects as the first stage of the “ecological imperialism” that accompanied the expansion of the West. In this chapter we have discussed the devastating impact of Old World disease on Native American peoples. Long separated from the populations of the Old World and lacking immunities to diseases such as measles and smallpox, populations throughout the Americas suffered disastrous losses after initial contact. Not only among the dense populations in Peru and Mexico, but in the forests of Brazil and the woodlands of North America, contact with Europeans and Africans resulted in epidemics that devastated the indigenous populations. Only after many generations did immunities build up in the remaining populations that allowed them to withstand the diseases.

Disease may have also moved in the other direction. Some authorities believe that syphilis had an American origin and was brought to Europe only after 1492. In general, however, forms of life in the Old World—diseases, plants, and animals—were more complex than those in the Americas and thus displaced the New World varieties in open competition. The diseases of Eurasia and Africa had a greater impact on America than American diseases had on the Old World.

With animals also, the major exchange was from the Old World to the New World. From the beginning of contact, Europeans noted with curiosity the strange fauna of America, so different from that of Europe. The birds were a hit. Parrots were among the first creatures brought to Europe from America. Many early observers commented on the smaller size of the mammals in the New World and the absence of certain types, not realizing that mastodons, horses, camels, and other animals that had once roamed the Americas had long since disappeared. American Indians had domesticated dogs, guinea pigs, some fowl, and llamas, but in general domesticated animals were far less important in the Americas than in the Old World. Protein resources were thus also more restricted. The absence of cattle and horses had also left the peoples of the Americas without beasts of burden except for the llamas of the Andes.

In the first years of settlement in the Caribbean, the Spanish introduced horses, cattle, sheep, chickens, and domestic goats and pigs, all of which were considered essential for civilized life as the Iberians understood it. Some of these animals thrived in the New World. In the scrub brush and prairies of North America, in the tropical grasslands of Venezuela and on the South American pampas, vast herds of cattle began to roam freely. A hundred head of cattle abandoned by the Spanish in the Rio de la Plata area in 1587 had become 100,000 head 20 years later. Both for the consumption of meat, tallow, and hides in the Americas and eventually for the export of hides and meat to Europe and the rest of the world, the arrival of cattle in the Americas was a revolutionary occurrence. In Mexico, livestock and Spanish *haciendas* grew as rapidly as the Indian population declined and Indian communities contracted. The replacement of Indians by cattle became a metaphor of the conquest of Mexico.

The success of other European livestock was no less impressive. In the Andes and in Mexico, sheep thrived and supported an active textile industry, which eventually supplied most of the local needs. Horses were adopted quickly by the nomadic peoples of North and South America. This adaptation transformed their societies and gave them added mobility, allowing them to meet the Europeans on an almost equal basis. With horses, the Apaches of Arizona and the Indians of the Argentine pampas were able to hold off the Europeans for 300 years.

VARIETIES OF OLD AND
NEW WORLD STAPLES^a
(in millions of calories per hectare)

Chief American Crops		Chief Old World Crops	
Maize	7.3	Rice	7.3
Potatoes	7.5	Wheat	4.2
Sweet potatoes and yams ^a	7.1	Barley	5.1
Manioc	9.9	Oats	5.5

^a Food and Agricultural Organization documents group sweet potatoes and yams together. The caloric value for sweet potatoes is higher than for yams, and more sweet potatoes are raised than yams, so I feel justified in including this statistic.

European livestock, even pigs and chickens, transformed indigenous life in America. Native Americans acquired some animals, such as oxen, slowly, but other animals, such as horses and sheep, had obvious benefits and were acquired more rapidly. The chief-tain in Panama who answered that the greatest benefit Spain had brought to his people was the chicken egg may have disappointed his questioner, but his statement reflected a keen appreciation of the importance of the interchange. The newly introduced animals changed the ecological balance in the New World. Not only animals that were purposefully introduced, but species such as the sparrow and the brown rat, whose arrival was unplanned, changed the nature of life in the Americas.

The Europeans also brought their crops and their weeds. It was hard for Iberians to live without the Mediterranean necessities: wheat bread, olive oil, and wine. Columbus on his second voyage in 1499 introduced wheat, peas, melons, onions, grapes, and probably olives as well as sugar cane. Some crops, such as sugar cane, thrived and provided the basis for the rise of plantation economies; other crops such as wheat, olives, and grapes needed cooler or drier environments and had to wait until the Spanish reached the more temperate zones before they flourished. Later, Europeans introduced all of their own crops and even some crops such as bananas, coconut trees, coffee, and breadfruit that they had found in Africa, Asia, and the Pacific. They also inadvertently introduced other plants, such as tumbleweed, which spread quickly.

In the exchange of foods and stimulants, the contribution of America probably outweighed that of Europe, however. It is difficult today to imagine the diet of the Old World before the discovery of America. New World plants, such as tomatoes, squash, sweet potatoes, types of beans, and peppers, became essential foods in Europe. Tobacco and cacao, or chocolate, both American in origin, became widely distributed throughout the world.

Even more important were basic crops, such as the potato, maize, and manioc, all of which yielded more calories per acre than all the Old World grains except rice. The high yield of calories per acre of maize and potatoes had supported the high population densities of the American civilizations. After the Columbian voyages, these foods began to produce similar effects in the rest of the world. Manioc,

or casava (we know it as tapioca), was a basic Indian food in the Caribbean and tropical South America. Particularly well suited to the tropics, manioc was never popular in Europe, but it spread widely in Asia and Africa, where it became a basic food by the 18th century. The potato, a staple of the Andean civilizations, was easy to grow and yielded large numbers of calories. By the 18th century it was well known from Ireland to Russia. Maize was a great success. It yielded as many calories per acre as rice, but it was easier to grow and could flourish in a wide variety of situations. By the 17th century it had spread to Spain and France, and by the 18th century it was found in Italy, Turkey, Greece, and Russia. The Europeans also introduced it to west Africa and China. Maize became a staple across the globe. At present, at least one-third of the crops raised to feed the world's population are of New World origin.

After 1750, the world population experienced a dramatic rise. The reasons for this expansion were many, but the contribution of the American foodstuffs with their high yields was a central one. Manioc, potatoes, sweet potatoes, and maize—to say nothing of peanuts, beans, and tomatoes—greatly expanded the food resources available throughout the world and continue to do so today. The balance sheet of the Columbian exchange was mixed, but the world was undeniably different after it began.

Questions: Why and in what ways was the Columbian exchange a particularly significant case of global contact? Was western Europe the chief beneficiary of the exchange? What balance was there between the economic dependency of the Americas and the ideas, technology, and goods they received from Europe?

TABLE 3
LARGEST WORLD CROPS IN 1963
(in million metric tons)⁸²

Potatoes	277.6
Rice	257.4
Wheat	250.3
Maize	231.8
Barley*	102.9

* Below barley the amount produced of each crop drops off sharply.