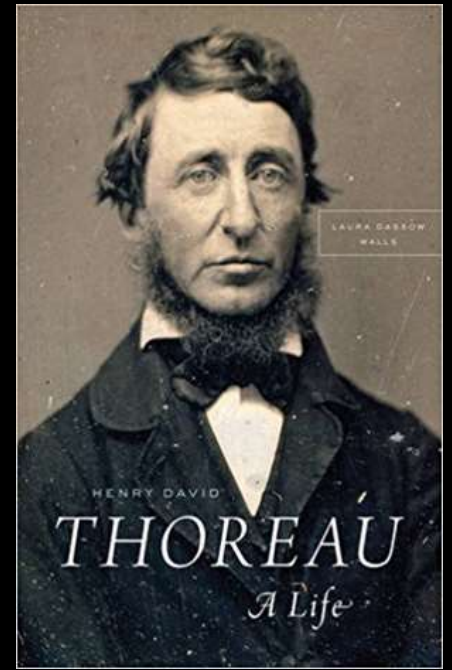
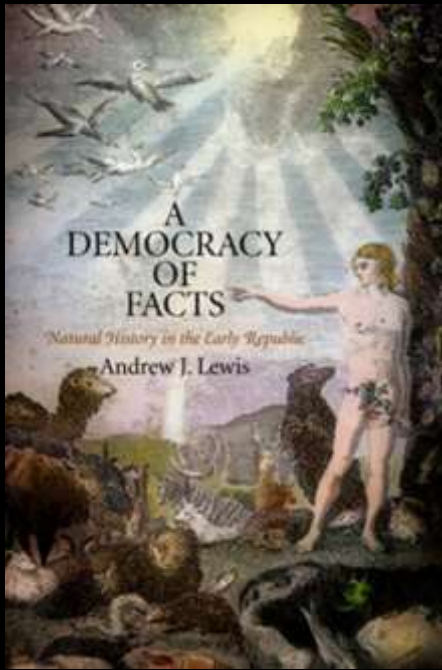
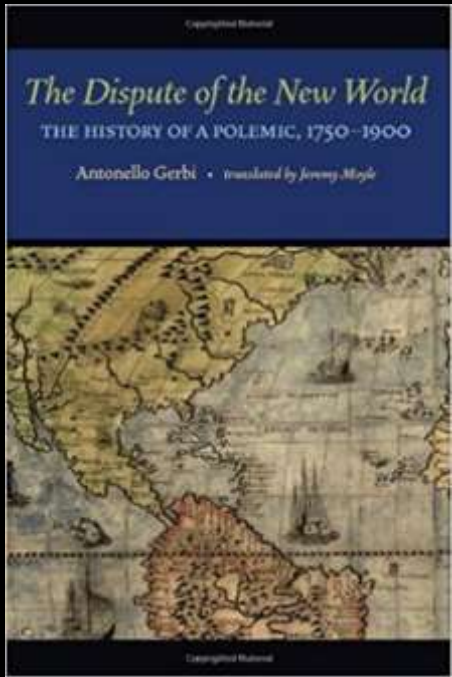
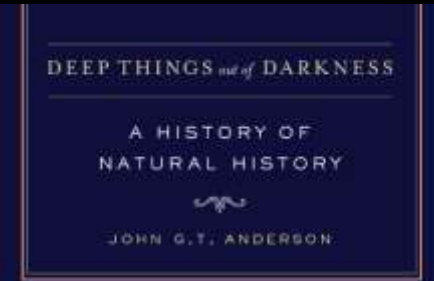




American Natural History: Thoreau and New World Nature



New World Nature and the Swamp

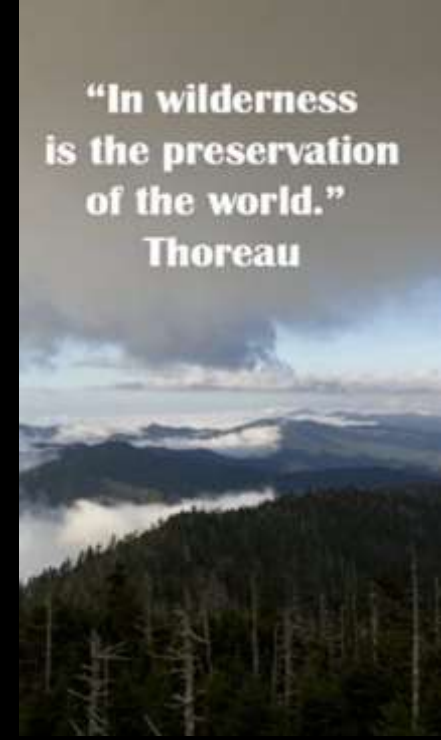
Henry David Thoreau, "Walking" (1862)

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.

**"In wilderness
is the preservation
of the world."
Thoreau**



SWAMPS?



WALKING

Henry David Thoreau



Thoreau and Nature History

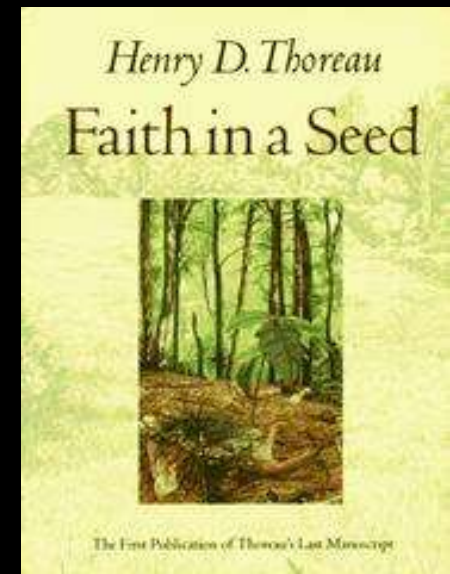
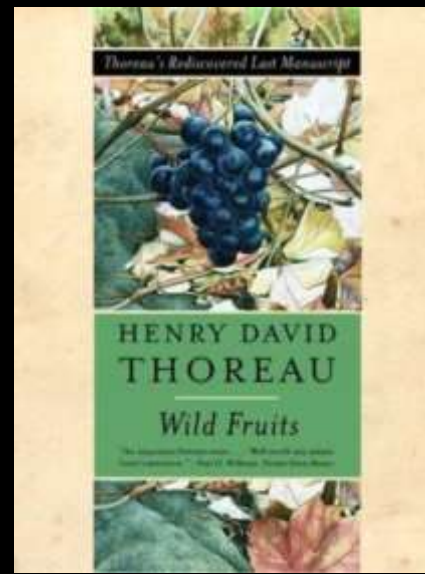
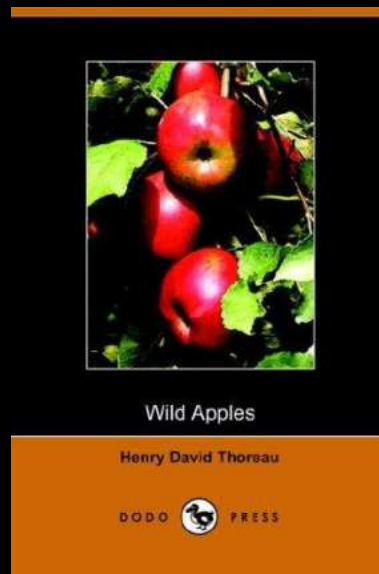
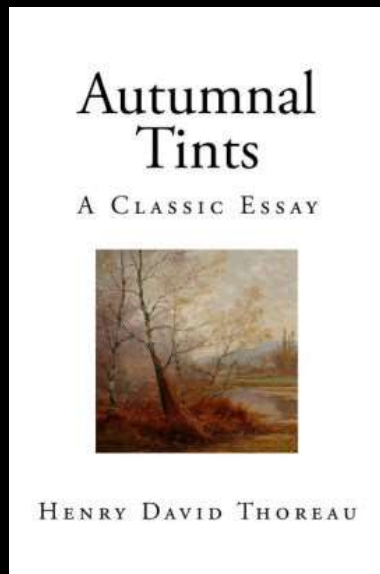
“Let us not underrate the value of a fact; it will one day flower in a truth”

“Think of our life in nature, - daily to be shown matter, to come in contact with it, - rocks, trees, wind on our cheeks! the *solid* earth! the *actual* world! The *common sense*! *Contact! Contact!* *Who are we? Where are we?*” 1846

Henry kept a series of notebooks, and these observations became the source for his late natural history essays, such as *Autumnal Tints*, *The Succession of Forest Trees*, and *Wild Apples*.

Until the 1970s, literary critics dismissed Thoreau's late pursuits as amateur science.

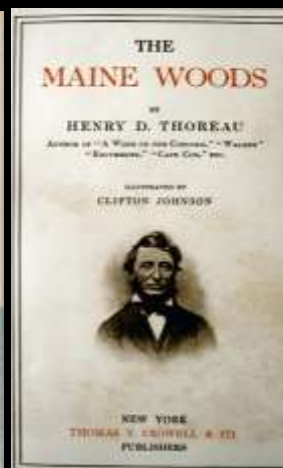
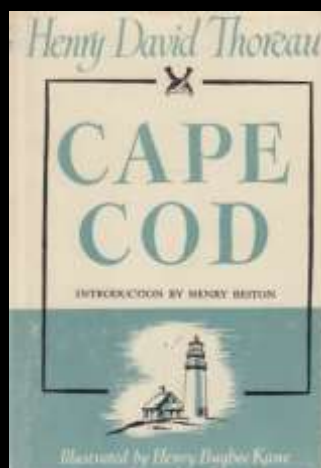
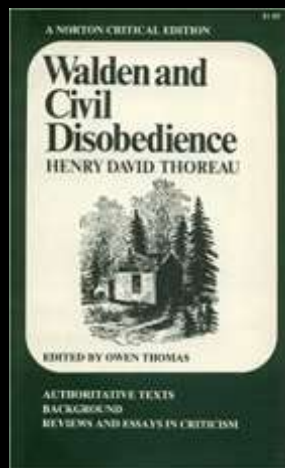
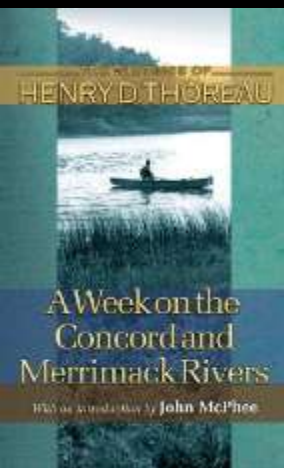
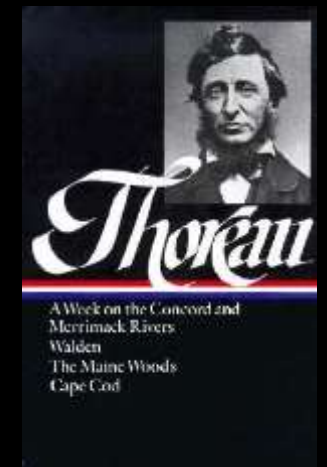
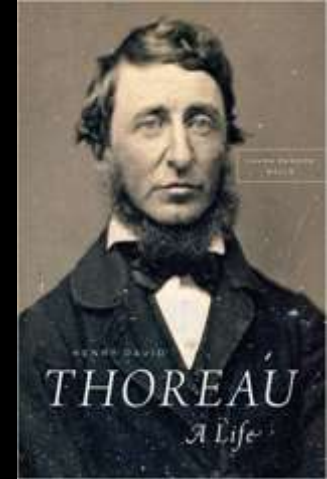
With the rise of environmental history and ecological literary criticism a new perception emerged, showing Henry to be both a writer and an analyst of ecological patterns in Concord's fields and woods – a naturalist.



Henry David Thoreau July 12, 1817 – May 6, 1862

Henry David Thoreau was born David Henry Thoreau in Concord, Massachusetts

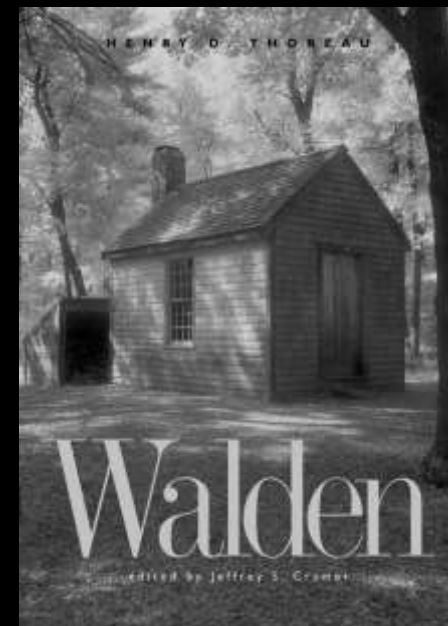
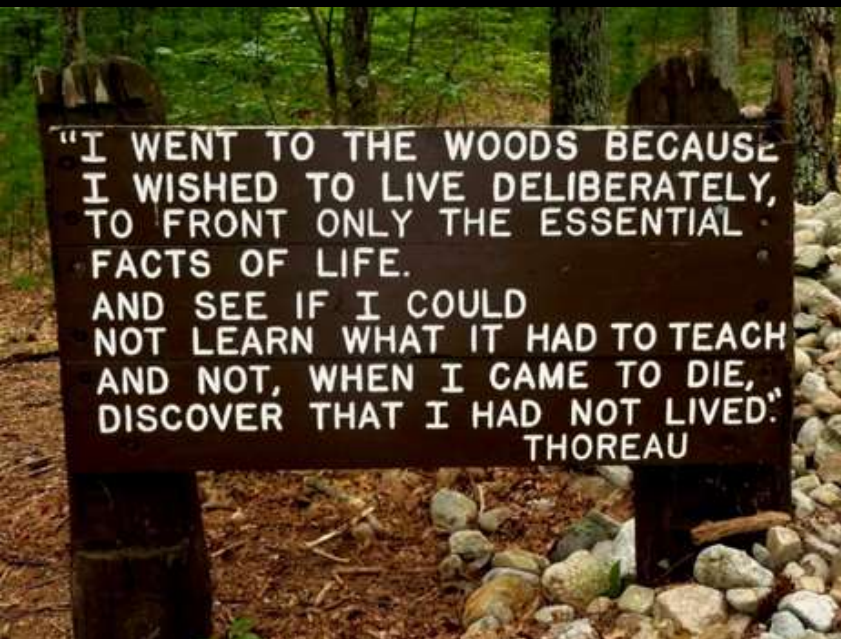
- From 1833 to 1837 he attended Harvard College.
- He and his brother John, opened a grammar school in Concord in 1838, teaching there until John became fatally ill in 1841. In 1841 he was invited to live in the Emerson household, where he lived sporadically until 1843 working as an all-around handyman, gardener, and assistant to Emerson.
- Henry worked in his family pencil factory and designed machines for making pencils. Thoreau then taught himself surveying which was his main profession besides writing.
- His mother and sisters were Abolitionist leaders and so was Henry.
- Thoreau first contracted tuberculosis in 1835 and suffered from it sporadically over his life. He died in 1862 and is buried in Concord.



Walden 1854

When he was 28, Henry moved to the woods. From 1845 to 1847, Henry lived on the shore of Walden Pond, a mile and a half south of Concord, in a cabin he built.

- First published in 1854, *Walden or Life in the Woods* details Thoreau's experiences over the course of two years, two months, and two days.
- Thoreau compresses the time into a single calendar year for the book.
- The book was not published until he was 37.
- The land was owned by his friend and mentor Ralph Waldo Emerson.



Emerson the Mentor

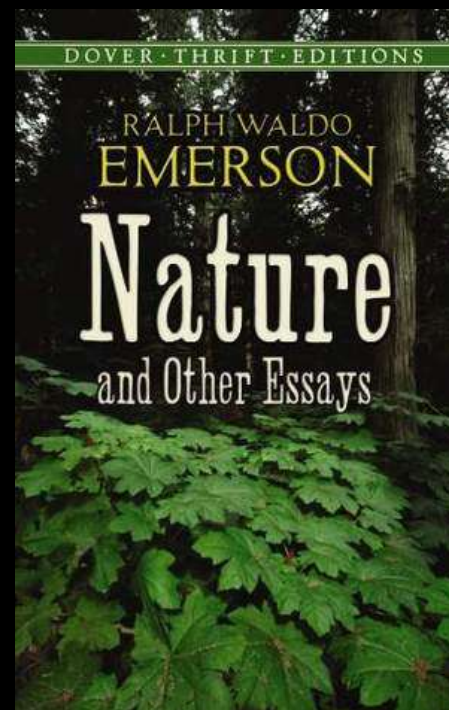
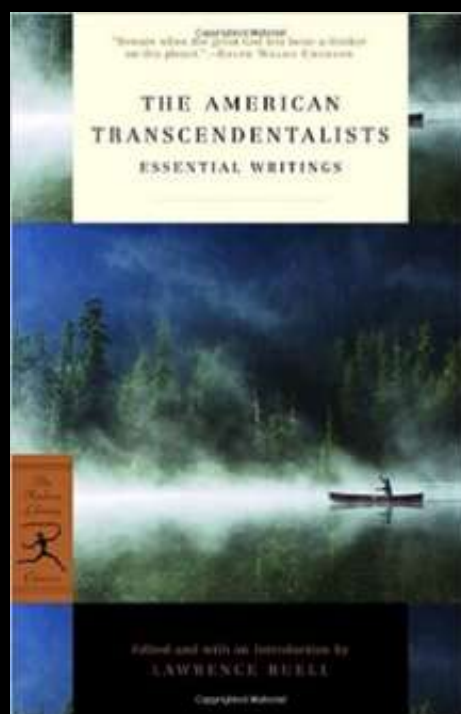
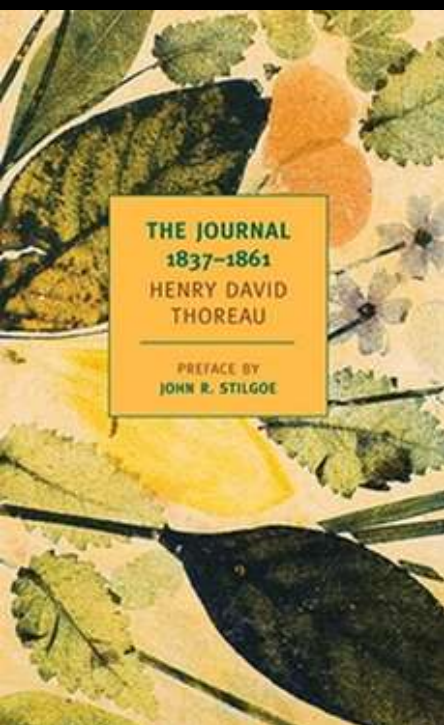
Ralph Waldo Emerson 1803-1882

Transcendentalism

- Nature is a source of sensations - healthy feelings. It is therapy for a overcivilized heart.
- Humans can discover emotional health in nature.
- Nature leads to moral and spiritual clarity.

The Journal

- Thoreau began keeping a journal at Emerson's suggestion. The first journal entry, on October 22, 1837, reads, "'What are you doing now?' he asked. 'Do you keep a journal?' So I make my first entry today." He continued to write increasingly detailed natural history observations about the Concord area in his journal, a two-million word document he kept for 24 years.



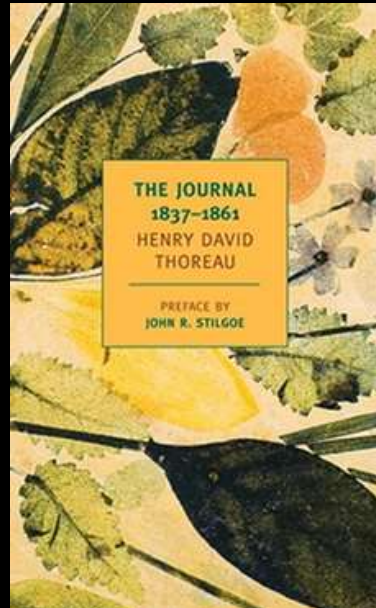
Thoreau, Natural History, and the Swamp

On November 8, 1850, Henry “stopped using his Journal as the means to the “real” work of art somewhere else, and started treating the Journal *itself* as the work of art” and natural history.

“I remember gazing with interest at the swamps about those days (1850) and wondering if I could ever attain to such familiarity with plants that I should know the species of every twig and leaf in them...

Though I knew most of the flowers, and there were not in any particular swamp more than half a dozen shrubs that I did not know, yet these made it seem like a maze to me, of a thousand strange species, and I even thought of commencing at one end and looking it faithfully and laboriously through till I knew it all.

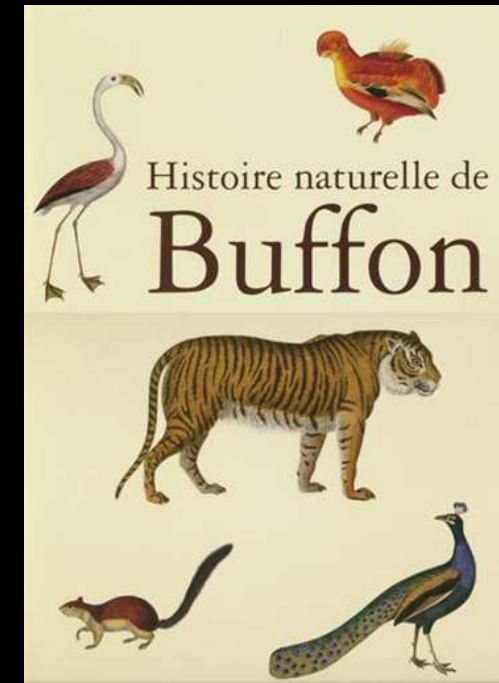
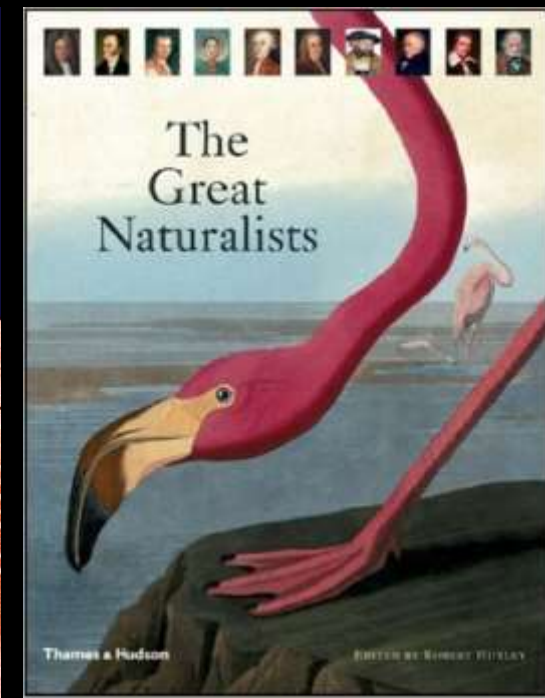
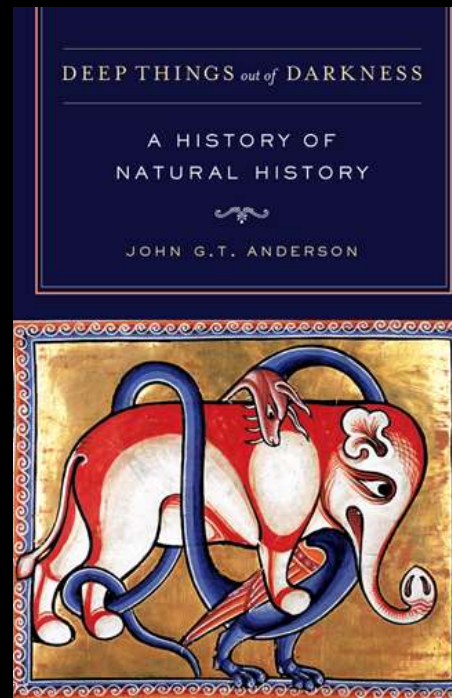
I little thought that in a year or two I should have attained to that knowledge without all that labor. (December 4, 1856, Journal)



The History of Natural History

Understanding whole organisms in context

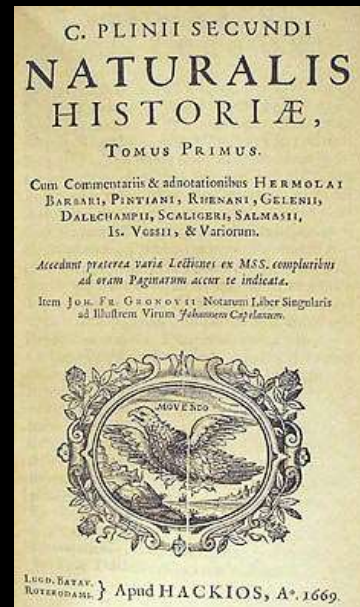
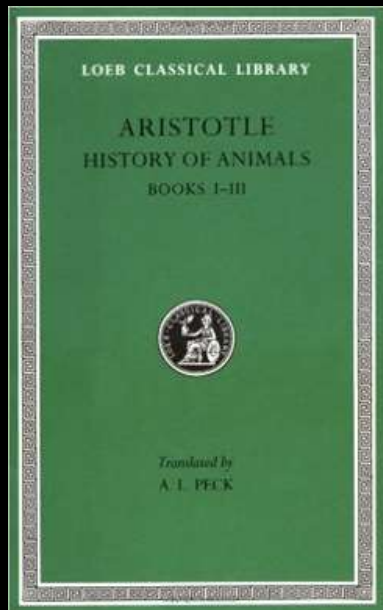
- Natural History
- Natural Philosophy
- Encyclopedias
- Collecting and Classifying - Taxonomy
- Natural History as Literature
- Natural History as Art
- Naturalists to Biologists



Natural History and the Study of Nature – Western Origins

The Greeks and Romans

- The originators of natural history were not scientists.
- They were philosophers and writers who studied nature and wrote *historia*
- This Greek word *historia* is closer to *investigation* or *research* rather than our word “history”
- But the books of their nature research were titled “Natural History” in English



Aristotle

384-322 BC

Philosopher of Nature

In Aristotle's terminology, "natural philosophy" is a branch of philosophy examining the phenomena of the natural world, and includes fields that would be regarded today as physics, biology and other natural sciences.

"Natural Philosophy" was the term used for science until the "Scientific Revolution" in the 1600s – although the English word "scientist" was not coined until the 1800s

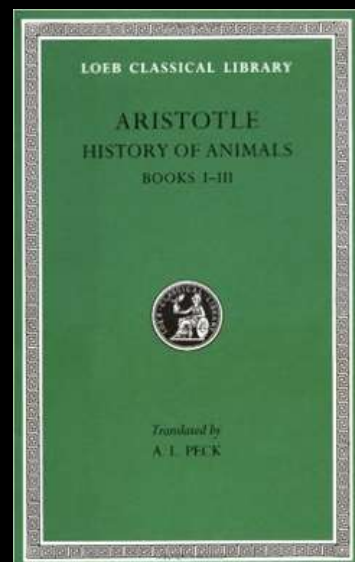
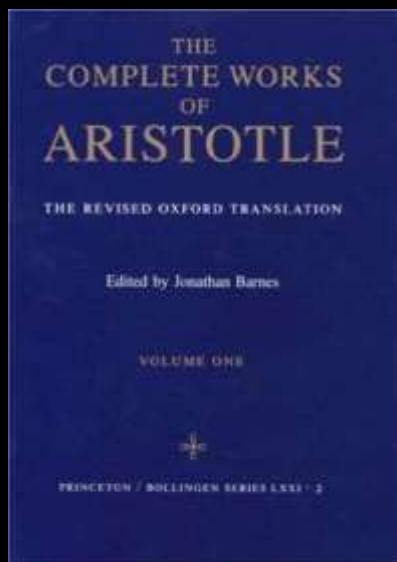
Observation before theory



Plato (left) and Aristotle (right), a detail of The School of Athens, a fresco by Raphael.

Aristotle gestures to the earth, representing his belief in knowledge through empirical observation and experience.

Plato gestures to the heavens, representing his belief in The Forms.

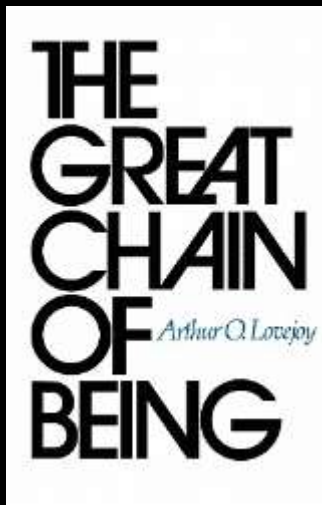
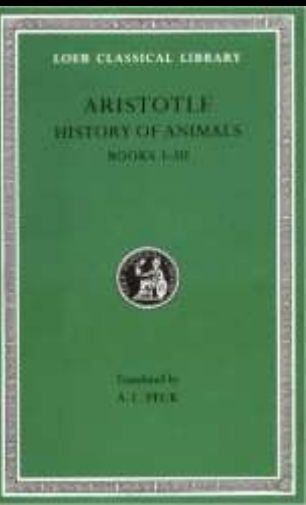




Classification of Living Things – *History of Animals*

The Great Chain of Being

- What the modern zoologist would call vertebrates and invertebrates, Aristotle called 'animals with blood' and 'animals without blood'
- Aristotle sets out to investigate the existing facts (what), prior to establishing their causes (why).
- Aristotle investigates four types of differences between animals: differences in particular body parts (Books I to IV); differences in ways of life and types of activity (Books V, VI, VII and IX); and differences in specific characters (Book VIII)
- Aristotle's *History of Animals* classified organisms in relation to a hierarchical "Ladder of Life" (*scala naturae*), placing them according to complexity of structure and function so that higher organisms showed greater vitality and ability to move.



This was the Great Chain of Being.

Roman Natural History Encyclopedia

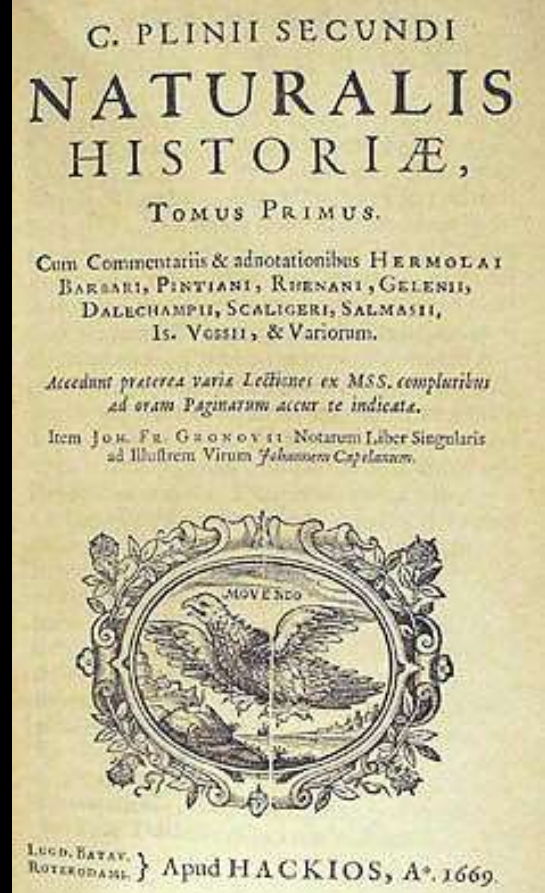
Pliny the Elder

23 – 79 AD (Died at the eruption of Vesuvius)

Naturalis Historia (Study of Nature)

37 chapters covering natural history, architecture, medicine, geography, geology, and other aspects of the world around him.

Became a model for all natural histories and encyclopedias written subsequently, in terms of the breadth of subject matter examined, the need to reference original authors, and a comprehensive index list of the contents.

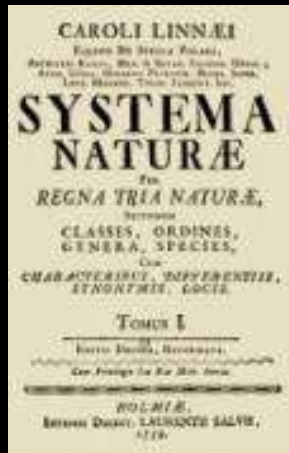
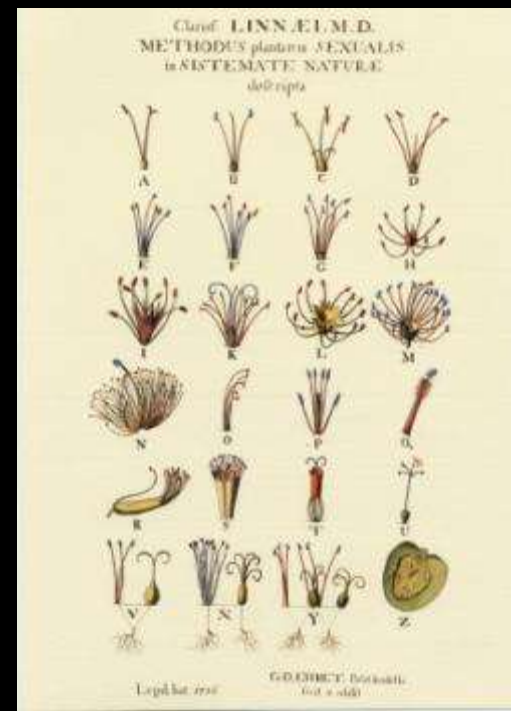


Classification and Identification - Taxonomy

Carl Linnaeus 1707 – 1778

Swedish botanist, physician, and zoologist

- The first edition of *Systema Naturae* was printed in 1735. He then returned to Sweden, where he became professor of botany at Uppsala.
- Linnaeus laid the foundations for the modern scheme of binomial nomenclature (Genus species).
- His “sexual system” of taxonomy used the flower and its reproductive parts to structure the taxonomy, and it focused on “essential” diagnostic characteristics.
- It was remarkably useful for the practical purposes of identification but inconsistent for animal classification.

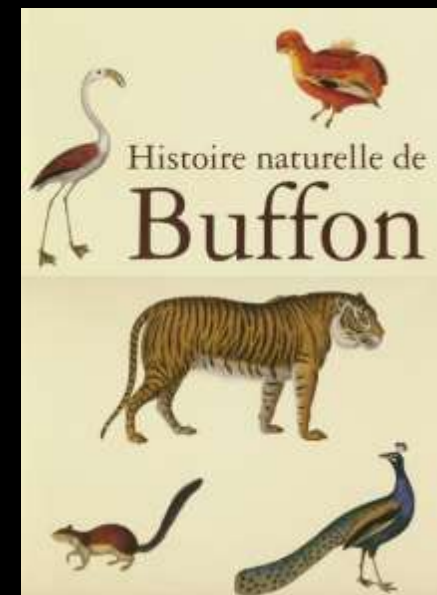


Classification and Collection – Encyclopedia

Comte de Buffon 1707–1788

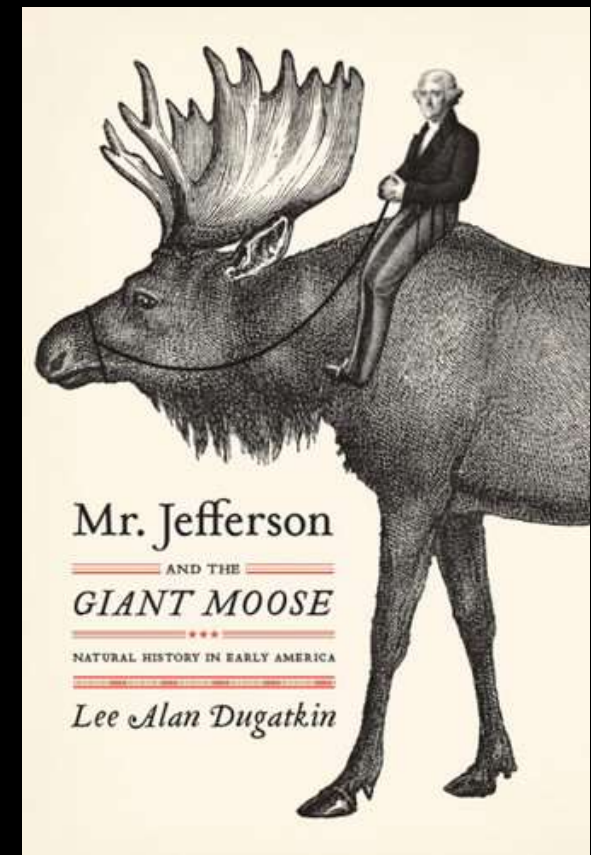
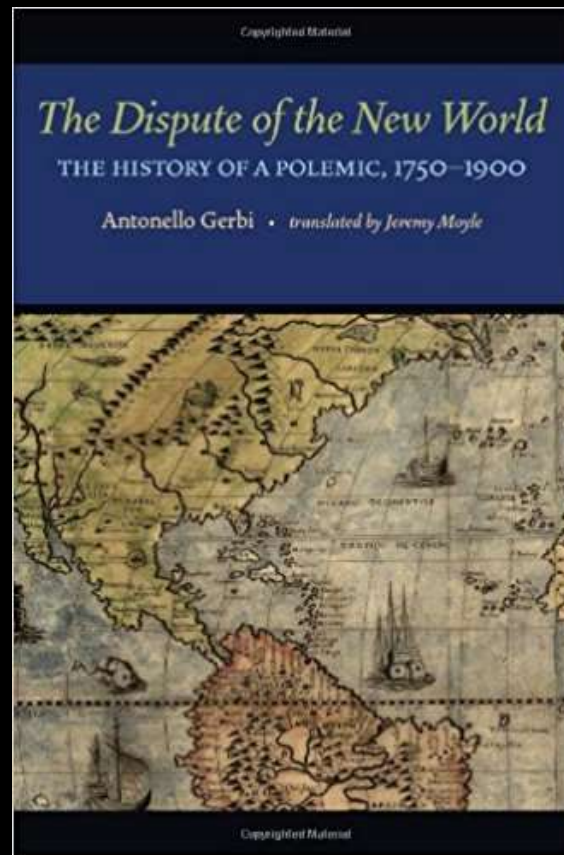
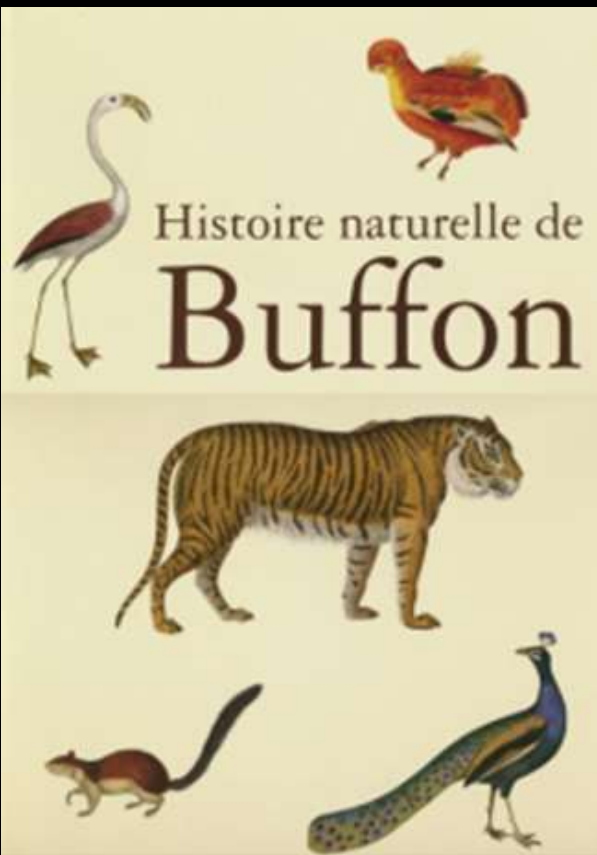
French naturalist, mathematician, cosmologist, and encyclopedic author.

- Buffon published thirty-six quarto volumes of his *Histoire naturelle* from 1749-88.
- In the course of his examination of the animal world, Buffon noted that despite similar environments, different regions have distinct plants and animals, a concept later known as Buffon's Law.
- This is considered to be the first principle of biogeography.
- He was not an evolutionist, yet he was the father of evolutionism.
- In the opening volumes of the *Histoire naturelle* Buffon criticized Linnaeus's taxonomical approach to natural history.
 - Buffon insisted we “must make use of all parts of the object” for classification, including internal anatomy, behavior, and distribution.
 - In contrast to Linnaeus, Buffon was less concerned with identification and more interested in vividly illustrating plenitude, diversity, and continuity of animal species.



Natural History and the Defense of American Nature

The Theory of Degeneracy and Jefferson's Moose



Theory of the Degeneracy of American Nature

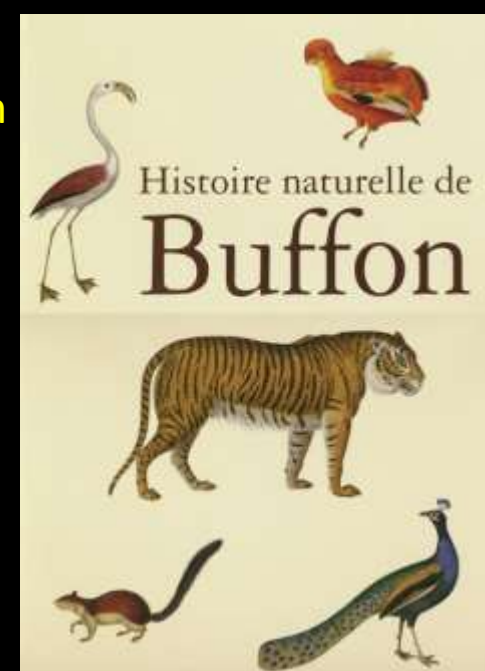
Comte de Buffon 1707–1788

In his ninth volume of *Histoire Naturelle*, published in 1761, Buffon argued for the theory of degeneracy of American Nature.

“Elephants belong to the Old Continent and are not found in the New...one cannot find there any animal that can be compared to the elephant for size and shape... Living nature is thus much less active there, much less varied, and we may even say, less strong.”

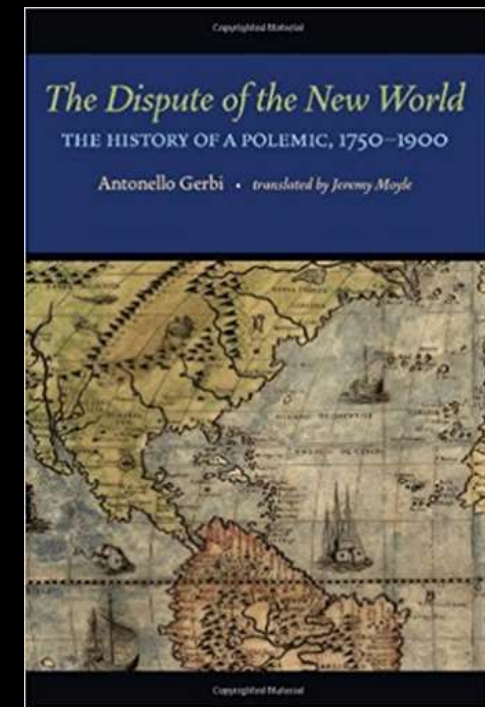
The horses, donkeys, oxen, sheep, goats, pigs, dogs, and all these animals, I say, became smaller there; and...those which were not transported there...those, in short, common to both worlds, such as wolves, foxes, deer...are likewise considerably smaller in America than in Europe...

There is thus, in the combination of the elements and other physical causes, something antagonistic to the increase of living nature in this new world...”



Theory of Degeneracy of American Nature and Humans

- There was no escaping the pernicious effects of the American environment - not even for Native Americans.
- “...here reduced, shrunken beneath this ungenerous sky and in this empty land, where man, scarce in number, was thinly spread, a wanderer, where far from making himself master of this territory as his own domain, nor tamed the waters, nor governed the rivers, nor worked the earth, he was himself no more than an animal...the savage is feeble and small in his organs of generation; he has neither body hair nor beard, and no ardor for the female of his kind...he lacks vivacity, and is lifeless in his soul.”
- The environment and natural history had never before been used to make such sweeping claims, essentially damning an entire continent in the name of science.
- Buffon's American degeneracy hypothesis was quickly adopted and expanded by men such as the Abbé Raynal and the Abbé de Pauw, who believed that Buffon's theory did not go far enough.
- They went on to claim that the theory of degeneracy applied equally well to transplanted Europeans and their descendants in America.



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.

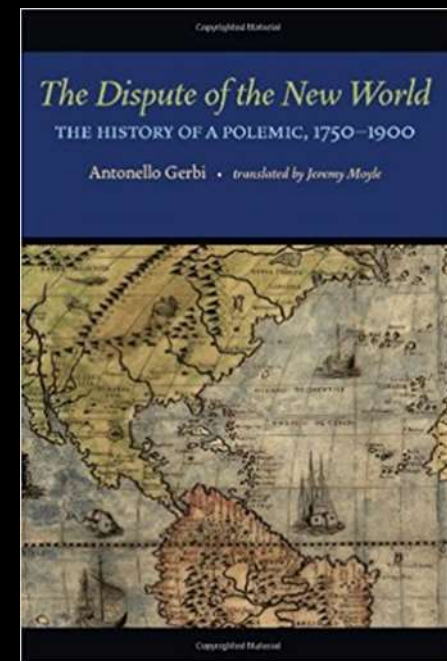
The sun vainly pours down its liveliest rays on this cold mass ... it will never produce anything but humid creatures, plants, reptiles, and insects, and cold men and feeble animals are all that it will ever nurture.”

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.

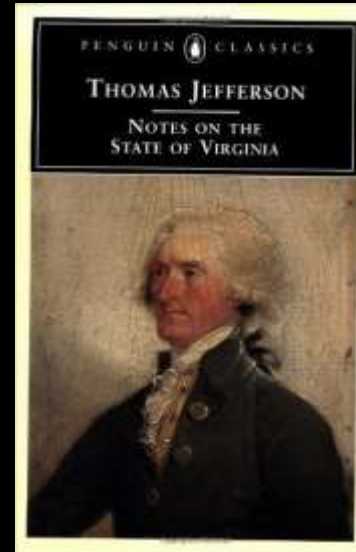
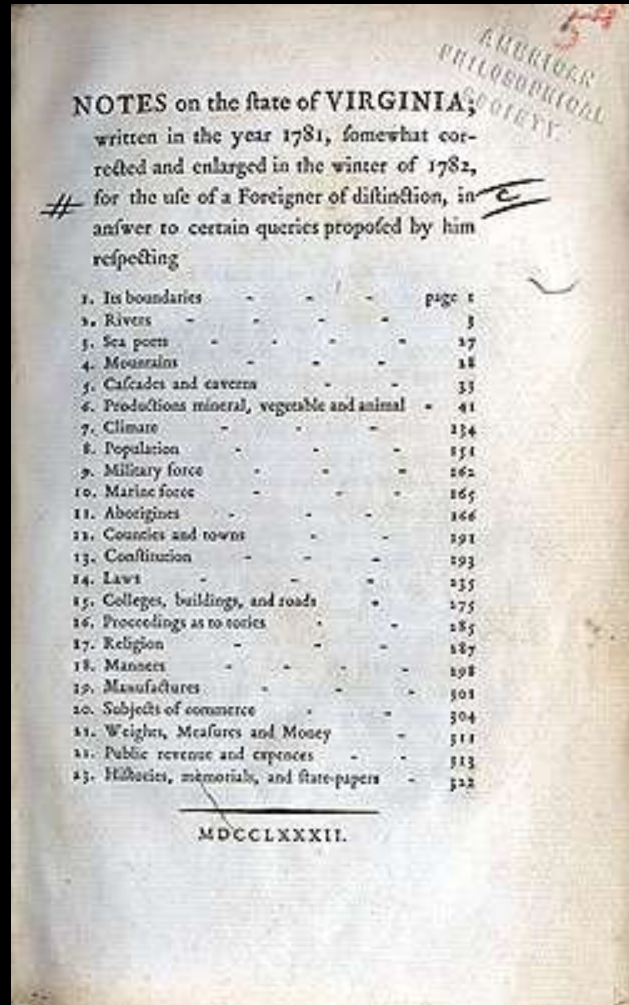
America is a land of swamps, where life putrefies and rots.



Jefferson, Natural History, and the Defense of American Nature

Notes on the State of Virginia (1785)

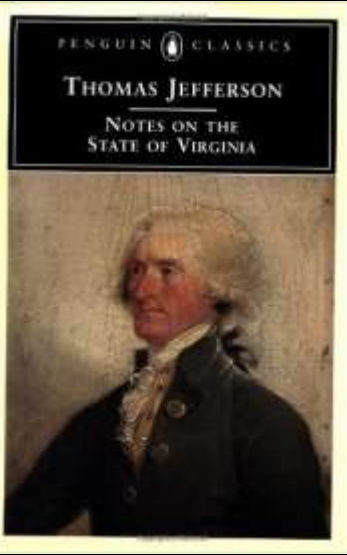
He completed the first version in 1781, and updated and enlarged the book in 1782 and 1783. He first published it anonymously in Paris in 1785



Widely considered the most important American book published before 1800, *Notes on the State of Virginia* is both a compilation of data by Jefferson about the state's natural resources and economy, and his vigorous argument about the nature of the good society.

Jefferson, Natural History, and the Defense of American Nature

- If the theory of American degeneracy took hold in Europe the long-term consequences could impact trade with and immigration too the United States.
- In his *Notes on the State of Virginia* (1785) Thomas Jefferson responded to Buffon's claims.
- His evidence included comparative tables of weights of animal species from America and Europe, lists of species endemic to each part of the world (the American list was four times as long) and even an explanation of why cattle were smaller in the New World than in the Old (farming practices, not climate conditions).
- He also included a passionate defense of Native Americans.



23

A Comparative view of the Quadrupeds of Europe and of America

121. III

place these three tables successively one after another & not side by side

I. Aborigines of both.		II. Aborigines of one only.		III. Domestic.	
Europe	America	Europe	America	Europe	America
Mammoth.		Sanglier. Wild boar.	280.	Fox. Red.	534.
Buffalo. Bison.	*1000.	Mouflon. Wild sheep.	56.	Elk. Horned.	*150.
White bear. Urs. blanc.		Bouquetin. Wild goat.		Puma.	
Cambou. Renne.		Lievre. Hare.	7.6.	Jaguar.	210.
Bear. Ours.	153.7.	Lepin. Rabbit.	3.4.	Cat. Leopard.	109.2.
Elk. Blon. Original.		Putois. Polecat.	3.3.	Tamandua.	109.
Red deer. Cerf.	288.8.	Genette. Chat.	3.1.	Tamandua.	65.4.
Fallow deer. Daim.	157.8.	Desman. Muskrat.		Cougar of N. America.	70.1.
Wolf. Loup.	69.8.	Loxocaul. Squirrel.	12.	Cougar of S. America.	59.4.
Beo. Chamois.	58.7.	Hermine. Armine.	8.2.	Ocelot.	

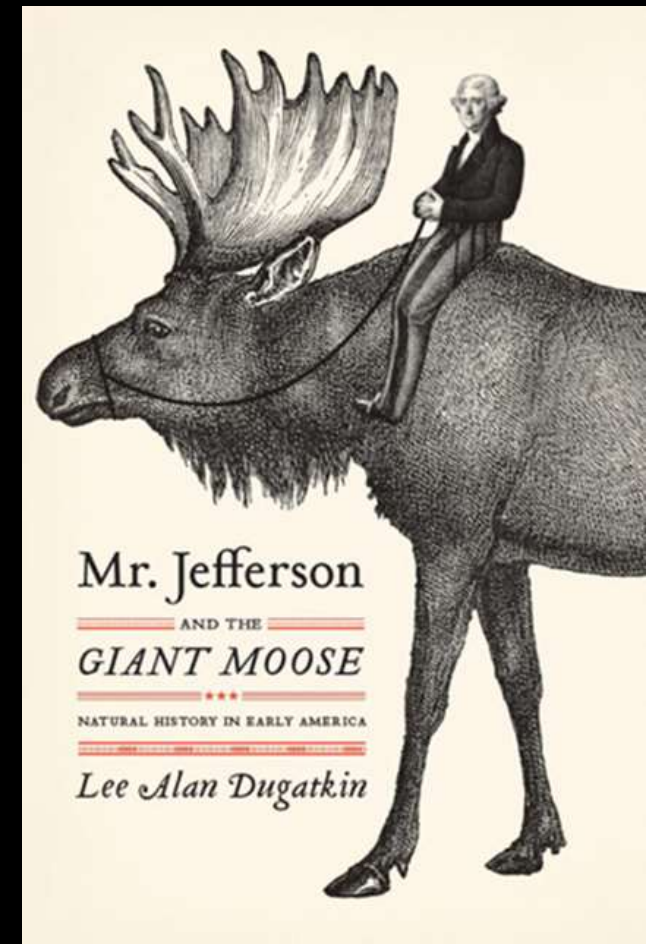
Jefferson's Moose

In addition, "Jefferson also wanted to present Buffon with tangible evidence...He tried with the skin of a panther, and then the bones of a hulking mastodon...but Buffon didn't budge.

Jefferson's most concerted effort in terms of hands-on evidence was to procure a very large, dead, stuffed American moose – antlers and all – to hand Buffon personally, in effect saying, "see."

This moose became a symbol for Jefferson – a symbol of the quashing of European arrogance in the form of degeneracy."

Dugatkin, 2009



19th Century Cultural Impact of the Theory of the Degeneracy of American Nature

American Nature - Great unerring Nature once seems wrong

Hegel (1816) “America has always been and still shows itself physically and spiritually impotent.” and animals in the New World are “in every way smaller, weaker and more cowardly” This inferiority applied to domesticated animals as well as wild ones, “a piece of European beef is a delicacy” compared to American beef.

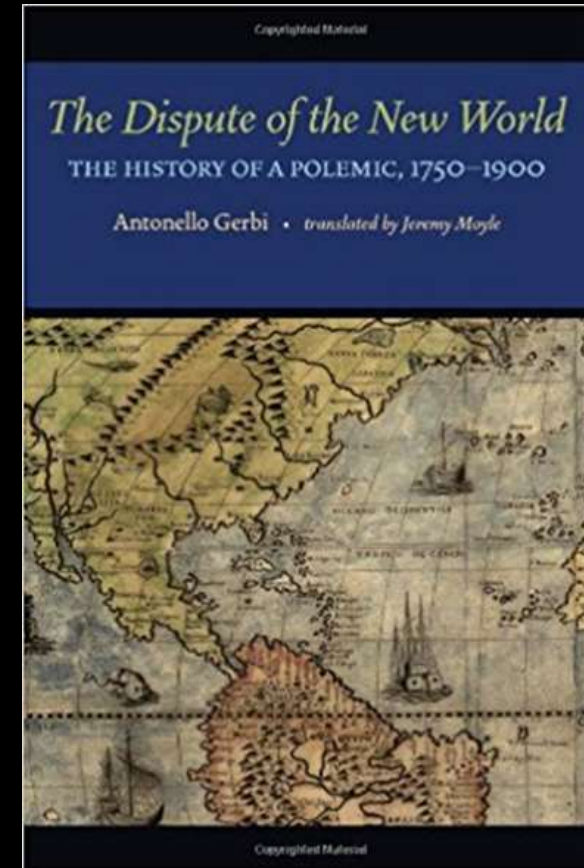
American birds were mostly mute and would only sing when they lived in a land that no longer “resounds with almost inarticulate tones of degenerate men.”

Keats – Lines to Fanny (1819)

Where shall I learn to get my peace again?
To banish thoughts of that most hateful land,

Whose rank-grown forests, frosted, black, and blind,
Would fright a Dryad; whose harsh herbag'd meads
Make lean and lank the starv'd ox while he feeds;
There flowers have no scent, birds no sweet song,
And great unerring Nature once seems wrong.

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



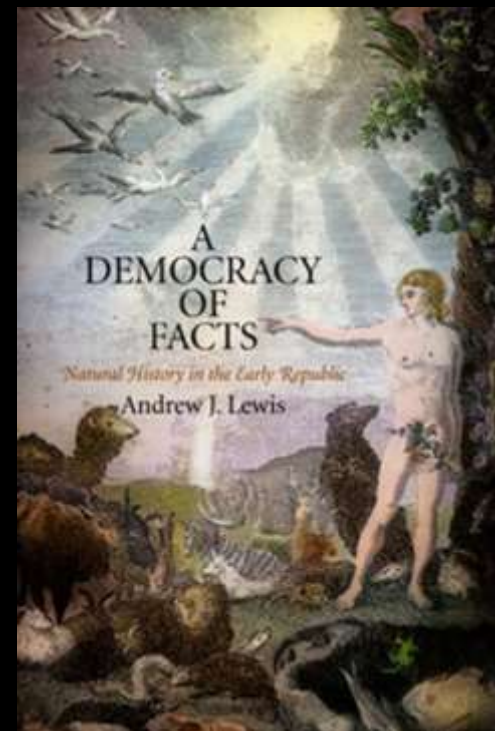
American Natural History and Nation Building

“Amalgam of Science and Sentiment”

“American naturalists initially advertised for and welcomed the participation of their fellow citizens. Natural history, they urged, was a tool to investigate, to catalogue, to explore, and, ultimately, to know the new nation. It was a method and means for a new citizenry to take ownership of a new nation...

Ordinary Americans made natural history a part of the nation building process, an exercise as much involved with the creation of national character as it was with plants and animals...

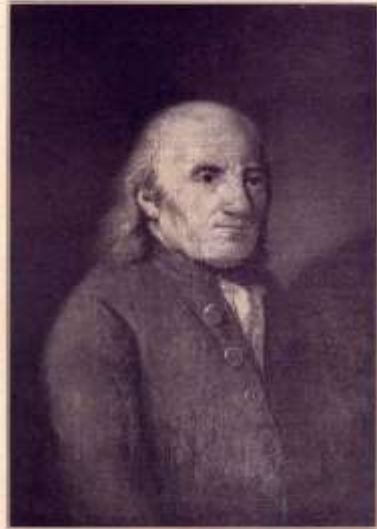
This powerful amalgam of science and sentiment made possible for Americans an understanding of nature and an ownership stake in the national landscape’s past and present, as well as prognostications of its future potential.”



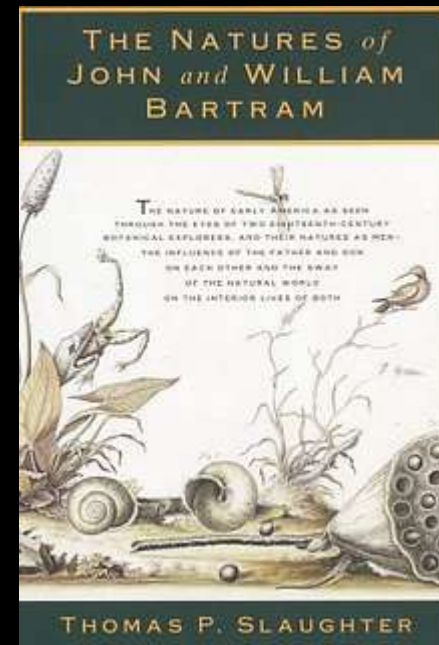
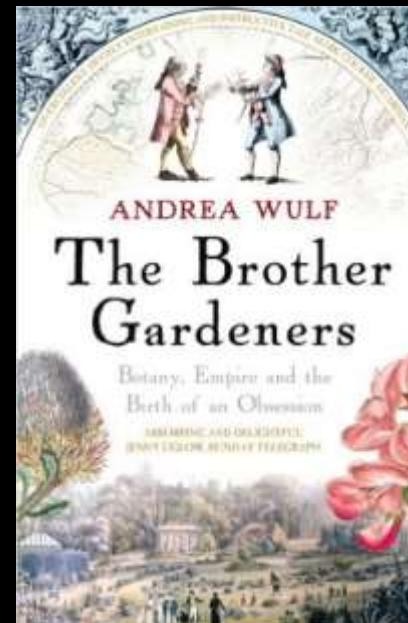
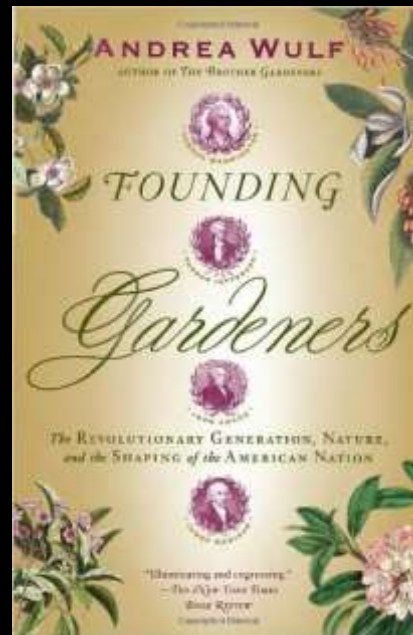
The Cultivation and Collection of New World Nature



John Bartram 1699-1777



JOHN BARTRAM
FROM THE PORTRAIT SHOWN BY CASPAR MALLARD, 1764 AND
OWNED BY RICHARD W. LANE



The Cultivation and Collection of New World Nature

Jefferson, Natural History, and the Gardens of Monticello

Thomas Jefferson loved to garden. He fell in love with designing gardens immediately after his inheritance of Monticello in 1757. Jefferson wanted to construct the gardens of Monticello from his own naturalistic point of view, and thus gathered materials from travelers all over the United States and other countries as well. Many of his acquaintances knew of his passion for gardening and often sent him various seeds and plants.



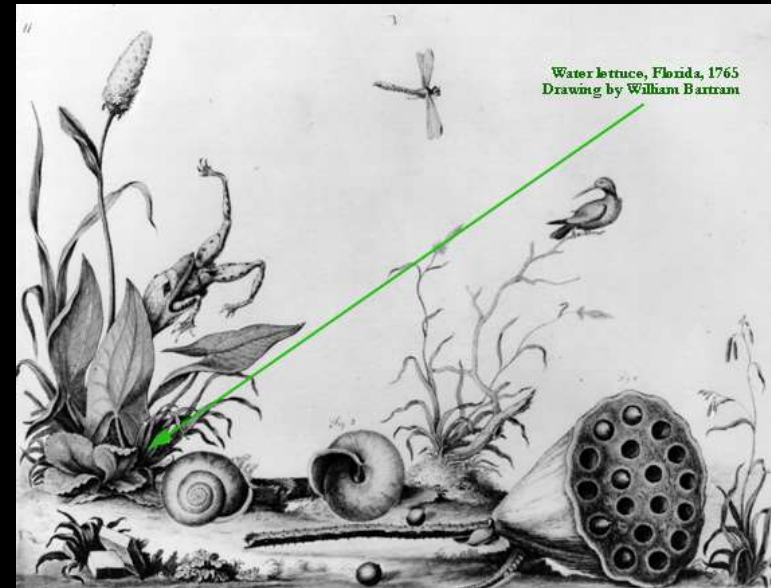
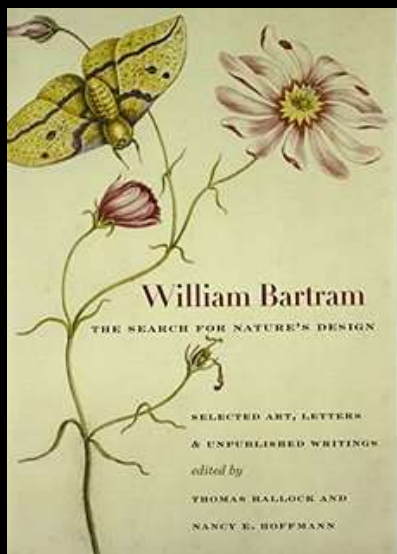
The Natural History of the New World - Artist Naturalist in North America

William Bartram 1739-1823 (son of John Bartram)

Travels through North and South Carolina, Georgia, East and West Florida (1791)

An aesthetic appreciation of nature with an accurate recording of data based on long term observations, admiration for Native American culture, Quaker/Pantheist – interconnection and underlying harmony

"It was now after noon; I approached a charming vale, amidst sublimely high forests, awful shades! Darkness gathers around, far distant thunder rolls over the trembling hills; the black clouds with august majesty and power, moves slowly forwards, shading regions of towering hills, and threatening all the destructions of a thunderstorm; all around is now still as death, not a whisper is heard, but a total inactivity and silence seems to pervade the earth; the birds afraid to utter a chirrup, and in low tremulous voices take leave of each other, seeking covert and safety; every insect is silenced, and nothing heard but the roaring of the approaching hurricane..."



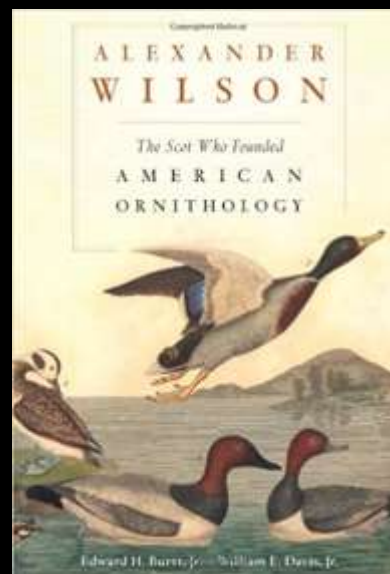
First American Ornithologist - Alexander Wilson (1766 – 1813)

In May 1794, at the age of 27, Wilson left Scotland for America. He settled near Philadelphia, and he taught school in Pennsylvania.

He met William Bartram, who got him interested in birds.

In 1802, Wilson decided to publish a book illustrating all the North American birds. He traveled widely, observing and painting birds, and gathering subscribers for the book. His nine-volume work, *American Ornithology* published in 1808-1814, illustrated 268 species, including descriptions of 26 new species.

Wilson also conducted the first breeding bird census, in Bartram's garden. His 1810 meeting with Audubon probably inspired Audubon to publish his own book.



Second American Ornithologist

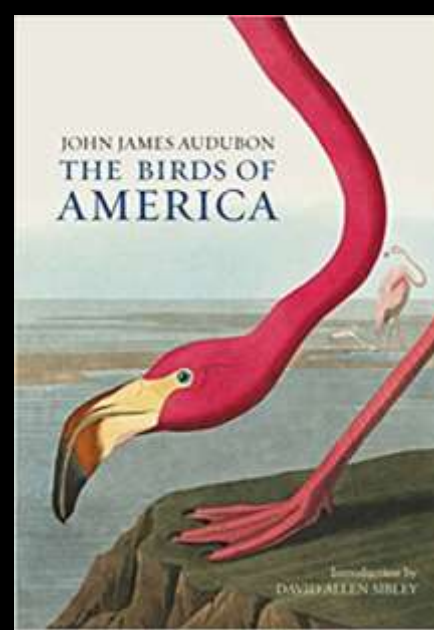
John James (Jean-Jacques) Audubon 1785-1851

Born in Haiti, raised in France, when he was 18 immigrated to America 1805

His major work, a color-plate book entitled *The Birds of North America* (1827–1839)

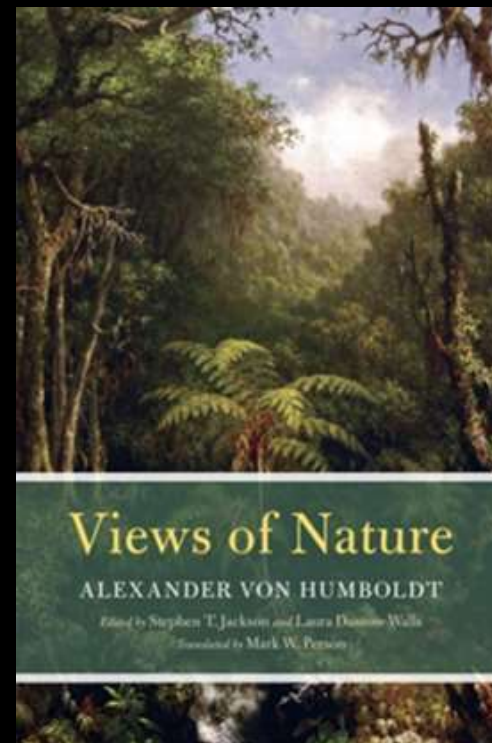
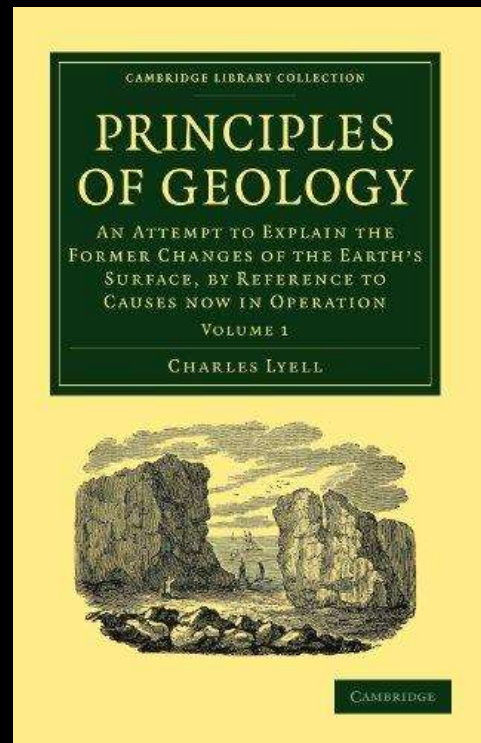
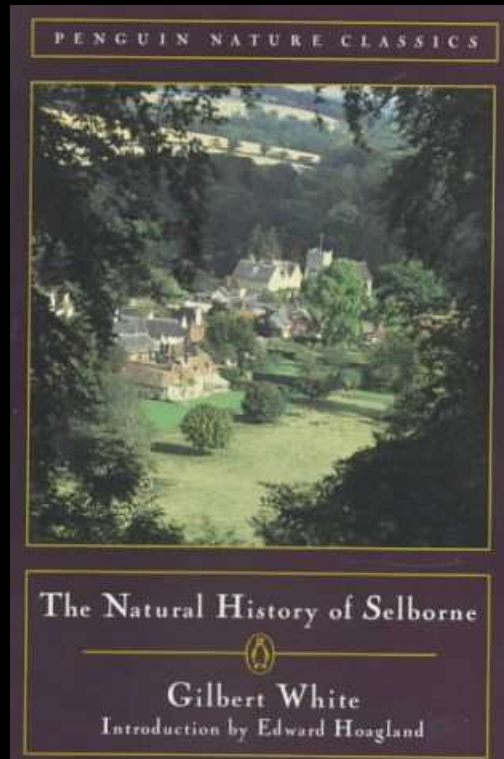
Audubon identified 25 new species and a number of new sub-species.

Inspired by Buffon's *Histoire naturelle* and the idea of showing the species in its habitat.

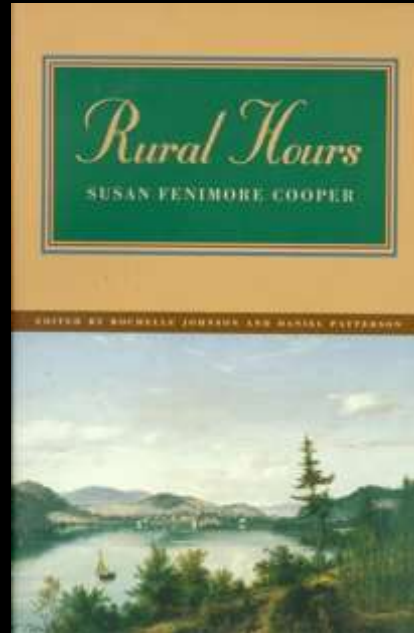
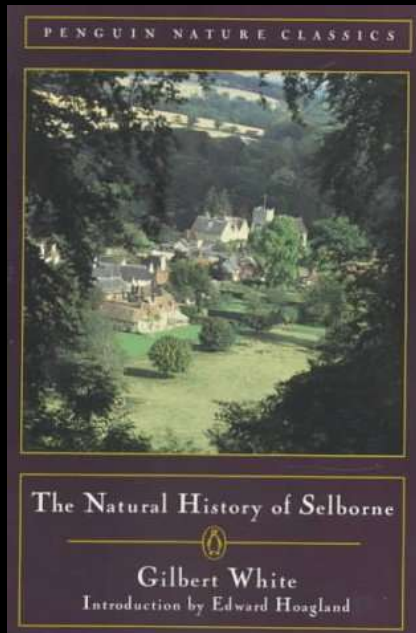


Thoreau and Natural History – The Literary and Scientific Naturalist

“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

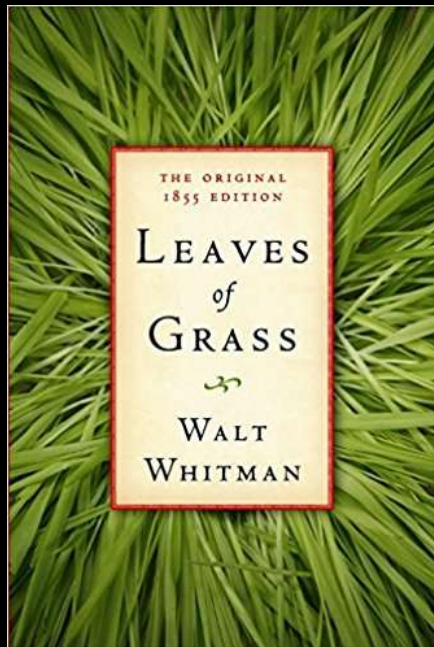


Literary Natural History – Thoreau the Literary Naturalist



"Sic Vita" or "Such is Life"
Henry David Thoreau 1837

I am a parcel of vain strivings tied
By a chance bond together,
Dangling this way and that, their links
Were made so loose and wide,
Methinks,
For milder weather.



A bunch of violets without their roots,
And sorrel intermixed,
Encircled by a wisp of straw
Once coiled about their shoots,
The law
By which I'm fixed.

Literary Natural History – Models for Walden

The Natural History and Antiquities of Selborne (1789)

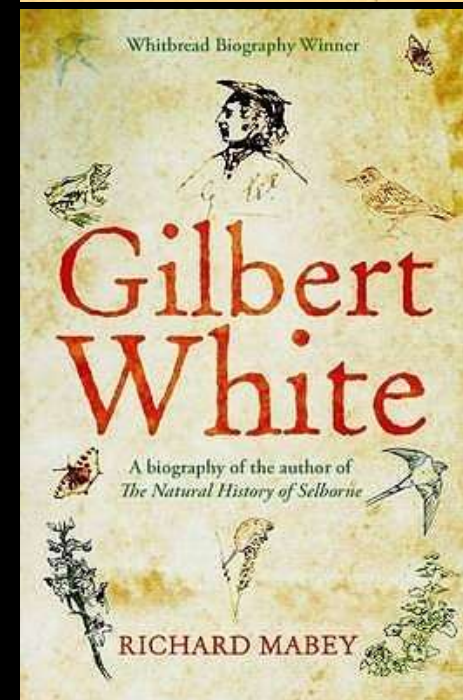
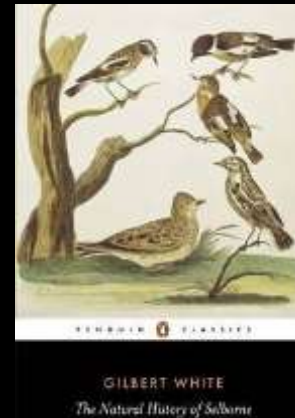
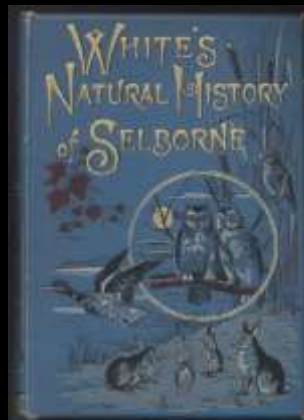
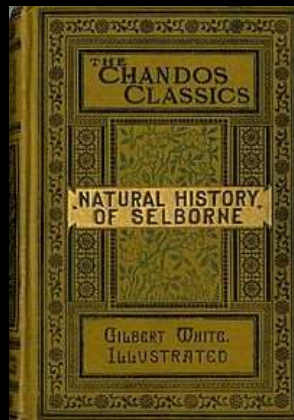
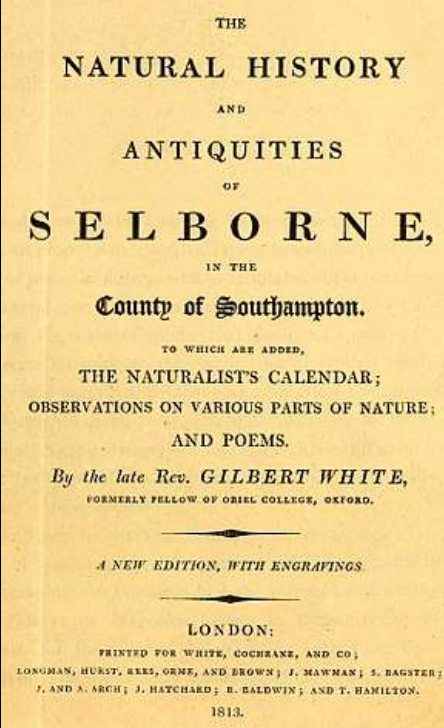
Gilbert White 1720 – 1793

English clergyman and first literary naturalist, born in his grandfather's vicarage at Selborne in Hampshire

The Natural History and Antiquities of Selborne still in print and over 300 editions.

First “Ecological” study and includes human impacts “antiquities” organized in three parts:

- A series of letters of natural history observations to two friends
- A year long 'Naturalist's Calendar' comparing observations made by White and William Markwick of the first appearances in the year of different animals and plants
- Observations of natural history organized systematically by species and group



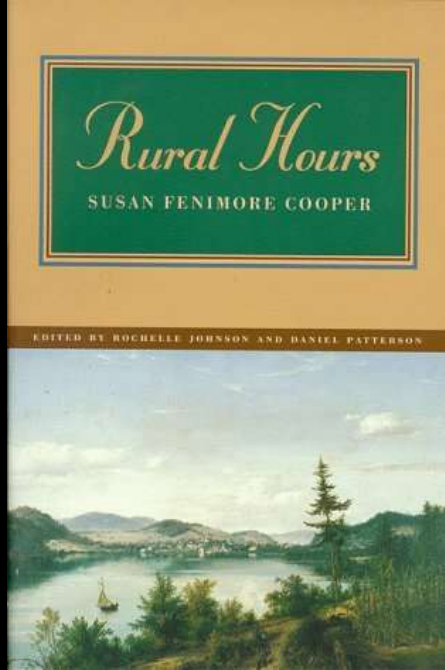
Literary Natural History – Models for Walden

Rural Hours (1850)

Susan Fenimore Cooper 1813-1894

The eldest daughter of American novelist James Fenimore Cooper . Her nature diary, *Rural Hours* (1850), covering two years in Cooperstown, New York. Through 1870, it went through 10 editions, but it was largely forgotten until republished in the 1990s.

- The "first major work of environmental literary nonfiction by an American woman writer, both a source and a rival of Thoreau's *Walden*."
- Focus on process, interconnectedness, and change brought by humans
- "While observing, this afternoon, the smooth fields about us, it was easy, within the few miles of country in sight at the moment, to pick out parcels of land in widely different conditions, and we amused ourselves by following upon the hill-sides the steps of the husbandman, from the first rude clearing, through every successive stage of tillage, all within range of the eye at the same instant."



Miss Susan Fenimore Cooper, probably in the middle 1850's.
Photograph by W. O. Smith, Cooperstown.

The Poet as Naturalist – Walt Whitman 1819-1892

I think I could turn and live with animals, they are so placid and self-contain'd;
I stand and look at them long and long.

They do not sweat and whine about their condition;
They do not lie awake in the dark and weep for their sins;
They do not make me sick discussing their duty to God;
Not one is dissatisfied—not one is demented with the mania of owning things;
Not one kneels to another, nor to his kind that lived thousands of years ago;
Not one is respectable or industrious over the whole earth.

Walden meets Leaves of Grass

Thoreau and Whitman met once in 1856

Bronson Alcott – the great men sat eyeing each other “like two beasts, each wondering what the other would do, whether to snap or run.”

A bunch of violets without their roots,
And sorrel intermixed,
Encircled by a wisp of straw
Once coiled about their shoots,
The law
By which I'm fixed.



Walt Whitman

Kosmos

Who includes diversity and is Nature,

Who is the amplitude of the earth, and the coarseness and sexuality of the earth, and the great charity of the earth and the equilibrium also,

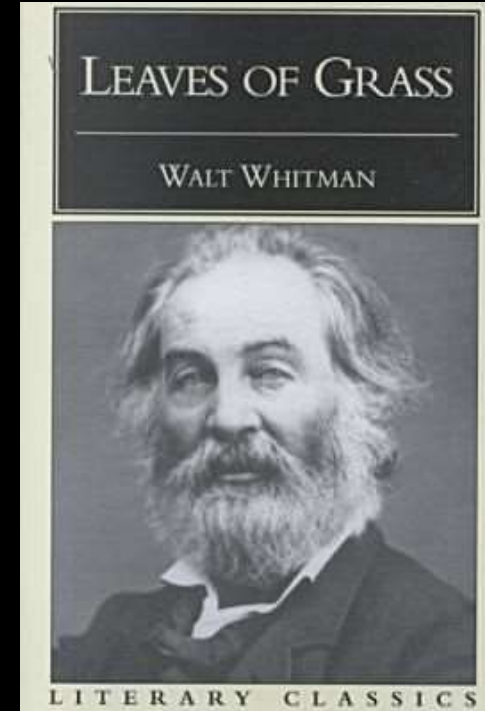
Who has not look'd forth from the windows the eyes for nothing, or whose brain held audience with messengers for nothing...

The theory of a city, a poem, and of the large politics of these States;

Who believes not only in our globe with its sun and moon, but in other globes with their suns and moons,

Who, constructing the house of himself or herself, not for a day but for all time, sees races, eras, dates, generations,

The past, the future, dwelling there, like space, inseparable together.



Thoreau the Scientific Naturalist

“Let us not underrate the value of a fact; it will one day flower in a truth.”

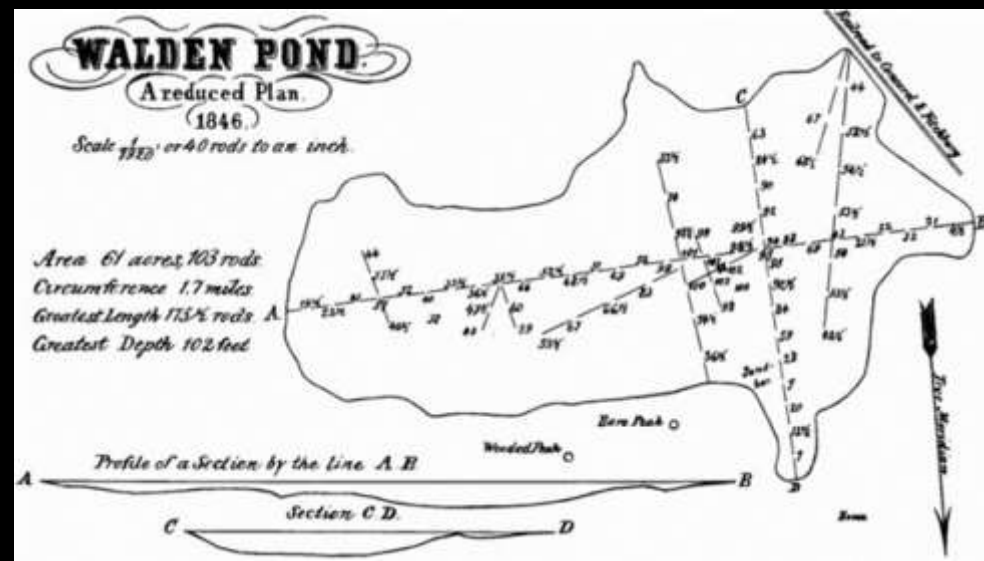
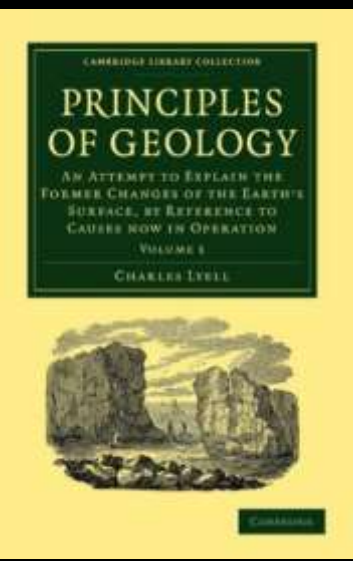
When Thoreau attended Harvard (1833-37) botany was not offered as a course in itself, but was included under natural history taught by the noted entomologist Thaddeus W. Harris.

“How indispensable to a correct study of nature is a perception of her true meaning – the fact will one day flower out into a truth...Mere accumulators of facts – collectors of materials for the master-workmen, are like those plants growing in dark forests, which ‘put forth only leaves instead of blossoms.’” 1837

Reads Lyell’s *Principles of Geology* (1830-33) in 1840.

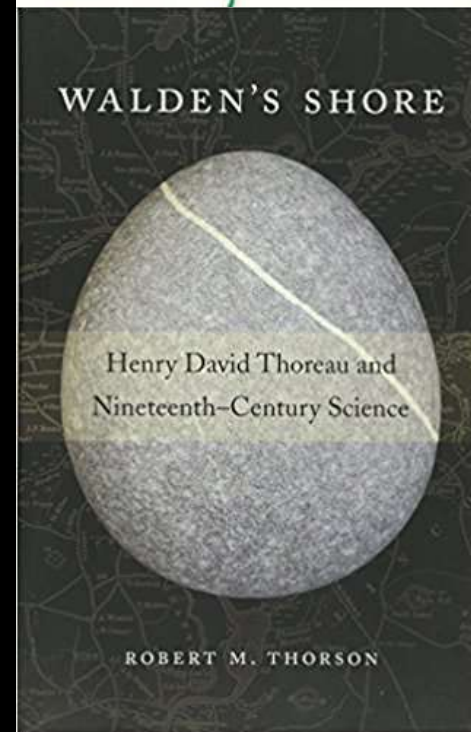
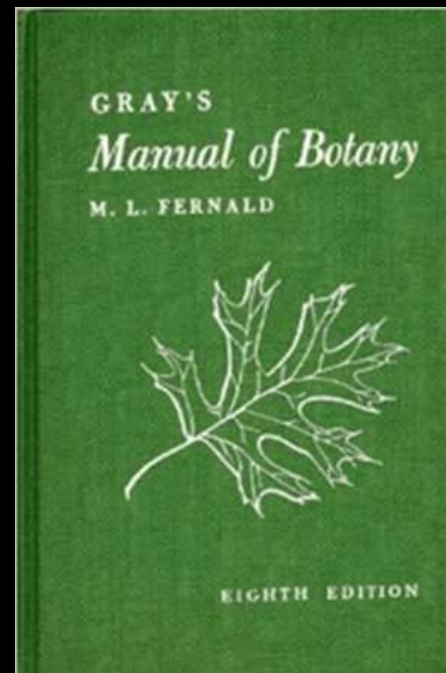
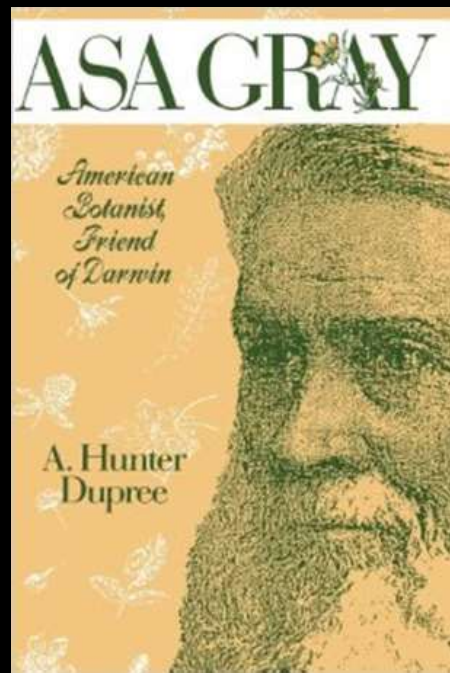
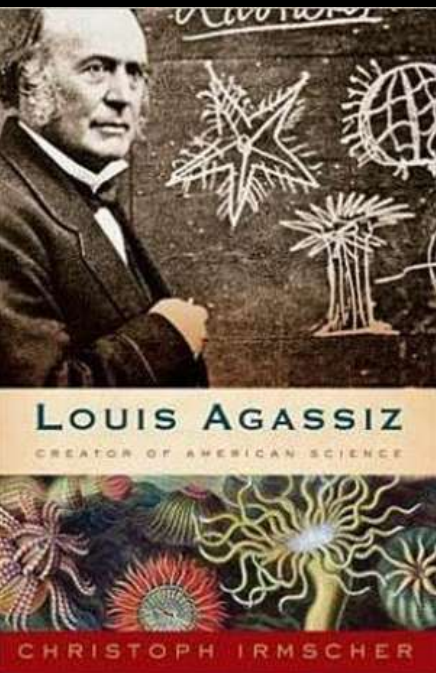
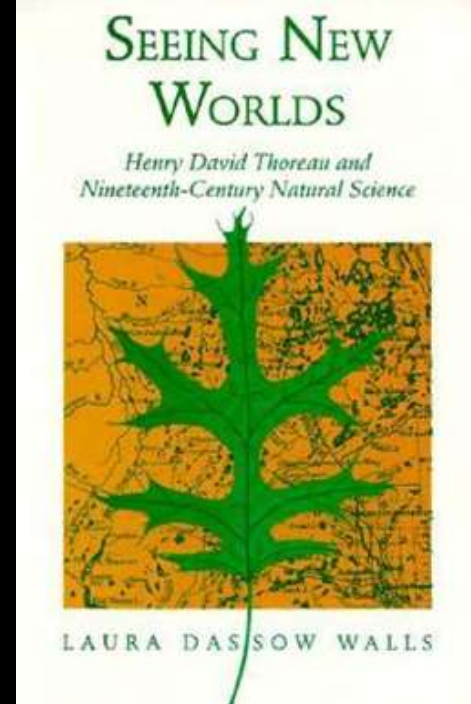
“We discover the causes of all past change in the present invariable order of the universe.” 1840

“How many new relations a foot-rule alone will reveal, and to how many things still this has not been applied! What wonderful discoveries have been, and may still be made, with a plumb line, a level, a surveyor’s compass, a thermometer, or a barometer!” 1845



Thoreau – Science and Natural History

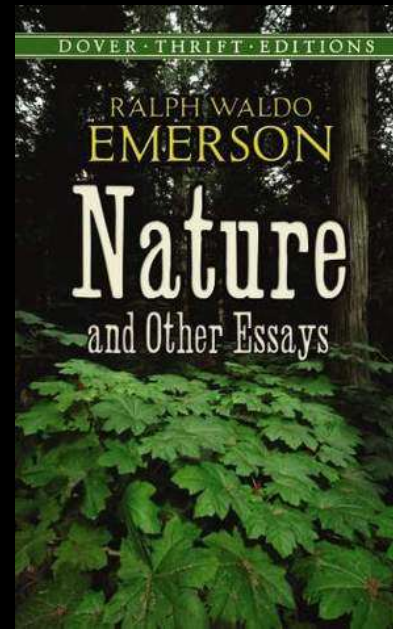
- The arrival in 1846 of Louis Agassiz at Harvard, and the publication in 1848 of Asa Gray's *Manual of Botany* helped to encourage Thoreau's interest in botany.
- On November 8, 1850, Thoreau begins to expand his Journal into a kind of scientific notebook – a natural history of Concord.
- Thoreau's earliest herbarium specimens were collected in 1850. Thoreau continued to collect for his herbarium over the following years, until his collection grew to about 900 specimens.



Emerson, Thoreau, and Science

Ralph Waldo Emerson

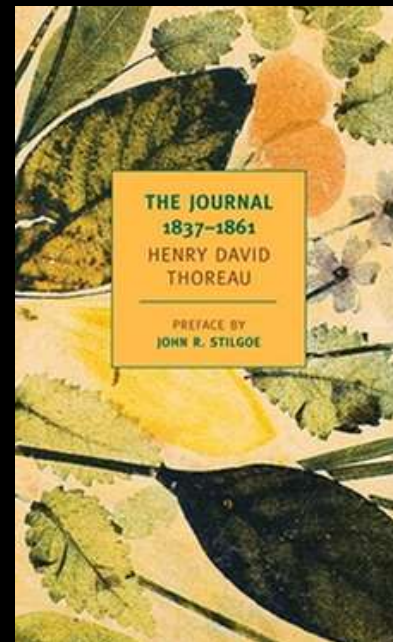
“All the facts in natural history taken by themselves, have no value, but are barren, like a single sex. But marry it to human history, and it is full of life. Whole floras, all Linnaeus’ and Buffon’s volumes, are dry catalogues of facts...”



Henry David Thoreau

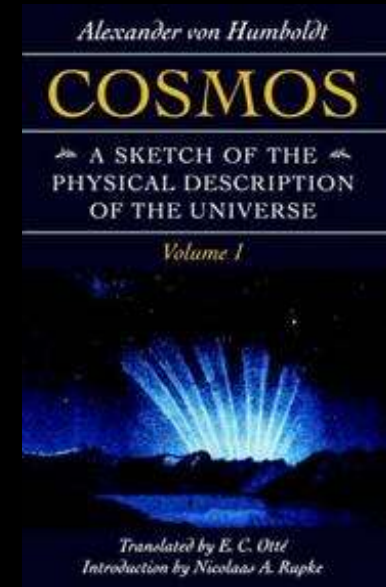
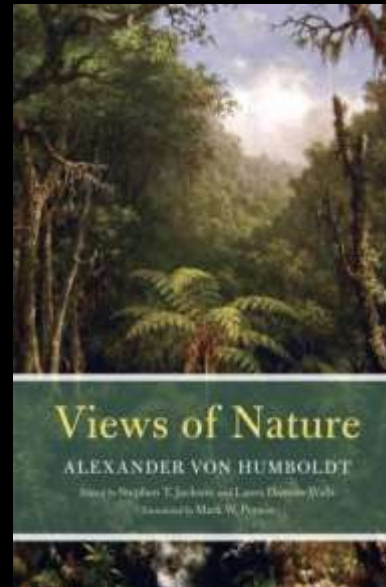
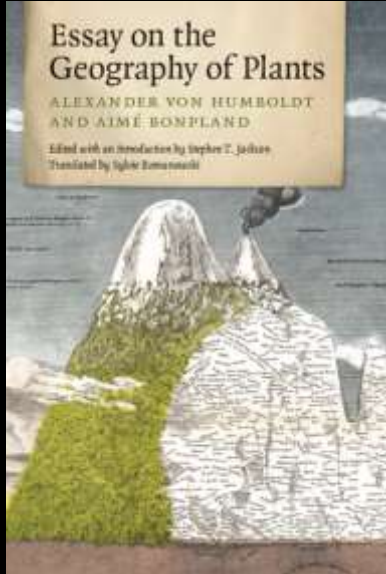
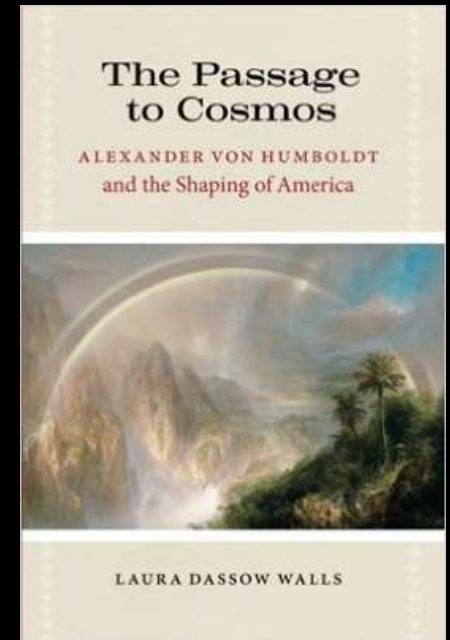
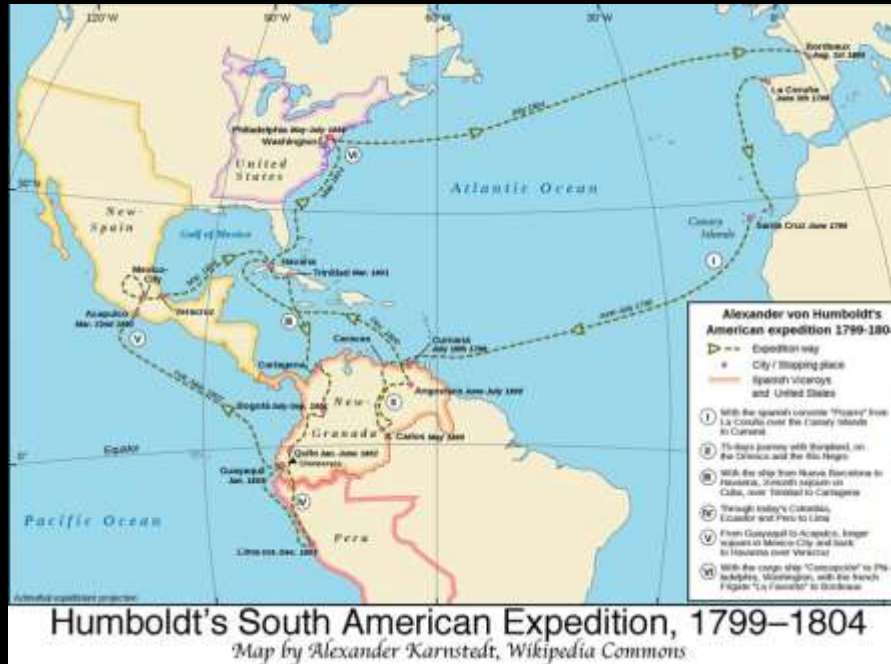
“What sort of a science is that which enriches the understanding but robs the imagination?”
1851

“If I am overflowing with life, as rich in experience for which I lack expression, then nature will be my language full of poetry, - all nature will fable, and every natural phenomenon be a myth. The man of science, who is not seeking for expression but for a fact to be expressed merely, studies nature as a dead language. I pray for such inward experience as will make nature significant.”
1853



Science, Imagination and Alexander von Humboldt

1769 – 1859



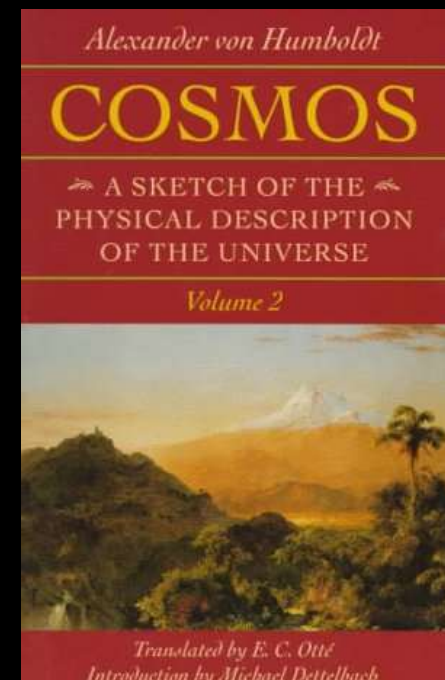
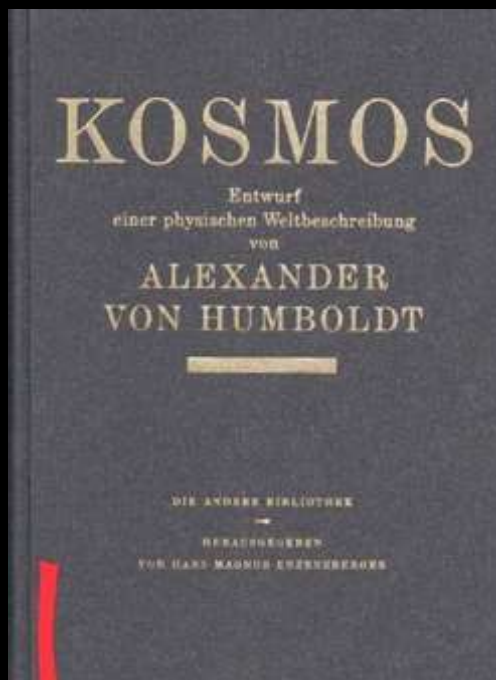
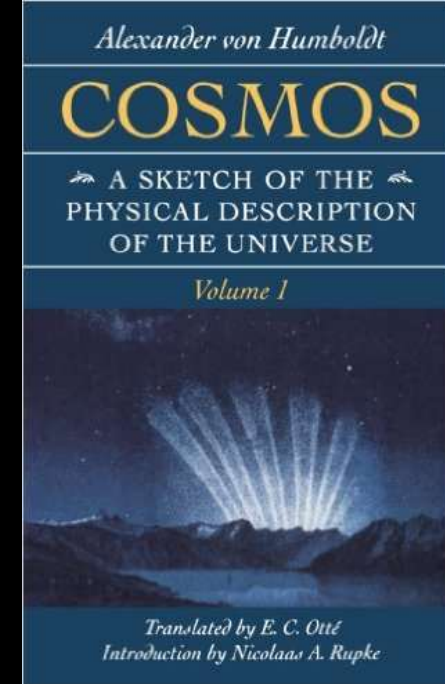
Humboldtian Science

Cosmos: A Sketch of the Physical Description of the Universe

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

Cosmos "is the assemblage of all things in heaven and earth, the universality of created things constituting the perceptible world."

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

“order of the world, and adornment of this universal order”

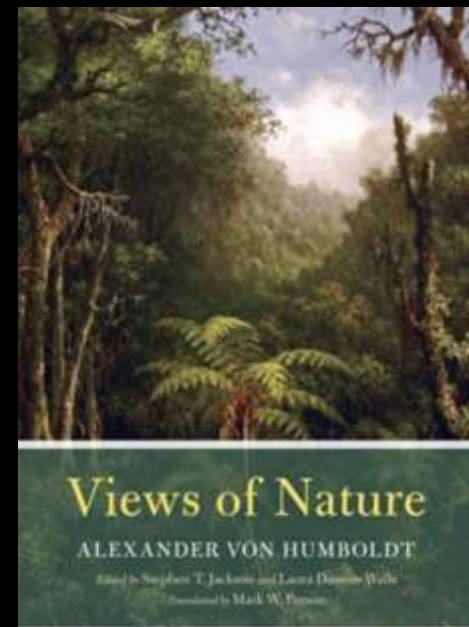
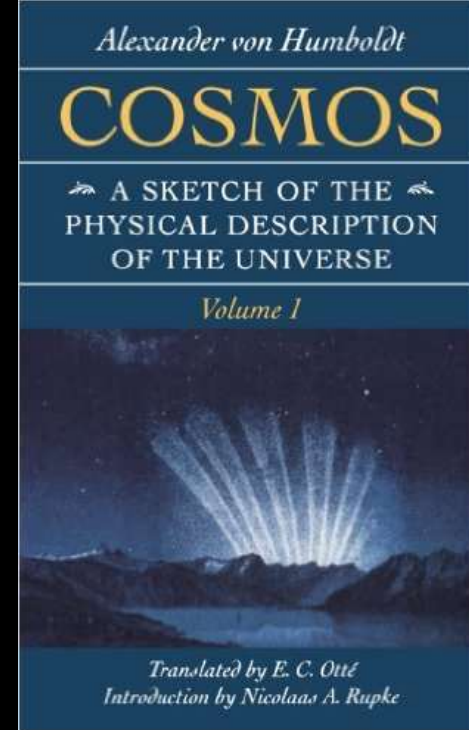
Humboldt viewed the world as what the ancient Greeks called a *kosmos* – “a beautifully ordered and harmonious system” – and coined the modern word “cosmos” to use as the title of his final work.

Cosmos signifies both the “order of the world, and adornment of this universal order.” Thus, there are two aspects of the Cosmos, the “order” and the “adornment.”

- “Order” refers to the observed fact that the physical universe, independently of humans, demonstrates regularities and patterns that we can define as laws.
- “Adornment” is up to human interpretation. To Humboldt, Cosmos is both ordered and beautiful.

Ansichten der Natur 1808 (*Views of Nature* 1849)

- Seven ways of viewing nature – steppes, deserts, plant ecology, rivers, forests, volcanoes, human impacts in the Andes

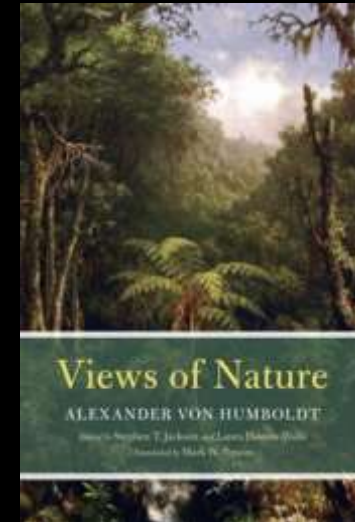


Humboldtian Science - Imagination/Mind and Nature



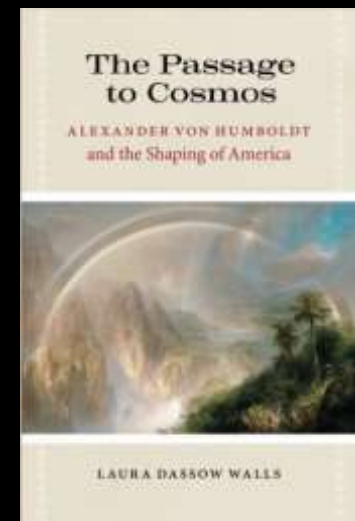
Heart of the Andes
1859

Frederic Edwin Church
1826-1900

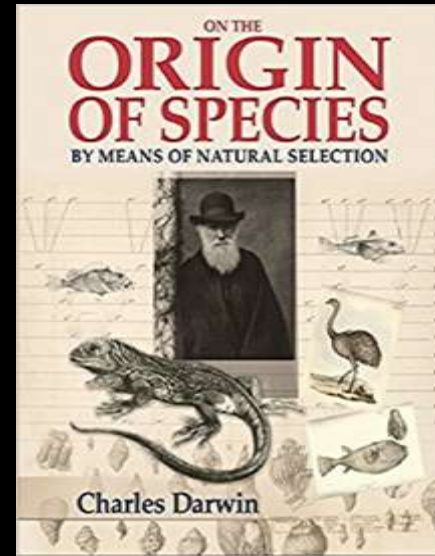
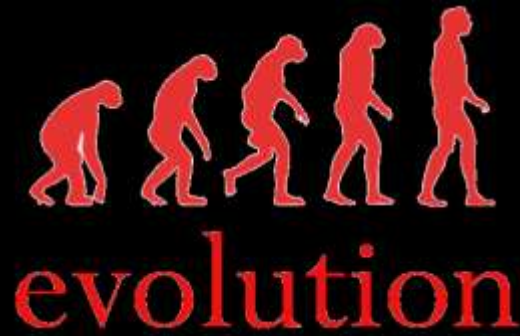
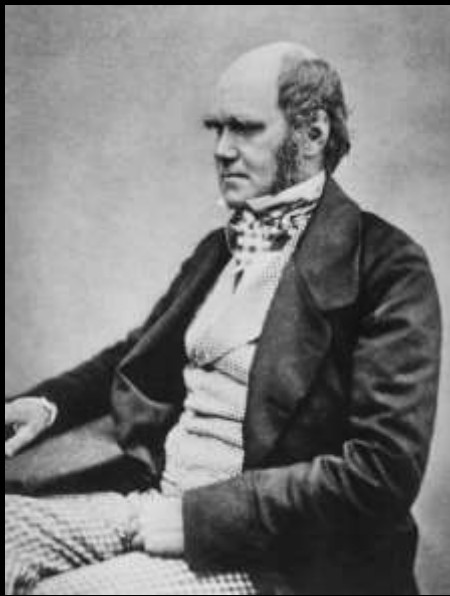


Art can incorporate and surpass science in conveying the perceptual truth of the whole, but only if the artist paints the truth of particulars. By truth Humboldt means natural historical truth.

The artist cannot paint just “plants,” but must become botanist and know each species, its growth and habits; clouds are not puffs of pigment but studies in meteorology; mountains are visual embodiments of geological principles, water of hydrology. Landscapes become not static portraits but dynamic historical ecologies. - Walls



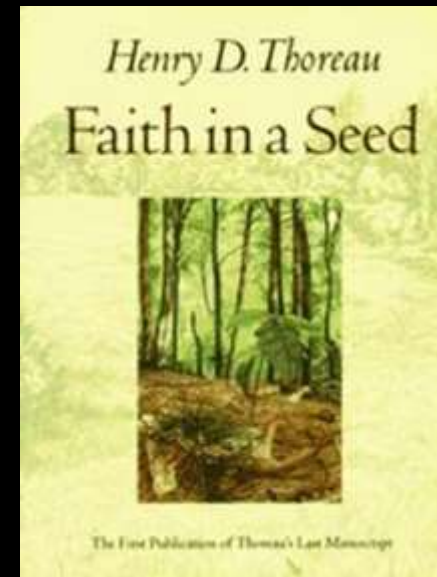
Thoreau and Darwin 1860



Charles Darwin, *On the Origin of Species*, published in 1859. In January 1860, Henry reads one of the first copies brought to America.

Throughout 1860, he carefully recorded the ways in which oaks and pines advanced, retreated and produced hundreds of thousands of acorns and pinecones to gain a foothold. He marvelled that Darwin's theory "implies a greater vital force in nature, because it is more flexible and accommodating, and equivalent to a sort of constant new creation".

"Though I do not believe that a plant will spring up where no seed has been, I have great faith in a seed. Convince me that you have a seed there, and I am prepared to expect wonders."



New World Nature and the Swamp

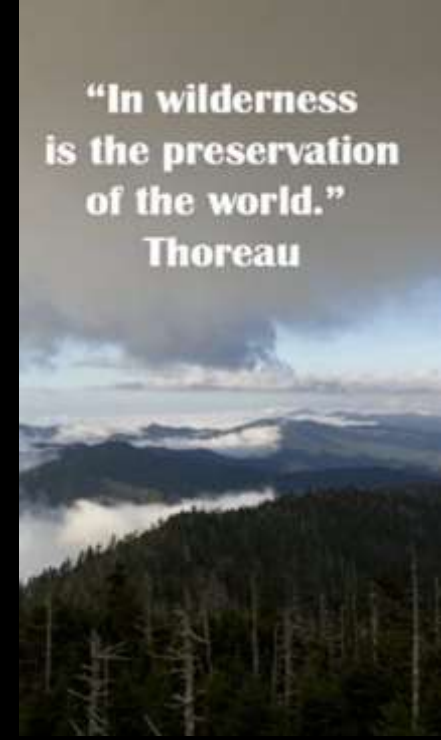
Henry David Thoreau, "Walking" (1862)

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.

**"In wilderness
is the preservation
of the world."
Thoreau**



SWAMPS?



WALKING

Henry David Thoreau



The Swamp, Buffon, and Natural History

“This statement will do at least to set against Buffon’s account of this part of the world and its productions.

If the moon looks larger here than in Europe, probably the sun looks larger also. If the heavens of America appear infinitely higher, the stars brighter, I trust that these facts are symbolical of the height to which the philosophy and poetry and religion of her inhabitants may one day soar.

For I believe that climate does thus react on man — as there is something in the mountain air that feeds the spirit and inspires. Will not man grow to greater perfection intellectually as well as physically under these influences?

Yes; though you may think me perverse, if it were proposed to me to dwell in the neighborhood of the most beautiful garden that ever human art contrived, or else of a dismal swamp, I should certainly decide for the swamp.

When I would recreate myself, I seek the darkest wood, the thickest and most interminable, and, to the citizen, most dismal swamp.

I enter a swamp as a sacred place — a *sanctum sanctorum*. There is the strength — the marrow of Nature. The wild wood covers the virgin mould, — and the same soil is good for men and for trees.”



WALKING
Henry David Thoreau



Thoreau and Nature History

“Think of our life in nature, - daily to be shown matter, to come in contact with it, - rocks, trees, wind on our cheeks! the *solid* earth! the *actual* world! The *common sense*! Contact! Contact! *Who are we? Where are we?*” 1846

Six weeks before his death in 1862, “I have not been engaged in any particular work on Botany, or the like, though, if I were to live, I should have much to report on Natural History.”

Emerson after Thoreau’s death –

“The country knows not yet, or in the least part, how great a son it has lost. It seems an injury that he should leave in the midst of his broken task which none else can finish, a kind of indignity to so noble a soul that he should depart out of nature before yet he has really been shown to his peers for what he is.”

