

# Columbian Exchange

**Instructional Objectives:** through the use of this article, you will be able to list and explain the various products that were exchanged between the New World and the Old World as a result of Columbus's Voyages, and will be able to list and explain the impact of those items on both the New World And the Old World



In 1992 there was an international recognition of the Quincentennial of Columbus' voyage to America. This 500th (1492-1992) anniversary was viewed with disdain and downright hostility by Native American communities. However, before the planned events various academic and government institutions in the Americas and abroad met with scholars and Native American leaders to seek ways to celebrate in a more sensitive spirit to all people. Ultimately, by the time the celebrations took place considerable diffusion and compromise resulted in an emphasis of the effects of one of the most dramatic and influential events in

human history. The emphasis tended to focus on the 'Columbian Exchange', a phrase and concept taken from a book written in 1972 by social historian Alfred W. Crosby. The Columbian Exchange was both biological and cultural. This exchange and its effects on the world became the focus of the quincentennial. Subsequently, the Columbian Exchange has become a part of many history texts and courses.

The five hundred years since Columbus arrived in the Caribbean brought many changes to America and the entire world. The most significant change was the the dispossession of Native Americans from most of their native land yet not their total disappearance. It is necessary to make it clear to the public and students that Native Americans are still here and that Native American cultures were as diverse as in the rest of the world. Further, many of the effects of the Columbian Exchange were not well known or understood, especially contributions made by Native American people.

The exchange of specific things are the most tangible and were narrowed down by historians to the most important five in terms of their biological and cultural impact. Many scholars debated about which should be included on this list, but finally settled on the following as having the most significant impact:

## AMERICAN CORN (MAIZE)

American corn or more properly maize is a grass (Podaceae) that was domesticated 5,000-7,000 years ago by Native American people in the Tehuacan Valley in the state of Puebla, Mexico. The word corn comes from an English word that means any hard kernel or grain and in some texts does not refer to 'Indian corn' or maize.



Since A.D. 1492 the world has increased its population 4-5 times and doubled between 1650-1850. Many scholars have proposed a variety of causal factors, but

the increase and improvement of the food supply is clearly the most important factor in population explosions since the beginning of the Columbian Exchange. It is also clear that the addition of Native American food plants is the most significant change for that world food supply. Some of the most important plants from America are:

|               |                  |                 |
|---------------|------------------|-----------------|
| Maize         | Potato           | Sweet potato    |
| Beans         | Chenopods        | Manioc/Cassava  |
| Squash        | Peanut           | Avocado         |
| Chili peppers | Tomato           | Pineapple       |
| Sunflower     | Peanut/Groundnut | Cocoa/Chocolate |

However, in terms of economic and cultural impact maize and potato are the most important and therefore made the list in the Columbian Exchange. There are over forty plants that diffuse to various parts of the world that originated from America and were first cultivated or domesticated by Native American people.

Maize (American Corn) is most significant in terms of agronomy and world wide economic impact. Maize produces good crops in various climatic zones and it prospers in areas too dry for rice and too wet for wheat; thus fitting into a niche between the two. Maize grows quickly and produces almost double the yield of wheat.

|                                      |
|--------------------------------------|
| MAIZE: 7.3 million calories/hectare  |
| WHEAT : 4.2 million calories/hectare |

Maize is used as human food, livestock feed, and export. Maize has gone through complex changes in use and form in parts of Southwestern Europe first and later in Southeastern Europe in the last 100 years. In parts of Africa, India, and China maize continues to fit between various ecological niches. It was combinations of plants from around the world that bolstered economies and resulted in exponential



population growth. In Europe maize is combined with wheat, barley, cabbage, beets, and the potato. In Africa maize is combined with millet, sorghum, yams and sweet potato. Finally, in Asia maize is combined with rice or millet, taro, sweet potato, and wheat. It is these diverse combinations that made maize so important to the rest of the world as it augmented other crops as a food and livestock feed. Maize continues to be important in America and in some areas is a primary food.

The use of maize tends to depend on which variety of plants, ears, and kernel that are combined with endless color variations of kernels to include yellow, white, red, blue, black, grey, and speckled. The varieties are

classified into five basic categories:

| VARIETY | CHARACTERISTIC | USE |
|---------|----------------|-----|
|---------|----------------|-----|

|              |                                |                                |
|--------------|--------------------------------|--------------------------------|
| <i>Flint</i> | Large ears/kernel              | Ripe, gruel, meal, hominy      |
| <i>Dent</i>  | Med. ears, dense kernel        | Ripe, meal, feed               |
| <i>Sweet</i> | Long ears, sm. rd. kernel      | Green, steamed, stew, relishes |
| <i>Pop</i>   | Sm. ears, sm. kernel           | Ripe, popped                   |
| <i>Pod</i>   | Short ears, kernel w/ind. husk | Green/Ripe, meal, roasted      |

Many areas in America use the flint and dent corns in their ripe form, which is where the ear husk has turned brown and the kernel hard. Rather than grinding the dry hard kernel, the kernels are put in a water solution mixed with wood ash (culinary ash) and boiled. This produces a product called hominy or, in Mexico, pozole. This makes the corn far more nutritious with more minerals. Many stews or soups use the hominy or pozole. In Mexican cuisine the pozole is used in menudo (pancita). These may also be processed into various products such as grits or masa; which ultimately end up in gruel or as a meal for such products like corn tortillas and various cornbreads.. Many cornbreads such as corn dodgers, corn pone or hushpuppies are baked or deep fried cornbreads. If you're from Northern areas of the U.S. you are more familiar with sweet corn on the cob or off the cob as a vegetable. Finally, popcorn was originally produced by Native Americans (3,000 years ago+) by placing the dry kernels or cobs on a hot rock slab. This has become a mainstay in our movie theaters and in American homes. In some places they coat the popcorn in various kinds of sugar. However, in some parts of the world popcorn is an oddity and corn is ground up as animal feed.

## POTATO

The potato is originally derived from the Andes of South America where Native Americans cultivated potatoes and other tubers by 10,000 years ago in the high Andean mountains of Bolivia, Peru and Ecuador.



The potato was important as a high altitude crop that could be freeze-dried into a product called *chuno*, which looks like a dried prune. There were about 7-10 cultivated species with thousands (3800) varieties in color, size, taste, and shape. The people of the Andes (Quechua) grew maize, beans, and squash in lower altitudes, but developed a variety of plants that could grow in a high altitude plateau known as the *puna*. Most of these high altitude plants were developed with characteristics to resist the extreme cold of altitudes between 5,000' and 14,000' above sea level. The peanut and potato are two familiar examples, but there were many more less known tubers. Many of these native cultigens are roots or rhizomes that are protected under ground, since nighttime temperatures can drop as much as 40-50 degrees F. Here are a few of those tubers that are beginning to attract attention due to their frost resistance, but also due to their resistance to disease.

| Common Name                  | Scientific Name               | Description  |
|------------------------------|-------------------------------|--|
| Potato, Papa                 | <i>Solanum tuberosum</i>      | 7 cultivated species   |
| Oca, Cavi                    | <i>Oxalis tuberosa</i>        | clover-like with wrinkled, multi-colored tubers                          |
| Arracacha, Apio              | <i>Arracacia xanthorrhiza</i> | carrot-like tuber  |
| Maca                         | <i>Lepidium meyenii</i>       | mustard family; turnip-like tuber, grows up to 14,000'                   |
| Ajipa                        | <i>Pachyrrhizus ahipa</i>     | climbing vine/legume; large 10 lb. root related to jicama (from Mexico)  |
| Yacon, Aricoma               | <i>Polymnia sonchifolia</i>   | sunflower relative; tubers in bunches, also like jicama                  |
| Ulluco, Papa Lisa            | <i>Ullucos tuberosus</i>      | multi-colored/shiny tubers; look like plastic; highly resistant to temp. |
| Achira, Queensland arrowroot | <i>Canna edulis</i>           | lily with edible rhizomes  |
| Mashua                       | <i>Tropaeolum tuberosum</i>   | nasturtium relative; frost tolerant, over 100 varieties                  |

There were other tubers from America, but they tended to be grown in the lowlands of Brazil or the Caribbean and did not spread to other tropical climates. They include the following:

|                       |                                 |  |
|-----------------------|---------------------------------|--|
| Cassava, Manioc, Yuca | <i>Manihot esculenta</i>        | sweet/bitter forms; high starch, but very low in protein |
| Sweet potato, Batata  | <i>Ipomoea batatas</i>          | looks like a yam, but different                          |
| Yampee, Indian Yam    | <i>Dioscorea trifida</i>        | only American yam; other yams originate in SE Asia       |
| Arrowroot, Eredu      | <i>Maranta arundinacea</i>      | rich, starchy rhizome                                    |
| Coco-yam, Yautia      | <i>Xanthosoma sagittifolium</i> | Araceae family   |
| Topee Tambu, Allulia  | <i>Calathea allouia</i>         | sm. hard tubers like water chestnut                      |

As one can see the potato is but one of many tuber-like crops that came from America. It was by chance that the potato was used as a cheap food for sailors returning to Europe from America. Once the

potato got to Europe, its ability to grow in poor soils, resistance to cold, and ease of management gave it an edge for temperate European environments with already overtaxed soils. It is too bad that Europeans didn't investigate Peruvian agronomy more since there were disease resistant forms of the potato. The Europeans used only three varieties of potato, but they were enough to provide food energy for thousands of poor workers that in turn provided a base to the industrialization of Western Europe, especially in the British Isles, Holland, France, Belgium, Germany, Poland, and Russia. Recent evidence indicates that the improved nutrients and yield per area of land (1/2 acre potatoes: 1 1/2 acres wheat, oats or barley) increased life expectancy and decreased mortality, which conservatively increased world population 25% from 1700-1900. Everyone tends to think of Ireland and the potato the most for deterring outright starvation; unfortunately this eventually led to disaster with sole dependency on potatoes forcing a generation of Irish to migrate to Australia, Africa, and America. The worst outbreak of 'late blight' occurred in 1845-46 and 1 million people starved to death. In spite of earlier disasters, the potato continues to be one of the major sources of food calories in the world. The International Potato Center(CIP) is working to restore many lost ancient Andean varieties that are disease resistant and more nutritious.

## HORSE

The horse (*Equus caballus*) has made many dramatic and significant journeys. During the Pleistocene (Ice Age), more than 20,000 years ago, wild horses that had evolved in America migrated to the Old World, Eurasia and Africa. More than 6,000 year ago in the Volga basin of eastern Europe horses were domesticated and in the subsequent millennia spread to other parts of Asia, Europe, and Africa. Horses were hybridized as draft animals, for hunting, and for war. Some horses remained quite small, about the size of zebras, while others were bred to be quite large. In Iberia (Spain) the initial domestic horse was brought by Celtic peoples and was a medium, sturdy, and shaggy horse built to pull chariots in battle. In the second century B.C. Romans brought Asian and African breeds of horses that were somewhat larger and smooth coated; which had been bred for racing and war. These Roman horses were successfully crossbred with the older Iberian horses to produce four traits that are regarded as typical of American horses: short distance speed, larger size, contrasting patterns in the coat, and gaited. Subsequently, these traits were brought to the New World, since the Spanish returned the horse to its place of origin, America.



There were three main types of Iberian horses that were brought to America.

| Type                  | Use                | Characteristics   |
|-----------------------|--------------------|---|
| Villano, Garrano      | war, games, racing | close-coupled, round-bodied, high-arched neck, broadhead, all colors & patterns |
| Jinete, Jennet        | draft, work        | gaited, small, short back arched neck w/ wavy mane                              |
| Gallego(Gallic horse) | peasant work horse | small, less gaited, coarse hair   |

Columbus brought horse stock on his second voyage (1493), but the major impact with horses came with the various conquistadors, like Cortez in 1519, when more horses from Caribbean breed stock were brought into Mexico to invade the Aztec Empire. Subsequent conquistadors also brought horses, but it is not until the later colonial system of tribute and labor, called *encomienda*, that Native Americans escaped with stock to more remote areas like the North American plains, the Venezuelan llanos and the



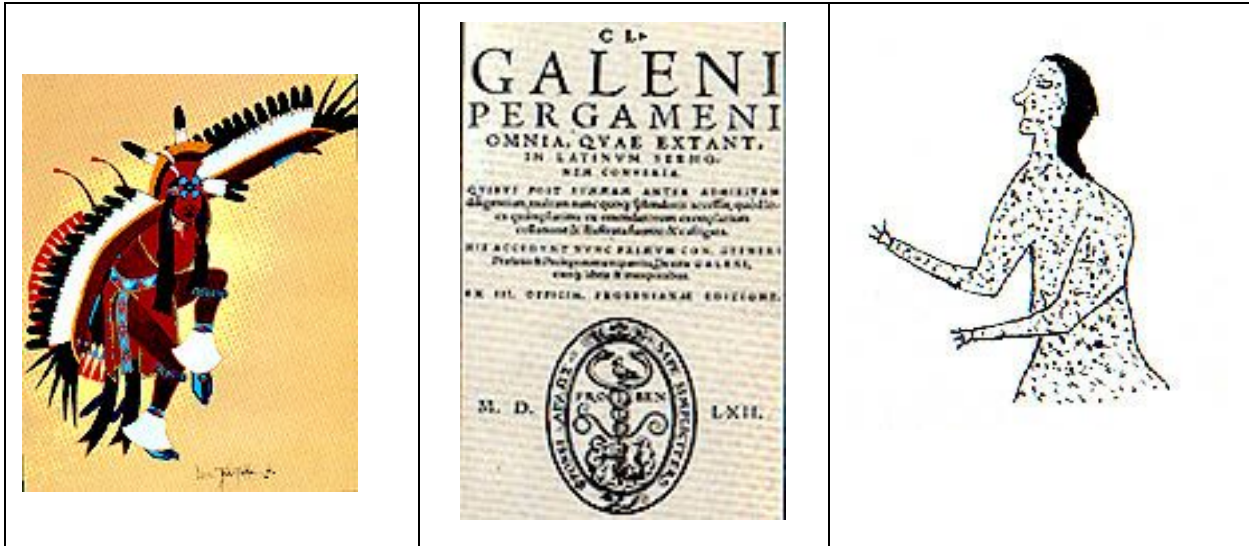
Argentinean pampas. In these areas the spread of thousands of head of feral mustangs changed the economy and warfare. Also, breeds brought to America were through breeding experience modified for new tasks here. The most famous is the American Quarter Horse, which was bred for short distance and agility to work stock in the American West. Many more breeds of horses, donkeys, cattle, goats and sheep were brought to America but the role of the horse in conquest, with new pastoral tribes, and in sheer economics for breeding and labor makes the horse the greatest influence in the Columbian Exchange. For the Plains Indian people, who were mainly displaced from the Eastern Woodlands, horses provided an edge in bison hunting, economics, and warfare from about A.D.1750 to 1890. In fact Plains

Indian culture is still the predominate stereotypical image of all American Indians. Horses continued making their mark on the American landscape as the primary source of transportation until the early 20th century. Even today, we continue to measure engines, including the automobile, in terms of horsepower.

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## DISEASE



" Smallpox was the captain of the men of death in that war, typhus fever the first lieutenant, and measles the second lieutenant. More terrible than the conquistadores on horseback, more deadly than sword and gunpowder..." (Asburn 1947)

Infectious disease probably had the most impact on the world following the initiation of contact by Columbus and his men. Certainly disease was the most effective weapon that Europeans brought to America. The devastating effect of disease on Native peoples was mostly due to the biological isolation and the limited intrusion of infectious diseases in America before A.D. 1492. The weapon of disease was not well recognized by Europeans, nor intentionally used in the early colonial contacts. In later times, especially the 19th century, disease was sometimes allowed to do its damage or was purposefully introduced into populations. However, African, and European populations were also dramatically affected by both epidemic and endemic diseases. Native Americans suffered 80-90% population losses in most of America with influenza, typhoid, measles and smallpox taking the greatest toll in devastating epidemics that were compounded by the significant loss of leadership. More incipient diseases such as tuberculosis, syphilis, typhus, mumps, whooping cough, malaria, yellow fever, and pneumonia would be compounded by the impact of nutritional, sanitation, and labor conditions in colonial America. It is estimated that the total Native American population of the Americas to be 90- 114 million people. About 90% died due to disease with the lowest Native American populations recorded in 1900. The initial 50 years after Columbus' arrival devastated the populations of the Caribbean and Mesoamerica. It is now clear that the conquest of the Aztecs by Cortes was helped considerably by the diseases brought by the Spanish in 1519. In South America diseases, especially smallpox, spread ahead of the Spanish to cause a civil war among the Inca and also weaken their armies to give an advantage to Pizarro and his when they arrived in 1532. The coastal areas of Brazil were settled by the Portuguese beginning in 1500 and the coastal areas suffered the greatest population loss of Native Americans initially. The Amazon Basin was the least settled and only in recent years diseases are beginning to take a toll on tribes just

being contacted. As the Spanish explored into North America diseases spread beginning with Desoto in 1539. Later in the 1600s English and French explored and settled North America beginning along the Eastern Seaboard and spreading into the West in the early 1800s. Much of the damage of epidemic diseases was due to the fact that leaders were more likely to suffer initial losses thus crippling the decision making networks of the culture.

On the Upper Missouri River American Fur Company interests stimulated trade via steamboats. In 1832 the US government approved smallpox vaccinations for Native Americans. However, the Secretary of War notified the Western Indian Agent not to vaccinate on the Missouri River above the Arikara villages. Later, in 1837 the American Fur Co. steamboat *St. Peters* went up the Missouri River with people contaminated with smallpox. With people getting off at Indian trading posts an epidemic quickly spread. Most of the tribes suffered 60% population loss and the Mandan suffered a 90% loss. This event has always been controversial and the intentionality, i.e. genocide is still not clear. Some say blankets were intentionally contaminated, others blame the edict by the Secretary of War five years earlier. Most scholars are also aware the two artists, George Catlin and Karl Bodmer on separate expeditions in 1833-34 painted pictures of some of these Upper Missouri tribes right before they were decimated by smallpox. It is believed that only 40-150 Mandan survived the smallpox scourge and survivors had to seek refuge with the Hidatsa.

## SUGAR



Sugar was first used by humans as a natural and necessary constituent in our plant and meat foods. Later, honey from wild bees would be sought out by humans as a special treat. As farming involves us with domestic plants humans identify and use various plants to produce sugar; such as sugar, maple, sugar beet, sugar palm, sweet sorghum, and sweet corn. Sugarcane (*Saccharum officinarum*) is the most important source of sucrose ( $C_{12}H_{22}O_{11}$ ) in world history and especially in the Columbian Exchange. Sugarcane was originally developed and domesticated in New Guinea about 10,000 years ago. By A.D. 700 sugarcane had diffused to the Mediterranean region by Islamic expansion and trade. Sugarcane sucrose had been viewed as an exotic spice and medicine, but by A.D. 1000, with the crusades Europe, will develop a broader appetite for sugar in many foods. In the 1500's Spain and Portugal will begin sugarcane production in the milder Atlantic Islands such as the Canary Islands

and Sao Tome'.

However, a much larger scale production of sugarcane shifts across the Atlantic to America with the introduction of sugarcane to Santo Domingo on Columbus' second voyage in 1493. Eventually, America will surpass Mediterranean sugarcane industry as huge plantations will spread to Cuba, Puerto Rico, and Jamaica. Sugarcane also made inroads with indigo in the Portuguese colony of Brazil. In conjunction with industrialization in Europe the habit of sugar consumption with coffee, tea, and rum will become a drug-like addiction involving sugar, alcohol, and tobacco. Europeans and eventually the world, as it industrializes, will, without much alarm or perceptions of dangers of abuse, feed one of the largest cash



crops and food businesses in the world. Cacao like tea and coffee contains a stimulant and is combined with vanilla , milk products, and sugar to produce a sweet with supposed aphrodisiac properties called chocolate this is only one aspect of sugars impact and importance.

The initial labor for sugarcane plantations in America will fall on Native Americans, but by 1600 95 % of Native Americans in the Caribbean and Atlantic Coast populations will be dead, mainly due to disease and labor. African slavery will replace the Native American slave labor and by 1888 9.5 million African people will be enslaved in the Americas. The Caribbean plantations will dominate in sugarcane and slaves, but Portuguese Brazil will always be a strong competitor to the Spanish and other Europeans in the Caribbean. The Southeastern United States in colonial times and as part of the United States will also operate plantations dominated with sugarcane and sorghum production of sugar. The cruelty and exploitation of these slave plantation systems will, driven by unprecedented greed, bring the entire African slave trade aspect to a halt by the late 1880s. In the case of French Haiti (called Saint Dominique) 450,000 African slaves will be persecuted so that a bloody fifteen year revolt will result in the only full takeover of a colony in America by African slaves.

After the abolishment of slavery and emancipation the need for labor continued due to the fact that the plantation system was too lucrative to abandon. Many freed slaves were hired at low wages, but thousands of new laborers were brought in from India, China, and S.E. Asia to the sugarcane plantations in the Americas. This, of course, explains the tremendous cultural mix of European, African, and Asian peoples, especially in the Caribbean. The original Native Americans of the Caribbean islands have mostly melted into the immigrant populations, but a few communities on the islands maintain their roots, e.g. Taino or Carib peoples whose ancestors actually greeted and initially aided Columbus in 1492.

So sugarcane was a major component of the Columbian Exchange and unfortunately the principle commodity for stimulating the American slave trade. Today, English and Americans are still the highest consumers of sugar (more than 120 lbs. per person per year), more than any other people on earth. The medical repercussions of this are just being recognized with sugar metabolism problems, alcoholism, and dental problems being just the tip of the iceberg. Today, a great deal of sucrose is derived from corn syrup and recently grape fructose. Rather than reducing our desire for sweet tastes, we have developed a whole new stimulus for the chemical production of artificial sweeteners, like saccharin, aspartame, and cyclamates.

1. What features made both corn and potatoes ideal for growing outside of the Americas?
2. Eating popcorn at the movies seems like a old tradition, but when and by whom was popcorn first “discovered,” meaning who and when was the first group to turn a corn kernel into popcorn.
3. Where was the origin of corn/maize?
4. Where was the origin of the potato?
5. What were the characteristics of the potato that made it easy to grow in Europe?
6. What role (give an example of the effects) did the potato have increasing the population in Europe?
7. Explain what Asburn’s quote in 1947 about the role disease played the European arrival in the Americas?
8. What was the key factor to disease having such a dramatic effect on the people in the New World?
9. Where and when was sugar first introduced to the Americas?

10. Why were large groups of African slaves brought in to work the sugarcane fields/plantations?
11. Why is/was there a large Asian population in the Caribbean? What caused their presence?
12. What was the principal commodity for stimulating the American slave trade?