

Biology, Ecological Change, and Native Species

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Don't judge species on their origins

Conservationists should assess organisms on environmental impact rather than on whether they are natives, argue **Mark Davis** and 18 other ecologists.

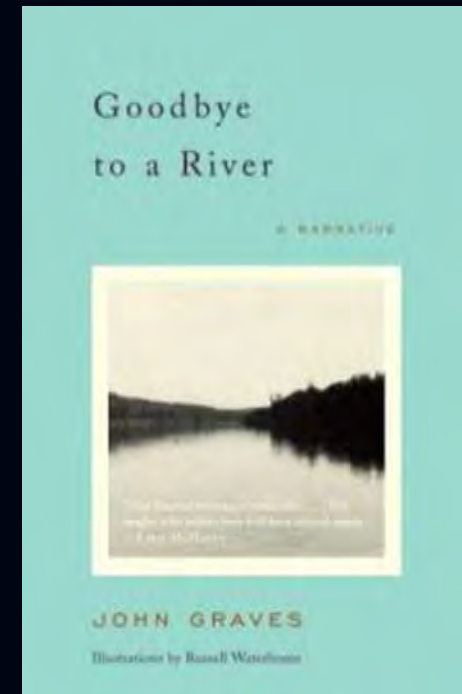
Ecological Change and the Narrative of Loss

To Have Viewed It Entire – John Graves

In recent decades it has become customary, and right I guess, and easy enough with hindsight, to damn the ancestral frame of mind that ravaged the world so fully and so soon. What I myself seem to damn mainly though, is just not having seen it. Without any virtuous hindsight I would likely have helped in the ravaging as did even most of those who loved it best.

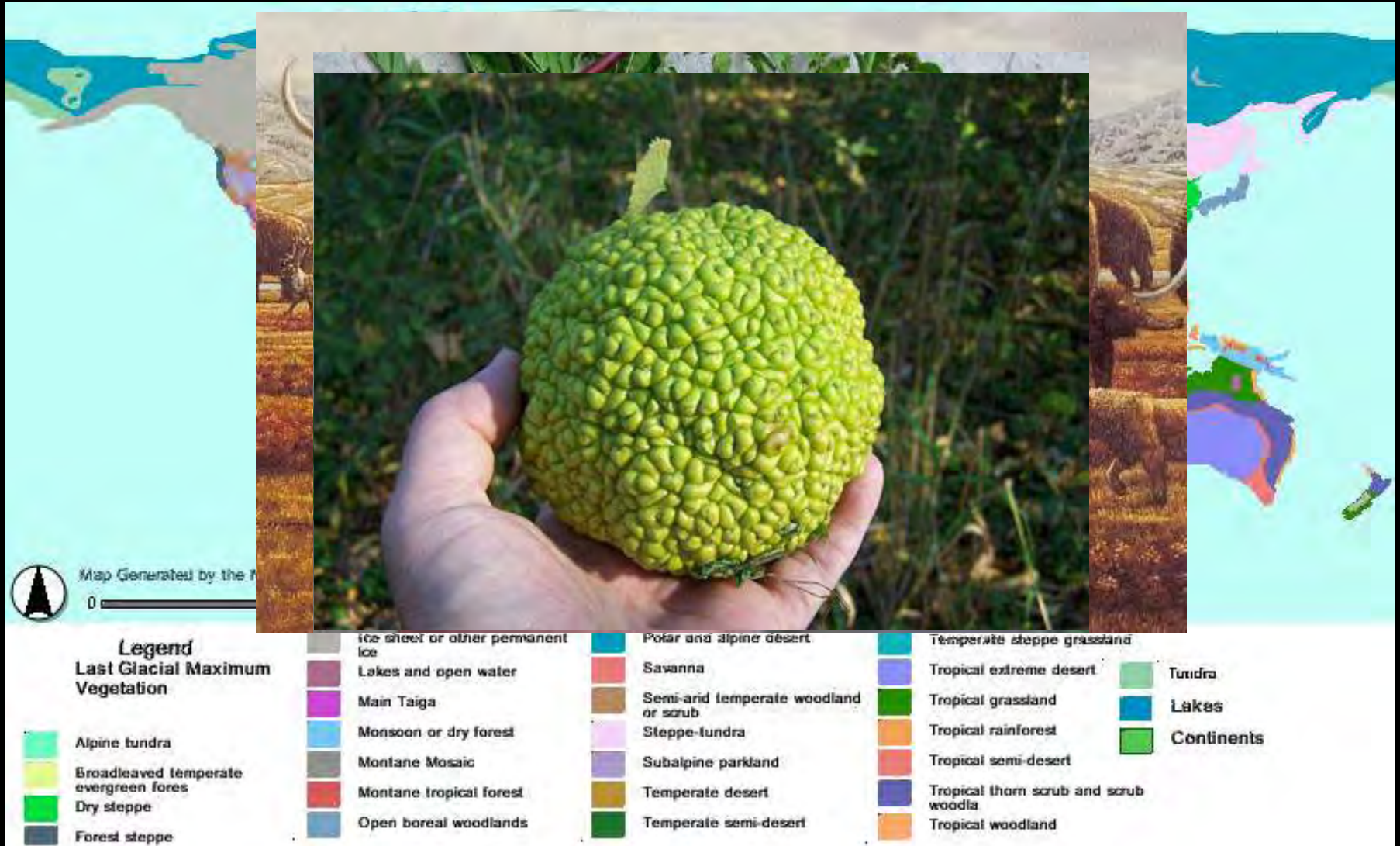
But God! To have viewed it entire, the soul and guts of what we had and gone forever now, except in books and such poignant remnants as small swift birds that journey to and from the distant Argentine, and call at night in the sky.

- From *Self Portrait, with Birds: Some Semi-Ornithological Recollections* (1991)



Which "Entire"?

The Last Glacial Maximum (LGM) refers to a period in the Earth's climate history when ice sheets were at their maximum extension, between 26,500 and 19,000–20,000 years ago



Ecological Change

At the peak of glacial expansion, vegetation and climate of Texas were much different than today.

As glaciers developed the climate of Texas became cooler and moisture effectiveness was greater which resulted in the presence of plant species that today typically occur in more mesic or cooler environments.

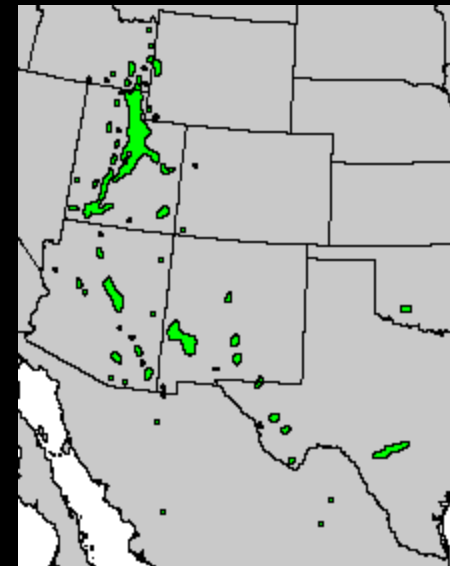
For example, the current distribution of many eastern forest species that extend into central and West Texas, such as bald cypress (*Taxodium disticum*), Chinkapin oak (*Quercus muhlenbergii*), redbud (*Cercis canadensis*) and many others, may have occurred during these more favorable glacial conditions.

Likewise, western species such as papershell pinon pine (*Pinus remota*), which was widespread across all of the current desert and arid grasslands of the Trans-Pecos region and onto the Edwards Plateau during the advance of the last glacier, bigtooth maple (*Acer grandidentatum*), madrone (*Arbutus xalapensis*) and other species that still exist in central Texas, are persisting today on favorable sites but were more widespread during the glacial periods.

Also, boreal forest species, such as spruce (*Picea glauca*), are documented to have extended as far south as Texas.



“Lost Maples”



Recent Climate Change

Over the past 10,000 years most of the state of Texas has generally become progressively warmer and drier with, of course, various fluctuations through time.

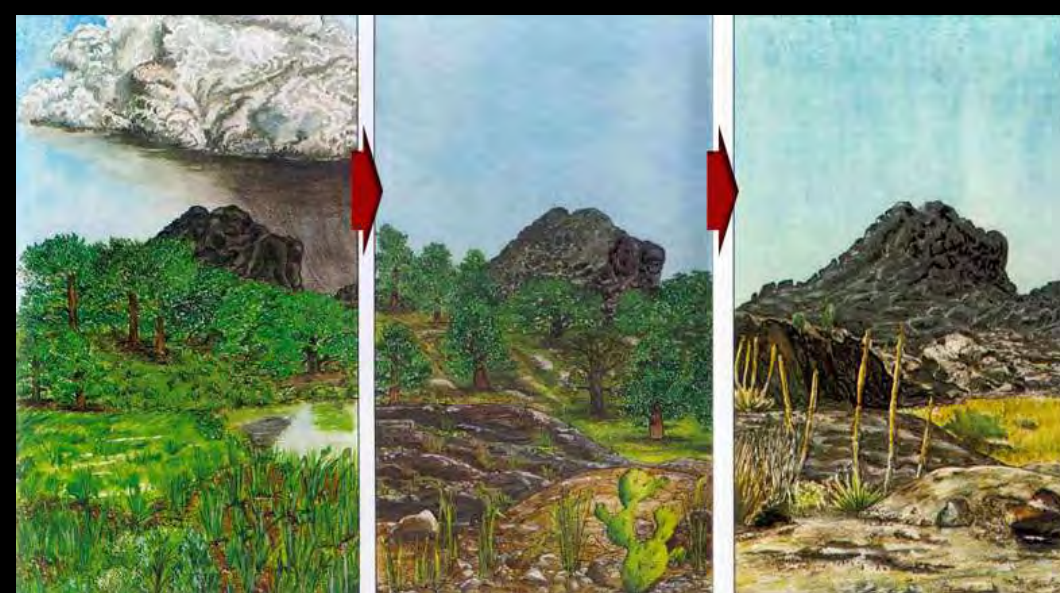
Beginning about 1000 years ago the earth's temperature became warmer up until about 600 years ago. This Medieval Warm Period is characterized by retreating mountain glaciers, and documented shifts in vegetation distributions in various parts of the world.

From 600 to 150 years ago the earth experience a cooling period known as the Little Ice Age. Many of the changes observed in the previous warm period were reversed.

From about 1850 to the present the earth has been in a warming mode.

Changing scene. Based on findings from pack rat middens, this artist's conception shows what Hueco Tanks may have looked like some 12,000 to 14,000 years ago (far left), some 9,300 years ago (middle) and as it appears today (right).

Colorado pinyon needles found in the oldest middens imply that Hueco Tanks was cooler and wetter 14,000 years ago. By 9,000 years ago, the climate had become more arid and the pinyons disappeared, leaving a juniper-oak woodland. Today Hueco Tanks is dominated by xeric grasslands and desert plants.



Humanized Landscape – Buttermilk Creek Complex 15,000 years old

Researchers in Texas have discovered thousands of human artifacts in a layer of earth that lies directly beneath an assemblage of Clovis relics, expanding evidence that other cultures preceded the Clovis culture in North America.

This pre-Clovis toolkit appears to be between 13,200 and 15,500 years old and it includes biface and blade technology that may have later been adapted—and improved upon—by the Clovis culture.

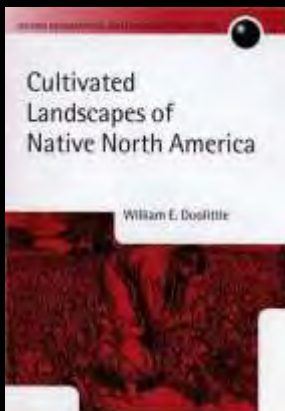
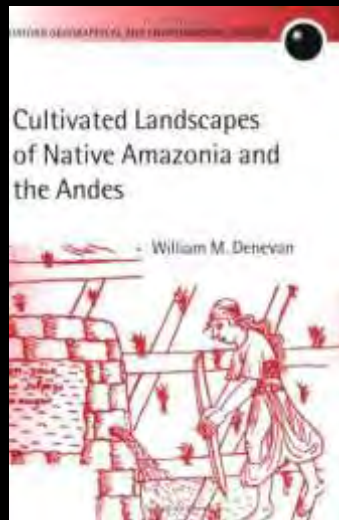
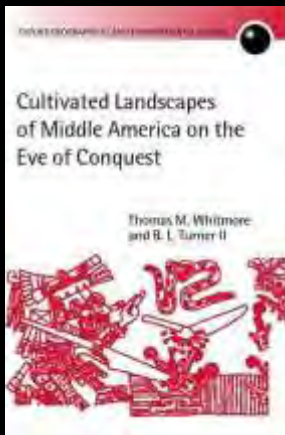
These new artifacts comprise what researchers are calling the **Buttermilk Creek Complex**, and details of its excavation are reported in the 25 March 2011 issue of *Science*.





Cultivated Landscapes of the Americas – The Myth of Pristine Nature

The geographer William M. Denevan argued in 1976 that the American population in 1492 was around 55 million and that the population north of Mexico was 4 to 8 million.



The Pristine Myth: The Landscape of the Americas in 1492

William M. Denevan

Department of Geography, University of Wisconsin, Madison, WI 53706

Abstract. The myth persists that in 1492 the Americas were a sparsely populated wilderness, "a world of barely perceptible human disturbance." There is substantial evidence, however, that the Native American landscape of the early sixteenth century was a humanized landscape almost everywhere. Populations were large. Forest composition had been modified, grasslands had been created, wildlife disrupted, and erosion was severe in places. Earthworks, roads, fields, and settlements were ubiquitous. With Indian depopulation in the wake of Old World disease, the environment recovered in many areas. A good argument can be made that the human presence was less visible in 1750 than it was in 1492.

Key Words: Pristine myth, 1492, Columbus, Native American settlement and demography, prehistoric New World, vegetation change, earthworks.

"This is the finest prairie . . ."

Evangelist: A Tale of Aztec (Langfellow, 1847).

WHAT was the New World like at the time of Columbus?—"Geography as it was," in the words of Carl Sauer (1971, xi). The Admiral himself spoke of a "Terrestrial Paradise," beautiful and green and fertile, teeming with birds, with naked people living there whom he called "Indians." But was the landscape encountered in the sixteenth century primarily pristine, virgin, a wilderness, nearly empty of people, or was it a humanized landscape, with the imprint of native Americans being dramatic and persistent? The former still seems to be the more common view, but the latter may be more accurate.

The pristine view is to a large extent an invention of nineteenth-century romanticist and

primitivist writers such as W.H. Hudson, Cooper, Thoreau, Longfellow, and Parkman, and painters such as Catlin and Church.¹ The wilderness image has since become part of the American heritage, associated "with a heroic pioneer past in need of preservation" (Pyne 1982, 17; also see Bowden 1992, 22). The pristine view was restated clearly in 1950 by John Bakeless in his book *The Eyes of Discovery*:

There were not really very many of these redskins . . . the land seemed empty to invaders who came from settled Europe . . . that ancient, primeval, undisturbed wilderness . . . the streams simply beaded with fish . . . so much game . . . that one hunter counted a thousand animals near a single oak log . . . the virgin wilderness of Kentucky . . . the forested glory of primitive America (11, 281, 233, 314, 407).

But then he mentions that Indian "prairie fires . . . cause the olean-mentioned oak openings . . . Great fields of corn spread in all directions . . . the Barrens . . . without forest," and that "Early Ohio settlers found that they could drive about through the forests with sleds and horses" (31, 304, 306, 314). A contradiction!

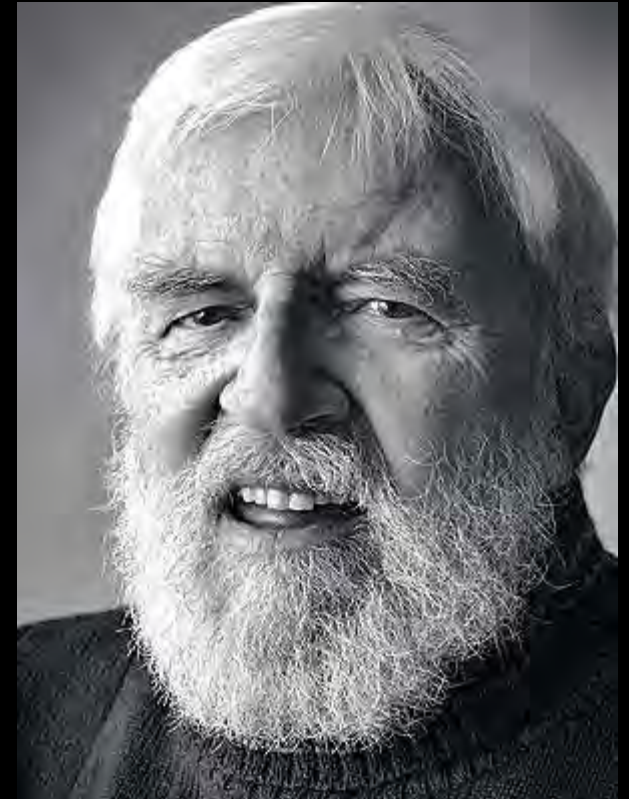
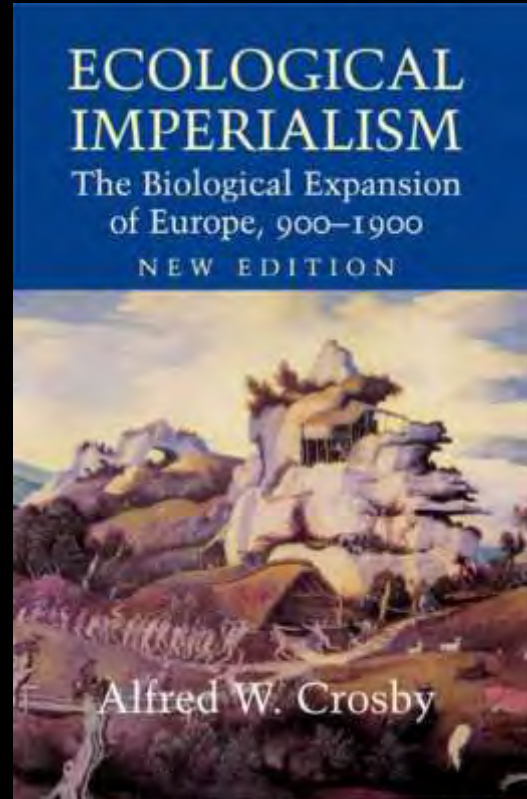
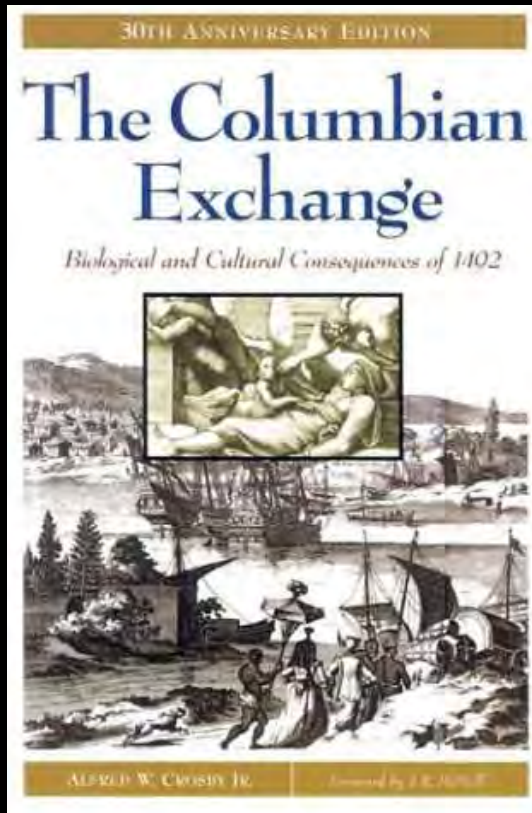
In the ensuing forty years, scholarship has shown that Indian populations in the Americas were substantial, that the forests had indeed been altered, that landscape change was commonplace. This message, however, seems not to have reached the public through texts, essays, or talks by both academics and popularizers who have a responsibility to know better.²

Krikpatrick Sale in 1990, in his widely reported *Conquest of Paradise*, maintains that it was the Europeans who transformed nature, following a pattern set by Columbus. Although Sale's book has some merit and he is aware of large Indian numbers and their impacts, he nonetheless champions the widely-held dichotomy of the benign Indian landscape and

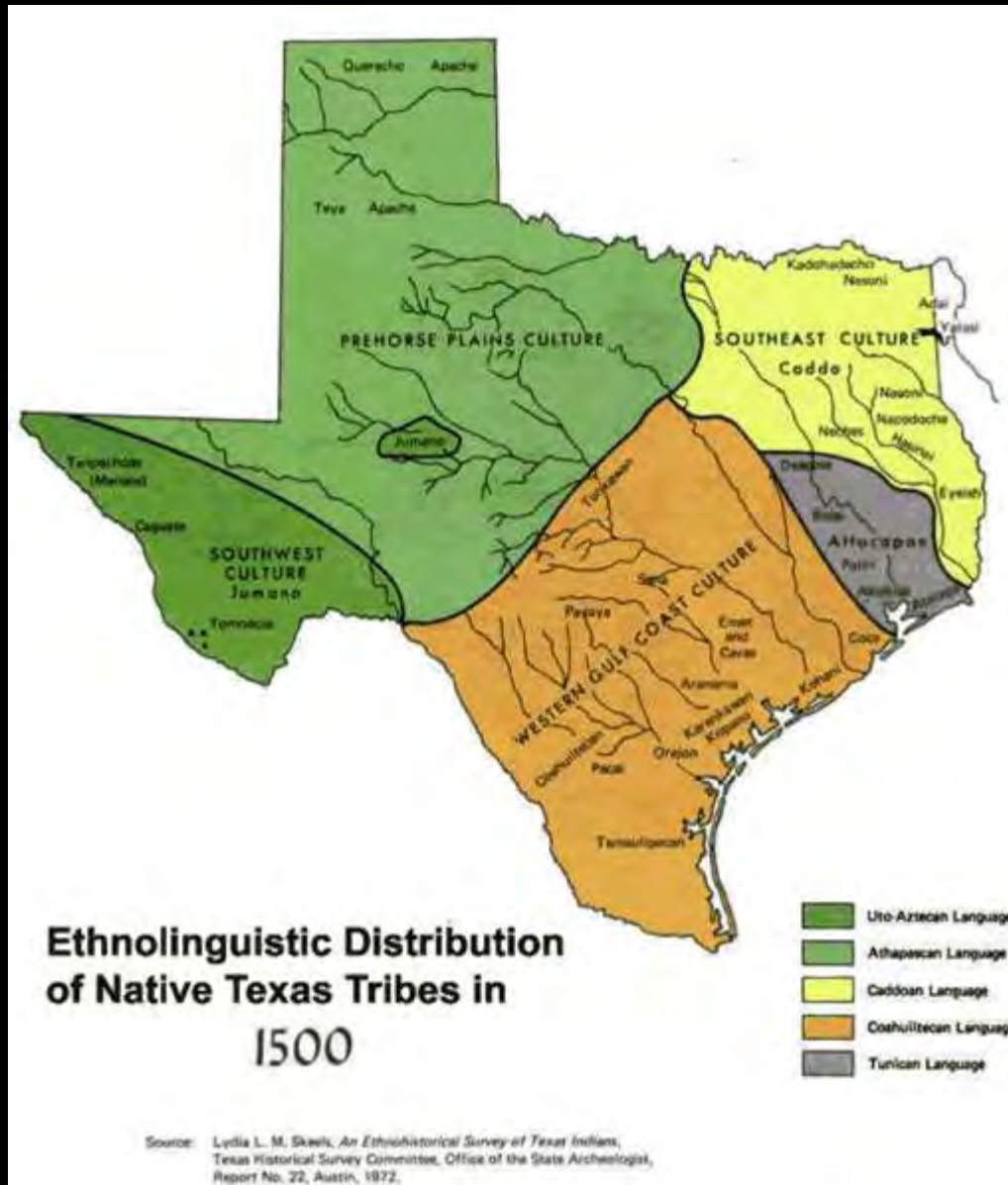
1. *Annals of the Association of American Geographers*, 20(2), 190; pp. 184-185. © Copyright 1990 by Association of American Geographers.



Alfred Crosby described the near extinction of some tribes and the dramatic depopulation of others in *The Columbian Exchange* (1972) and the biological expansion of Europe in *Ecological Imperialism*(1986).

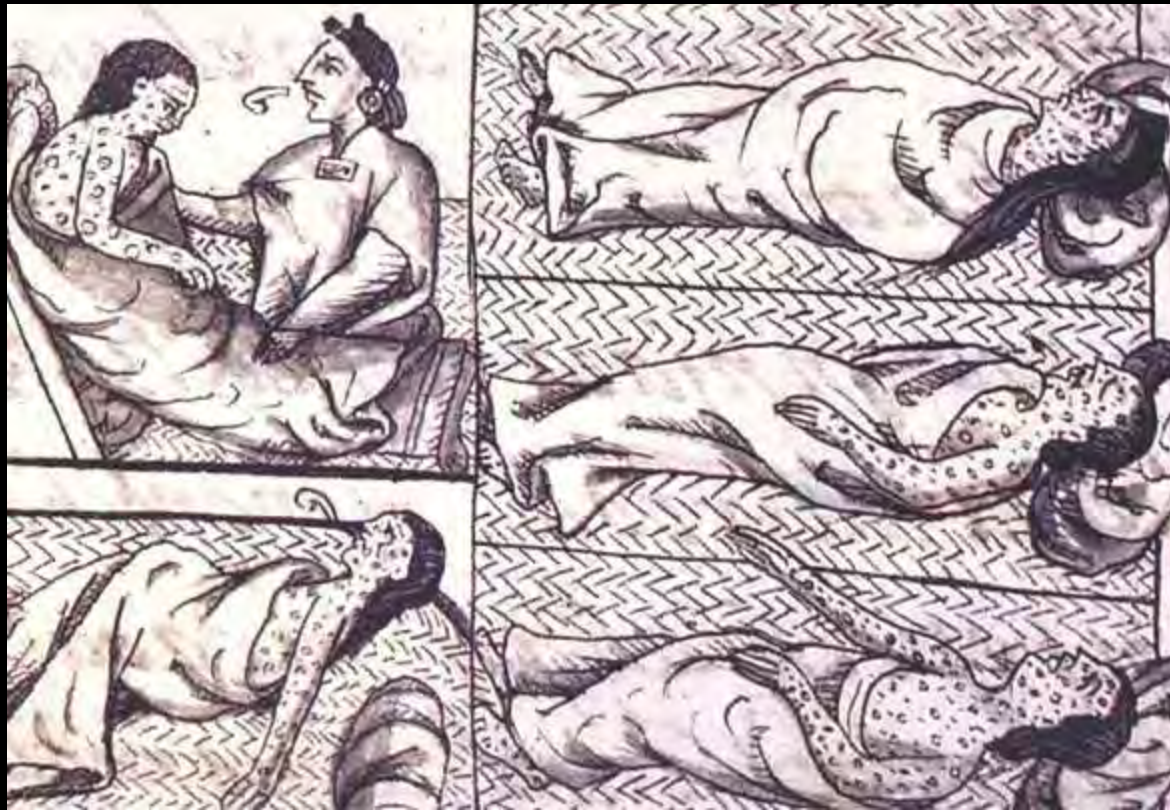


The Columbian Exchange and Texas



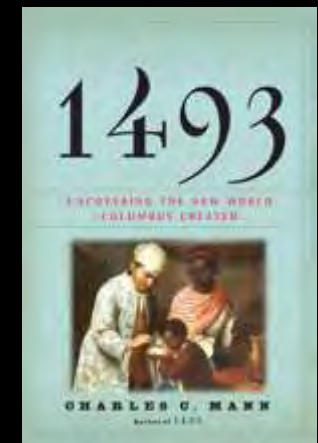
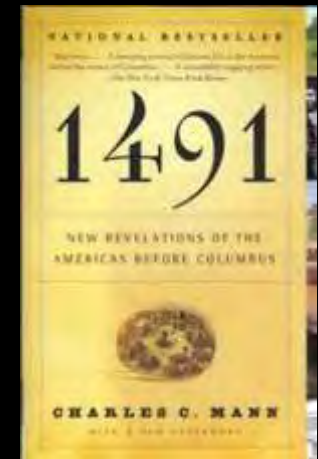
The Columbian Exchange and Ecological Imperialism

Disease and Depopulation



“Until Columbus, Indians were a keystone species in most of the hemisphere. Annually burning undergrowth, clearing and replanting forests, building canals and raising fields, hunting bison and netting salmon, growing maize, manioc, and the Eastern Agricultural Complex.

Native Americans had been managing their environment for thousands of years...But all of these efforts required close, continual oversight. In the sixteenth century, epidemics removed the boss...Not only did invading endive and rats beset them, but native species, too, burst and blasted, freed from constraints by the disappearance of Native Americans.” Mann, 1491



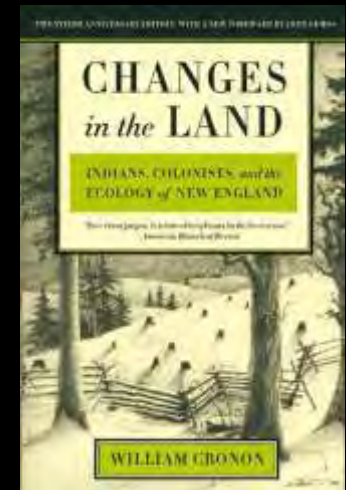
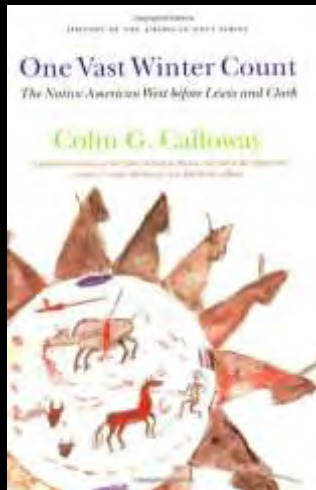
Native Americans – Fire and Other Ecological Impacts

The widespread presence of burned rock middens suggests that fire was a significant tool utilized by Native Americans. While the record is not clear as to their use of fire as a vegetation and wildlife management tool, or as an ally in warfare, it can be reasonably surmised that purposeful and accidental wildfires would have occurred.

Early inhabitants, through their selective harvesting and use of various plants and hunting of animals probably had major influences on the local abundances of many species.

Likewise their local encampments produced disturbance patches of locally altered vegetation. Most of these early inhabitants were nomadic and hence served as effective dispersal agents for the reproductive propagules of many plant species.

The total extent and types of influences exerted by the early Native American is not completely understood.



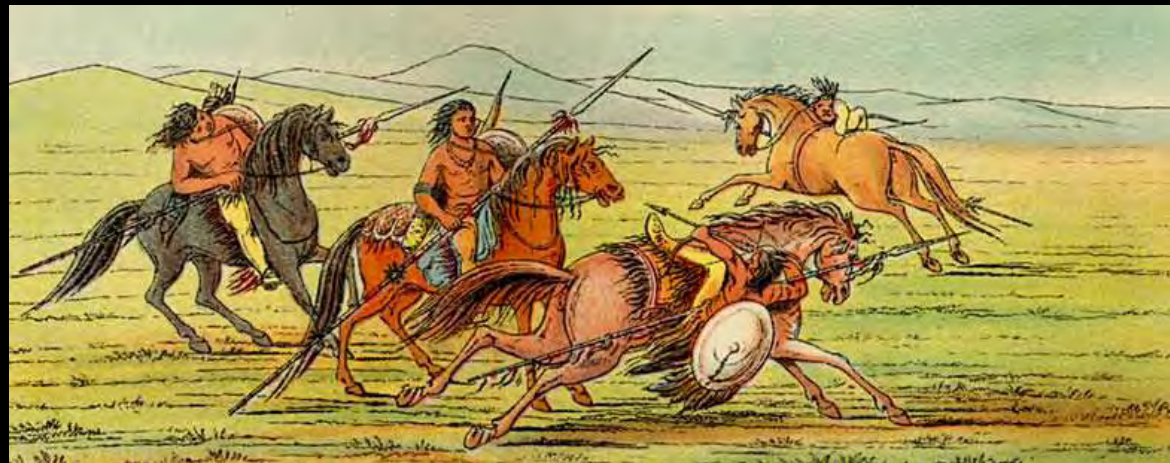
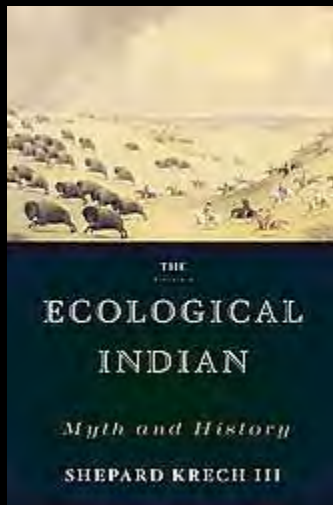
Horses and Cattle

As early as 1680, Indians on the Pecos River had acquired horses from the Spaniards. The horse exerted a profound effect on Indian culture. Their possessions of the horse prevented Anglo settlement of much of Texas for over 200 years.

The net result was the development of a very large horse population (including wild bands) in Texas well before settlers started moving onto the western rangelands.

This increase of horses, as well as cattle, significantly increased the grazing pressure and marked the beginning of what would be a considerable change in the vegetation composition and structure of Texas rangelands.

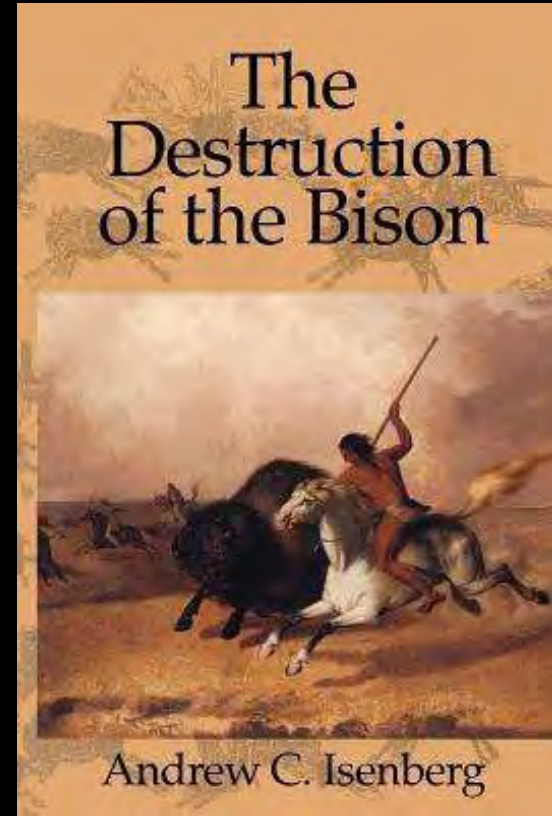
In places heavy grazing by their feral animals had occurred for over 100 years before settlers arrived. There was a period after the Civil War when the settlers actively pursued these animals and for a short period substantially reduced these numbers.



Ethnolinguistic Distribution of Indians in Texas in 1776



Large numbers of herbivores such as bison had significant impacts



The occurrence of large numbers of herbivores such as bison would be expected to have had significant impacts on the composition and structure of the vegetation, however, since they were free-roaming they rarely and only locally produced destructive and long lasting impacts.

Most of the large herbivores were reduced or eliminated by the 1870's. This was also the time at which large numbers of free-ranging feral horses and cattle were rounded up and sent to slaughter houses on the Texas coast or driven to northern markets for sale or slaughter.

During the period between 1870 and 1885, before widespread stocking of the ranges by settlers and after the demise of the bison, the ranges were relatively free of grazing by large herbivores. This was also a period of favorable precipitation and is often referred to as the “Golden Period” of the Southwestern stockman.

The rangelands seemed capable of supplying unlimited amounts of forage for grazing animals. As a result there was rapid and severe overstocking of the rangelands .

Originally these animals grazed on free and open range, but soon with the advent of more settlers, the availability of barbed wire and windmills to provide water, the animals were confined, which led to destructive grazing of many rangelands.



Buffalo bones stacked at the Michigan Carbon Works in Detroit, 1880s. Joseph Klum, Jr. photos. Courtesy Burton Historical Collection, Detroit Public Library.



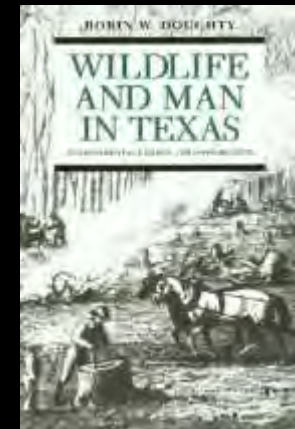
The Myth of Superabundance

Europeans significantly and permanently changed the character of Texas native flora and fauna.

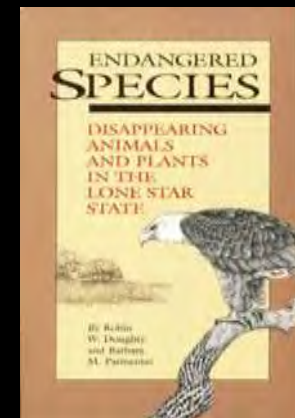
White-tailed deer were exceptionally abundant and were eliminated from many parts of the state and later reintroduced.

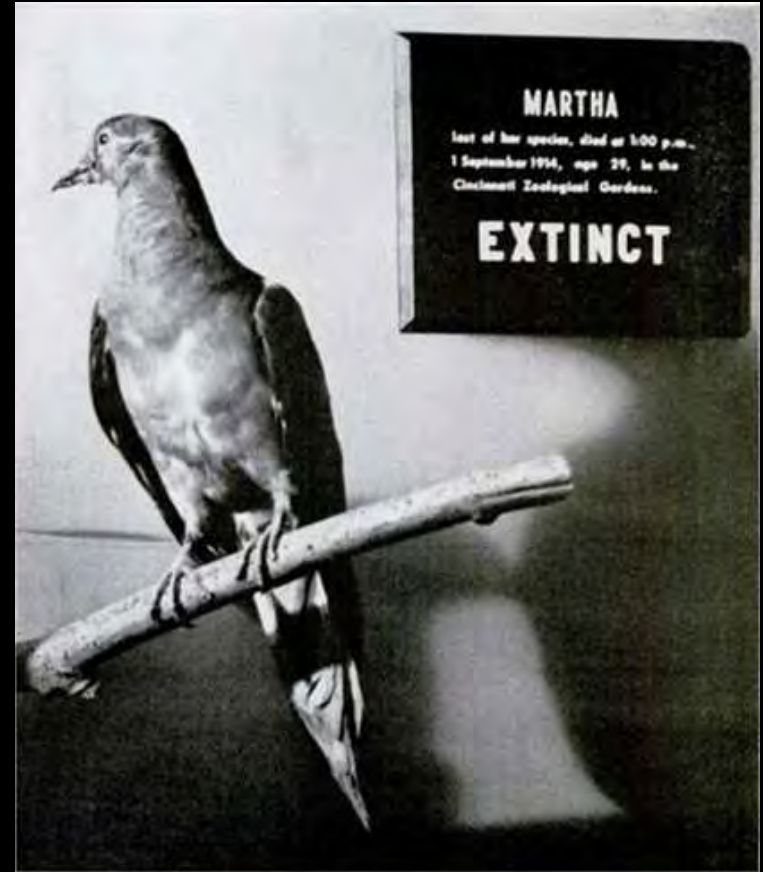
Prairie dogs were largely eliminated as were their impacts on the ecosystem. A prairie dog colony stretched from San Angelo to Clarendon, an area 250 miles by 100 miles that was estimated to contain almost a half-billion prairie dogs.

Many predators were greatly reduced in numbers or essentially eliminated as were many birds and other species. For example bears, which were common in Central Texas, were locally driven to extinction.



Black-Tailed Prairie Dog





Prior to forty years ago they were common in the Region, particularly in the extreme eastern part of Travis County where greater crops of acorns could be found. Then in the fall of 1878 a large migration took place over the city, moving from the southeast toward the northwest...string after string of many thousands of birds passed over; many lit in the tall trees along Barton Creek just above the mouth and in the trees along the south side of the river just above the creek, literally loading down the limbs...Not a single bird has been seen in the Austin Region since that year.

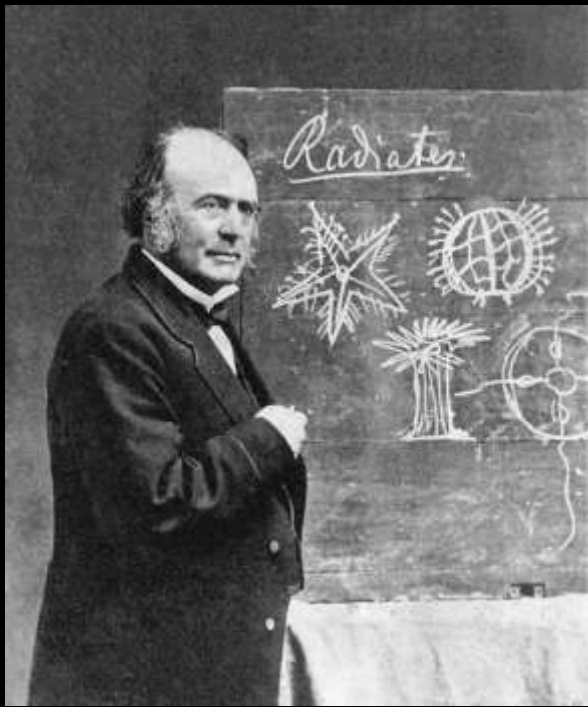
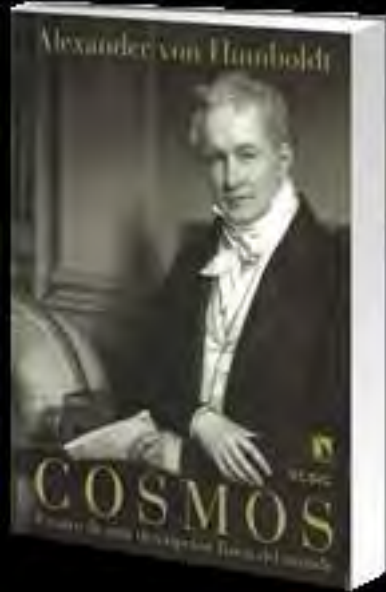
George Finlay Simmons, *Birds of the Austin Region* (1925)

Emergence of American Biology 1800-1900

THE NARRATIVE PRESS
THE VOYAGE OF THE BEAGLE
Darwin's First Great Circumnavigation
CHARLES DARWIN



Portrait by Sir John Everett Millais, 1845, National Portrait Gallery, London



American Natural History and Natural Theology

Theology of Nature - Natural History as a Window into the Divine

Ordinary Americans asked and answered why phenomena occurred, oftentimes with theological reasoning, adding religious import to nature study and nationalist gloss.

Cotton Mather 1663 – 1728

The Christian Philosopher. A Collection of the Best Discoveries in Nature, with Religious Improvements 1721

“Natural Philosophers” were not a threat to religion but when properly construed they presented evidence of God’s perfection.

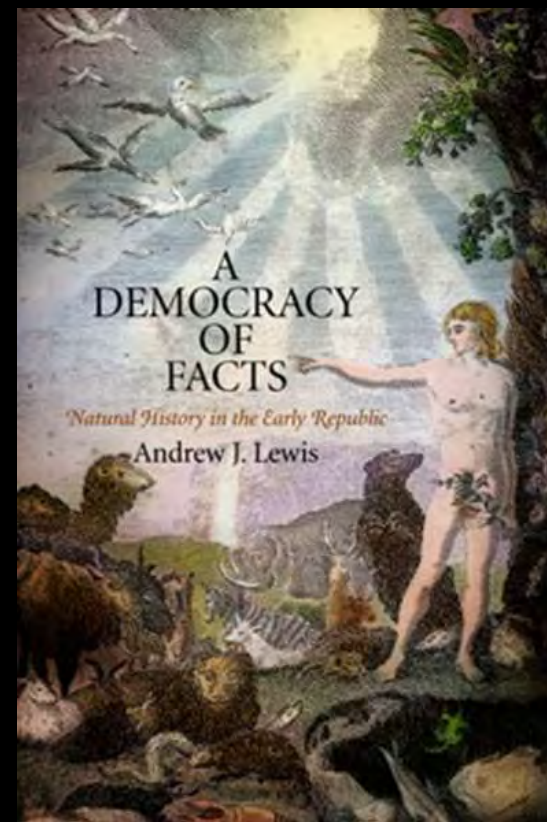
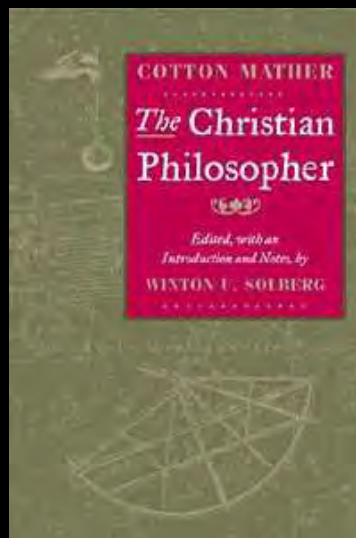


Image from
Natural History of the Bible
Thaddeus Mason Harris
1793

A Vision of the Unity of Nature

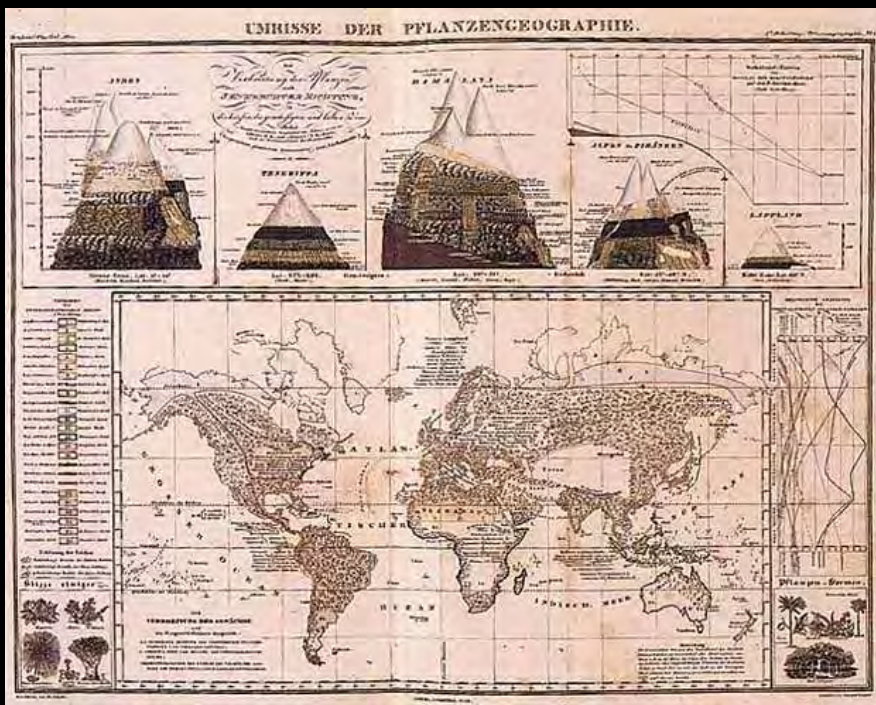
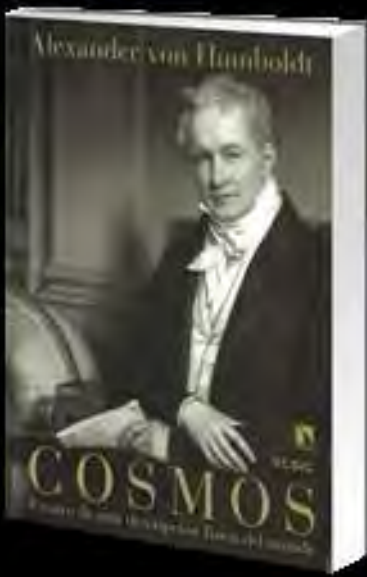
Alexander von Humboldt 1769 - 1859

*Unity in diversity, and of connection, resemblance, and order, among created things most dissimilar in their form, one fair harmonious whole...
Kosmos, 1845*

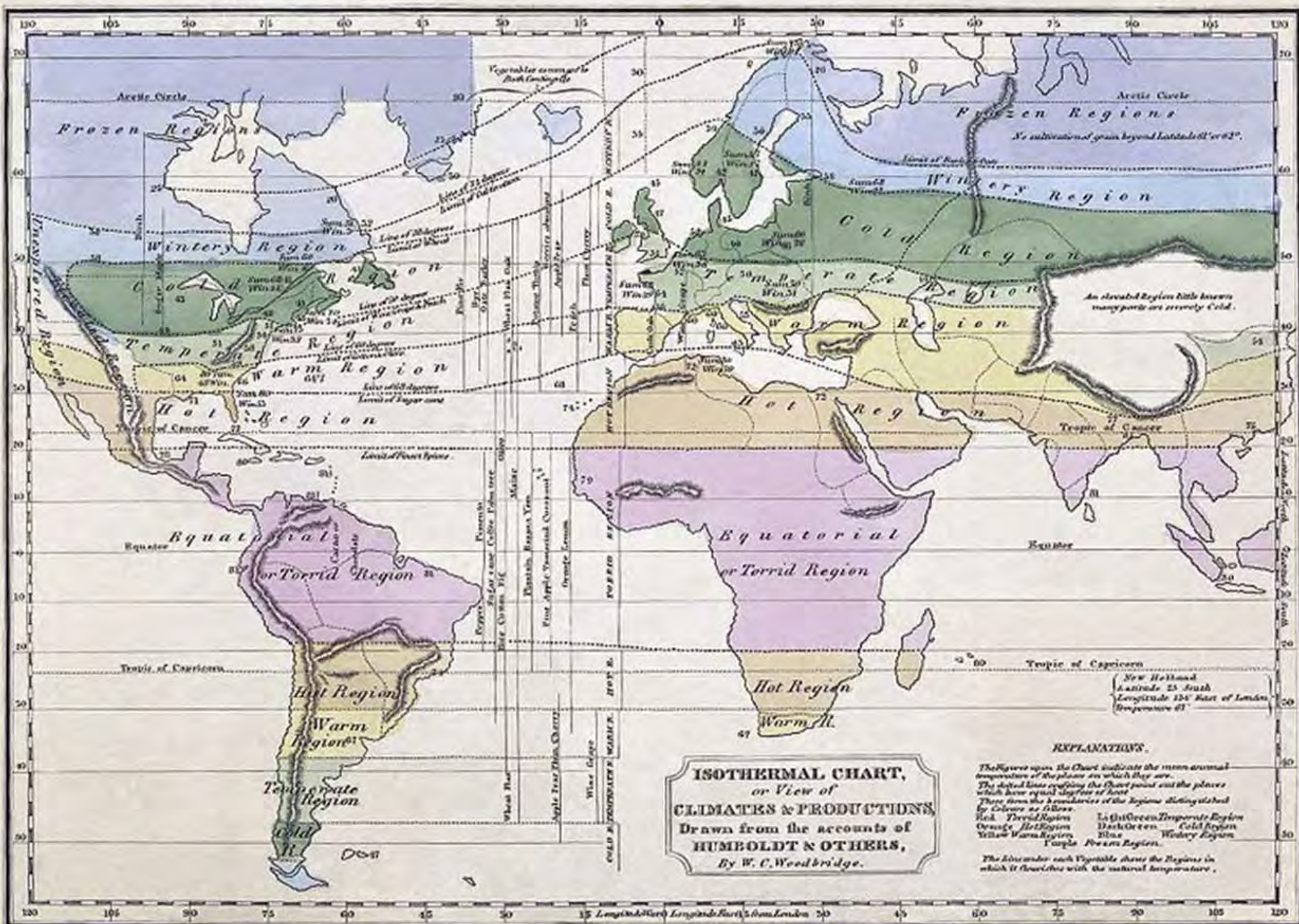


Charles Darwin described him as "the greatest scientific traveler who ever lived." He is widely respected as one of the founders of modern geography and ecology. Alexander von Humboldt's travels, experiments, and knowledge transformed western science in the nineteenth century.

Between 1799 and 1804, Humboldt travelled extensively in Latin America, exploring and describing it. His description of the journey was written up and published in an enormous set of volumes over 21 years. Later, his five-volume work, *Cosmos* (1845), attempted to unify the various branches of scientific knowledge.







ISOTHERMAL CHART,
or View of
CLIMATES & PRODUCTIONS,
 Drawn from the accounts of
HUMBOLDT & OTHERS,
By W. C. Woodbridge.

EXPLANATIONS.

The figures upon the Chart indicate the mean annual temperature of the places on which they are.
 The dotted lines crossing the Chart point out the places which have equal degrees of heat.

These form the boundaries of the Regions distinguished by Colours as follows.

Red	Torrid Region	Light Green	Temperate Region
Orange	Hot Region	Dark Green	Cold Region
Yellow	Warm Region	Blue	Wintery Region
Purple	Equatorial Region	White	Frozen Region

The lines under each Vegetable show the Regions in which it flourishes with the natural temperature.

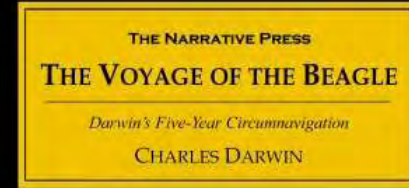
Revised according to act of Congress the 15th day of January 1850. By William C. Woodbridge of the State of Massachusetts.

Biology and Evolution

Charles Darwin 1809-1882

He established that all species of life have descended over time from common ancestry, and proposed the scientific theory that this branching pattern of evolution resulted from a process that he called natural selection in *On the Origin of the Species* (1859).

The Voyage of the Beagle 1831-36



NUMBER 51 IN THE HISTORICAL ADVENTURE AND EXPLORATION SERIES



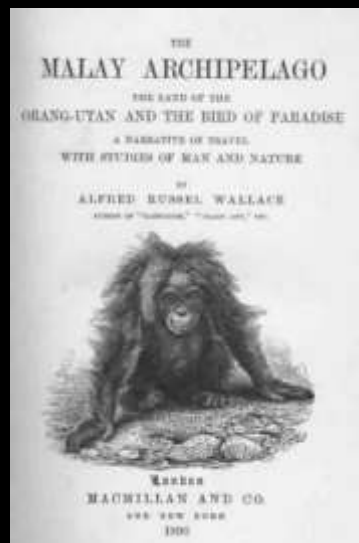
Biology and Evolution

Alfred Russel Wallace 1823-1913

Travels in the Amazon and Malay Archipelago (1848-1862)

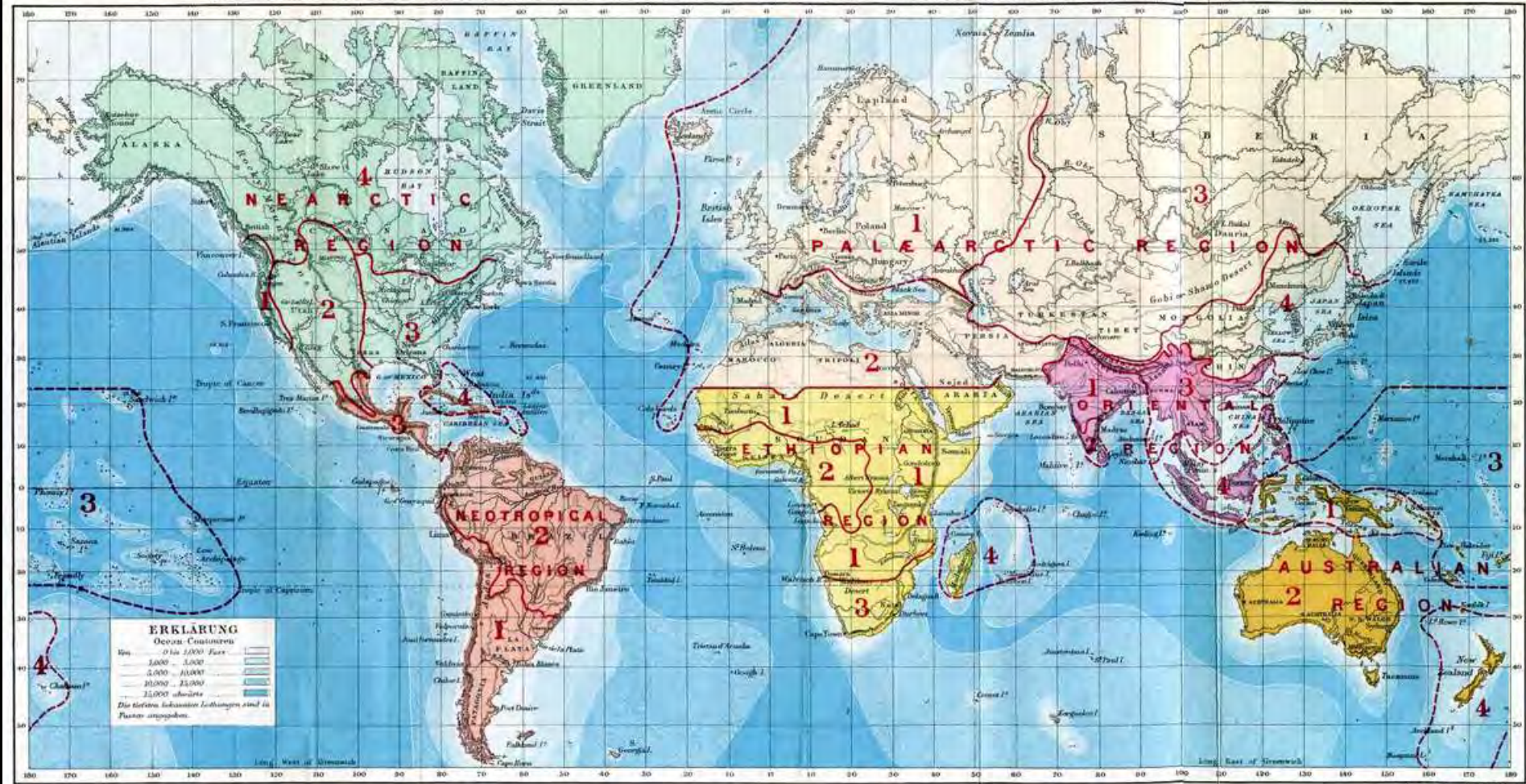
He is best known for independently proposing a theory of evolution due to natural selection that prompted Charles Darwin to publish his own theory.

Wallace did extensive fieldwork, first in the Amazon River basin and then in the Malay Archipelago, where he identified the Wallace Line that divides the Indonesian archipelago into two distinct parts, one in which animals closely related to those of Australia are common, and one in which the species are largely of Asian origin.



The Geographical Distribution of Animals (1876)

DIE ERDE IN MERCATOR'S PROJECTION MIT DEN ZOOGEOGRAPHISCHEN REGIONEN UND DEN APPROXIMATIVEN SCHWANKUNGEN DES OCEAN-BETTES



The Rise of Biotic Nativeness 1830s and 1840s

“The Rise and Fall of Biotic Nativeness: a Historical Perspective“

Matthew K. Chew and Andrew L. Hamilton in *Fifty Years of Invasion Ecology: The Legacy of Charles Elton* (2011)

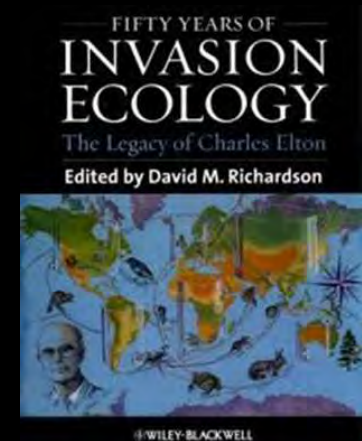
The idea of a native species was first defined in 1847.

As biogeographical studies accumulated and floras and faunas were documented, it became common practice to signify additions to existing lists with an Asterisk.

Asterisks identified doubtful botanical claims the way they now identify sports records achieved by ‘ performance enhanced ’ athletes.

Asterisks increasingly denoted suspicion of human dispersal, and were routinely applied to agricultural weeds and relict cultivars.

In 1835, Cambridge botany professor John Henslow proposed adding two more standard symbols: the degree (°) denoting obviously introduced plants, and the dagger (†) for uncertain cases.



The Rise of Biotic Nativeness

In 1847, Hewett (H.C.) Watson, dissatisfied with daggers and asterisks, published his intention of establishing ' the civil claims and local situation of [British plant] species in accordance with a scale of terms '.

In an apparent first, he named his categories, producing an ad hoc botanical redefinition of native , alien, and three additional, fully codified categories of intermediate establishment and/or uncertainty:

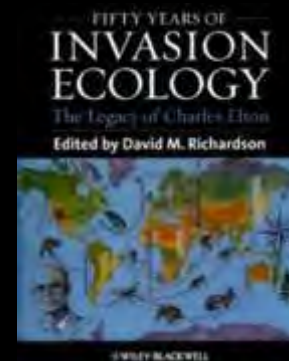
Native : Apparently an aboriginal British species; there being little or no reason for supposing it to have been introduced by human agency.

Denizen : At present maintaining its habitats, as if a native, without the aid of man, yet liable to some suspicion of having been originally introduced.

Colonist : A weed of cultivated land, or about houses, and seldom found except in places where the ground has been adapted for its production by the operations of man

Alien : Now more or less established, but either presumed or certainly known to have been originally introduced from other countries.

Incognita : Reported as British, but requiring confirmation as such. Some ... through mistakes of the species ... others may have been really seen [as] temporary stragglers from gardens ... others cannot now be found in the localities published for them ... some of these may yet be found again. A few may have existed for a time, and become extinct.



The Rise of American Botany

Asa Gray 1810 – 1888

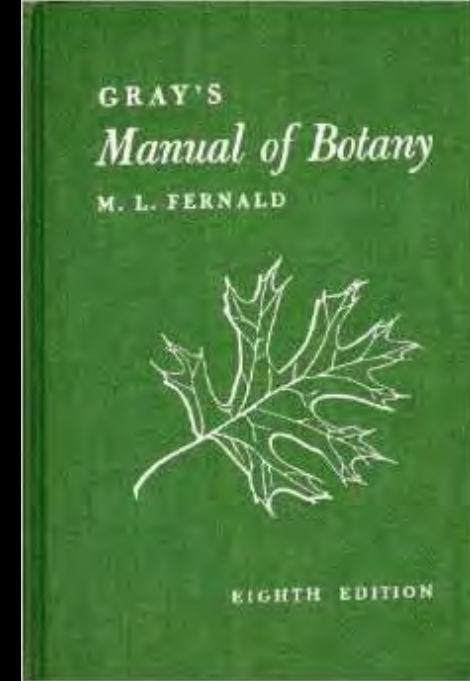
He was instrumental in unifying the taxonomic knowledge of the plants of North America.

Gray was born in Sauquoit, New York in 1810. In 1838, Gray became the very first professor at the newly founded University of Michigan. Appointed the Professor of Botany and Zoology, Gray was dispatched to Europe by the regents of the university for the purpose of purchasing a suitable array of books to form the university's library.

In 1842, before ever returning to teach a course at Michigan, Gray accepted appointment as professor of natural history at Harvard University, a post he retained until 1873

His most widely used book, *Manual of the Botany of the Northern United States, from New England to Wisconsin and South to Ohio and Pennsylvania Inclusive* (1848), commonly called *Gray's Manual*, has remained, in successive editions, a standard work in this subject.

Darwin's strongest and most vocal scientific ally in the United States, Gray recognized the scientific importance of Darwin's efforts for the growing professionalism of biological researchers.



Gray's Botanical Network

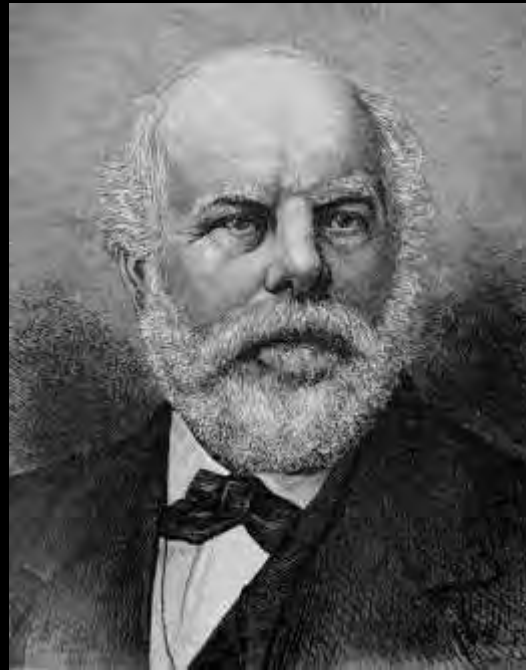
George Engelmann 1809 – 1884

Jean Louis Berlandier 1830s

Thomas Drummond 1830s

Ferdinand Lindheimer 1830s

Ferdinand von Roemer 1840s



John Torrey 1796 – 1873

Professionalism and American Science

Louis Agassiz 1807 - 1873

He grew up in Switzerland and became a professor of natural history at University of Neuchâtel through Von Humboldt's support. His two great areas of study were marine biology and glaciation. Agassiz made extensive contributions to ichthyological classification (including of extinct species) and to the study of geological history (including to the founding of glaciology).

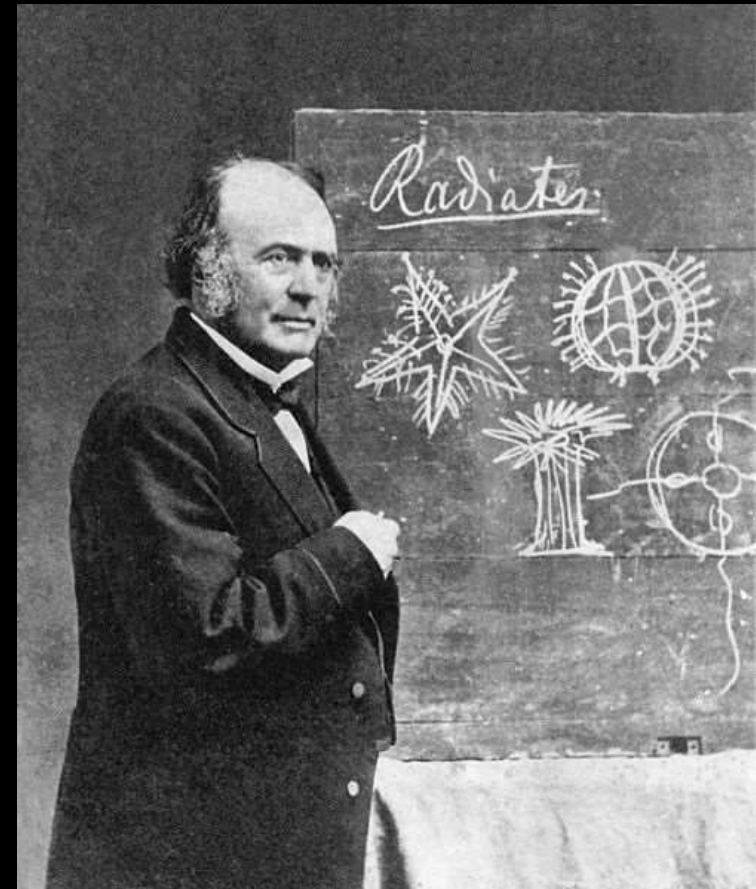
In 1848 he accepted a professorship at Harvard.

He immediately set about organizing and acquiring funding for a great museum of natural history. In 1859 his dream came true with the founding of the Museum of Comparative Zoology, which opened its doors in 1860. This was the first publicly funded science building in North America.

Natural Theology "A species is a thought of the Creator"

Agassiz was a staunch creationist, and he taught that after every global extinction of life God created every species anew.

His philosophy of nature, aiming to understand the Divine Plan, is the last great expression of the old school of natural theology, started by men like John Ray almost two hundred years before.



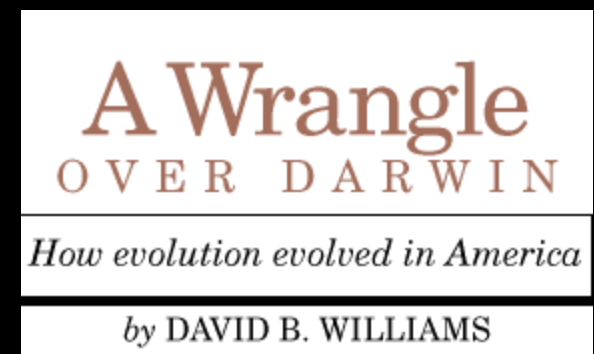
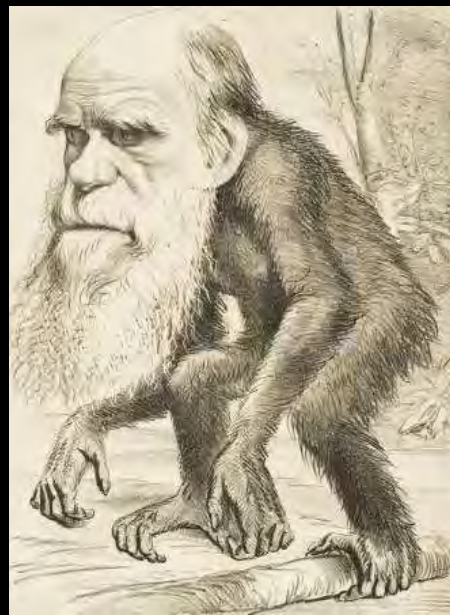
Origin of the Species and the Evolution Debate in America

Of the several thousand letters that Charles Darwin wrote during his lifetime, few were more important than one he sent on September 5, 1857, to Asa Gray.

Darwin wrote in his semi-legible scrawl: "I will enclose the briefest abstract of my notions on the means by which nature makes her species....I ask you not to mention my doctrine." Asa Gray thus became the first person in North America to learn about Darwin's ideas on natural selection.

Darwin revealed his theory to the general public two years later in his revolutionary book, *On the Origin of Species*. Its publication prompted fierce debate in America.

On one side arose Gray, Darwin's friend and supporter, a taciturn man best known as a cataloguer and collector of plants. In opposition stood Gray's Harvard colleague Louis Agassiz, a charming, brilliant lecturer and the most popular scientist in the land. Harvard thus became the most important battleground in the initial American engagement with natural selection.



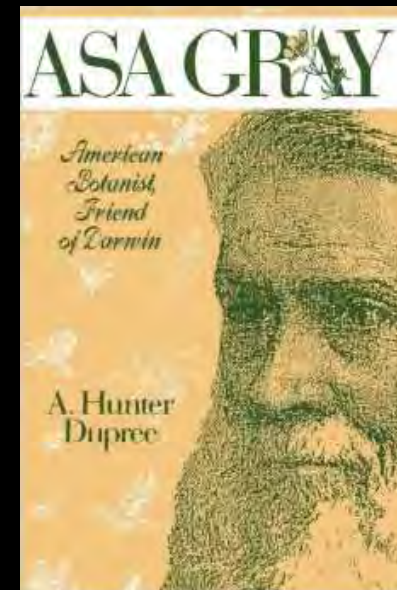
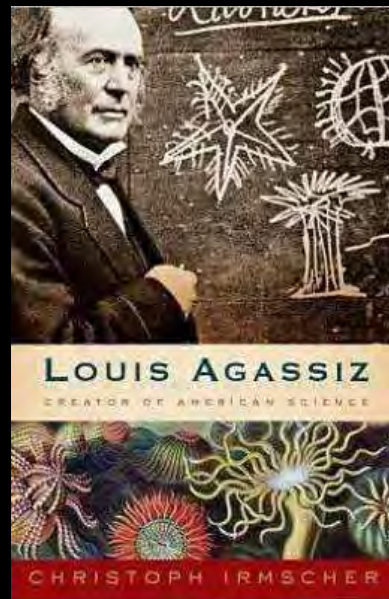
The Debate and the Rise of Evolution

Agassiz launched his public attack on Darwin at the American Academy of Arts and Sciences, Boston's most important learned society. He told the group gathered on January 10, 1860, that modern species and fossil species had no genetic relationship. This tenet was central to the theory of special creationism, which held that God had created each and every species in its current location. Species did not change through time, but they did become extinct. Great catastrophes, like floods or the glaciers described by Agassiz in *Études*, had periodically destroyed life on earth.

Gray began his public defense of Darwin, also in the American Journal of Science, with a positive review of *Origin* in the March 1860 issue. He wrote that Darwin's ideas on variation within plants and animals were "general, and even universal."

Despite Gray's strong religious feelings, he was at heart a scientist. Unlike Agassiz, he could separate his faith and his science. Gray ultimately concluded that "The work [*Origin*] is a scientific one...and by its science it must stand or fall."

By Agassiz's death in 1873, Darwin's theory as championed by Gray was broadly accepted by American biologists.



The National Biological Survey 1885-1910

C.Hart Merriam, at age sixteen, had accompanied Spencer Baird (the first secretary of the Smithsonian Institution) on the Hayden Survey (the first scientific expedition to Yellowstone) in 1872.

By 1883 Merriam formed the American Ornithological Union and became the U.S. Department of Agriculture's economic ornithologist in 1885.

By 1896 his office became the Division of Biological Survey, and in 1906 it became a bureau.

By 1910 the Biological Survey was forced to devote its time controlling noxious weeds and predatory animals and Merriam retired, realizing that his dream of a national biological survey would never come to pass.



Merriam's Life Zones and Von Humboldt

Life zones were proposed by Alexander von Humboldt and others who emphasized plants. Around 1900 C. Hart Merriam, then chief of the U.S. Biological Survey, related life zones, as observed in the field, with broad climatic belts across the North American continent designed mainly to order the habitats of America's important animal groups.

The first-order differences between the zones, as reflected by their characteristic plants and animals, were related to temperature; moisture and other variables were considered secondary.



Biological Survey of Texas 1889-1905 – Merriam and Bailey

It has been over 100 years since the Biological Survey of Texas was completed. The field work for that survey was conducted from 1895-1898 under the direction of the US Bureau of Biological Survey and was led by Vernon Bailey. Bailey later (1905) published the results of these efforts as "The Biological Survey of Texas."

Bailey was born in Minnesota in 1864. At age 11, Bailey received a shotgun and soon filled a room of his parents house with preserved specimens and taxonomic mounts. When he was 20 he contacted C. Hart Merriam.

In 1889 Merriam sent Bailey to Texas. He returned in 1892, 1899, 1900-1902, and 1904, publishing his results in 1905.

In 1899 Bailey married Merriam's sister Florence Merriam, who had already become one of the most prominent ornithologists of the nation (and who later would publish *The Birds of New Mexico* in 1928.) She led the fight to declaring the killing of birds for feathers to be used in millinery and private egg collection, which led to the development of the Audubon Society.



While in Texas, Bailey hired a number of naturalists to help him, most notably the renowned artist Louis Agassiz Fuertes and H. P. Attwater who played an important role in developing wildlife laws in Texas in the 1920s.

Another naturalist to accompany Bailey was Harry Church Oberholser, whose *Bird Life of Texas*, was posthumously published in 1974 by his longtime editor Edgar B. Kincaid.



Ecological Change and Biological Survey

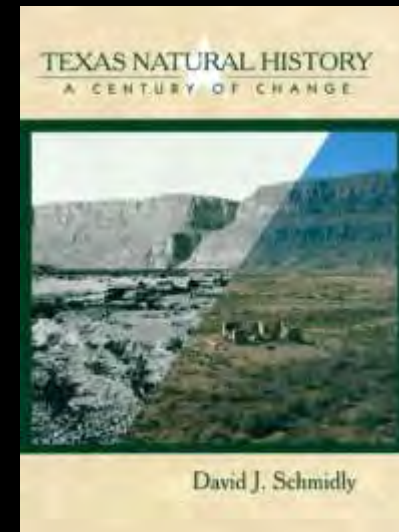
Bailey's work gives a baseline for understanding the changing distribution of animals in Texas over the last hundred years.

For example, he commented that opossums were not found west of San Angelo (and now they are found in New Mexico).

He also noted that javelina were found along the Pecos River into New Mexico and into the sand dunes near Monahans ("the center of their abundance"), and also along the Concho River as far north as San Angelo. Now they are found at least as far as Borden County and on the Llano Estacado as far north as Andrews. Bailey found none on top of the Llano Estacado.

During Bailey's time, mountain lions were hunted almost to extinction, and during his time were still found in the Big Thicket of east Texas and in the mountains of West Texas, and along the western edge of the Llano Estacado around the sand dune country.

Now they are found in almost every county of the state.



The Fall of Biotic Nativeness

Matthew K. Chew and Andrew L. Hamilton

The idea of a native species was first defined in 1847.

Nativeness is an organizing principle of numerous scientific studies and findings, and the *sine qua non* invoked by many management policies, plans, and actions to justify intervening on prevailing ecosystem processes.

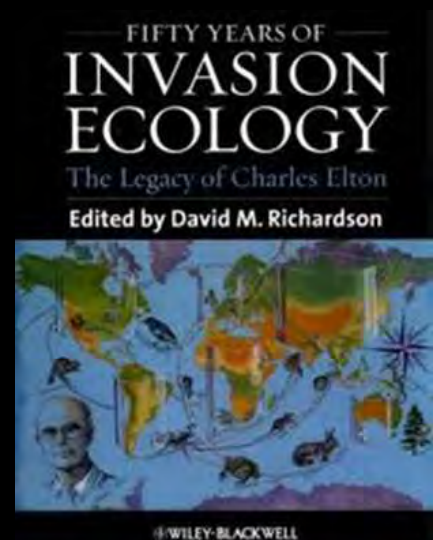
It is important to be clear about what these concepts mean.

1. Is nativeness conceptually defensible?
2. Does it accomplish any theoretical work?

In answering, we conclude that its categorical meaning and significance both dissolve under scrutiny.

Biotic nativeness is theoretically weak and internally inconsistent, allowing familiar human desires and expectations to be misconstrued as essential belonging relationships between biota, places and eras.

We believe much well-intended effort is wasted on research contrasting 'native' and 'alien' taxa, and by conservation projects focused primarily on preserving or restoring natives.



Don't judge species on their origins

Conservationists should assess organisms on environmental impact rather than on whether they are natives, argue **Mark Davis** and 18 other ecologists.

BIOLOGICAL BIAS

Nativeness is not a sign of evolutionary fitness or of a species having positive effects. The insect currently suspected to be killing more trees than any other in North America is the native mountain pine beetle *Dendroctonus ponderosae*. Classifying biota according to their adherence to cultural standards of belonging, citizenship, fair play and morality does not advance our understanding of ecology. Over the past few decades, this perspective has led many conservation and restoration efforts down paths that make little ecological or economic sense.

We are not suggesting that conservationists abandon their efforts to mitigate serious problems caused by some introduced species, or that governments should stop trying to prevent potentially harmful species from entering their countries. But we urge conservationists and land managers to organize priorities around whether species are producing benefits or harm to biodiversity, human health, ecological services and economies. Nearly two centuries on from the introduction of the concept of nativeness, it is time for conservationists to focus much more on the functions of species, and much less on where they originated. ■

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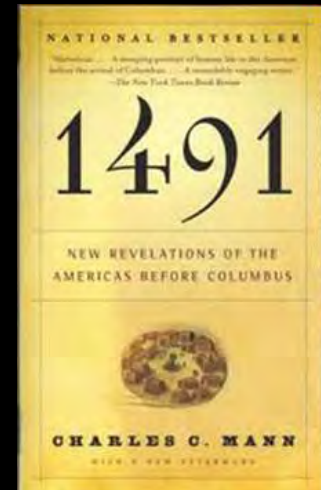
Ecological Release

“Columbus set off an ecological explosion of a magnitude unseen since the Ice Ages.

Some species were shocked into decline (most prominent among them *Homo sapiens*, which in the century and a half after Columbus lost a fifth of its number, mainly to disease).

Others stumbled into new ecosystems and were transformed into environmental overlords: picture-book illustrations of what scientists call “ecological release.” Mann, *1491*

Not all released species will become invasive. Most released species that don’t immediately die out tend to find a small niche in the local ecosystem. Ecological release occurs when a species expands its niche within its own habitat or into a new habitat where there is little competition for resources.



What good is a bluebonnet?



"The idea of nature contains, though often unnoticed, an extraordinary amount of human history."
Raymond Williams, "Ideas of Nature"