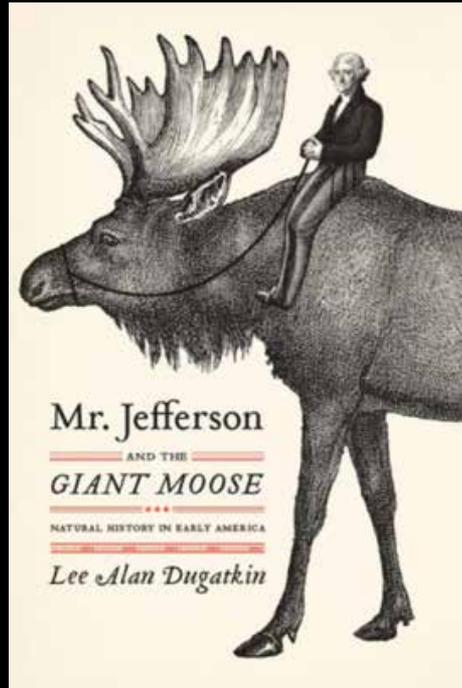


American Natural History and the Theory of Degenerate Nature

Kevin M. Anderson, Ph. D.

Austin Water Center for Environmental Research



Natural History

Understanding whole organisms in context

Scientific - Ecological understanding shaped by cultural contexts

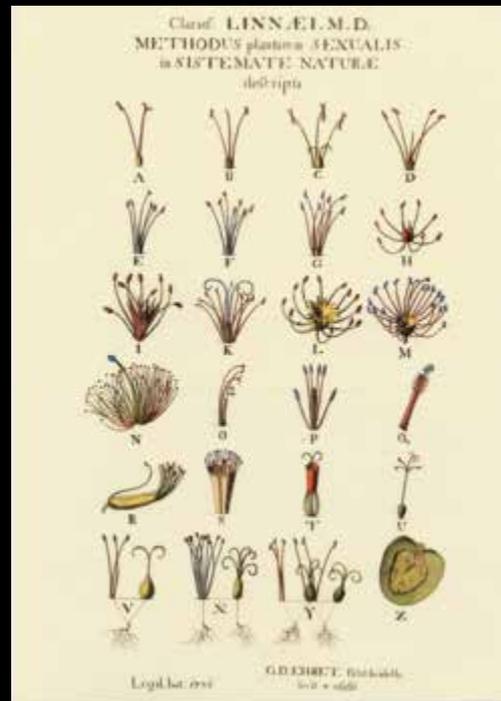
Literary - Cultural understanding shaped by ecological contexts



"The idea of nature contains, though often unnoticed, an extraordinary amount of human history."
Raymond Williams, "Ideas of Nature" 1980

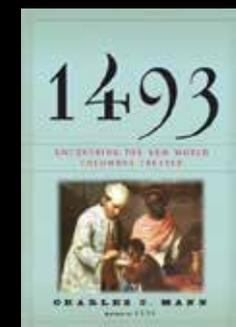
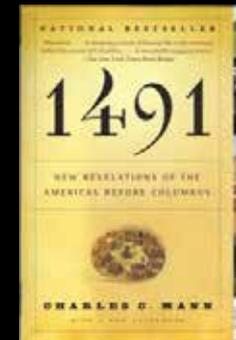
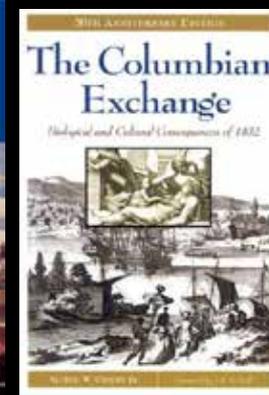
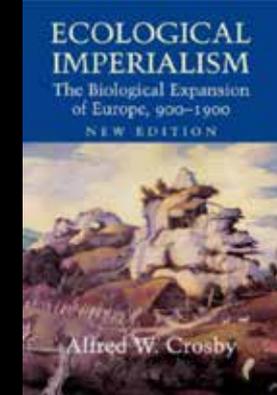
The Practice of Natural History

- Observation
- Description
- Classification
- Collecting
- Mapping
- Amateurs to Professionals
- Artists as Naturalists
- Naturalists to Biologists
- Natural History as Literature
- Encyclopedias
- Museums
- Evolution



Colonial America Natural History 1492-1800

- European Naturalists - Spanish, French, Dutch, English
- Reshaping the Natural History of Earth - Ecological Imperialism
- Botanical Empires - Crops and Commerce
- Acclimatization and Botanical Gardens – By 1800, Europe had hundreds
- The Columbian Exchange
- Politics of Natural History – Local Knowledge vs. European Professional Knowledge



Classification and Identification - Taxonomy

Carl Linnaeus 1707 – 1778

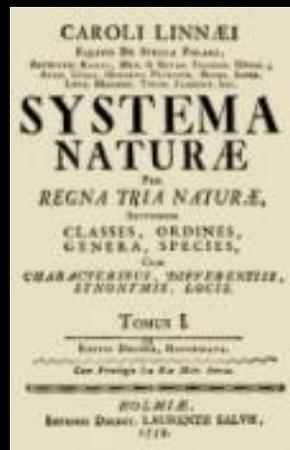
Swedish botanist, physician, and zoologist, who laid the foundations for the modern scheme of binomial nomenclature (*Genus species*).

The first edition of *Systema Naturae* was printed in 1735. He then returned to Sweden, where he became professor of botany at Uppsala.

In the 1740s, he was sent on several journeys through Sweden to find and classify plants and animals. In the 1750s and 60s, he continued to collect and classify animals, plants, and minerals.

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 Natural Diversity - Biogeography

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 opening volumes of the *Histoire naturelle* Buffon criticized Linnaeus's taxonomical approach to natural history.

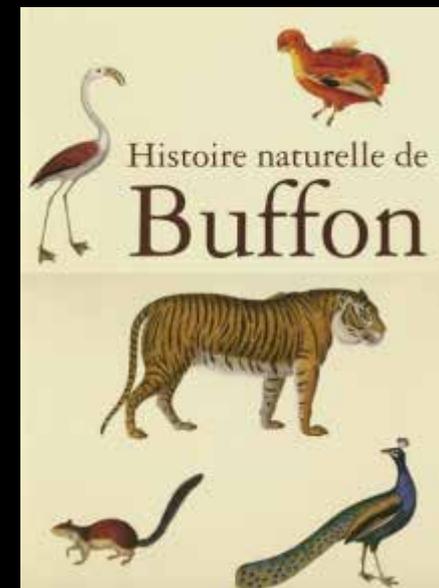
In the course of his examination of the animal world, Buffon noted that despite similar environments, different regions have distinct plants and animals, a concept later known as Buffon's Law.

This is considered to be the first principle of biogeography.

He was not an evolutionist, yet he was the father of evolutionism. He was the first person to discuss a large number of evolutionary problems.

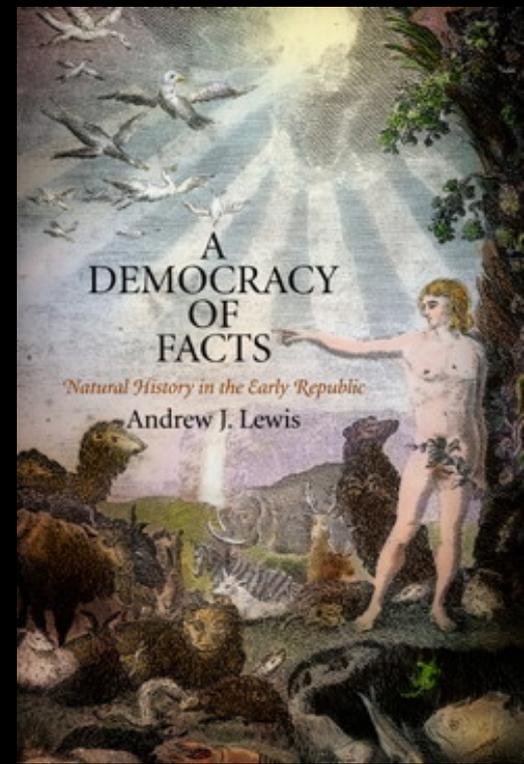
In contrast to Linnaeus, Buffon was less concerned with identification and more interested in vividly illustrating plenitude, diversity, and continuity of animal species.

Buffon insisted we “must make use of all parts of the object” for classification, including internal anatomy, behavior, and distribution.



American Natural History 1700 - 1900

- A Democracy of Facts – Citizen participation in natural history
- Amateur Naturalists
- “Amalgam of Science and Sentiment”
 - Natural Theology
 - Nation Building and Nature
 - Nature Study
- Popularization of Natural History – Museums, Zoos

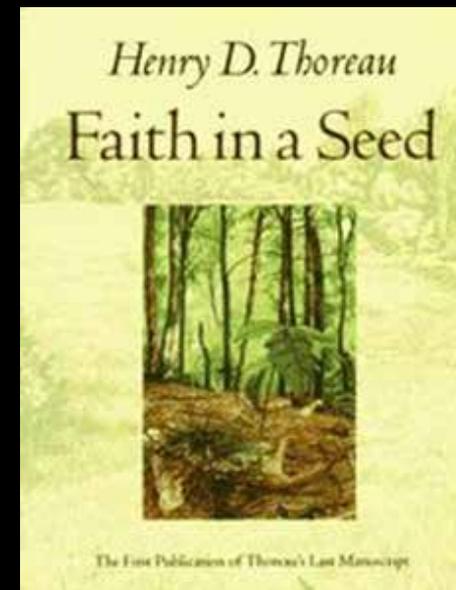


Professional Knowledge

- Emergence of American Professional Naturalists
- Natural History and Commerce
- Acclimatization and Botanical Gardens

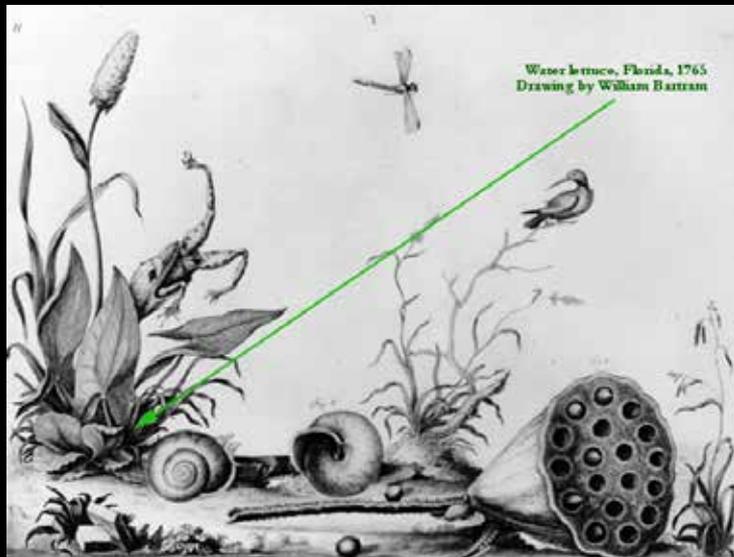
Artists Naturalists

- Visual Artist as Naturalist – Catesby, Bartram, Wilson, Audubon
- Literary Naturalists – Thoreau to Burroughs



Documenting American Natural History

Artist Naturalists



European Naturalists in North America

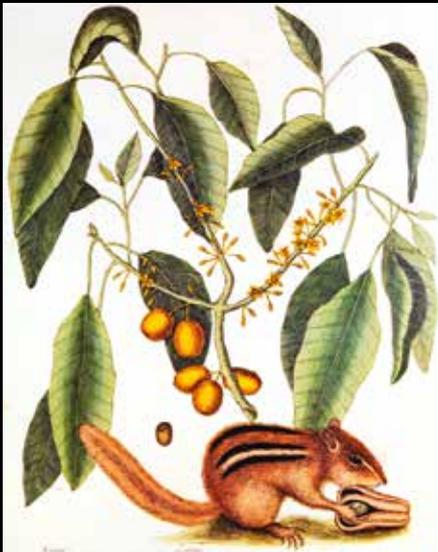
Mark Catesby 1683-1749 English Naturalist

Natural History of Carolina, Florida, and the Bahama Islands (1732-43)

In February 1722, Catesby set sail to South Carolina. His sojourn in the New World was taken under the auspices of London's Royal Society.

Catesby spent the next four years exploring the southeast colonies and the Bahamas, and the subsequent 20 years writing and illustrating his exhaustive two-volume *Natural History of Carolina, Florida and The Bahama Islands*.

He depicted live specimens in their natural habitats, and made special study of both migration and extinction.



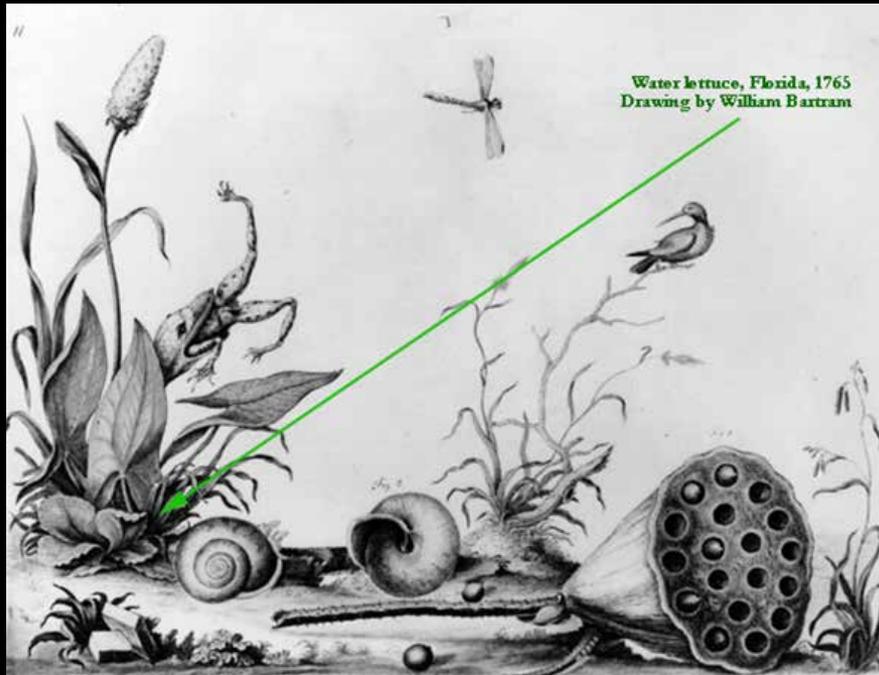
American Naturalists

William Bartram 1739-1823

From 1773-77, William Bartram (1739-1823) explored the American Southeast to record the region's plants, animals, and Indian peoples.

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

Experts disagree as to whether or not Water lettuce is native to the U.S.



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.

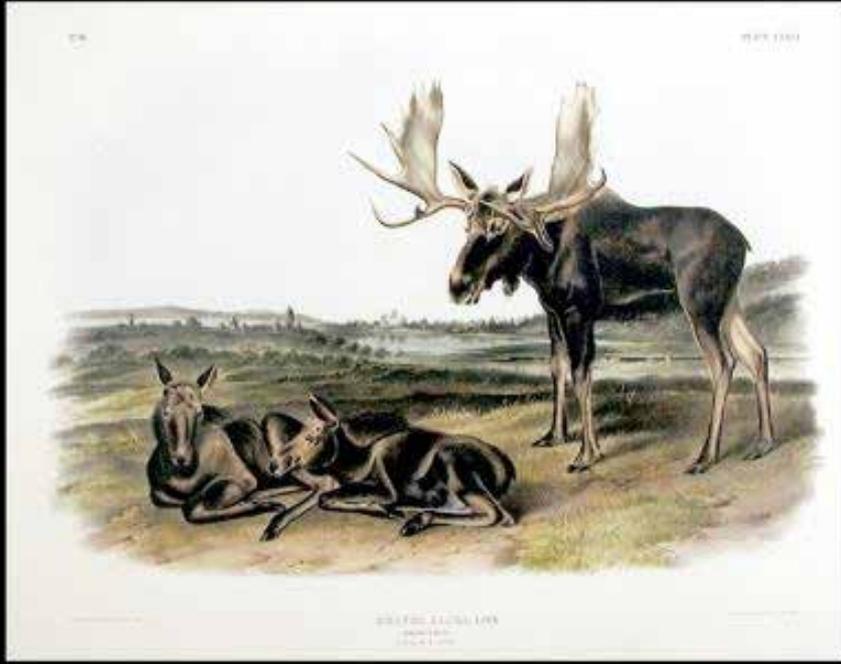
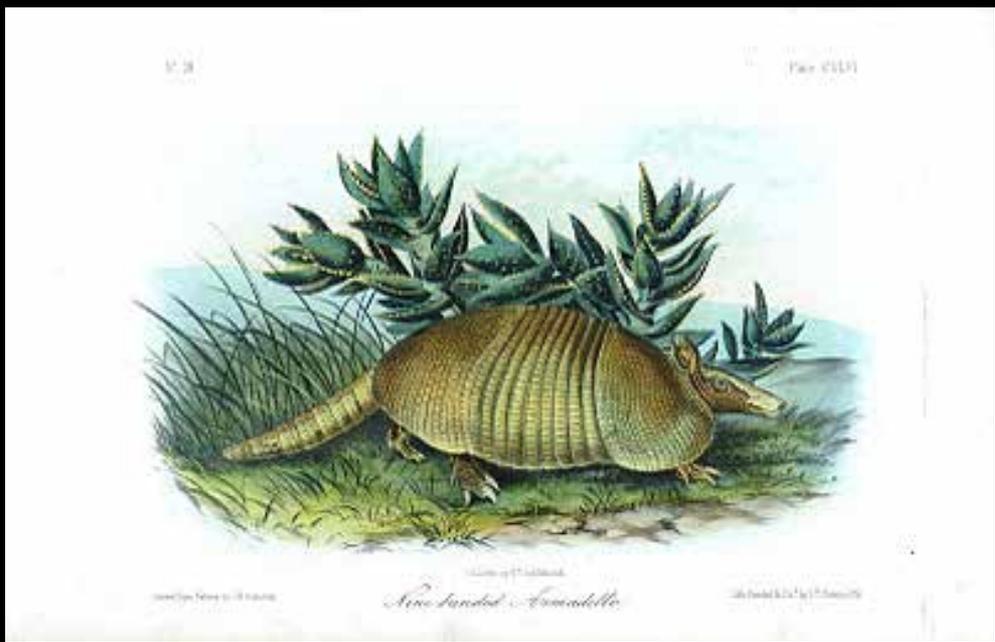


Viviparous Quadrupeds (Mammals) of North America 1845-48

Following the success of his *Birds of America*, Audubon began to gather material for an equally ambitious project to document the animal life of North America - *Viviparous Quadrupeds of North America* (literally meaning live young bearing four-footed animals).

He envisioned *Viviparous Quadrupeds* as the definitive record of all North American mammals.

By 1846 Audubon's health was failing and his son, John Woodhouse, made substantial artistic contributions, eventually completing half the plates for *Quadrupeds*. Another son, Victor, served as editor.



American Natural History and Natural Theology

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

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

Cotton Mather 1663 – 1728

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

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

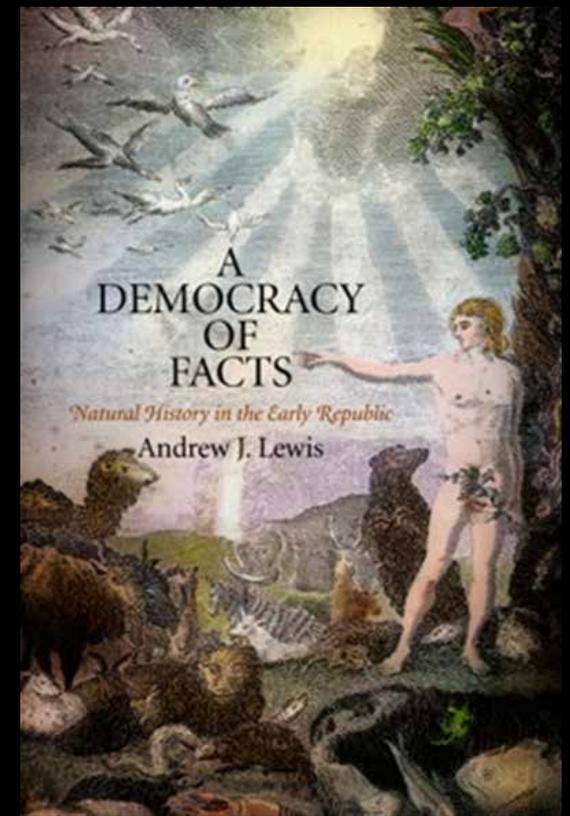
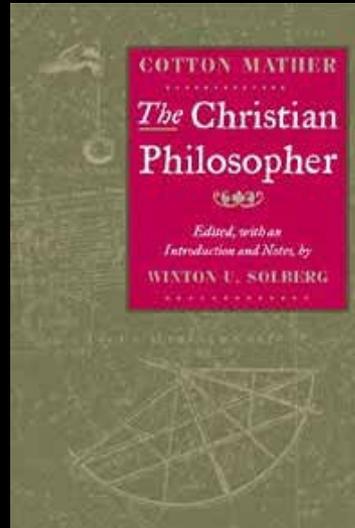


Image from
Natural History of the Bible
Thaddeus Mason Harris
1793

American Natural History "Science and Sentiment"

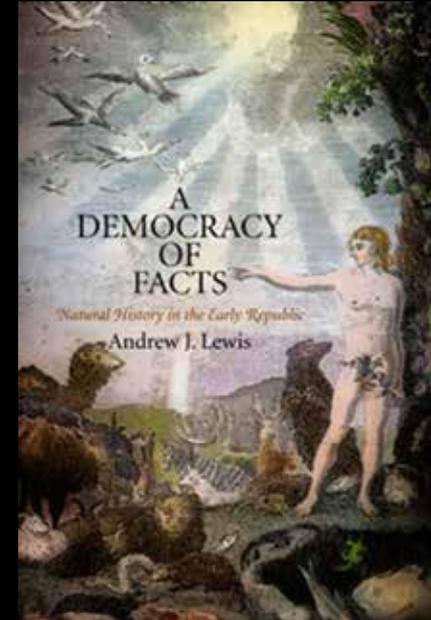
Natural History and Nation Building

"American naturalists initially advertised for and welcomed the participation of their fellow citizens.

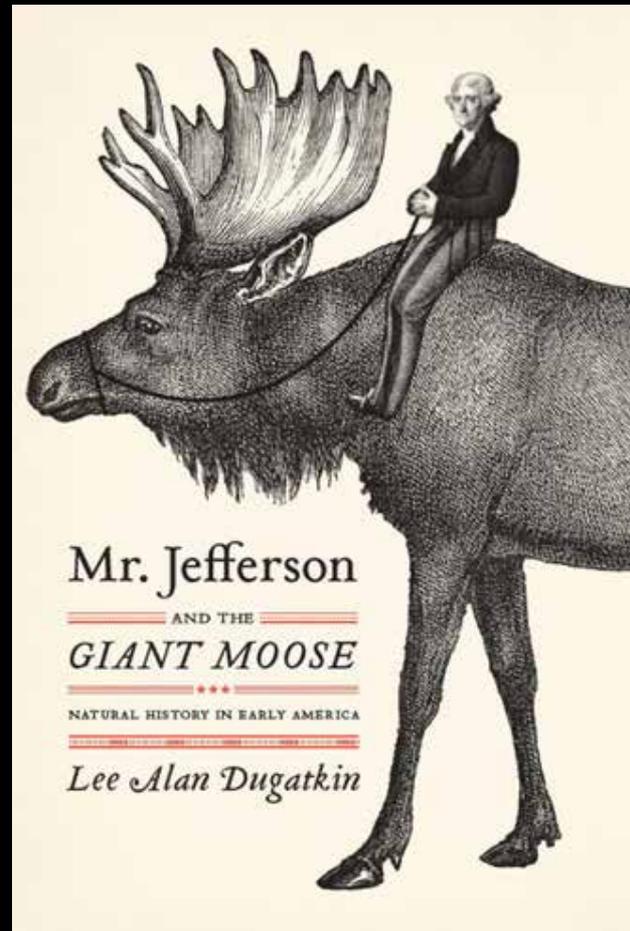
Natural history, they urged, was a tool to investigate, to catalogue, to explore, and, ultimately, to know the new nation. It was a method and means for a new citizenry to take ownership of a new nation...

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 Theory of Degeneracy and Jefferson's Moose



Comte de Buffon 1707–1788

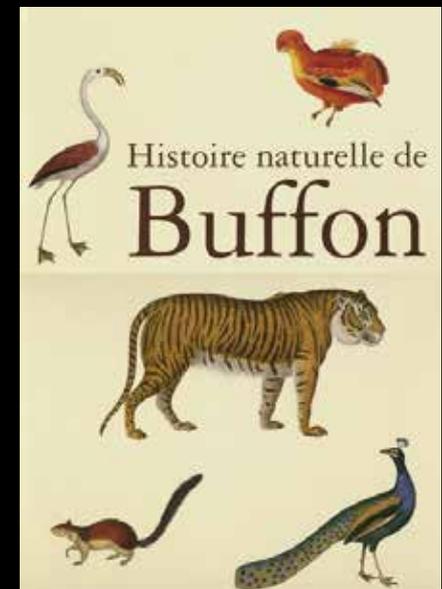
Theory of Degeneracy

“In his massive encyclopedia of natural history, Buffon laid out what came to be called the theory of degeneracy.

He argues that, as a result of living in a cold and wet climate, all species found in America were weak and feeble. What's more, any species imported into America for economic reasons would soon succumb to its new environment and produce lines of puny, feeble offspring.

America, Buffon told his readers, is a land of swamps, where life putrefies and rots. “

Dugatkin, 2009



The Theory of American Degeneracy (Environmental Determinism)

"There was no escaping the pernicious effects of the American environment - not even for Native Americans. They too were degenerate. For Buffon, Indians were stupid, lazy savages.

In a particularly emasculating swipe, he suggested that the genitalia of Indian males were small and withered - degenerate - for the very same reason that the people were stupid and lazy.

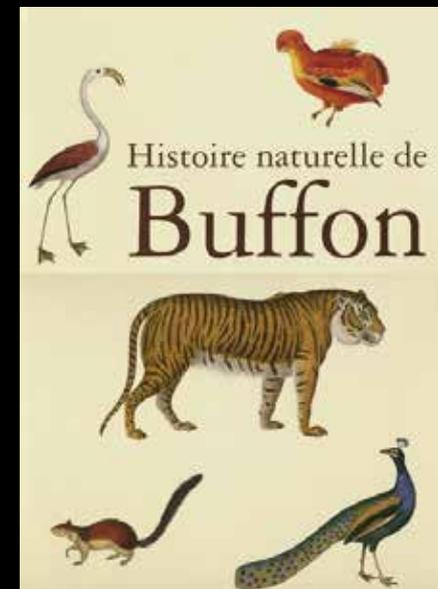
The environment and natural history had never before been used to make such sweeping claims, essentially damning an entire continent in the name of science.

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.

These ideas became mainstream enough that Raynal felt comfortable sponsoring a contest in France on whether the discovery of America had been beneficial or harmful to the human race."

Dugatkin, 2009



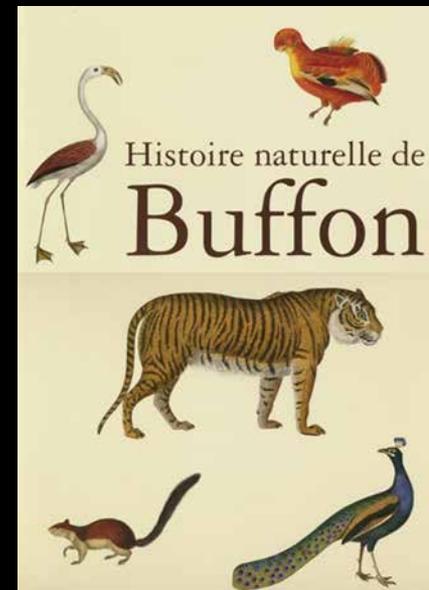
The Theory of American Degeneracy

Kant – the climate in America produced a race “too weak for hard work, too indifferent to pursue anything, incapable of culture” (1788)

Hegel – “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.” (1816)

Keats – *Lines to Fanny* (1819)

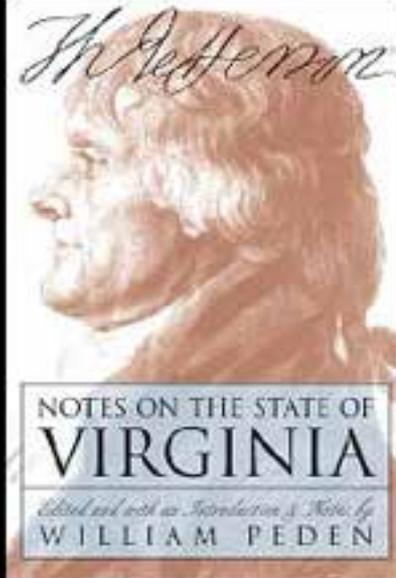
Where shall I learn to get my peace again?
To banish thoughts of that most hateful land,
Dungeoner of my friends, that wicked strand
Where they were wreck'd and live a wrecked life;
That monstrous region, whose dull rivers pour
Ever from their sordid urns unto the shore,
Unown'd of any weedy-haired gods;
Whose winds, all zephyrless, hold scourging rods,
Iced in the great lakes, to afflict mankind;
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.



Jefferson's Moose and Refuting the Degeneracy Theory

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

I. Aborigines of both.		II. Aborigines of one only.		III. Domestic animals, their	
Europe	America	Europe	America	Europe	America
Mammoth		Sauvages Wildboar	280	Fox	53
Beaver	100	Mouflon Wildsheep	56	Elk	1250
White bear	1000	Bouquetin Wildgoat		Puma	120
Cambou	100	Licorne	7.6	Sauvages	210
Beaver	153.7	Lapin	3.4	Caribou	109
Elk	1000	Putorius	3.8	Tamandua	65.4
Red deer	200.0	Genette	3.1	Coyote of N. America	75.0
Fallow deer	167.0	Desman	1.0	Coyote of S. America	59.1
Wolf	69.8	Sciurus	0.7	Deer	100
Beaver	58.7	Humulus	0.2		

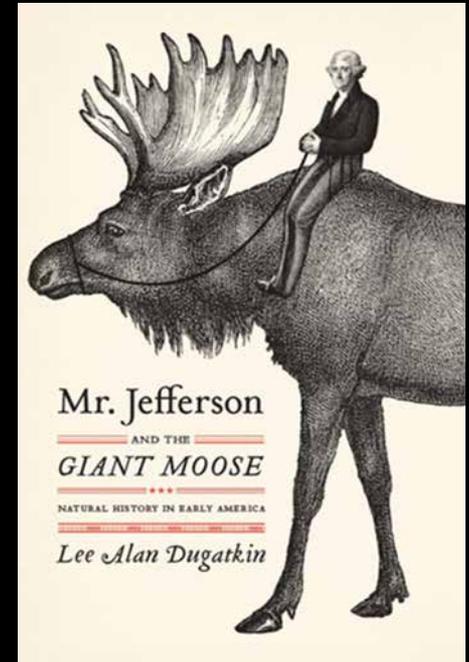
place these three tables successively one after another & not side by side.

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



The Theory of Degeneracy and the Myth of American Nature

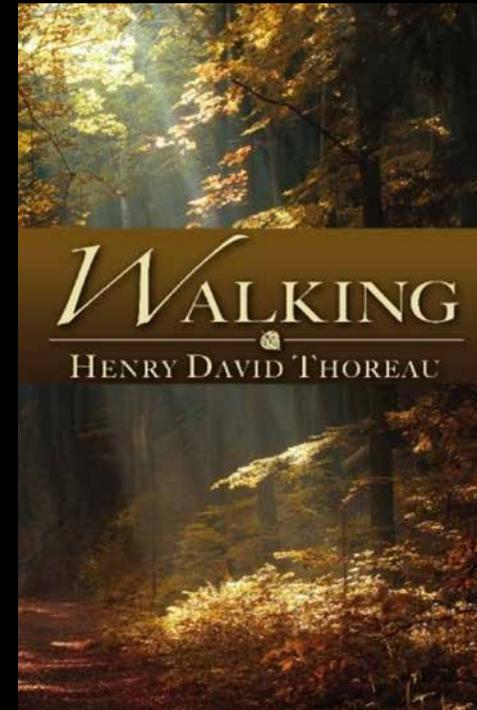
Henry David Thoreau, "Walking" (1862)

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

'We go eastward to realize history, and study the works of art and literature, retracing the steps of the race, — we go westward as into the future, with a spirit of enterprise and adventure. The Atlantic is a Lethean stream, in our passage over which we have had an opportunity to forget the old world and its institutions.'

"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.



Literary Natural History and Myth Making

The Wild and The Wilderness and The Swamp

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. Every tree sends its fibres forth in search of the Wild. The cities import it at any price. Men plow and sail for it. From the forest and wilderness come the tonics and barks which brace mankind.

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...

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.



Thoreau the Amateur Naturalist and Swamps

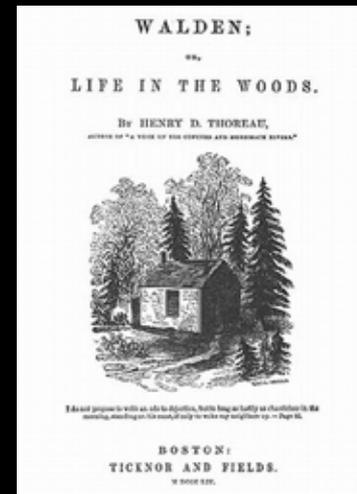
I remember gazing with interest at the swamps about those days and wondering if I could ever attain to such familiarity with plants that I should know the species of every twig and leaf in them...Though I knew most of the flowers, and there were not in any particular swamp more than half a dozen shrubs 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)



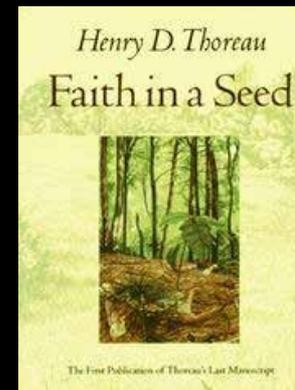
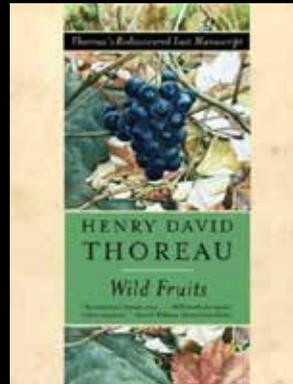
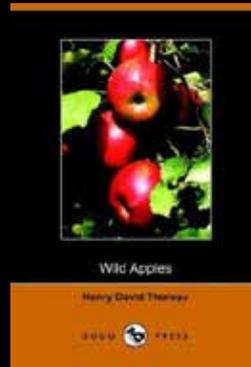
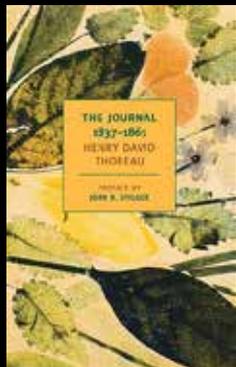
When Thoreau attended Harvard (1833-37) botany was not offered as a course in itself, but was included under natural history taught by the noted entomologist Thaddeus W. Harris.

The arrival in 1846 of naturalist Louis Agassiz at Harvard, and the publication in 1848 of Asa Gray's Manual of Botany helped to encourage Thoreau's interest in botany.

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.



Published 1854



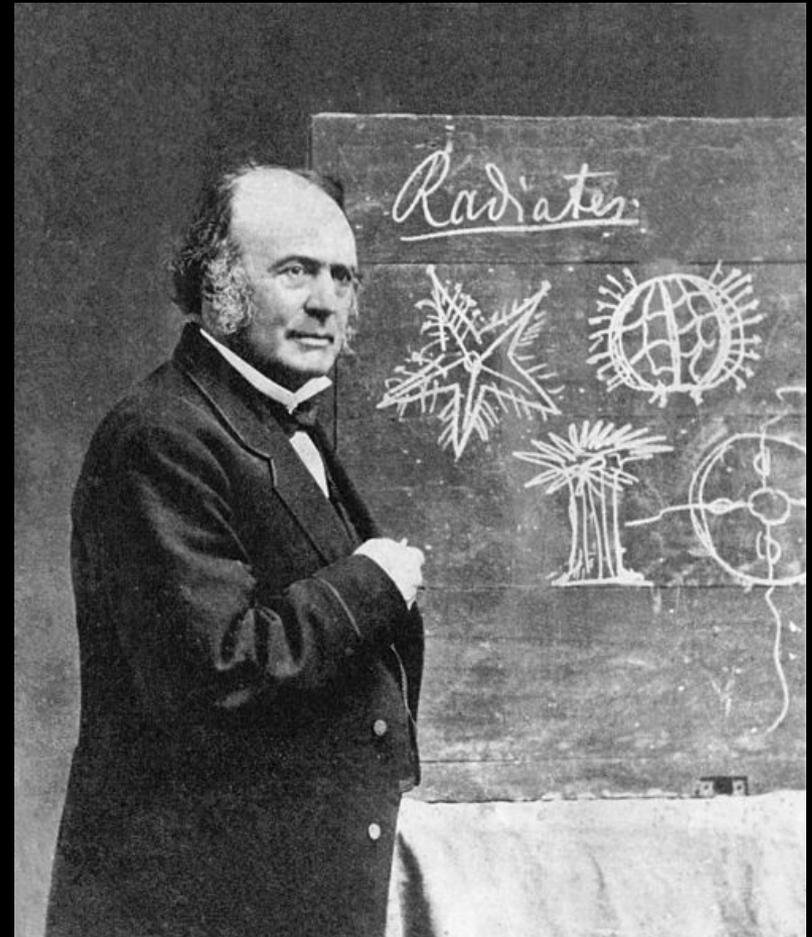
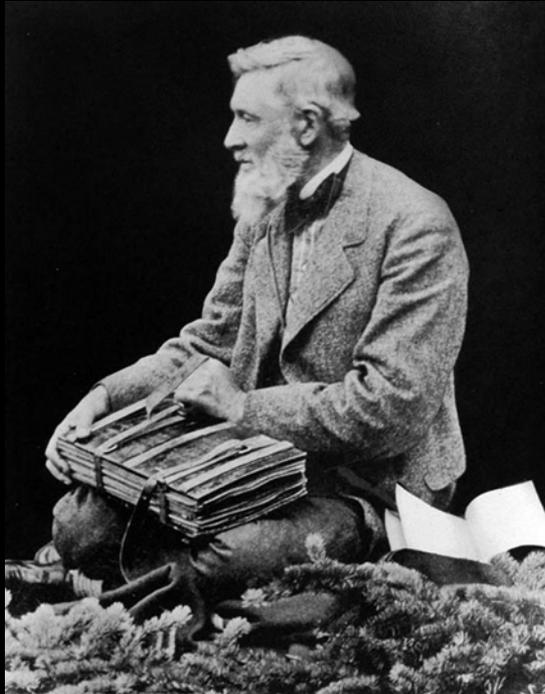
Emergence of American Professional Naturalists

Harvard University - Asa Gray –Louis Agassiz

Politics of Natural History

Local Knowledge vs. Professional Knowledge

- “Amalgam of Science and Sentiment”



Asa Gray
(1810 – 1888)

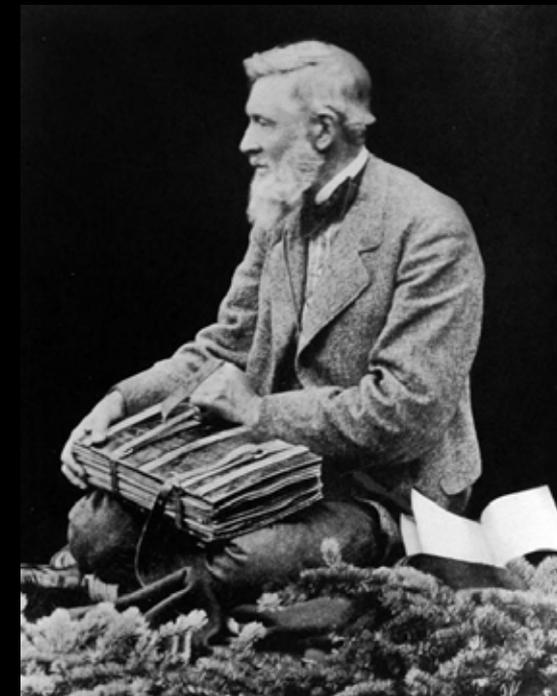
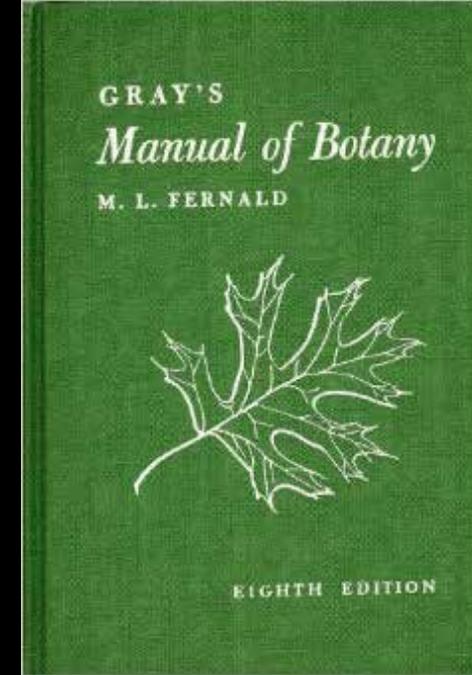
He was instrumental in unifying the taxonomic knowledge of the plants of North America.

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

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

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

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



Professionalism and American Natural History

Louis Agassiz 1807 - 1873

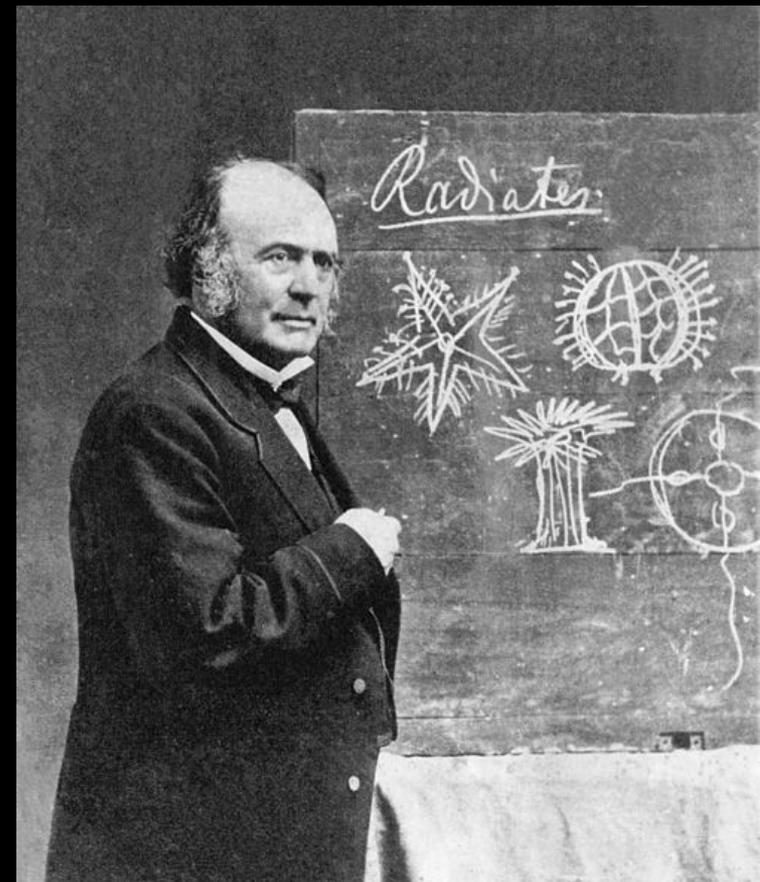
He grew up in Switzerland and became a professor of natural history at University of Neuchâtel. In 1848 he accepted a professorship at Harvard.

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

Natural Theology

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

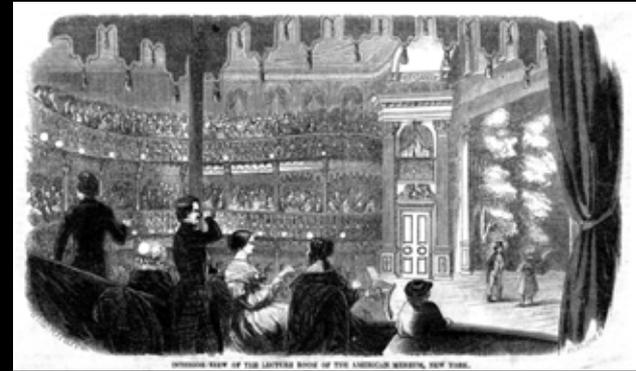
His philosophy of nature, aiming to understand the Divine Plan, is the last great expression of the old school of natural theology, started by men like John Ray almost two hundred years before.



Museums and Natural History

Popularizing American Natural History

Harvard University Museum of Comparative Zoology, which opened its doors in 1860.



P.T. Barnum opens "Barnum's Great American Museum" in New York 1841. It burns down in 1868.

American Museum of Natural History in New York 1868
Their *American Museum Journal* [later *Natural History*] first published 1900

Natural history museums by 1900

Germany 150

Great Britain 250

France 300

The United States 250



Museum displays in naturalistic settings

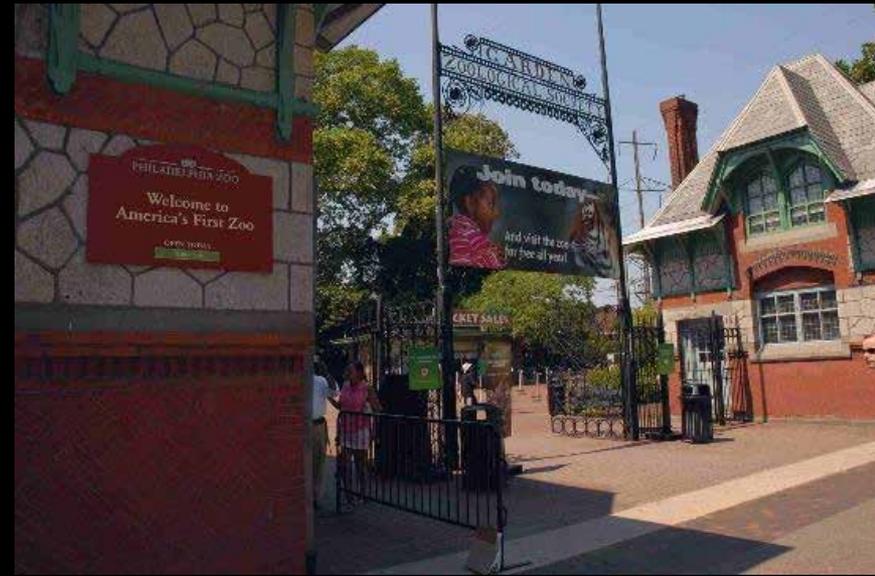


Gardens and Zoos Popularizing Natural History

The Philadelphia Zoo established as the Zoological Society of Philadelphia 1859. Due to the Civil War, however, it was another 15 years before America's first zoo was ready to open. The Zoo opened its gates on July 1, 1874.

The National Zoo in Washington was created by an Act of Congress in 1889

New York Zoological Society Park [the Bronx Zoo] 1899



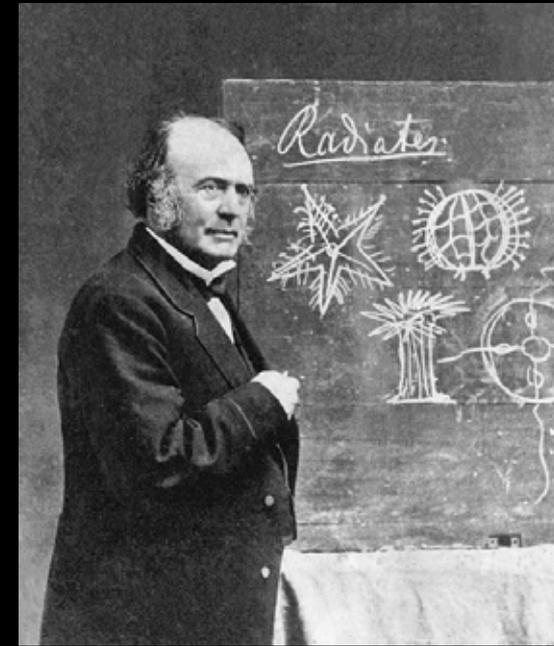
New York Botanical Garden 1891

Professionalism and American Natural History

Education and Nature Study - Agassiz "Study Nature, not Books"

In early 1873, Agassiz persuaded businessman John Anderson to give him Penikese Island, a 75-acre island off the coast of Massachusetts, as a site for a school to teach the study of natural history where students would study nature instead of books.

The school opened in July 1873, initially headed by Louis Agassiz. Following his death in December 1873, his son Alexander Agassiz ran the school. The school was closed following a fire in 1875, but some of the former students opened in 1888 the Marine Biological Laboratory, in nearby Woods Hole.

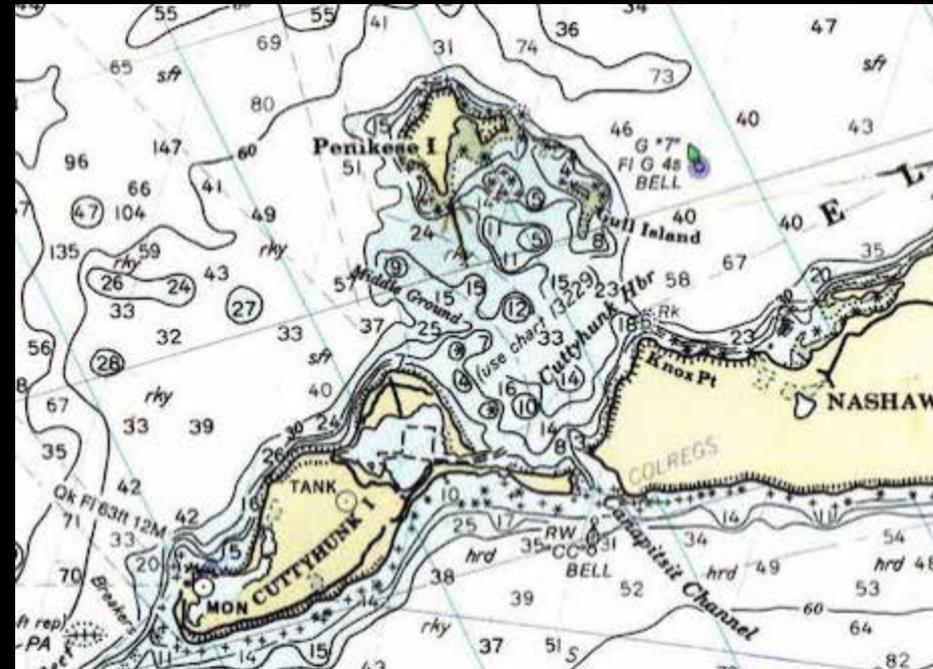


The Prayer of Agassiz

John Greenleaf Whittier (1807–1892)

On the isle of Penikese,
Ringed about by sapphire seas,
Fanned by breezes salt and cool,
Stood the Master with his school.

Said the Master to the youth:
"We have come in search of truth,
Trying with uncertain key
Door by door of mystery;
We are reaching, through His laws,
To the garment-hem of Cause..."



Natural History and Society

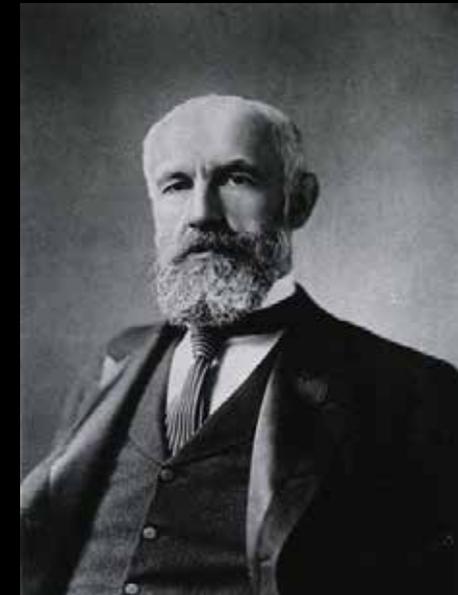
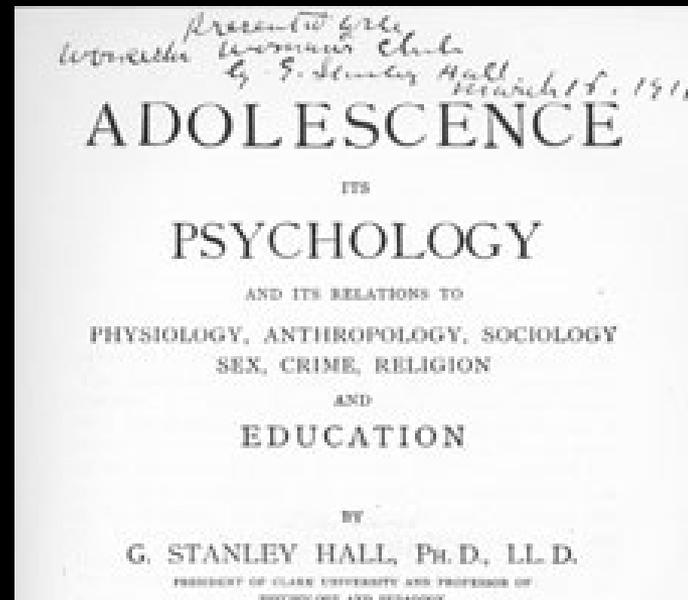
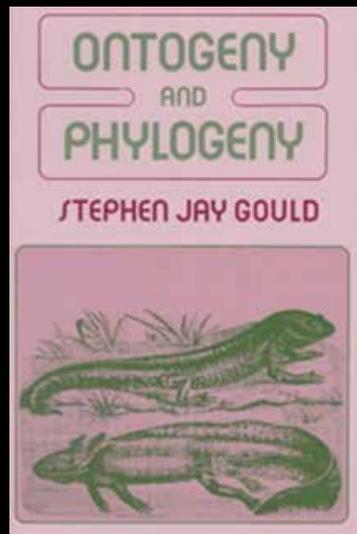
Genetic Psychology and Mental Development

G. Stanley Hall 1844-1924 His interests focused on childhood development and evolutionary theory. Hall was the first president of the American Psychological Association

Supporter of Haeckel's recapitulation theory of evolution, which held that the embryological development of an organism repeats its evolutionary history - "ontogeny recapitulates phylogeny"

Children must recapitulate human development from primitive rural stages to complex urban life. Denial of this process in cities bred social immaturity, crime, and chaos.

Educators need to "perpetually incite" children to explore " field, forest, hill, shore, the water, flowers, animals, the true homes of childhood in this wild, undomesticated state from which modern conditions have kidnapped and transported him."

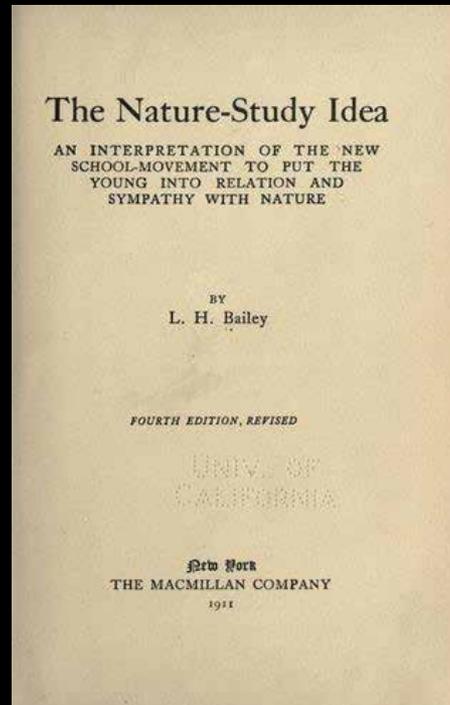
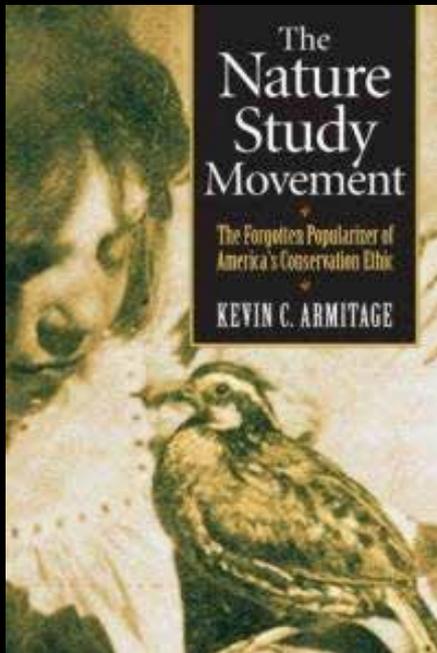


The Nature Study Movement – Agassiz “Study Nature, not Books”

Liberty Hyde Bailey (1858-1954) The Nature-Study Idea (1903) “we must live closer to nature and we must perforce begin with the child”

Anna Comstock defined the idea extensively in her book, Handbook of Nature Study (1911) “Nature Study is for the comprehension of the Individual life of the bird, insect or plant that is nearest at hand.”

“the nature study movement...reflected the scientific aspirations as well as the spiritual longings of the professional middle class. Just as nature came to invoke scientific modernity, it also connoted the cultural opposite of modernity: a place of primitive and authentic spiritual an aesthetic refuge, a place both physically and psychically disassociated from industrial life.” Armitage 2009



Birds and Nature Study – Good Birds and Bad Birds “Amalgam of Science and Sentiment”

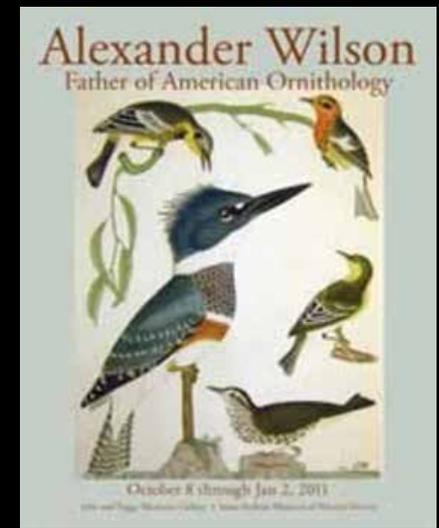
Ornithologist’s Union 1883 – checklist and official names

National Association of Audubon Societies 1886 - George Bird Grinnell (1848-1938)

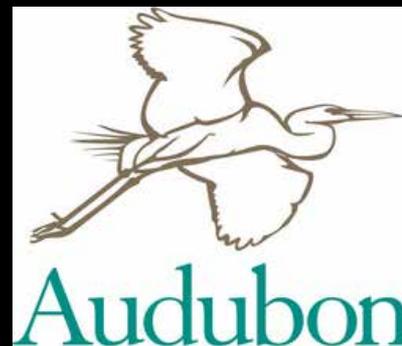
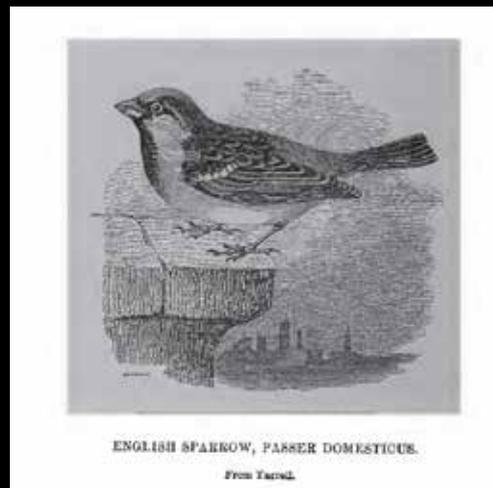
- Junior Audubon Clubs in schools 1911 [205,138 junior members 1916]

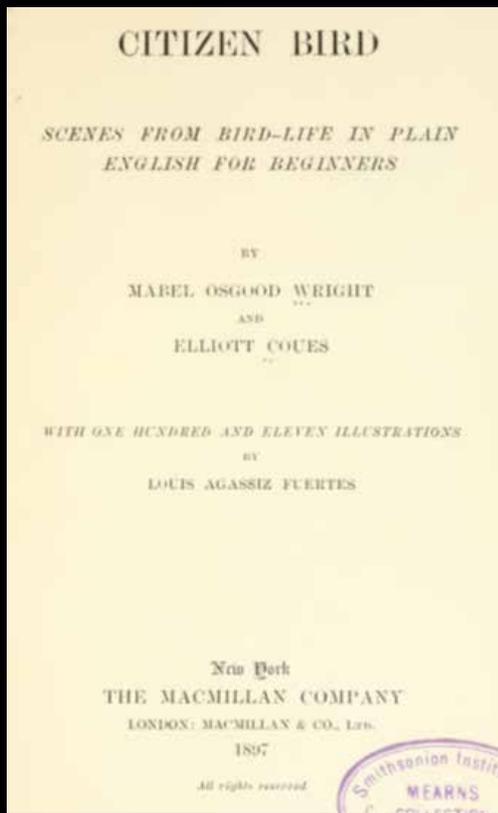
In 1889, the U.S. Bureau of Biological Survey devoted its first bulletin entirely to “The English Sparrow in North America” and compiler Walter Barrows concluded that these foreigners were “a curse of such virulence” that they should be systematically and completely destroyed.

Furthermore, it should be a crime to kill the shrike, sparrow hawk, screech owls, bluejays, or grackles, since they eat English sparrows.

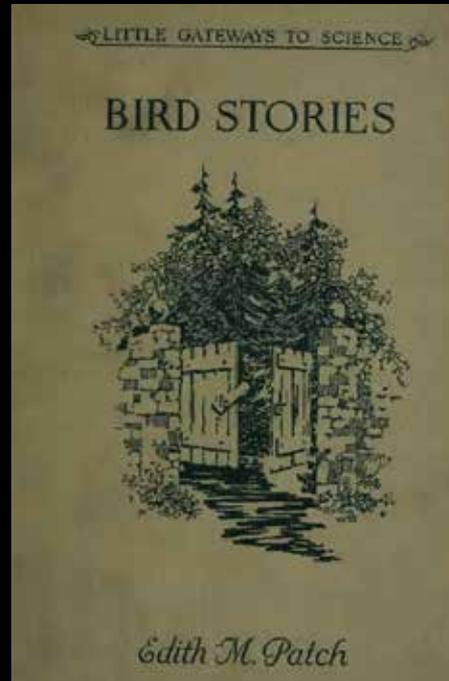


Died 1813





Citizen Bird (1897) About city children learning scientific terminology on an abandoned farm in New England



Bird Stories (1921) Christian ornithology as introductory science. For city children to learn to learn scientific observation and touching parables of virtues



Literary Natural History

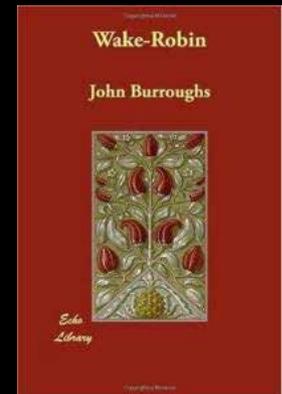
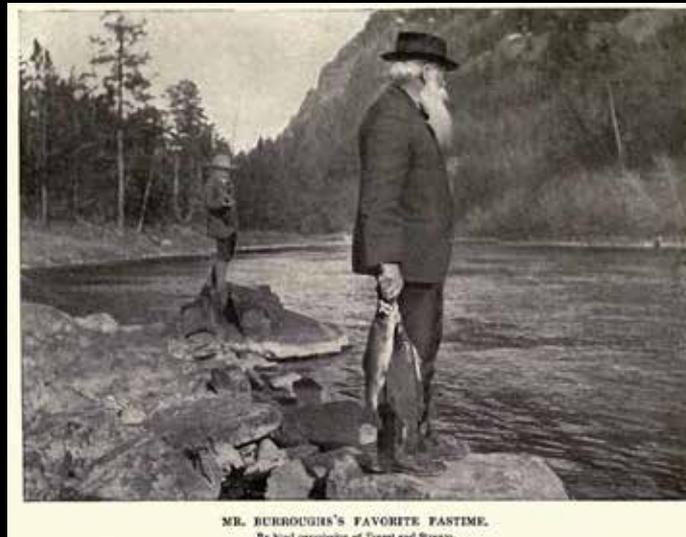
John Burroughs (1837 – 1921)



He was born on the family farm in the Catskill Mountains, near Roxbury, New York and lived all his life in the Catskills. He published his first essay in *Atlantic Monthly* in 1860.

During the Civil War, Burroughs met Whitman in Washington DC, and the two became close friends. In 1867, Burroughs published *Notes on Walt Whitman as Poet and Person*, the first biography and critical work on the poet. Four years later, Burroughs's published his first collection of nature essays *Wake-Robin*.

Burroughs accompanied many personalities of the time in his later years, including Theodore Roosevelt, John Muir, Henry Ford, Harvey Firestone, and Thomas Edison.

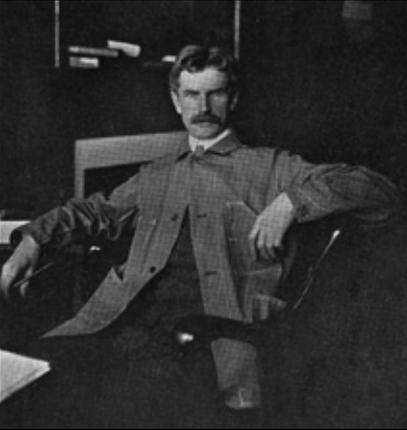




The Nature Fakers Controversy 1903-1907 "Amalgam of Science and Sentiment"

The nature essay, and particularly stories about animals, had become enormously popular in the early 20th century, but Burroughs felt that many of the writers had very little direct experience of nature and simply pretended that the animals are just like us.

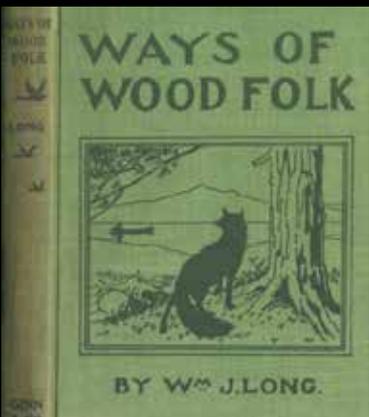
This new genre emphasized sympathetic and individualistic animal characters.



Burroughs's main objection to these nature writers was that, despite claims of veracity on the part of the authors, the natural history portrayed was not in line with the facts.

William Joseph Long (1857–1952) *Ways of Wood Folk* (1899)

Burroughs concluded that "Mr. Long's book reads like that of a man who has really never been to the woods, but who sits in his study and cooks up these yarns from things he has read in *Forest and Stream*, or in other sporting journals. Of real observation there is hardly a vestige in his book; of deliberate trifling with natural history there is no end"





The Nature Fakers Controversy 1903-1907

Ernest Thompson Seton (1860 – 1946) Seton was an early pioneer of the modern school of animal fiction writing, his most popular work being *Wild Animals I Have Known* (1898)

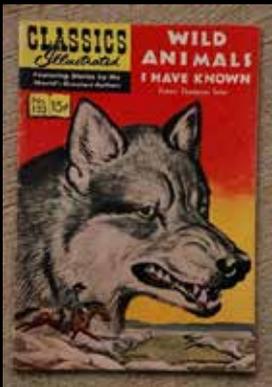
“Redruff: The Story of the Don Valley Partridge” –

“Down the wooded slope of Taylor's Hill the Mother Partridge led her brood; down toward the crystal brook that by some strange whim was called Mud Creek. Her little ones were one day old but already quick on foot, and she was taking them for the first time to drink...”

“[The] line between fact and fiction is repeatedly crossed and... a deliberate attempt is made to induce the reader to cross too... Mr. Thompson Seton says in capital letters that his stories are true and it is this emphatic assertion that makes the judicious grieve.” - John Burroughs on Ernest Thompson Seton's *Wild Animals I Have Known*, in "Real and Sham Natural History,"

When President Theodore Roosevelt came to Burroughs' defense in his article “Nature Fakers,” the debate subsided.

Seton met Scouting's founder, Lord Baden-Powell, in 1906. Baden-Powell had read Seton's book, *The Birch Bark Roll of the Woodcraft Indians*, and was greatly intrigued by it. The pair met and shared ideas. Baden-Powell went on to found the Scouting movement worldwide, and Seton became vital in the foundation of the Boy Scouts of America and was its first Chief Scout.



NATURAL HISTORY NETWORK

Natural History—exploring the stories of nature by attending to and representing the natural world. This practice, focused from the organism to the landscape, is the link between our species and the rest of the world. Promoting natural history is our mission and our passion.

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► Star-Star by Emily Eng
Emily M. Eng is a freelance artist and graduate from the Science Illustration Graduate Program at California State University, Monterey Bay. Prior to illustration, Emily worked across the country as a naturalist and outdoor educator, she also studied biology, environmental studies, studio art and religious studies as an undergrad. Emily's passion to make science accessible drives her illustrations today.
www.emilyeng.com

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Natural History Gatherings!!

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T E X A S

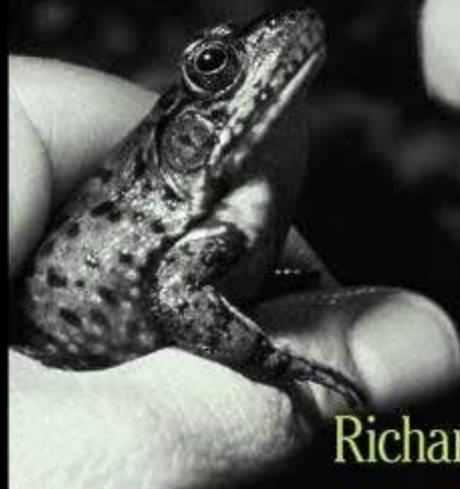
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Understanding whole organisms in context

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Literary - Cultural understanding shaped by ecological contexts



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

Raymond Williams, "Ideas of Nature"