Center for Environmental Research at Hornsby Bend

Austin Water

American Biology: Natives, Immigrants, and Humboldt's Children

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Austin Water – Center for Environmental Research

American Nature and Biology

Natural History to Biology

- From Description and Classification
- To Scientific Explanation of Life

Alexander von Humboldt

- Humboldtian Science
- Humboldt's Children

  Natives – Asa Gray

  Immigrants – Louis Agassiz

  Darwin – Origin of Species

Science and New World Nature

New World Nature and the Swamp

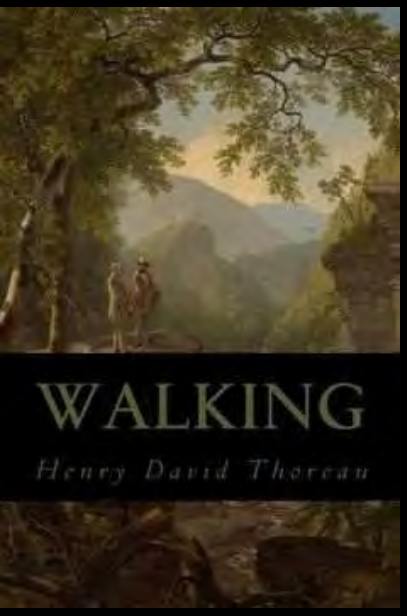
Henry David Thoreau, “Walking” (1862)

I wish to speak a word for Nature, for absolute Freedom and Wildness, as contrasted with a freedom and culture merely civil,—to regard man as an inhabitant, or a part and parcel of Nature, rather than a member of society.

The West of which I speak is but another name for the Wild; and what I have been preparing to say is, that in Wildness is the preservation of the world.

Hope and the future for me are not in lawns and cultivated fields, not in towns and cities, but in the impervious and quaking swamps.

SWAMPS?



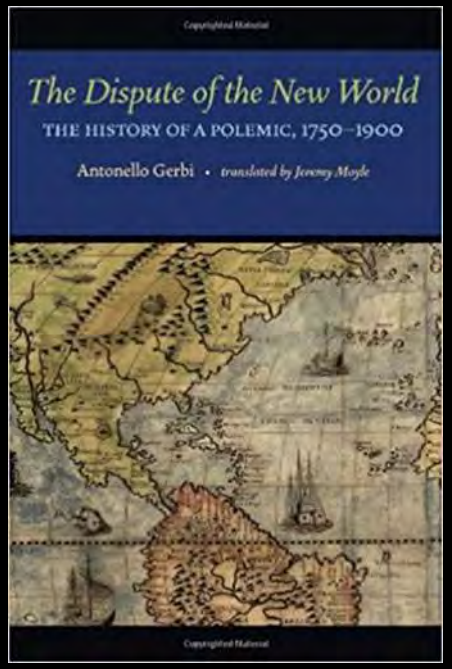
Theory of Degeneracy of American Nature

The Swamp

"…the crude state in which nature is found…in this state of abandon, everything languishes, decays, stifles. The air and the earth, weighed down by the moist and poisonous vapors, cannot purify themselves nor profit from the influence of the star of life.

The sun vainly pours down its liveliest rays on this cold mass … it will never produce anything but humid creatures, plants, reptiles, and insects, and cold men and feeble animals are all that it will ever nurture."

The Theory



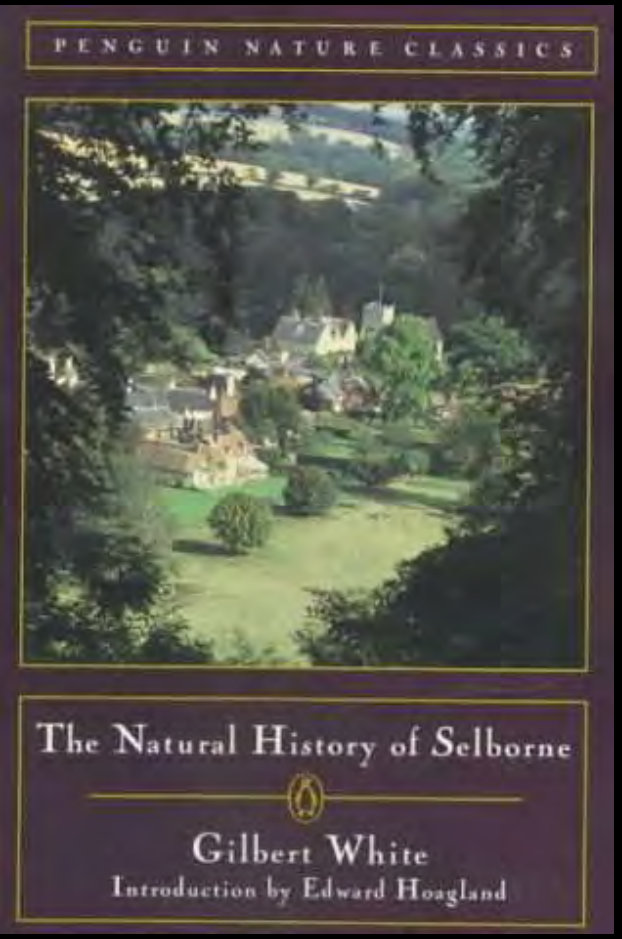
As a result of living in a cold and wet climate, all species found in America were weak and feeble…

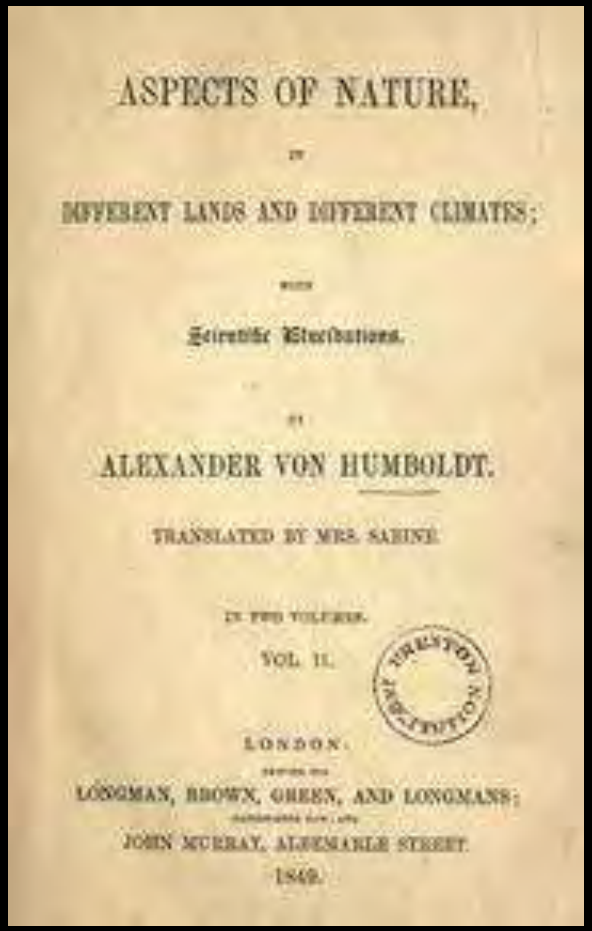
And any species imported into America for economic reasons would soon succumb to its new environment and produce lines of puny, feeble offspring, which applied equally well to transplanted Europeans and their descendants in America.

America is a land of swamps, where life putrefies and rots.

Thoreau and Natural History – The Literary and Scientific Naturalist

"I am an observer of nature generally, and the character of my observations, so far as they are scientific, may be inferred from the fact that I am especially attracted by such books of science as White's Selborne and Humboldt's 'Aspects of Nature.'" 1853




ASPECTS OF NATURE,

IN

DIFFERENT LANDS AND DIFFERENT CLIMATES;

WITH

Scientific Elucidations.

BY

ALEXANDER VON HUMBOLDT.

TRANSLATED BY MRS. SABINE.

IN TWO VOLUMES.

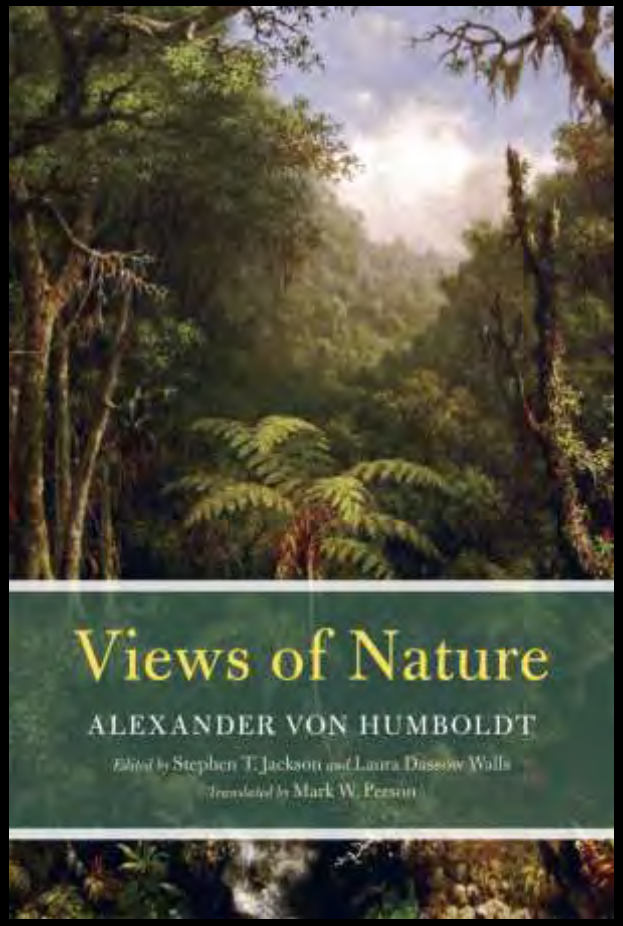
VOL. II.

LONDON:

LONGMAN, BROWN, GREEN, AND LONGMANS;

JOHN MURRAY, ALBEMARLE STREET.

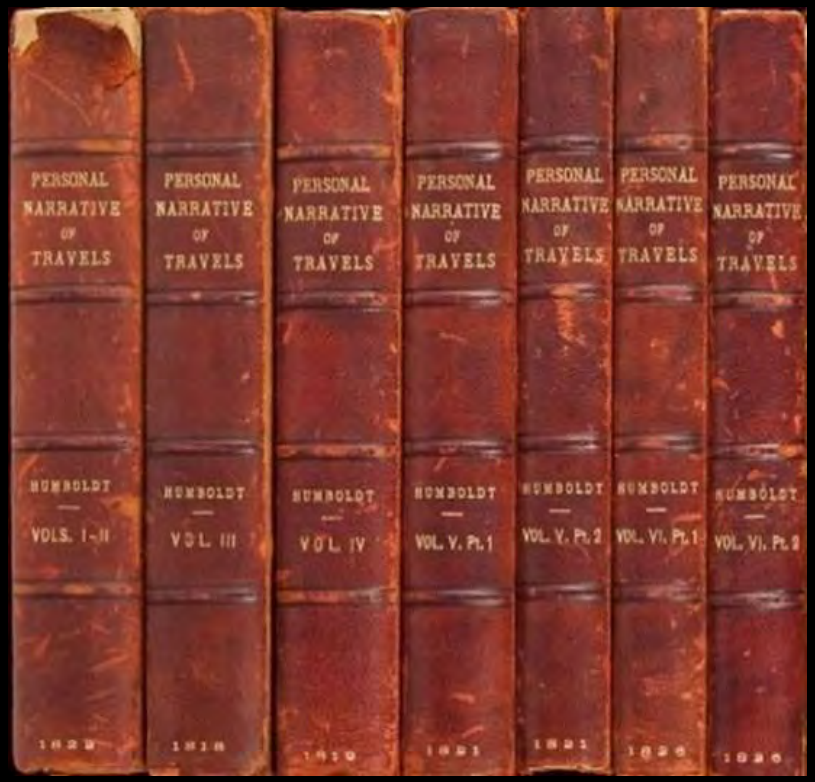
1849.

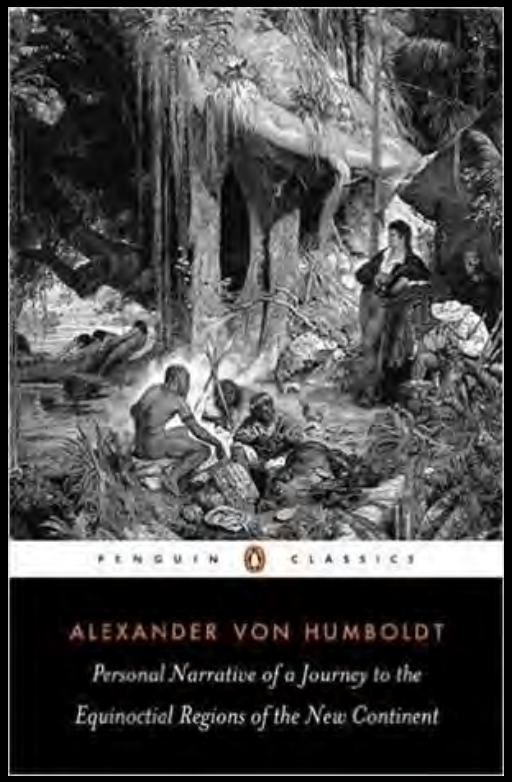


Humboldt's Progeny - Charles Darwin

Darwin's epitaph for his hero, written in a letter to his friend Joseph Hooker the year before Darwin's own death.

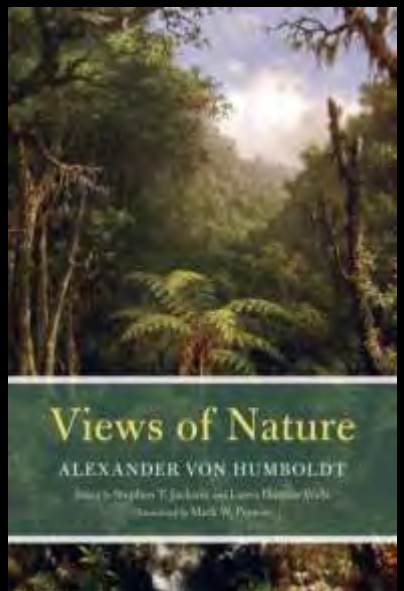
"I believe that you are fully right in calling Humboldt the greatest scientific traveler who ever lived. You might truly call him the parent of a grand progeny of scientific travelers, who taken together have done much for science.'

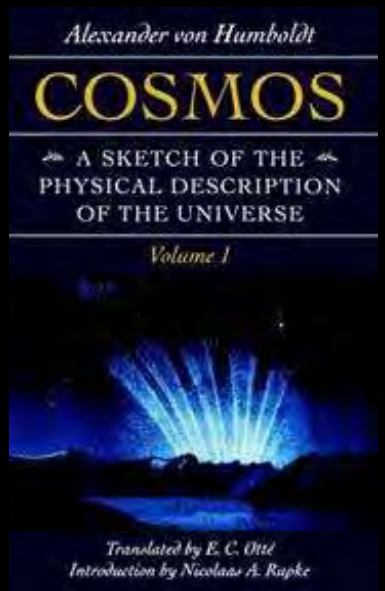


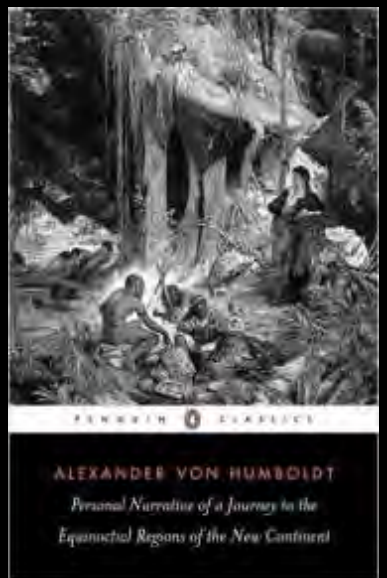


Alexander von Humboldt (1769 – 1859)

"Certain celebrated writers, more struck by the contrasts than the harmonies in nature have been pleased to depict all America as a land of swamps…it would be superfluous for me to refute here M. de Buffon's hazardous assertions on the alleged degeneration…"







Alexander von Humboldt (1769 –1859)

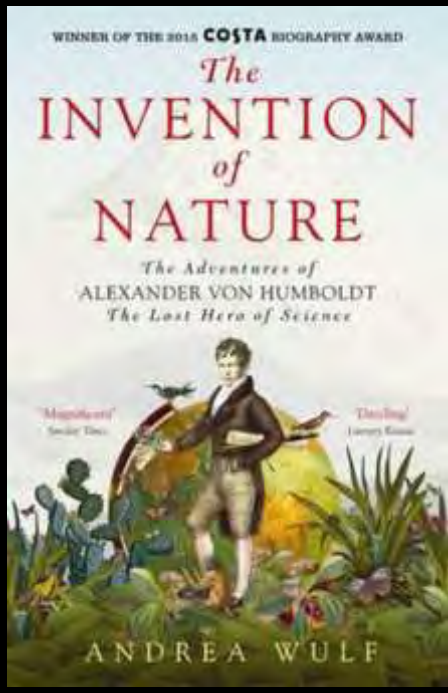
- Born in Berlin. His father was in the Prussian military, a confidant of the future king Friedrich Wilhelm II (who was Alexander's godfather) and set to be a minister, but died when Alexander was 9 and his brother, Wilhelm, was 11.
- His mother Maria Elisabeth was the daughter of a rich manufacturer and was described as distant and cold. She expected the boys to be successful and provided private tutors who were part of the Enlightenment culture of Berlin.
- His brother Wilhelm von Humboldt (1767–1835) Prussian diplomat and education reformer, philosopher, and linguist. Founder of the University of Berlin 1810. In 1949, it changed its name to Humboldt University in honor of both its founder Wilhelm and his brother, Alexander.
- Hated the "von" and signed his name "Alexander Humboldt"

Wilhelm von Humboldt

Alexander von Humboldt


The death of his mother in 1796 sets him free.
1797 Scientific journey through the Alps taking magnetic, topographical, and meteorological measurements – practice for a bigger journey.

In 1798, Alexander Von Humboldt was appointed by the King of Spain to make the first thorough scientific exploration of Spanish America.



"I shall collect plants and fossils and make astronomic observations. But that's not the main purpose of my expedition – I shall try to find out how the forces of nature interact upon one another and how the geographic environment influences plant and animal life. In other words, I must find out about the unity of nature."

At the end of his journey, he had a new vision of nature – of isotherms, ecosystems, food webs, watersheds, climate change, and complex interconnectivity – and he had invented the modern concept of nature. - Wulf

Aimé Bonpland 1773 – 1858


120°W
90°W
60°W
30°W
0°
30°N
Bordeaux
Aug. 1st 1804
La Coruña
June 5th 1799
July 1804
Philadelphia May-July 1804
Washington
VI
United States
May 1804
Atlantic Ocean
New-Spain
Gulf of Mexico
Canary Islands
Santa Cruz June 1799
I
Havana
Trinidad Mar. 1801
Mexico-City
Mar. 1804
Veracruz
Acapulco
Mar. 22nd 1803
III
Dec. 1800
June-July 1799
V
Caracas
Cumaná
July 16th 1799
Cartagena
Angostura June-July 1800
Feb.-Mar. 1803
Bogotá July-Sep. 1801
New-Granada
II
S. Carlos May 1800
Quito Jan.-June 1802
Chimborazo
Guayaquil
Jan. 1803
IV
Peru
Lima Oct.-Dec. 1802
Alexander von Humboldt's
American expedition 1799-1804
Expedition way
City / Stopping place
Spanish Viceroys
and United States
I With the spanish corvette "Pizarro" from La Coruña over the Canary Islands to Cumaná
II 75-days journey with Bonpland, on the Orinoco and the Rio Negro
III With the ship from Nueva Barcelona to Havanna, 3-month sojourn on Cuba, over Trinidad to Cartagena
IV Through today's Colombia, Ecuador and Peru to Lima
V From Guayaquil to Acapulco, longer sojourn in Mexico-City and back to Havanna over Veracruz
VI With the cargo ship "Concepción" to Philadelphia, Washington, with the french Frigate "La Favorite" to Bordeaux

Venezuela 1799–1800

In February 1800, Humboldt and Bonpland left the coast with the purpose of exploring the course of the Orinoco River and its tributaries. This trip, which lasted four months and covered 1,725 miles had the important result of establishing the existence of the Casiquiare canal (a communication between the water-systems of the rivers Orinoco and Amazon).

To the Andes 1801-2

Beginning in March 1801 they travel down the Andes from Bogata and reached Quito on 6 January 1802. Five months after his arrival, Humboldt finally left Quito on 9 June 1802. He intended to travel to Lima. First, though, he was going to climb Chimborazo—the crown of his obsession. This majestic inactive volcano—a 'monstrous colossus' as Humboldt described it—was about one hundred miles to the southwest of Quito and rose to almost 21,000 feet.

Chimborazo - On 22 June they arrived at the foot of the volcano where they spent a fitful night in a small village. Early the next morning, Humboldt's team began the ascent together with a group of local porters. They crossed the grassy plains and slopes on mules until they reached an altitude of 13,500 feet. As the rocks became steeper, they left the animals behind and continued on foot

At 15,600 feet their porters refused to go on.

After an hour of treacherous climbing, the ridge became a little less steep but now sharp rocks tore their shoes and their feet began to bleed. Then, suddenly, the fog lifted, revealing Chimborazo's white peak glinting in the sun, a little over 1,000 feet above them—but they also saw that their narrow ridge had ended. Instead, they were confronted by the mouth of a huge crevasse which opened in front of them.

There was no way to cross.

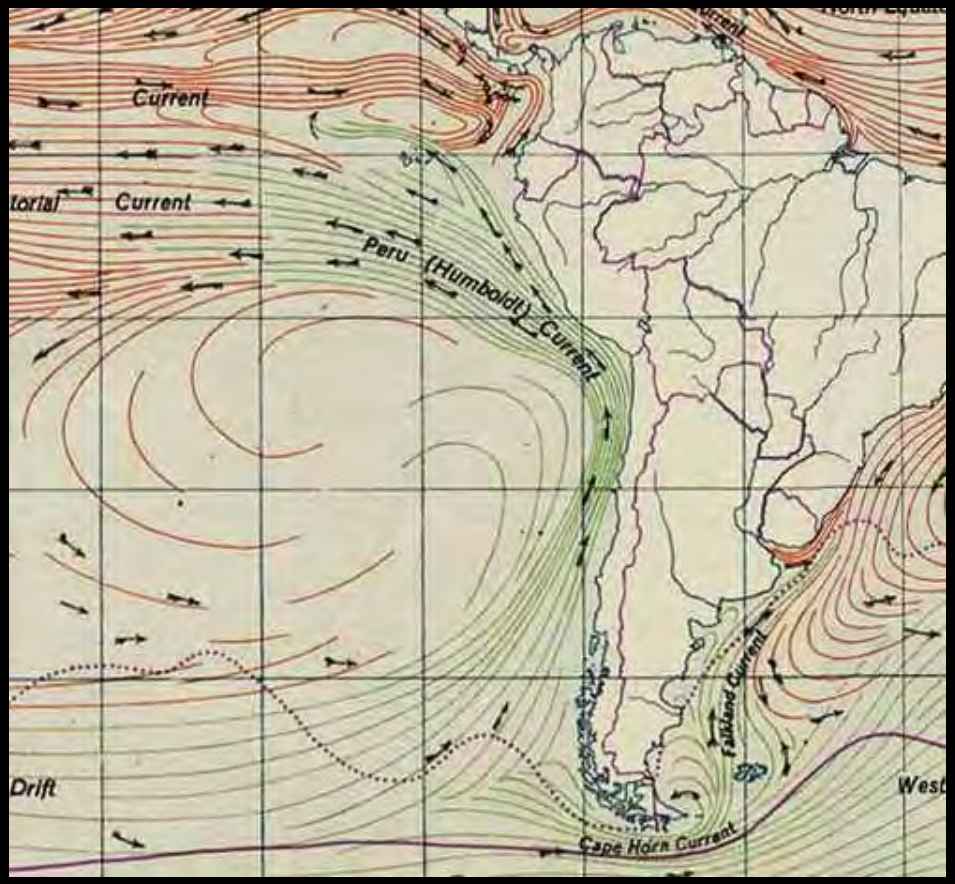
- From Andrea Wulf

Humboldt took out the barometer again and measured their altitude at 19,413 feet. No one had ever come this high—not even the early balloonists. A record only surpassed in 1849 by the botanist Joseph Hooker, who went a few meters higher in the Himalayas.

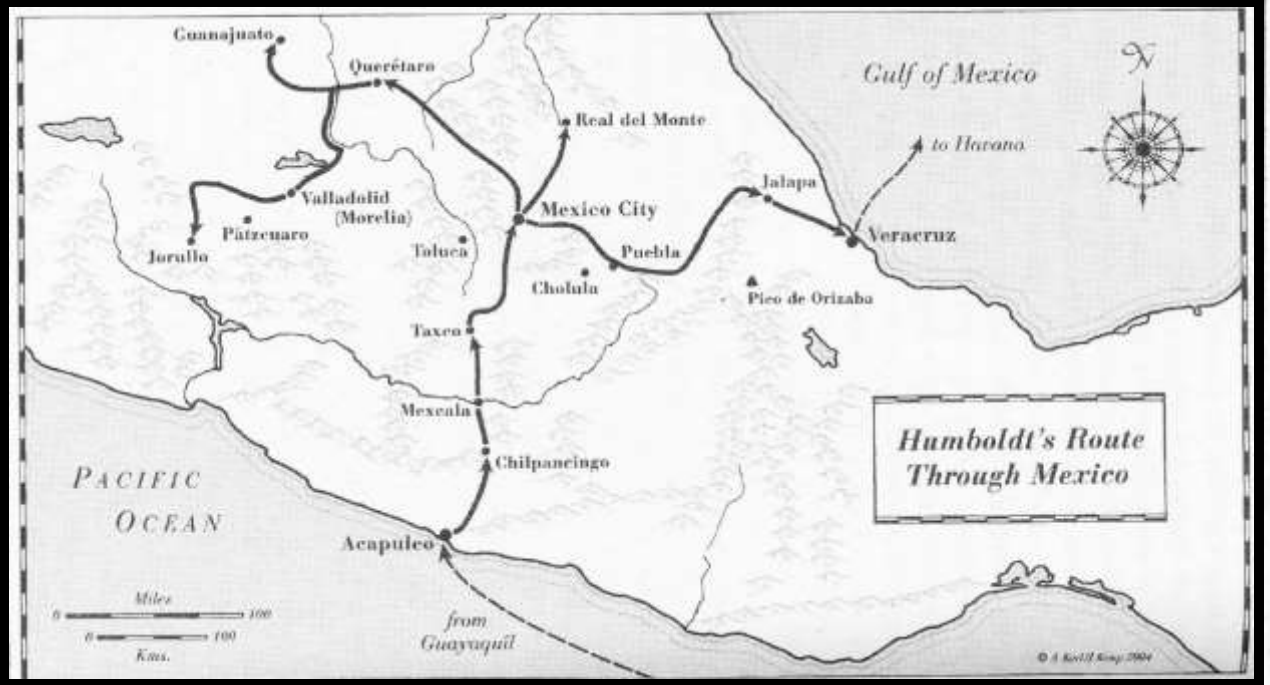
To the Equator and Lima then north to Mexico 1802-3

They left Quito in June 1802 and trekked south to Peru surveying Inca ruins, researching the chinchona tree (quinine bark), and the Earth's magnetic field at the geographic equator – then he was the first to measure the magnetic equator 7 degrees south. Arrived in Lima October 1802.

Sail from Lima to Guayaquil January 1803, and along the way is the first to measure the cold coastal current now known as the Humboldt Current. When the Cotopaxi volcano erupted on 4 January 1803, he and Bonpland travelled up the Rio Guayaquil to Bebahoyo on 6 February in order to examine the phenomenon at close range. In February 1803 they sail for Mexico…



His visit to Mexico began in Acapulco on March 22, 1803, and lasted for almost a year. He left Mexico via Veracruz for Cuba on March 7, 1804.



Humboldt went to see Jorullo Volcano, since it was a rare example of a brand new volcano. Jorullo first erupted in September 1759 and activity continued until 1774.

Santa María Regla, in the state of Hidalgo, north of Mexico City, is the best known location in Mexico for basalt columns.


A MAP OF
NEW SPAIN
from 16°. to 38°. North Latitude
reduced from the Large Map drawn from
astronomical observations at Mexico
in the Year 1804,
BY ALEXANDRE DE HUMBOLDT,
and comprehending the whole of the information contained in the
Original Map,
except the heights of the Mountains
LOUISIANA

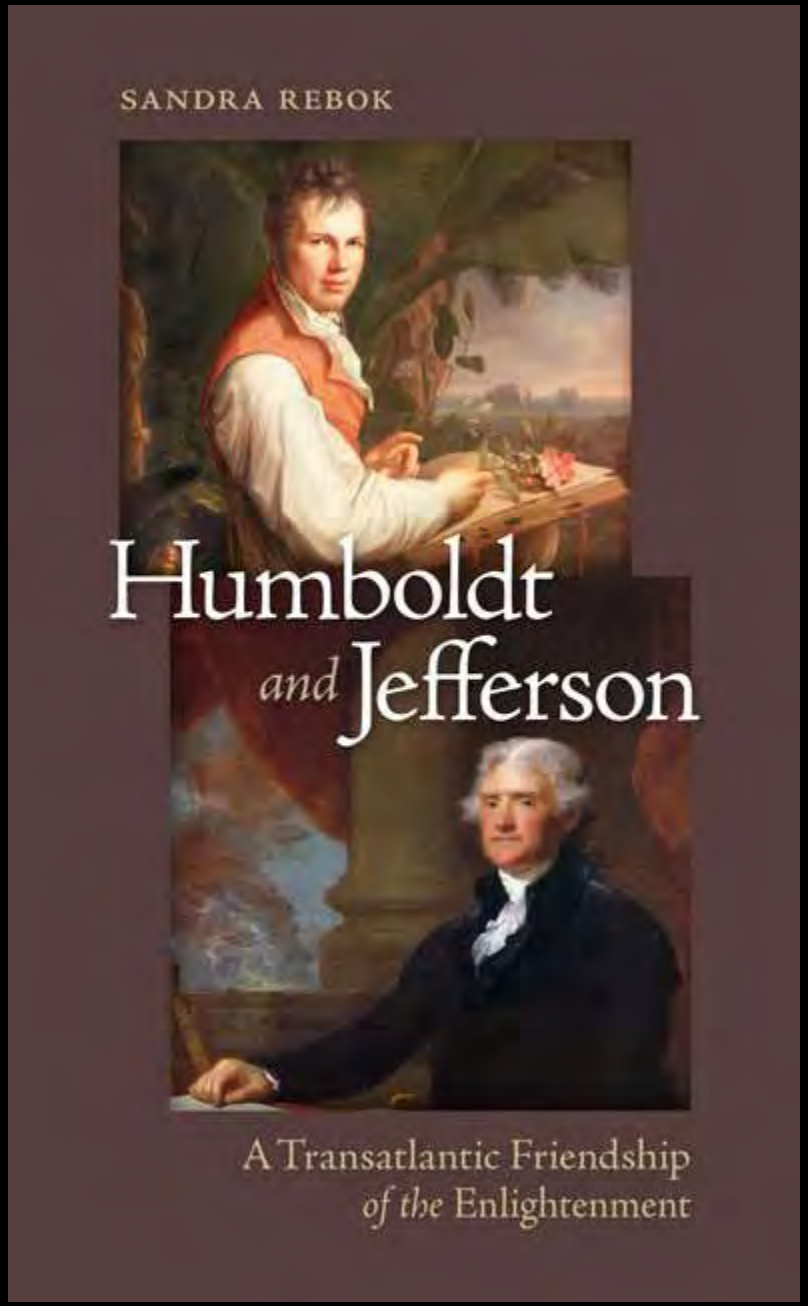
To Cuba and on to the United States 1804

In March 1804 they sail to Cuba planning to go directly to France, but American consul to Cuba, Vincent Gray, convinces Humboldt to visit Washington to meet President Jefferson.

Sail north into an early hurricane and almost sink, but they survive and arrive in Philadelphia on May 28th. Meets with the American Philosophical Society, visits Bartram's botanical garden, Charles Wilson Peale's natural history museum, ornithologist Alexander Wilson.

Peale takes him to Washington where Jefferson opens the White House to him and they spend a week talking. Meets Secretary of State Madison and Secretary of Treasury Gallatin. Humboldt shares his map of New Spain with Jefferson and the US government…copies are made.

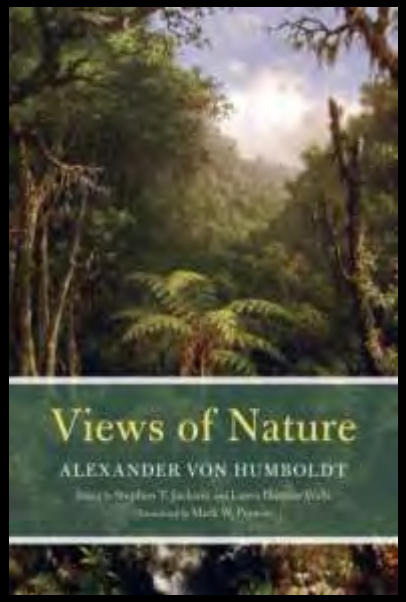
"I consider him Humboldt the most important scientist whom I have met." — Thomas Jefferson

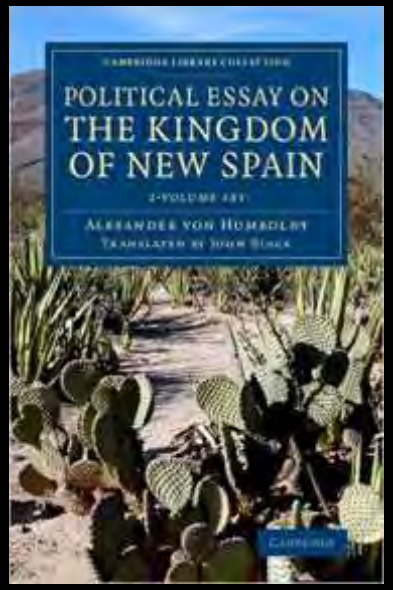


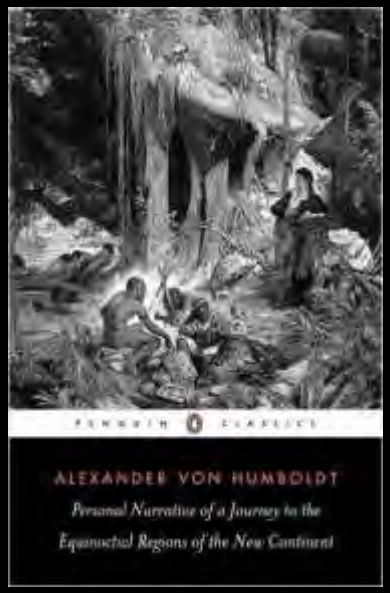
Home to France 1804

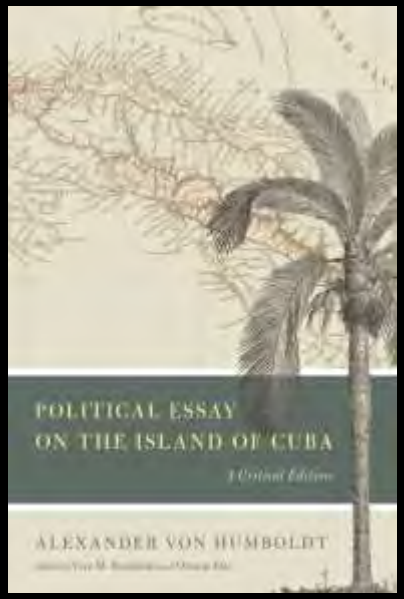
Departs the US at the end of June and arrives back in France 1 August 1804. Travels to Rome, Berlin, and settles in Napoleon's Paris in 1808 where he remains writing his books until 1826.

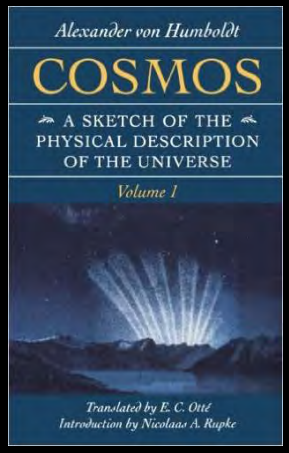
Humboldt's Books 1807-1859

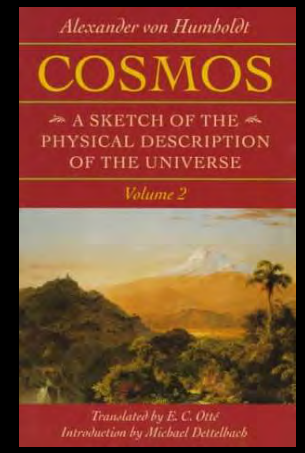






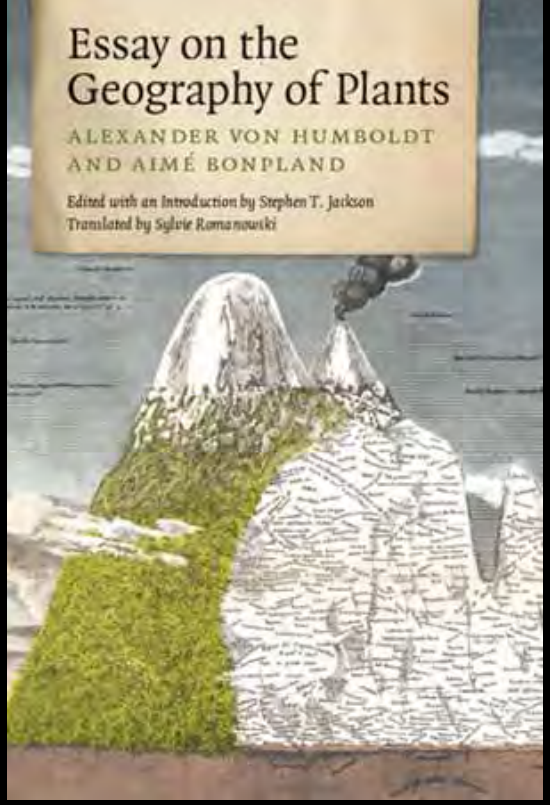






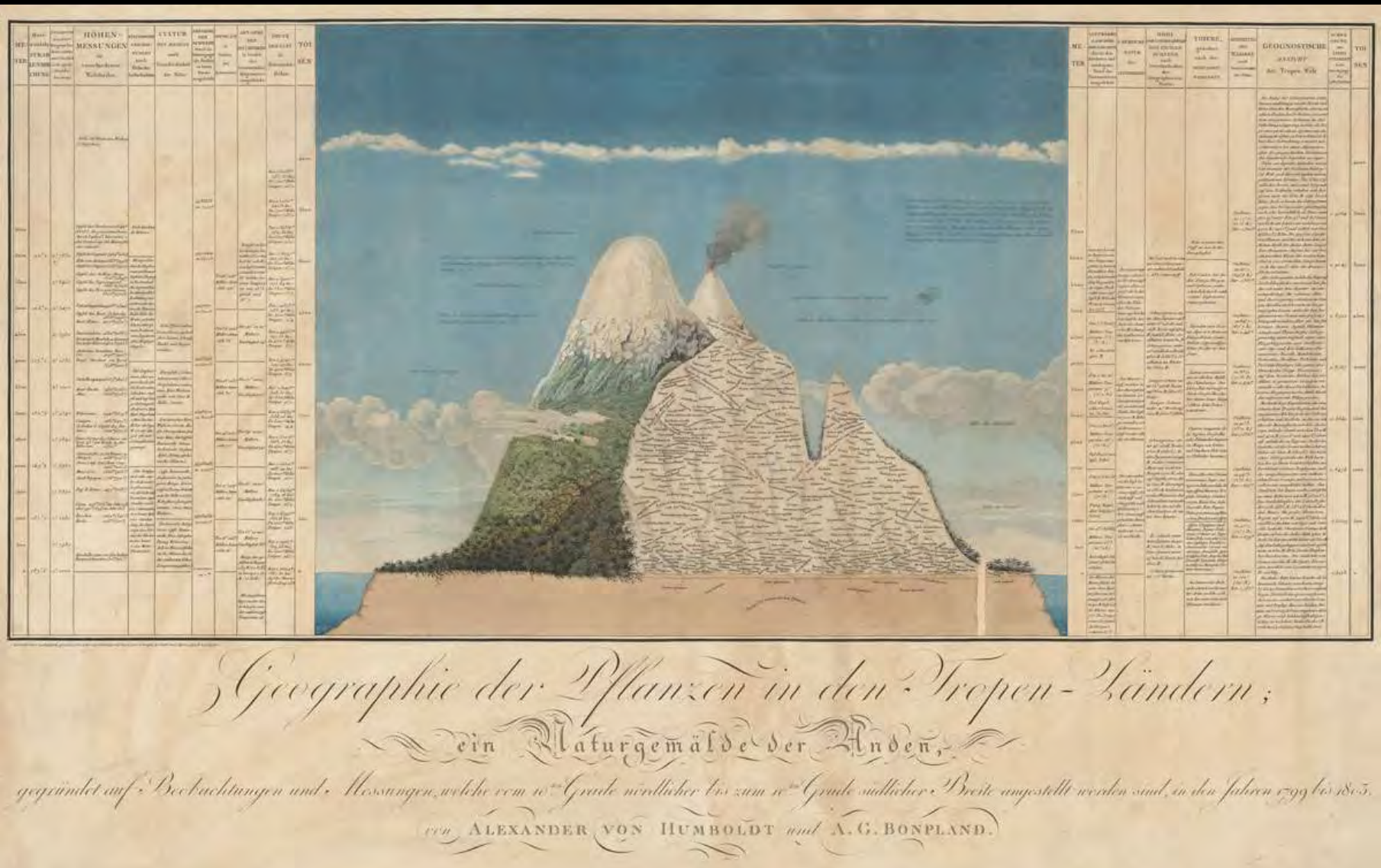
Humboldtian Science – *Essay on the Geography of Plants* 1807

- Physical geography as a science "consider together all the physical phenomena that one can observe on the surface of the Earth as well as the surrounding atmosphere"
- Connect - Show how diverse phenomena of the world can be unified and reduced to a small set of interconnecting patterns
- The similarity between coastal plants shows an ancient connection between Africa and South America and suggests continents geologically shift [plate tectonics]



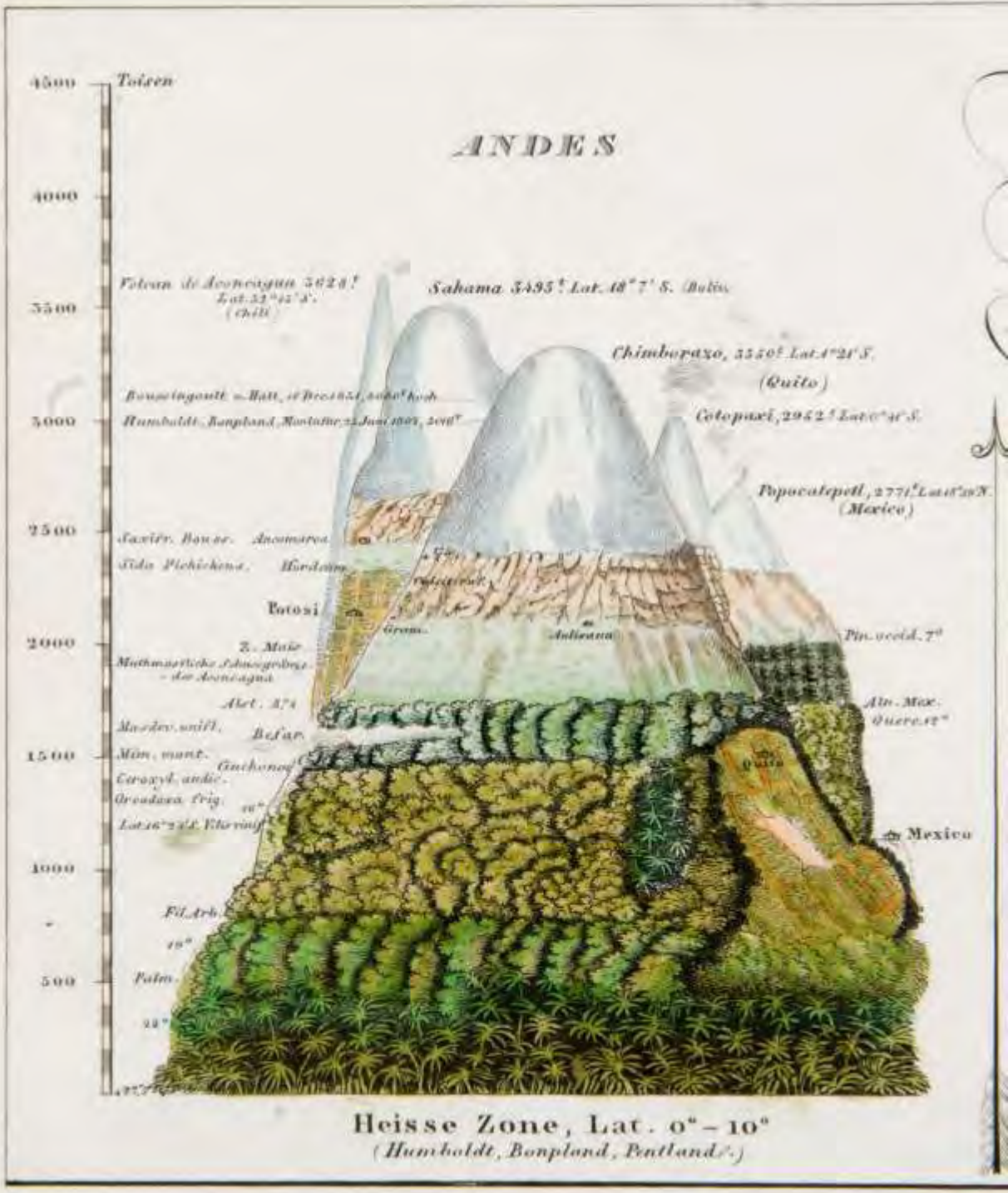
Naturgemälde – Data in visual form - nature a web in which everything was connected – not just a way of thinking but a way of seeing

- plants distributed according to their altitudes, ranging from subterranean mushroom species to the lichens that grew just below the snow line.
- Every plant was placed on the mountain precisely where Humboldt had found them.

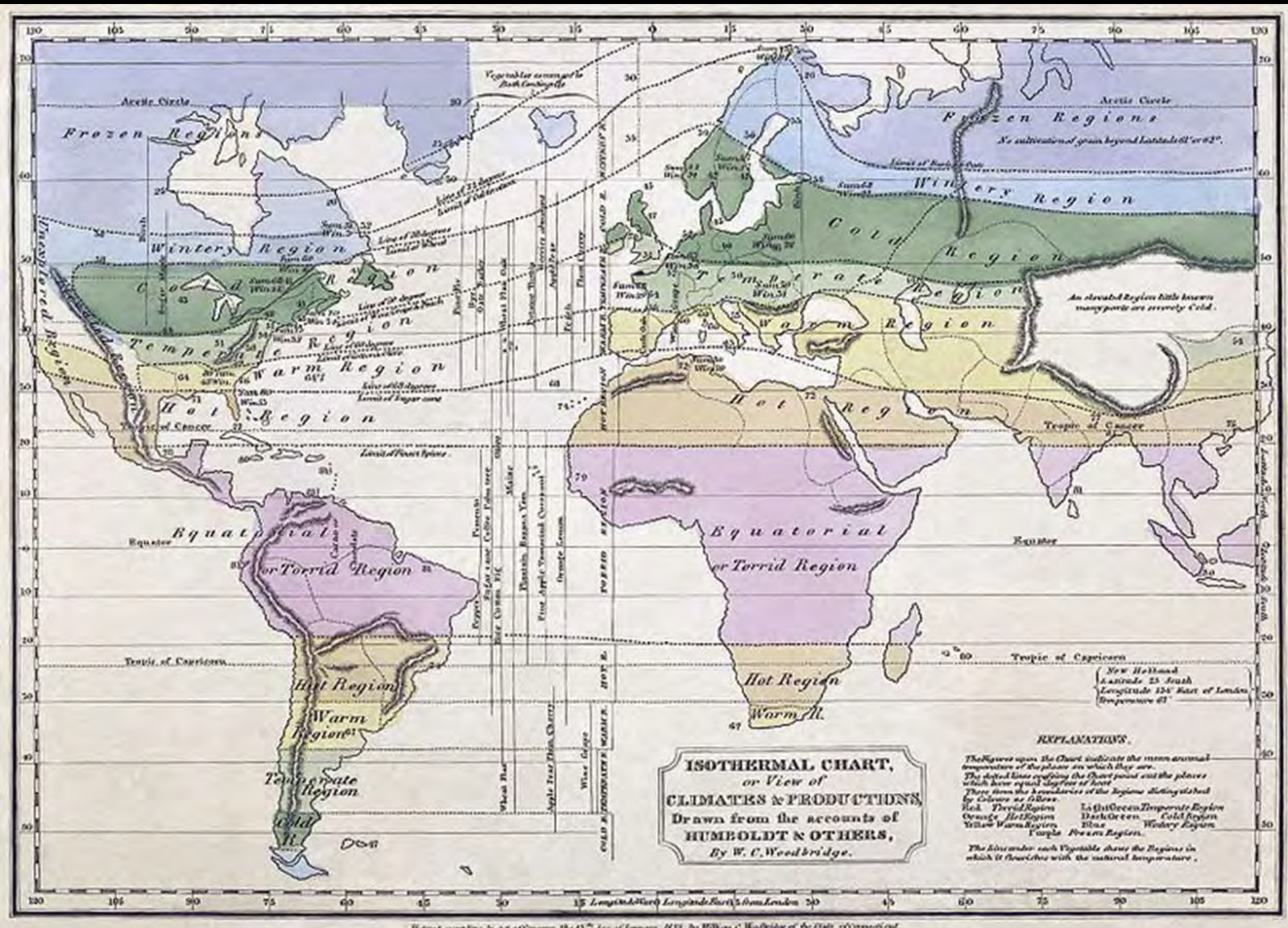



ANDES
ALPES ET PYRÉNÉES
LAPPLAND

- This variety and richness, but also the simplicity of the scientific information depicted, was unprecedented.
- Humboldt was the first scientist to present such data visually.
- The Naturgemälde showed for the first time that nature was a global force with corresponding climate zones across continents. Humboldt saw 'unity in variety'
- An ecological vision - Instead of placing plants in their taxonomic categories, he saw vegetation through the lens of climate and location: a radically new idea that still shapes our understanding of ecosystems today.

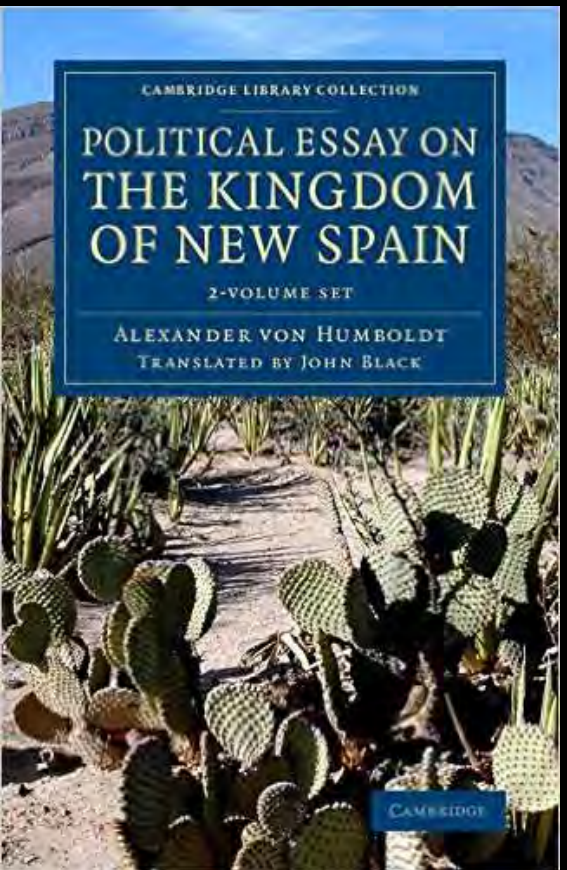


Isotherms - Vegetation zones stretching in bands around the globe



Humboldtian Science - *Political Essay on the Kingdom of New Spain* 1808-1810
Humans are part of Nature

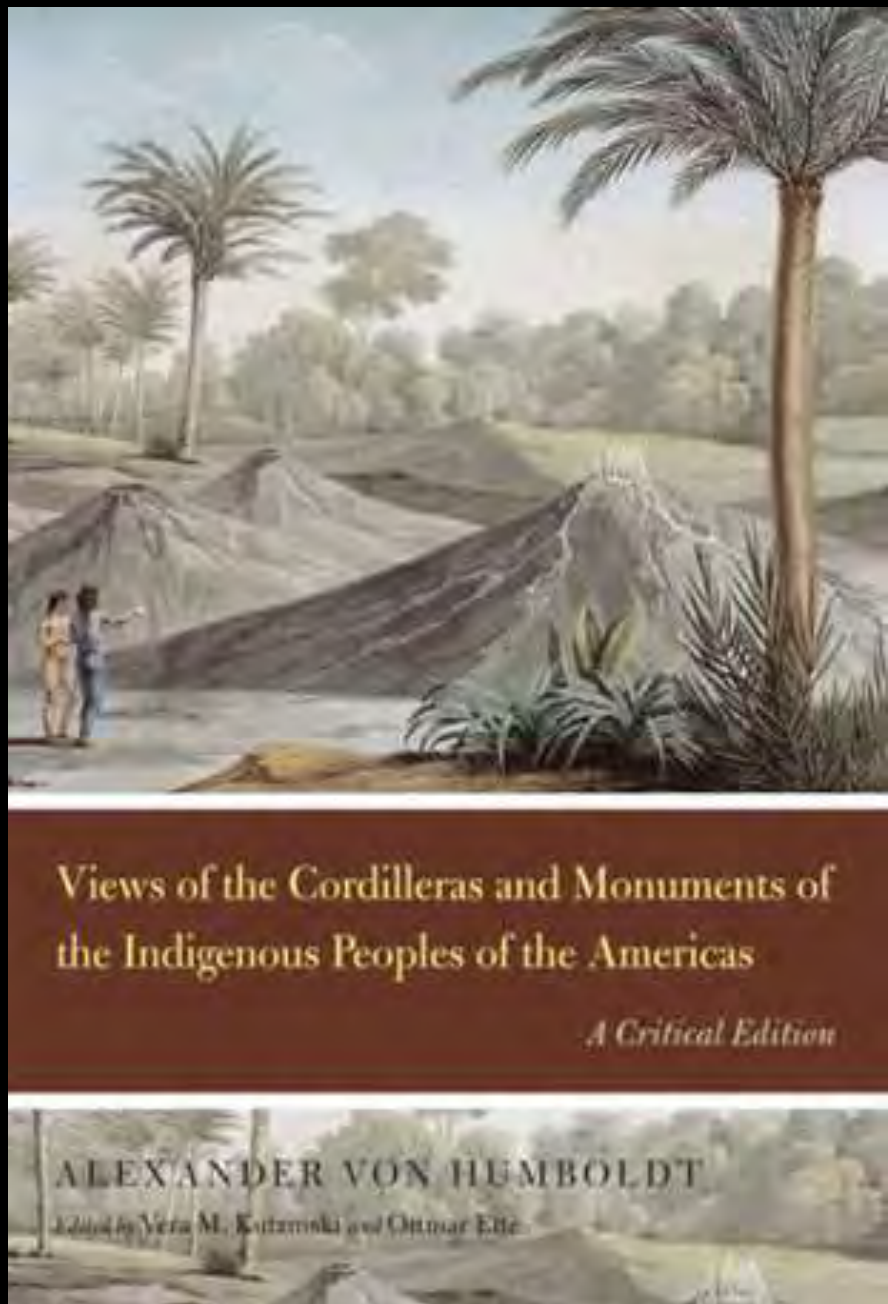
- Geographical survey of Spanish Central America
- Map – visual science
- An environmental history
- Social construction of "race" - "The prosperity of the whites is intimately connected with the copper colored race…there can be no durable prosperity for the two Americas till this unfortunate race, humiliated but not degraded by long oppression, shall participate in all the advantages resulting from the progress of civilization and the improvement of social order."



Autoportrait de Humboldt à 45 ans
Crayon, portant l'indication, en allemand et en français : « Alex. H. von mir selbst im Spiegel, 1814 a. — Alex. H., par moi-même, dans la glace, 1814.
(Collect. Société de Géographie)

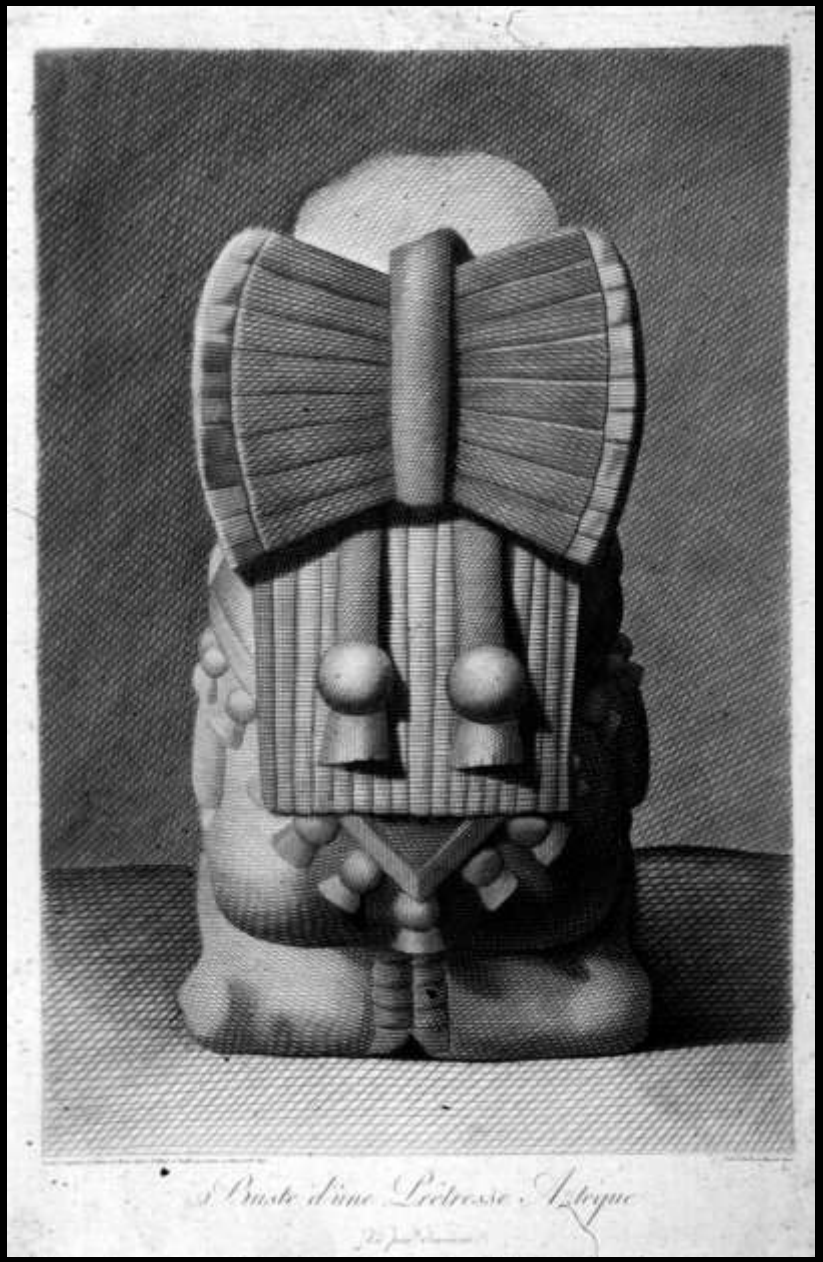
Humboldtian Science – Science and Culture *Views of the Cordilleras* 1810-13

- Scientific study of human culture
- First to analyze Aztec and Incan art
- Aztec calendar and language
- New World culture equal to Old World culture



Relief en basalte

représentant le Calendrier Mexicain



3. Buste d'une Prêtresse Azteque

Hiéroglyphes Aztèques

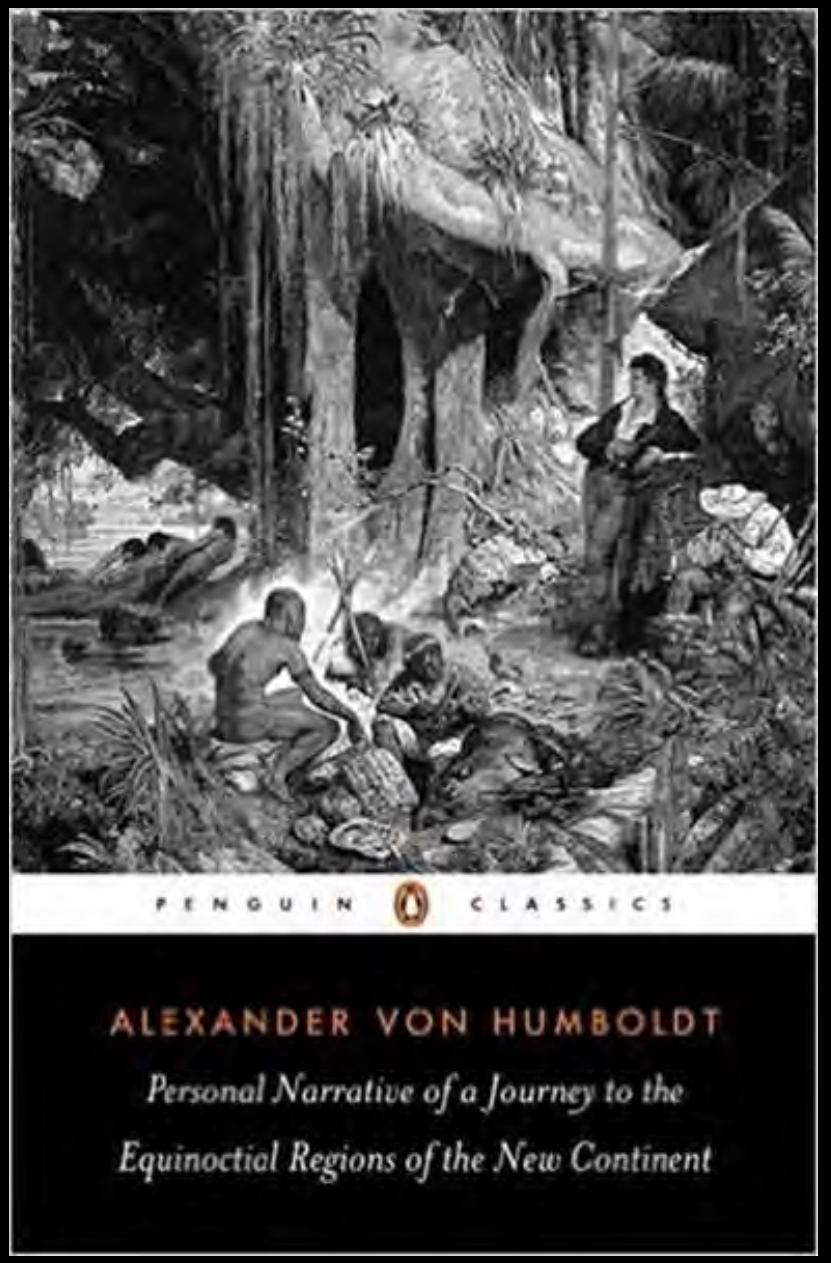
du Monument de Velletri

Humboldtian Science – *Personal Narrative* 1814

Explore, Collect, Measure

Humboldt's South American Expedition, 1799–1804

Map by Alexander Karnstedt, Wikipedia Commons



Humboldt's Cosmos

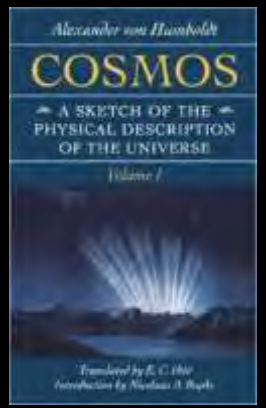
The dance of world and mind

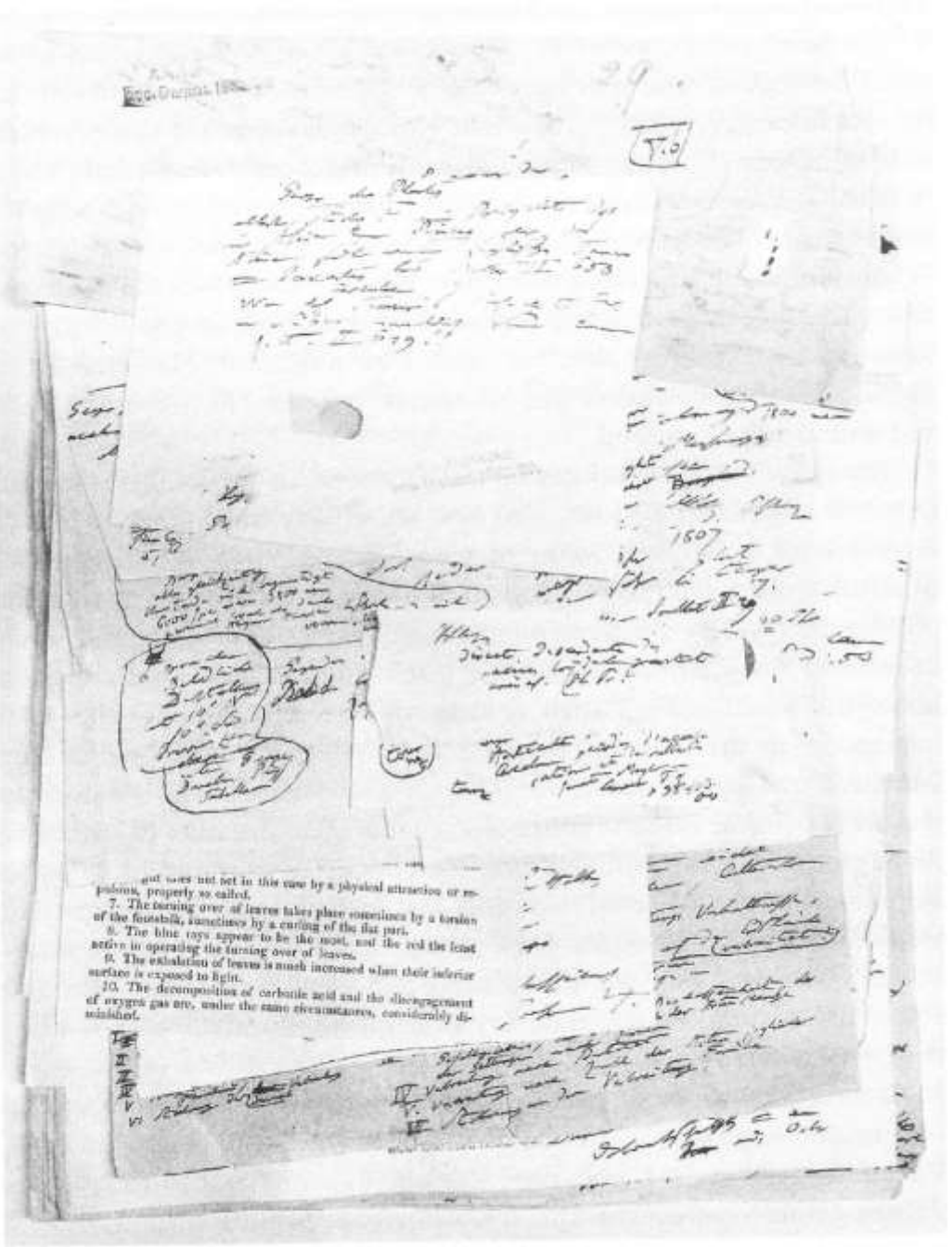
Humboldt lived in Paris from 1805-1827 but was forced to return to Berlin in May 1827

In November 1827 he began a series of 61 lectures that proved so popular he added 16 more. For six months he gave lectures several days each week.

No entry fee was charged and hundreds of people attended ranging from the royal family to coachmen and half those attending were women. Humboldt "democratized" science.

From these lectures, the multi-volume work *Cosmos* was born.



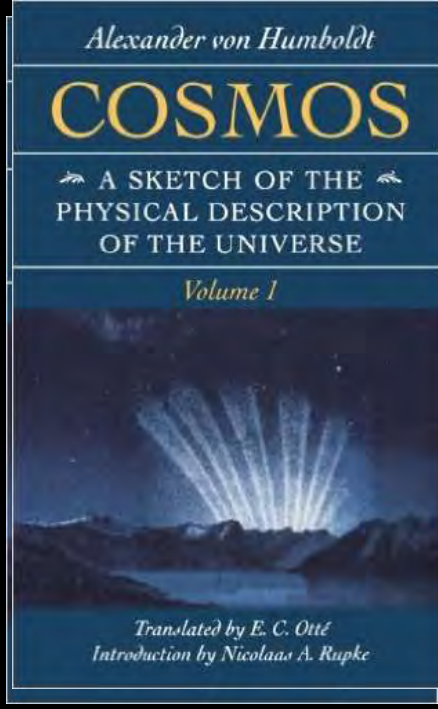


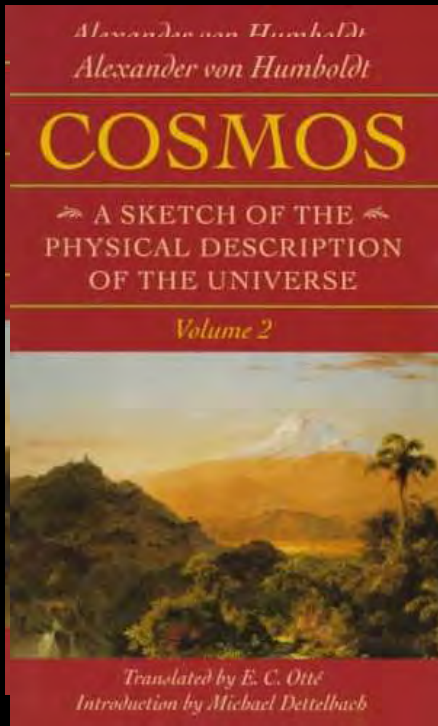
Humboldt's lecture notes on plant geography

Cosmos: A Sketch of the Physical Description of the Universe

Humboldt's five-volume opus Cosmos (1845-1862)

Cosmos was the scientific bestseller of the age. In 1845, the first edition of the first volume sold out in two months; by 1851, Humboldt estimated that eighty thousand copies had been shipped. He himself superintended the French translation, and by 1846 it had also been translated into English, Dutch, and Italian. His publisher wrote in 1847 that the demand for the second volume was "epoch-making"





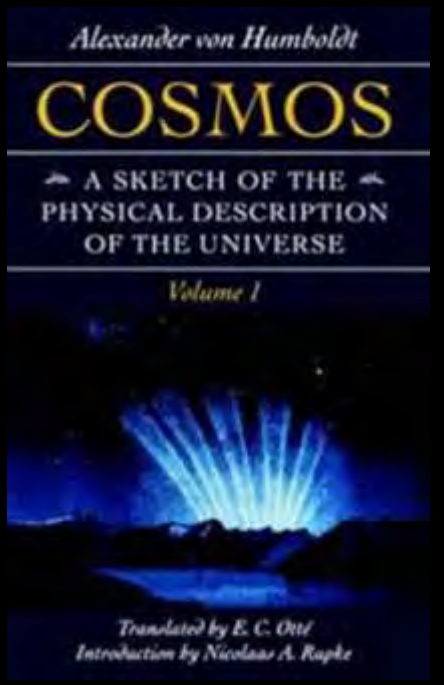
Humboldtian Science – The Systematic Universe

1. Explore – “Nature speaks and the scientist must go out and listen”
2. Collect – gather data for or against an idea/theory
3. Measure – widespread, accurate, collaborative
4. Connect – detect patterns that point to underlying laws
5. Cosmopolitan science – international collaboration

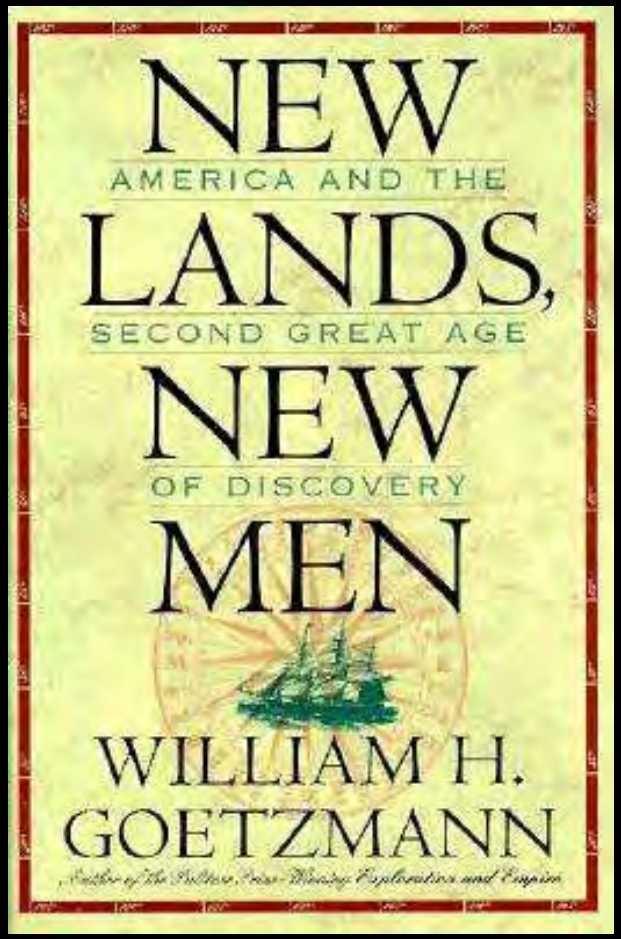
The Systematic Universe “the accurate measured study of widespread but interconnected real phenomena in order to find a definite law and a dynamic cause”

Earth’s magnetic field – advocated global monitoring network

Scientific Collaboration, Friendship, Mutual Support, Mentorship



Humboldt's Influence on American Culture and Science



"Humboldt's Children"

Humboldt "came to stand like a colossus over the scientific exploration and study of the continents"

"provided a model and a method for organizing all the data that poured into Europe from the ever-increasing number of expeditions to all parts of the globe."

Humboldt the Model and Mentor

Ralph Waldo Emerson

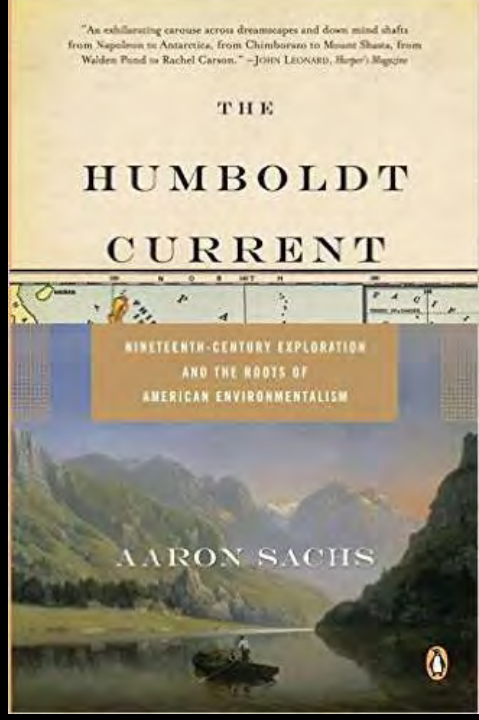
The wonderful Humboldt, with his solid centre and expanded wings, marches like an army, gathering all things as he goes. How he reaches from science to science, from law to law, folding away moons and asteroids and solar systems in the clauses and parentheses of his encyclopædic paragraphs!

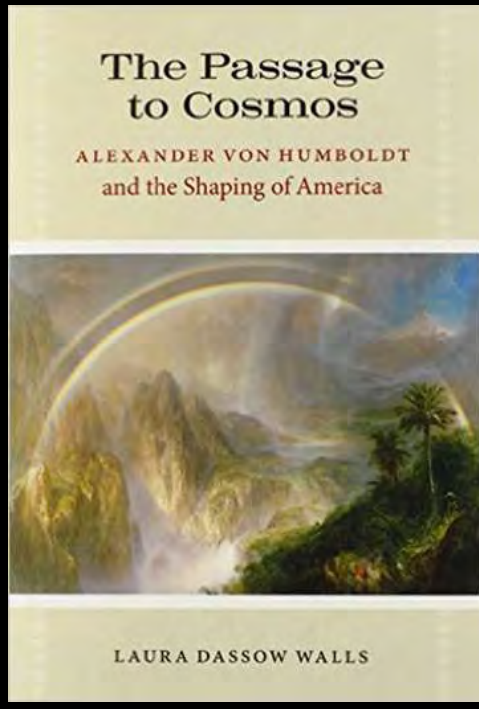
Henry David Thoreau

"I am an observer of nature generally, and the character of my observations, so far as they are scientific, may be inferred from the fact that I am especially attracted by such books of science as White's Selborne and Humboldt's 'Aspects of Nature.'"

Thomas Jefferson
Washington Irving
Edgar Alan Poe - *Eureka: A Prose Poem* 1849
Frederic Edwin Church – American landscape painting
Albert Gallatin - American Ethnological Society
George Perkins Marsh – American Environmentalism
Franz Boaz – American Anthropology

John Muir "How intensely I desire to be a Humboldt!"



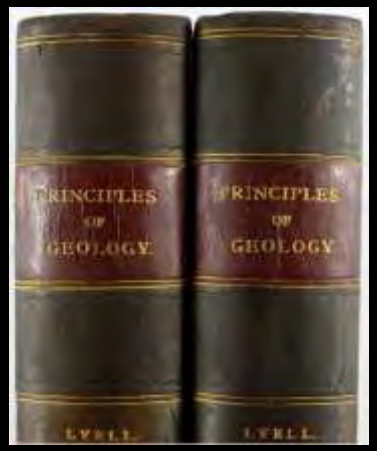


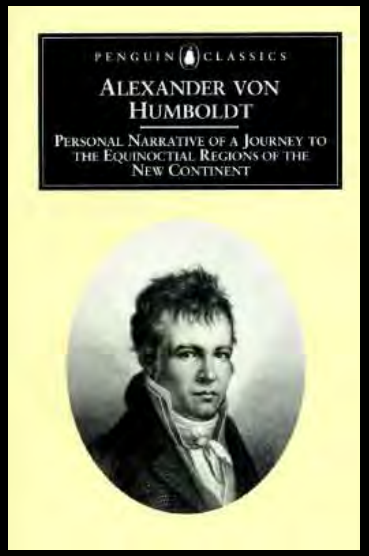
Humboldt's Chimborazo and his Vision of Nature
The Landscape of the Americas

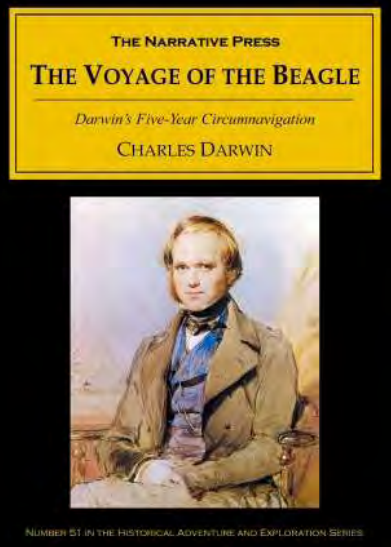
Frederic Edwin Church - The Heart of the Andes won Church fame when it debuted in 1859. The picture is a scientific study of every natural feature that exists in that area of the Andes. Every species of plant and animal is readily identifiable; even climatic zonation by altitude is delineated precisely to fulfill Humboldt's vision

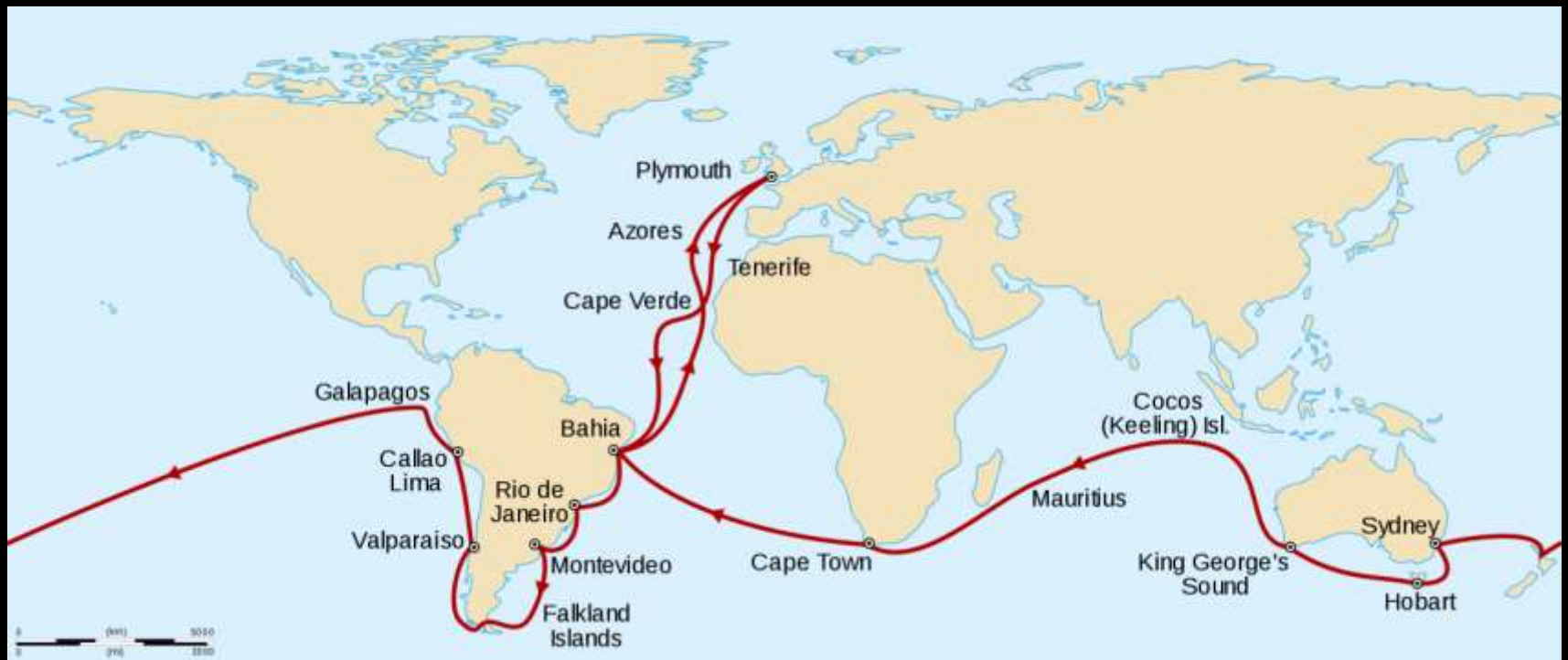
Humboldt the Model - Charles Darwin 1809-1882

The Voyage of the Beagle 1831-36
Published 1839









Humboldt the Model - Charles Darwin

"I spent a very pleasant afternoon lying on the sofa, either talking to the Captain or reading Humboldt's glowing accounts of tropical scenery. — Nothing could be better adapted for cheering the heart of a sea-sick man." (Dec 31)

In a later entry he describes Humboldt's writing as "the rare union of poetry with science" and notes that "I am at present fit only to read Humboldt; he like another Sun illumines everything I behold." (Feb 28).

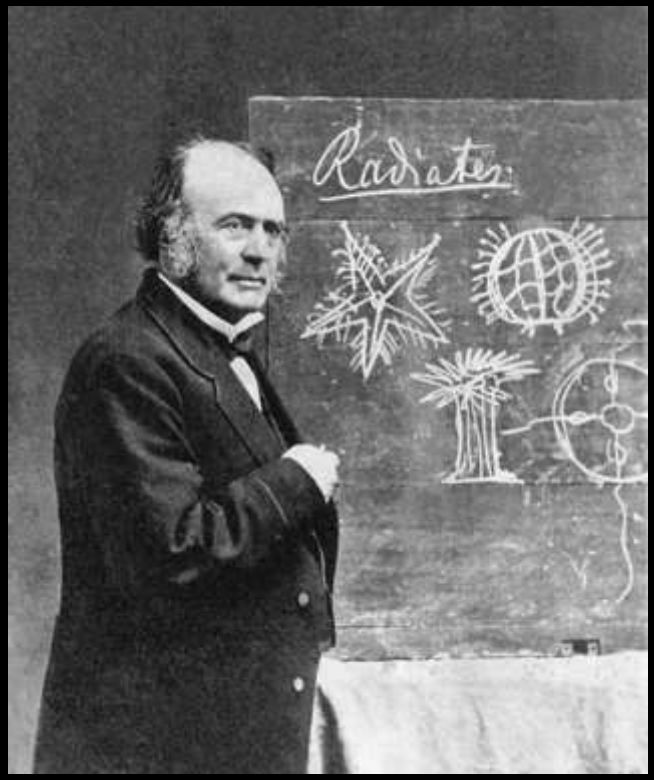
In 1839, Humboldt sent a letter that Darwin prized as much as any he ever received. Humboldt wrote,

"You told me that, when you were young, the manner in which I studied and depicted nature in the torrid zones contributed toward exciting in you the ardor and desire to travel in distant lands. Considering the importance of your work, Sir, this may be the greatest success that my humble work could bring. Works are of value only if they give rise to better ones."

Darwin meets Humboldt 1842 – Darwin was 32, Humboldt 72

Humboldt the Mentor

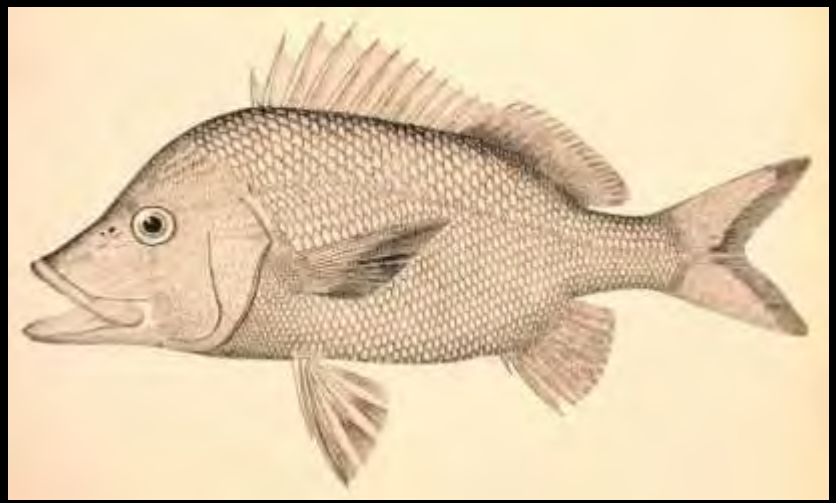
Louis Agassiz 1807 - 1873



He grew up in Switzerland and studied in France during 1831-32 working closely with Cuvier on fossil fish at the Museum of Natural History in Paris. There he became friends with Humboldt, who made a large cash gift to help Agassiz continue his work.

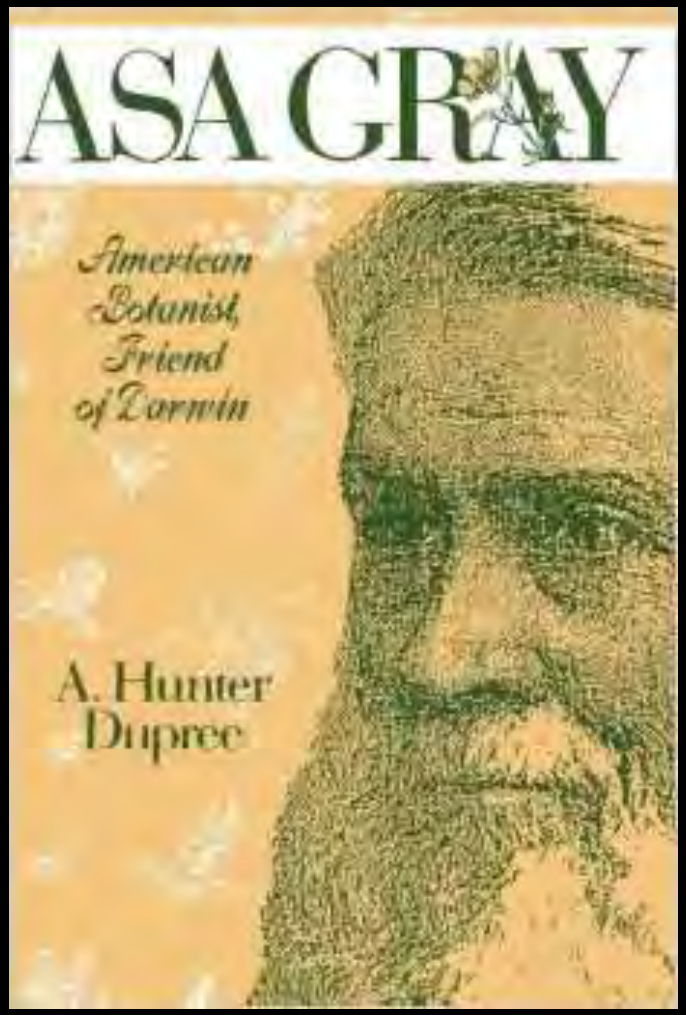
Later that year, he became a professor of natural history at University of Neuchâtel through Humboldt's support.

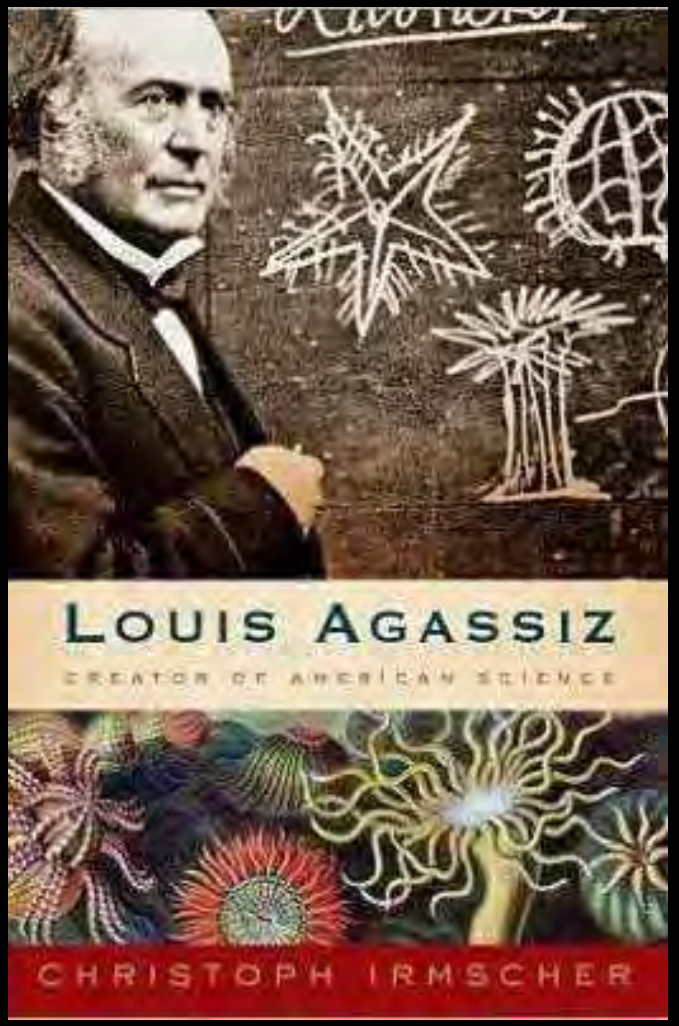
His two great areas of study were marine biology and glaciation. Agassiz made extensive contributions to ichthyological classification (including of extinct species) and to the study of geological history (including to the founding of glaciology).



Emergence of American Biology

Natives and Immigrants



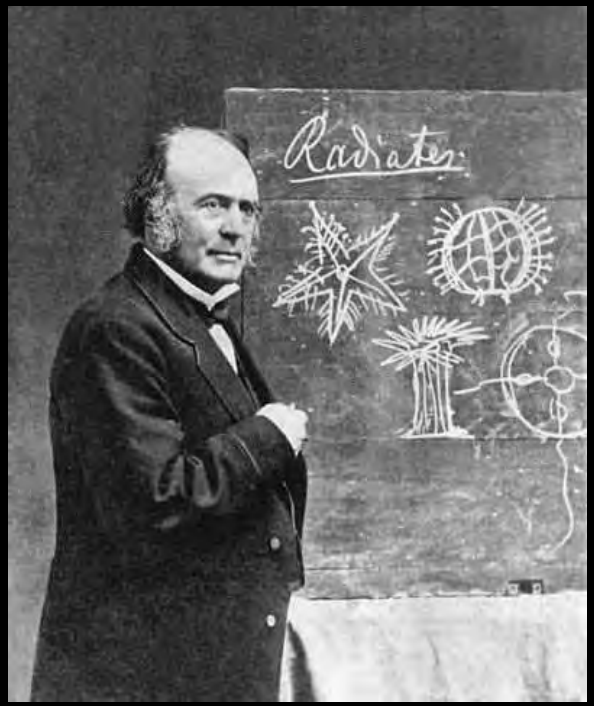


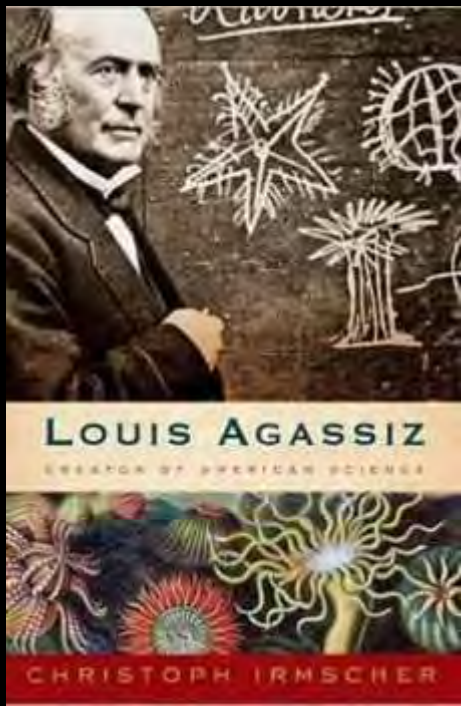
Immigrants - Agassiz and American Science

In 1846, Agassiz came to the United States on a lecture tour arranged by Humboldt; he was a huge popular success and his expertise was widely recognized and celebrated.

In 1848 he accepted a professorship at Harvard to be a professor of zoology and geology at Harvard and to head its Lawrence Scientific School. His popular public lectures inspire the Nature Study movement in America. “Study Nature not Books”

In 1859 he founded the Museum of Comparative Zoology, which opened its doors in 1860. This was the first publicly funded science building in North America.

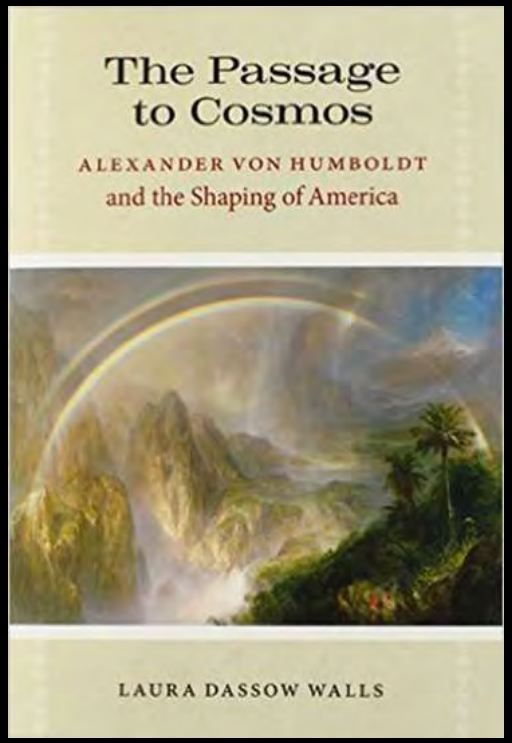




Agassiz vs. Humboldt – Evolution vs. Creationism

In *Cosmos* Humboldt makes no mention of God. Humboldt's Cosmos is "entirely secular" and "he took evolution for granted even as he was baffled by its cause." – Walls 2009

- Agassiz was a staunch creationist, and he taught that after every global extinction of life God created every species anew. "A species is a thought of the Creator"
- Agassiz saw the Divine Plan of God everywhere in nature, and could not reconcile himself to a theory that did not invoke design.
- Agassiz staunchly supported the fixity of species and special creation of man, and thus became an outspoken critic of Darwin's theory of evolution.



Natives – Gray and Humboldtian Science
Asa Gray 1810 – 1888

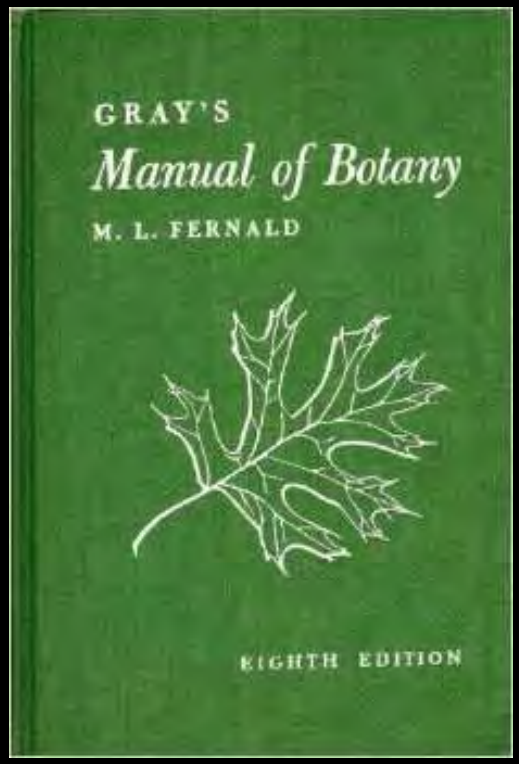
- Gray was born in Sauquoit, New York in 1810.
- On a trip to New York City, he attempted to meet with John Torrey to get assistance in identifying specimens, but Torrey was not home, so Gray left the specimens at Torrey's house. Torrey was so impressed with Gray's specimens that he began a correspondence with Gray.
- Gray became an assistant to Torrey. Gray and Torrey published *The Flora of North America* together in 1838.
- 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 England he is hosted by Sir William Hooker and meets his son, Joseph Dalton Hooker who introduces him to his friend, Charles Darwin, recently back from a voyage around the world.

John Torrey 1796 – 1873
First American Bontanist

Asa Gray in 1841

The Rise of American Natural History – Gray's *Manual of Botany*

- On returning from Europe, Gray discovers that the job in Michigan has evaporated, but that Harvard University has a position for him.
- The offer was $1000/year salary, teaching duties limited to only botany, and being superintendent of Harvard's botanic garden. Gray accepted this appointment as Fisher Professor of Natural History at Harvard. The formal appointment was made in 1842.
- 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.



Humboldtian Science
Gray's Botanical Network

George Engelmann 1809 – 1884
Gray met physician and botanist George Engelmann in the early 1840s and they remained friends and colleagues until Engelmann died in 1884

Jean Louis Berlandier 1830s

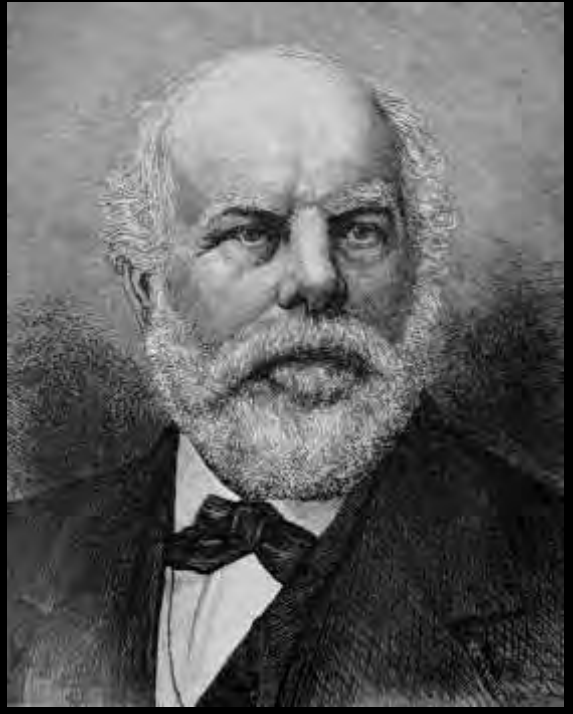
Thomas Drummond 1830s

Ferdinand Lindheimer 1830s

Ferdinand von Roemer 1840s

International Network

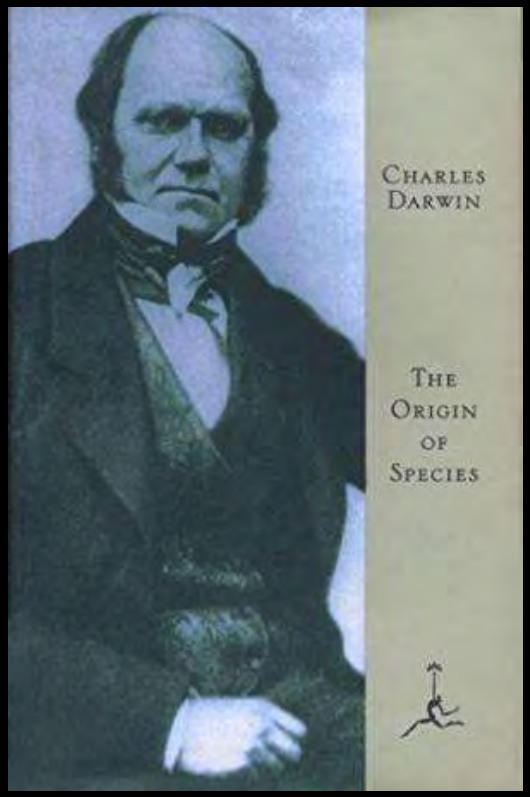
Shipped [Sold] to Kew Gardens - Joseph Hooker and other European botanical collections



The “Co-discovery” of the Theory of Evolution 1858-1859

When Darwin received Alfred Russel Wallace's paper which described natural selection, Hooker and Charles Lyell arranged for a joint reading of papers by Darwin and Wallace to the Linnean Society on July 1, 1858.

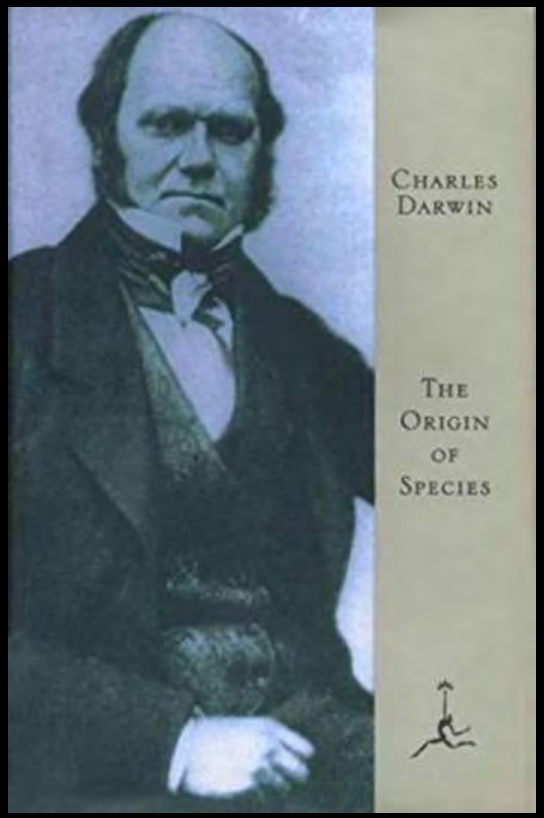
Since Darwin had nothing prepared, the reading included excerpts from his 1844 unpublished essay "On the Variation of Organic Beings in a state of Nature; on the Natural Means of Selection; on the Comparison of Domestic Races and true Species" and from the letter he had sent to Asa Gray in July 1857, outlining his theory on the origin of species.



Darwin and Gray – the Letter

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.

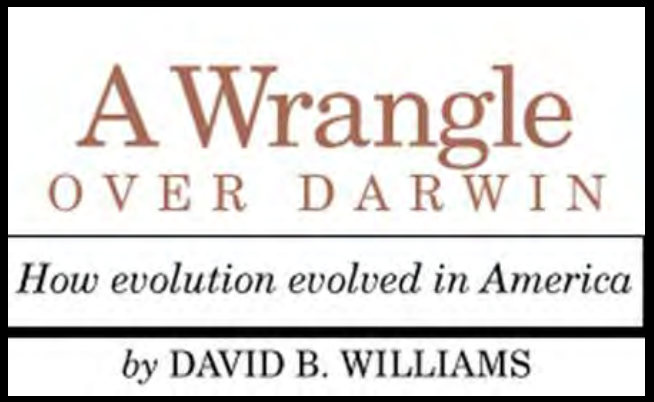


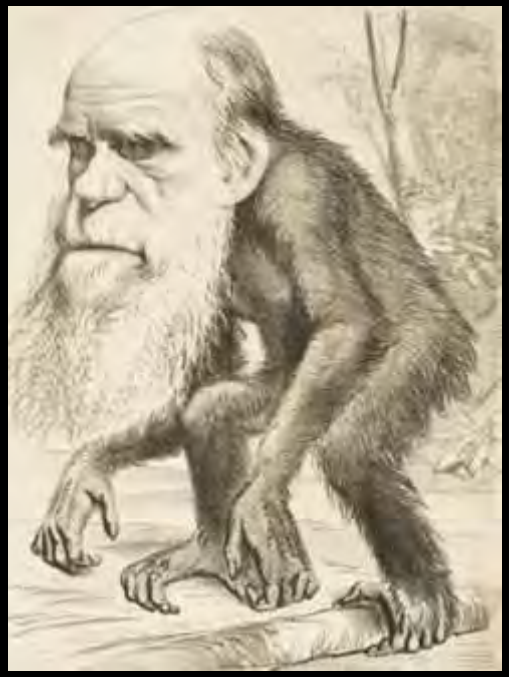
The Great American Evolution Debate – Gray vs. Agassiz

On one side arose Gray, Darwin's friend and supporter. 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.

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.





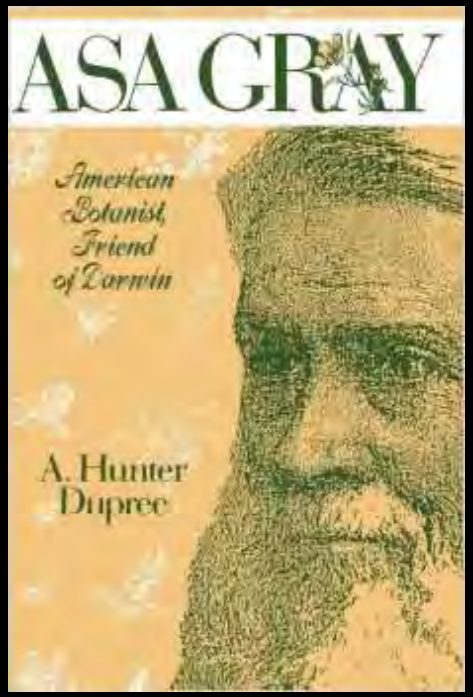
"Darwin's Dove“ and Humboldt’s Progeny

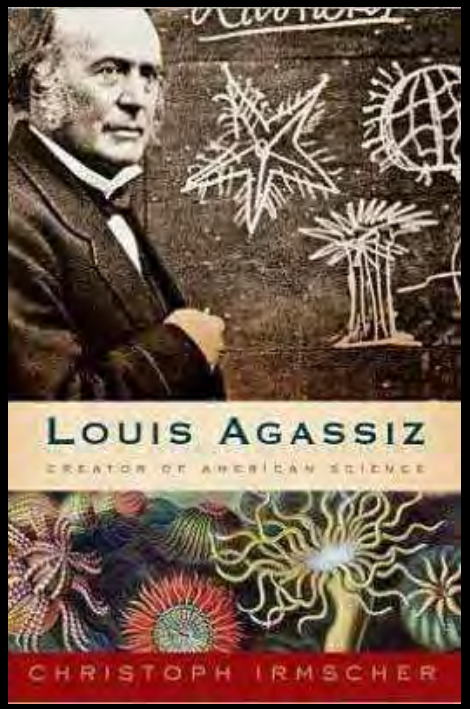
Gray began his public defense of Darwin, also in the American Journal of Science, with a positive review of *Origin of the Species* in the March 1860 issue. He wrote that Darwin's ideas on variation within plants and animals were "general, and even universal.“

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."

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





HUMBOLDT.

The One Hundredth Birthday of the Philosopher.

Celebration Generally Throughout the Country.

Unveiling of the Bust at the Central Park.

ORATION BY DR. FRANCIS LIEBER.

Processions, Banquet and Speeches in this City.

EXTENSIVE OBSERVANCES IN BOSTON.

Eulogistic Address by Professor Agassiz.

IN THIS CITY.

Extent of the Observances—Decorations in the City and on the Shipping—Leading Features of the Celebration.

FIG. 1—The entire front page of the 15 September 1869 *New York Times*, on which these headlines appeared, was given over to coverage of the Humboldt celebrations in New York and other U.S. cities, as was additional space in that day's issue.

On 14 September 1869, tens of thousands of people crowded the streets of cities across the United States to mark the centennial of Humboldt's birth: Parades, speeches, concerts, monuments, and banquets honored the most famous and beloved scholar of the time. The next day the *New York Times* devoted its entire front page to coverage of the events

Humboldt died in 1859, six months before Darwin's *Origin of Species* was published.

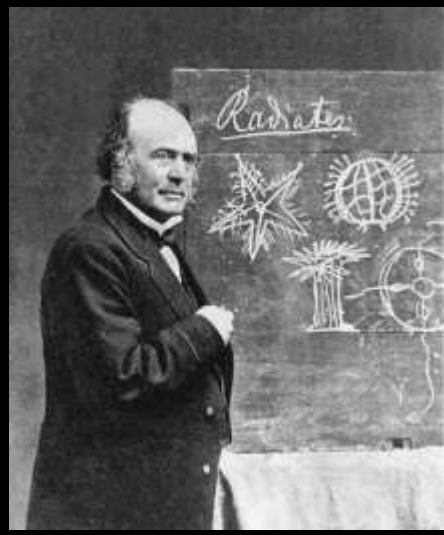
In 1869, the centennial of his birth was celebrated across the globe, from Moscow to Mexico City and, in the United States, most cities hosted celebrations, with 10,000 people joining President Grant in Pittsburgh while 15,000 attended the festivities in New York City.

Boston hosted three separate celebrations, among them one at the Music Hall under the auspices of the Boston Society of Natural History. The audience and speakers included Emerson, Longfellow, Louis Agassiz, and Oliver Wendell Holmes, together with the mayor, senators, the governor, and "many others, almost as equally distinguished"

Why was Humboldt forgotten in America?

Louis Agassiz, in his memorial address of 1869: “Every schoolboy is familiar with his methods now, but he does not know that Humboldt is his teacher. The fertilizing power of a great mind is truly wonderful; but as we travel farther from the source, it is hidden from us by the very abundance and productiveness it has caused”

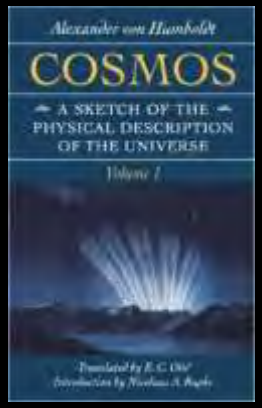
- Humboldt not associated with a university or an individual science
- In America, Agassiz obscures his mentor’s legacy
- Agassiz develops his own school of American science and nature study

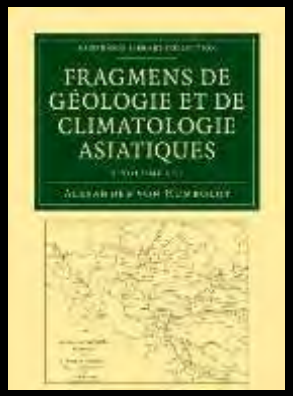


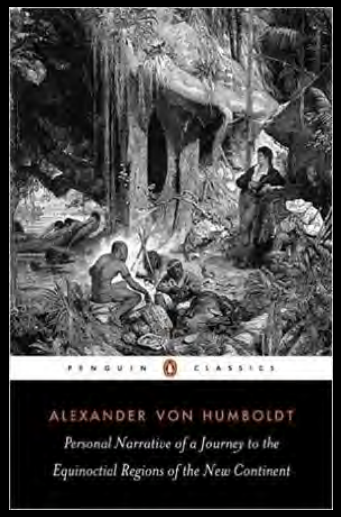
Why was Humboldt forgotten in America?

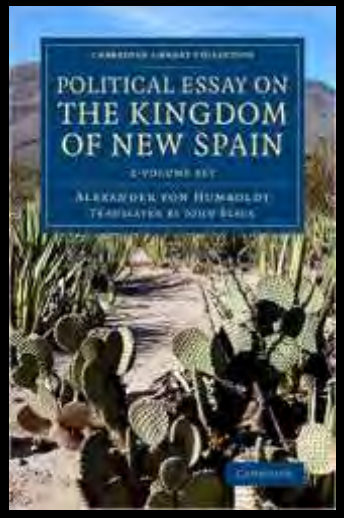
LIterature and Translating

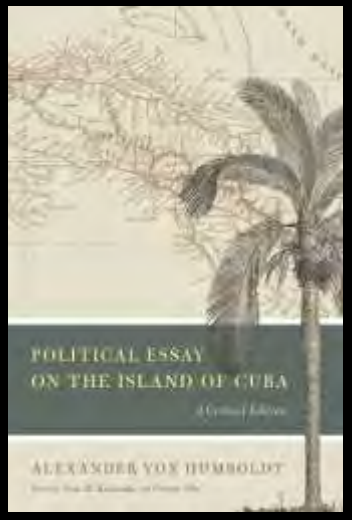
- Humboldt's writing style – complexity, hyper-text
- Literary genre? romantic? aesthetic science?
- Before his time?
- Poor translations and limited translations over time

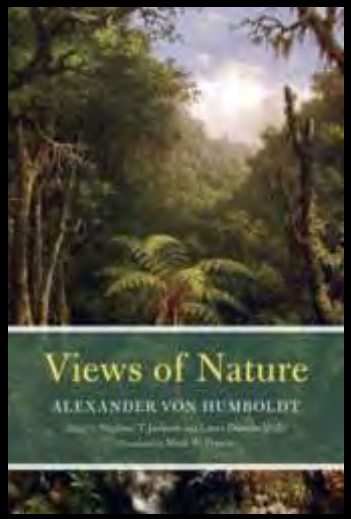












Why was Humboldt forgotten in America?

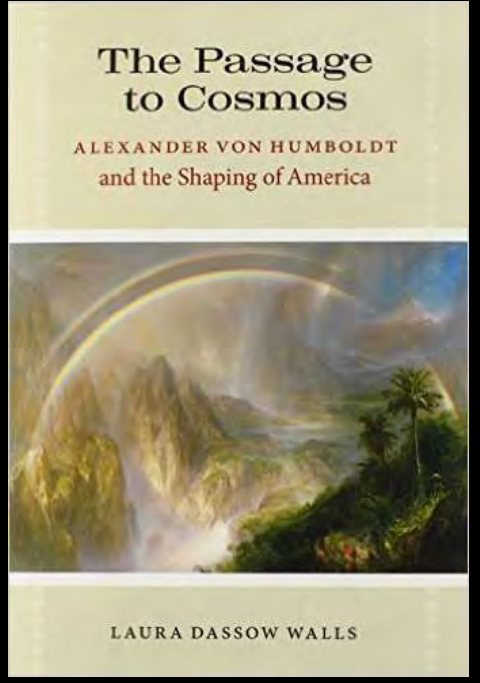
- Development of Professional, Institutionalized Science/Academia
- Humboldt a “meta-scientist” – Charles Sanders Peirce
- Specialization vs. Comprehensive/Holistic Science

Specialization would seem a logical response to a rapidly expanding knowledge base; it yielded tangible results and ever-greater capacity for human manipulation and control of nature.

As scholars and researchers raced down their separate disciplinary pathways, though, knowledge became increasingly fragmented and communication across major disciplinary boundaries more the exception than the rule.

Nowhere was reintegration a discipline.

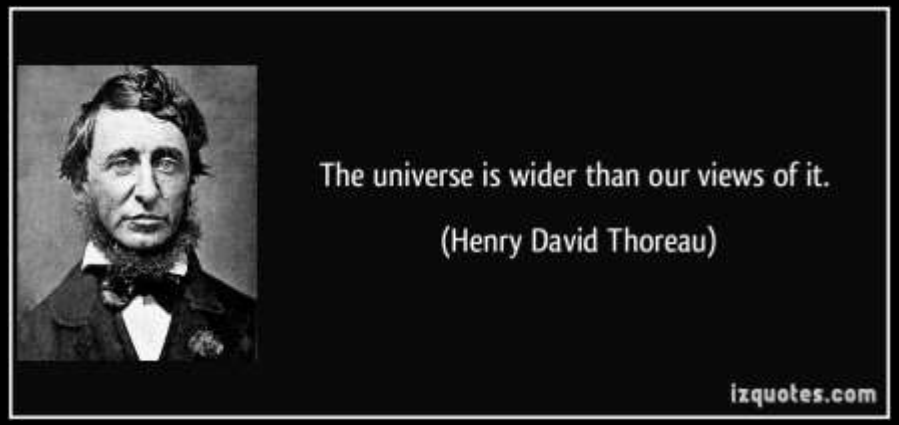
- Walls, *Passage to Cosmos*

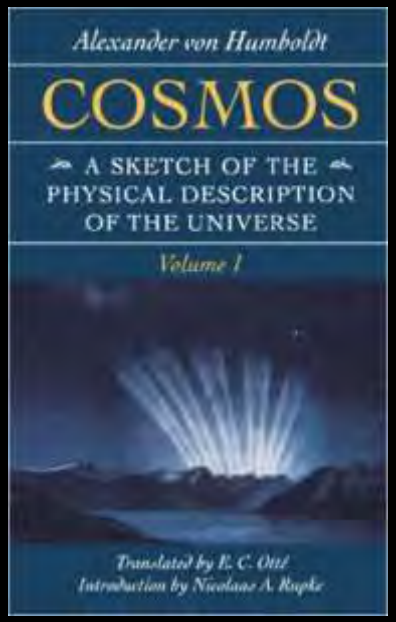


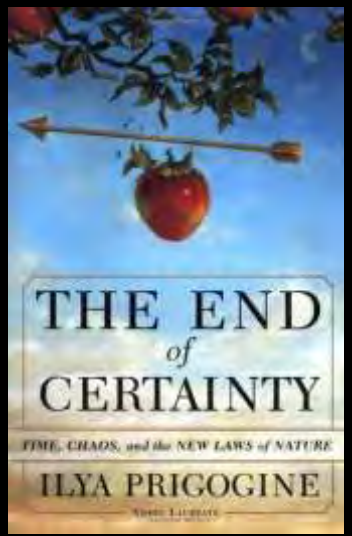
Humboldt's Vision of Science

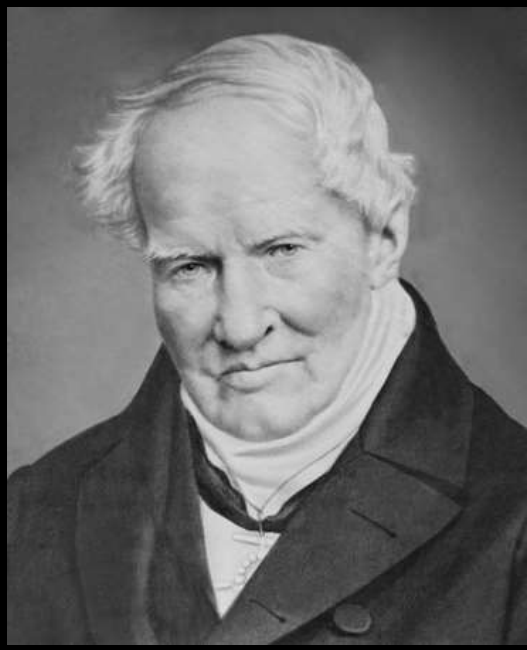
Humanity's Limitations in Comprehending The Cosmos

"The attempt perfectly to represent unity in diversity must …necessarily prove unsuccessful…If nature be illimitable in extent and contents, it likewise presents itself to the human intellect as a problem which cannot be grasped, and whose solution is impossible."





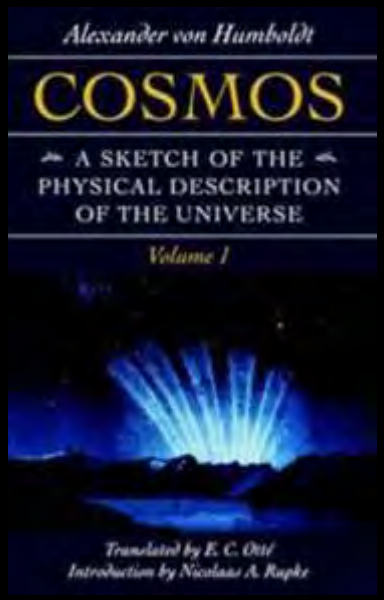




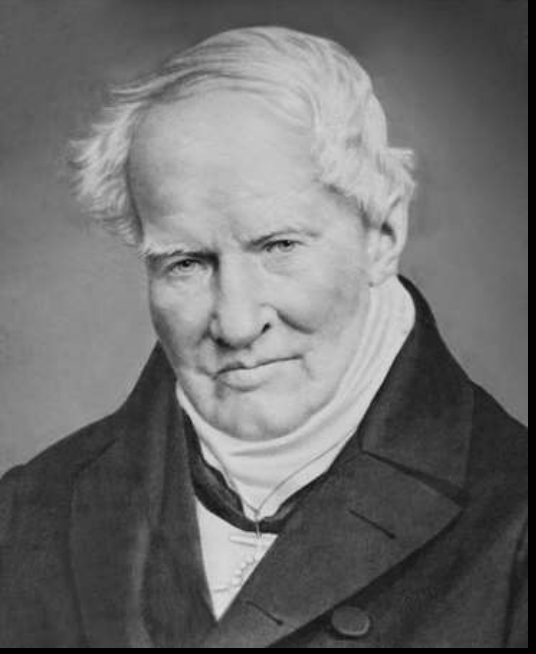
The Consolation of Nature

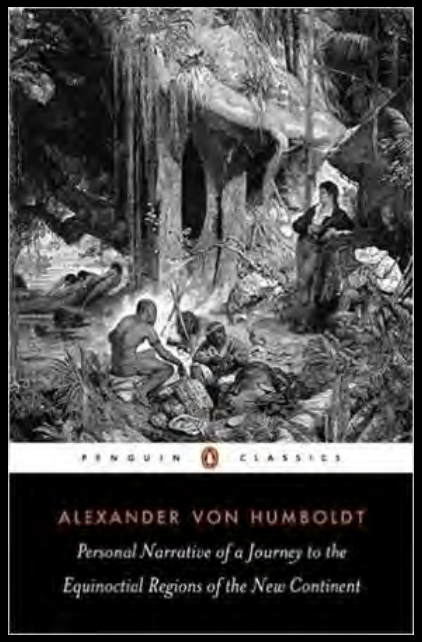
The earnest and solemn thoughts
awakened by a communion with Nature
intuitively arise from
a presentiment of the order and harmony
pervading the whole universe,
and from the contrast we draw
between the narrow limits of our own existence
and the image of infinity revealed on every side,
whether we look upward to the starry vault of heaven,
scan the far-stretching plain before us,
or seek to trace the dim horizon
across the vast expanse of ocean.

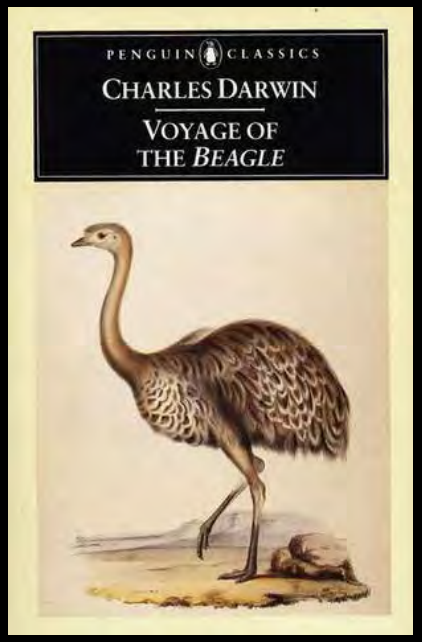
Cosmos 1:3



Humboldt's Progeny - Charles Darwin







There is no better proof of how Darwin treasured his Personal narrative to the end of his life than his ink note written inside the back cover of volume 3 of his own copy: "July 6 1881 to p. 417 – April 3rd 1882 finished".

So the book given to Darwin by Henslow half a century before must have been one of the last Darwin ever read, or in this case re-read. He was too ill in the following weeks to do much else.

Darwin died on 19 April 1882.