



2022 CER Lunchtime Lectures  
Humboldt, Science, and The Geography of Nature





## 2022 CER Lunchtime Lectures - Humboldt, Science, and The Geography of Nature

### Western Culture and the Study of Nature

January – Natural Philosophy and the Study of Nature

February – Natural History and the Taxonomy of Nature

March – Ecological Imperialism and the Geography of Nature

April – Physical Geography and the Science of Nature



### Humboldt and the Science of Nature

May – The Science of Nature: Humboldt and the Empirical Earth

June – The Romance of Nature: Science, Imagination, and the Poets of Nature

July – The Invention of Modern Nature: The Earth as a “Natural Whole”

August – The Evolution of Nature: Humboldt, Darwin, and Biogeography

September – The Economy of Nature: Ecology, Culture, and Cosmos

### Humboldt and the Geography of Nature

October – The Great Disruptors: Physical Geography as Modified by Human Action

November – The Earth Managers: New Science and Environmental Change

December – The Anthropocene: Gaia and the Geography of Nature





## Humboldt and The Science of Nature

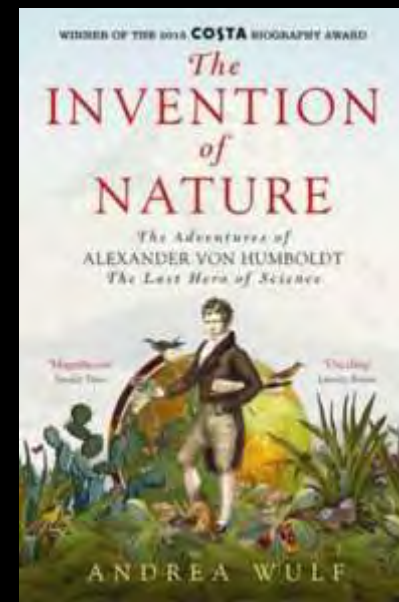
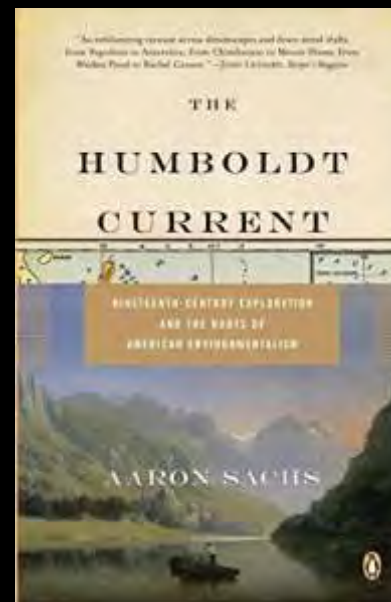
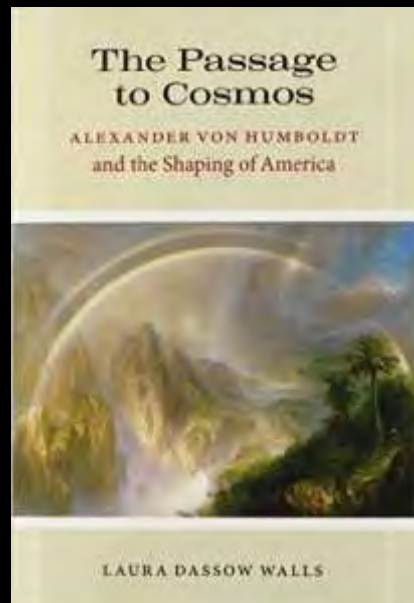
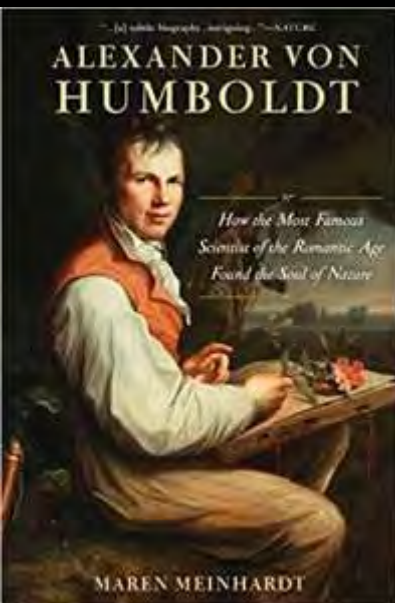
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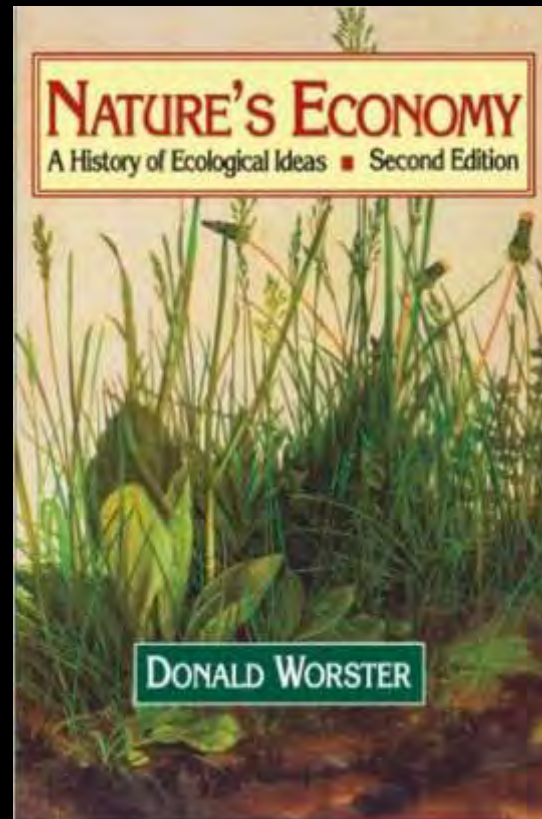
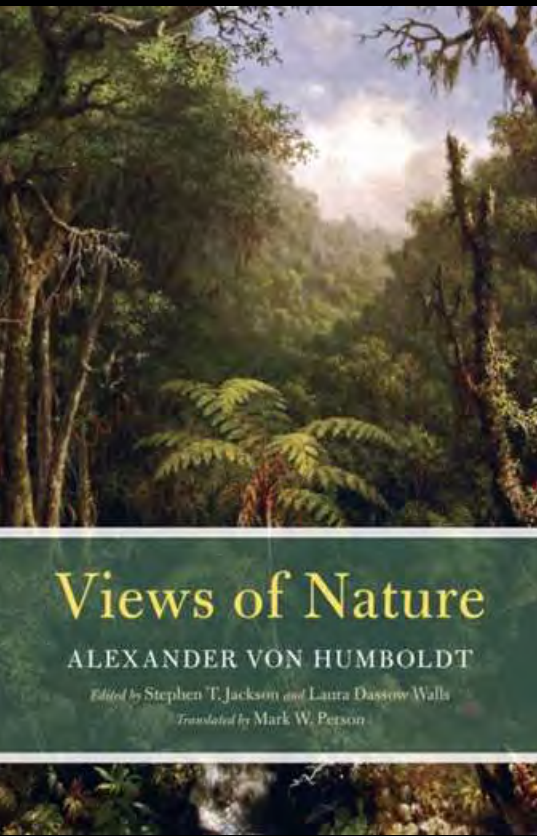
Center for  
Environmental  
Research at Hornsby Bend



## The Economy of Nature: Ecology, Culture, and Cosmos

Kevin M. Anderson Ph.D.

Austin Water Center for Environmental Research







- Alexander von Humboldt's American expedition 1799-1804**
- -- Expedition way
  - City / Stopping place
  - Spanish Viceroy's and United States
- I With the spanish corvette "Pizarro" from La Coruña over the Canary Islands to Cumaná
  - II 75-days journey with Bonpland, on the Orinoco and the Rio Negro
  - III With the ship from Nueva Barcelona to Havana, 3-month sojourn on Cuba, over Trinidad to Cartagena
  - IV Through today's Colombia, Ecuador and Peru to Lima
  - V From Guayaquil to Acapulco, longer sojourn in Mexico-City and back to Havana over Veracruz
  - VI With the cargo ship "Concepción" to Philadelphia, Washington, with the french Frigate "La Favorite" to Bordeaux

# Humboldt in the United States

May – July 1804

Arrives in Philadelphia and spends six weeks meeting and befriending political, cultural, and scientific leaders of the United States – most significantly, President Thomas Jefferson.





# Home to Europe 1804

Departs the US at the end of June and arrives back in France 1 August 1804.

Travels to Rome, Berlin, and settles in Napoleon's Paris in 1808 where he remains writing his books until 1826.





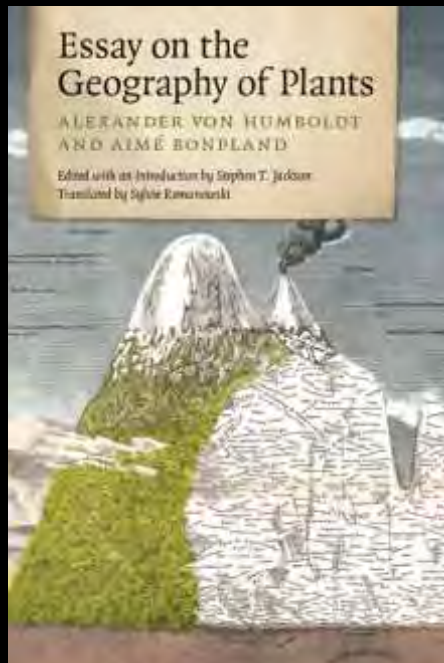
## The Economy of Nature: Ecology and Culture



PENGUIN CLASSICS

ALEXANDER VON HUMBOLDT

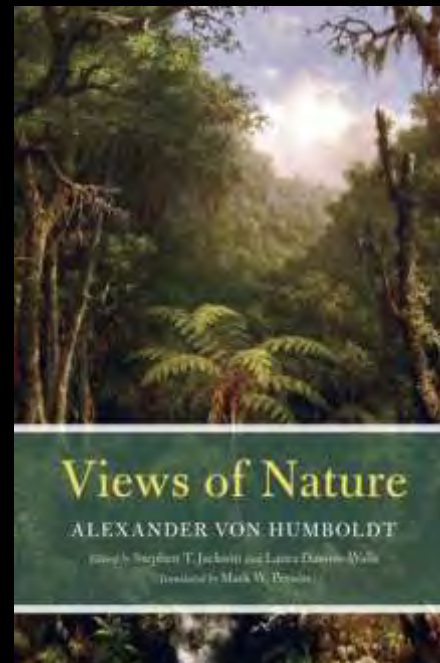
*Personal Narrative of a Journey to the  
Equinoctial Regions of the New Continent*



Essay on the  
Geography of Plants

ALEXANDER VON HUMBOLDT  
AND AIMÉ BONPLAND

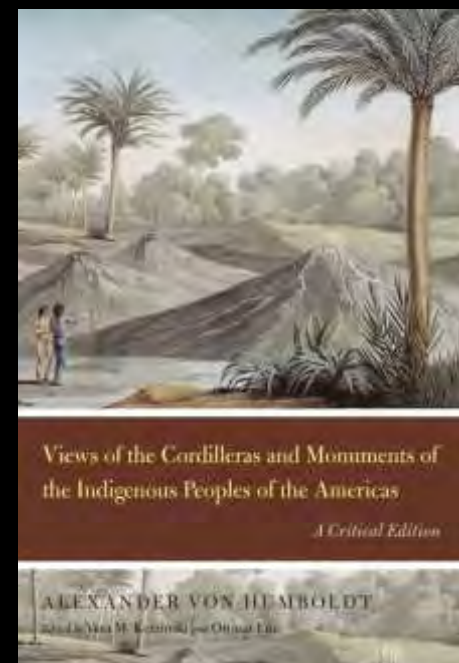
Edited with an Introduction by Stephen T. Jackson  
Translated by Sophie Karwowski



Views of Nature

ALEXANDER VON HUMBOLDT

Edited by Stephen T. Jackson and Laura E. Adams-Walks  
Translated by Mark W. Hayden



Views of the Cordilleras and Monuments of  
the Indigenous Peoples of the Americas

A Critical Edition

ALEXANDER VON HUMBOLDT

Edited by Mark W. Hayden (see Original Title)



# The Economy of Nature

## How does Nature work?

Carl Linnaeus 1707 – 1778

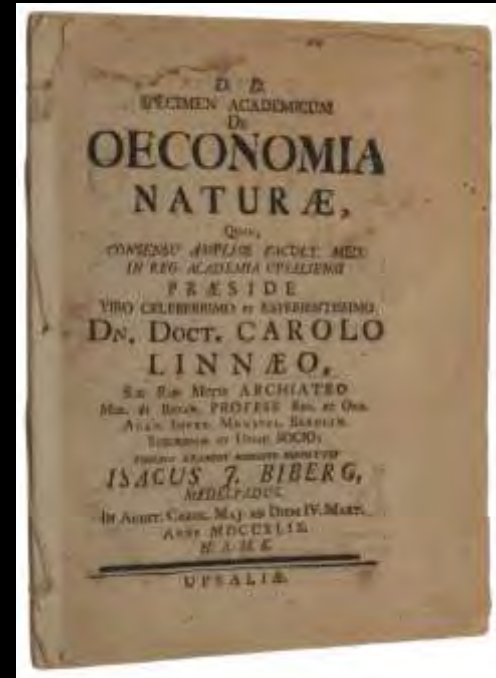
Swedish botanist and zoologist, who laid the foundations for the modern scheme of binomial nomenclature (*Genus species*).

In 1751 he publishes *The Economy of Nature* [*Oeconomia naturae*]

Linnaeus opened his *The Economy of Nature*, "We understand the all-wise disposition of the Creator in relation to natural things, by which they are fitted to produce general ends and reciprocal uses."

"an order of nature, that some animals should be, as it were, created only to be miserably butchered by others, it seems that his Providence not only aimed at sustaining, but also keeping a just proportion amongst all the species; and so prevent any one of them increasing too much, to the detriment of men, and other animals.

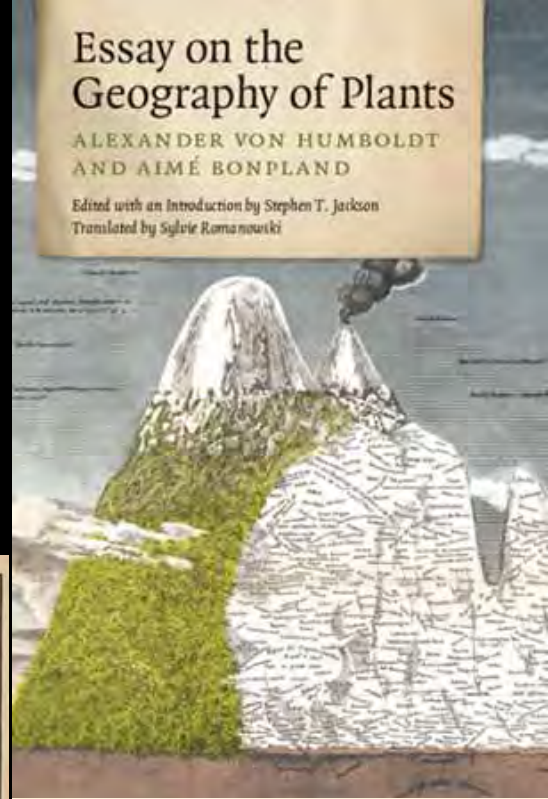
For if it be true, as it is most assuredly, that the surface of the earth can support only a certain number of inhabitants, they must all perish, if the same number were doubled or tripled."



# Humboldtian Science – Biogeography and Ecology

## *Essay on the Geography of Plants* 1807

- An ecological vision - Instead of placing plants in their taxonomic categories, he saw vegetation through the lens of climate and location – biogeography
- Dedicated to Goethe
- Show how Nature works – the Naturgemälde



*Geographie der Pflanzen in den Tropen-Ländern;  
ein Naturgemälde der Anden,*

*gegenüber auf Beobachtungen und Messungen, welche von 10° Grade nördlicher bis zum 10° Grade südlicher Breite angestellt worden sind, in den Jahren 1799 bis 1800.*

*VON ALEXANDER VON HUMBOLDT und A. G. BONPLAND.*



Abgebildet im Herbarien 4 8. 1799  
Gravé par F. Goussier, en allié de M. Bonpland; à Paris, le 10. jour du mois de  
Septembre 1811. — A la H. par M. Goussier, dans le mois de  
Mars, l'an de la République.



# Naturgemälde – Infographic Art and Science



*Geographie der Pflanzen in den Tropen-Ländern;  
ein Naturgemälde der Anden,*

*gegründet auf Beobachtungen und Messungen, welche vom 10<sup>ten</sup> Grade nördlicher bis zum 16<sup>ten</sup> Grade südlicher Breite angestellt worden sind, in den Jahren 1799 bis 1805.*

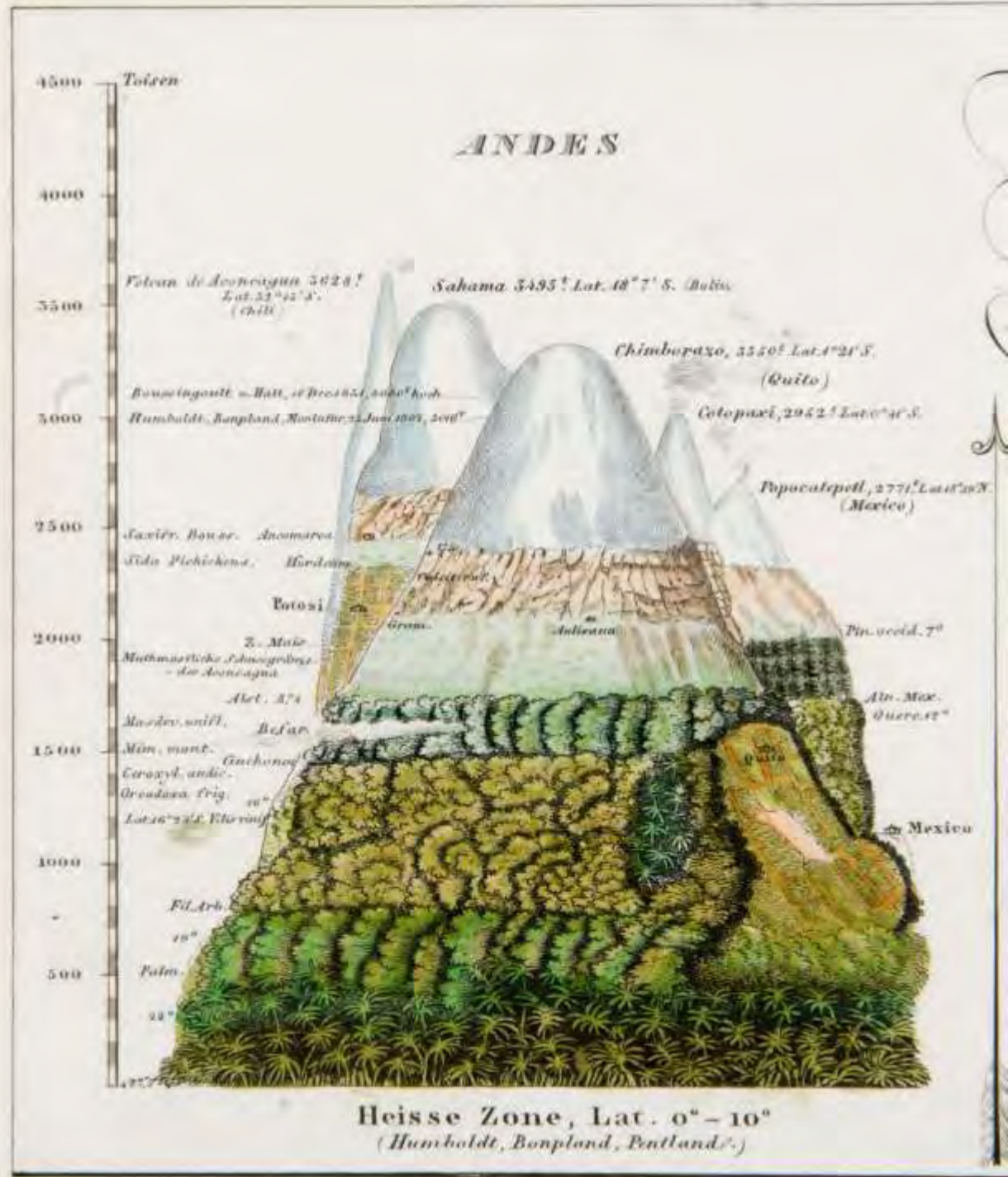
*von ALEXANDER VON HUMBOLDT mit A. G. BONPLAND.*

# Naturgemälde

## Infographic

This variety and richness, but also the simplicity of the scientific information depicted, was unprecedented.

Plants distributed according to their altitudes, ranging from subterranean mushroom species to the lichens that grew just below the snow line.





# Alexander and Goethe's Perspective on Nature Science, Perception, and Imagination (Ecology, Ecosystem)

## Unity of Nature (Humans are part of Nature)

“In the Amazon forests, as on the peaks of the Andes, I had the feeling that the same life infiltrates stones, plants and animals, as well as the swelling breast of humankind, as if animated by a single spirit from pole to pole. Everywhere I felt strongly how powerfully those relationships forged at Jena influence me now, and - thanks to Goethe's perspectives on Nature - I have acquired virtually new organs of perception”

Alexander, *Letter to Caroline von Wolzogen, Berlin, 1806*

## The Locality (Ecosystem)

“A naturalist only deserves respect if he can depict and present the most strange and most foreign things in their locality, with all their neighboring circumstances always in their own peculiar element.”

Goethe, *The Elective Affinities* 1809



# Perception and Imagination

## The Humboldts, Goethe, and Schiller – 1794

Wilhelm collaborated with Schiller and published on aesthetics in Schiller's journal *Die Horen*, a monthly German literary journal from 1795 to 1797

An introduction was arranged by Wilhelm, and in 1794 Goethe (45) Schiller (35) and Alexander (25) meet in Weimar...



Alexander (standing) with Schiller, Wilhelm, and Goethe





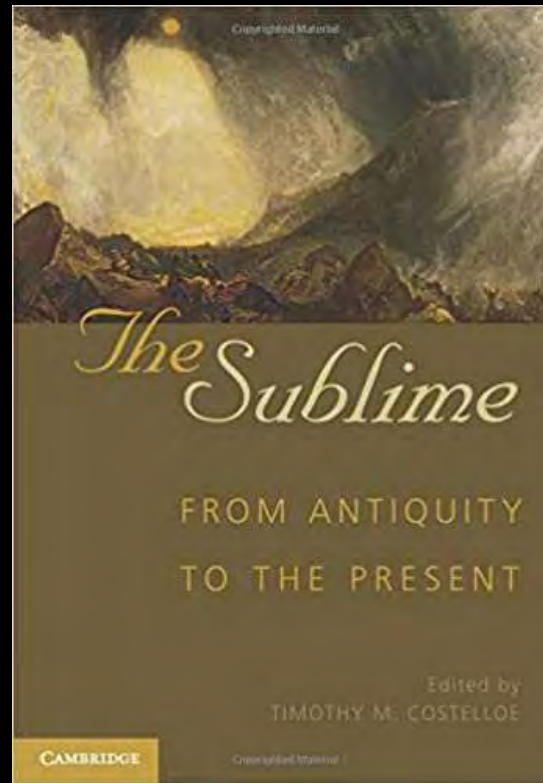
# Perception and Imagination

## The Sublime and the Beautiful

Friedrich Schiller (1759-1805)

Beautiful – “Delight consistent with reason”  
Sublime – Awe, Terror, overwhelm reason

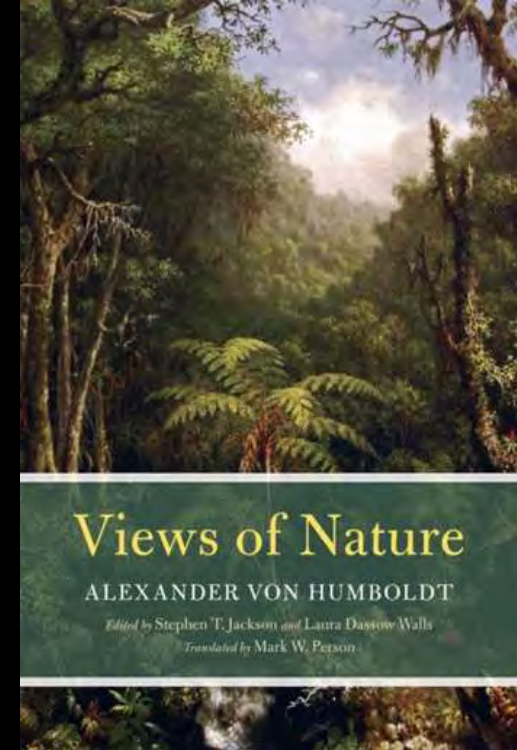
“Only if the sublime is married to the beautiful and our sensitivity to both has been shaped in equal measure, are we complete citizens of nature, without on that account being its slaves, and without squandering our citizenship in the intelligible world.”  
*Schiller Concerning the Sublime 1796*



# Perception and Imagination

## Humboldtian Science – *Views of Nature* 1808

- Ansichten der Natur – translated as “views” or “aspects” emphasis “active viewing”
- Dedicated to George Forster - *Views of the Lower Rhine, Brabant, Flanders* (1791–94)
- Seven views of nature – steppes, deserts, plant ecology, rivers, forests, volcanoes, human impacts in the Andes
- Science/Nature writing
- Each essay filled with extensive annotations
  - Hypertext
- Imagination – Chapter 7 - The Life Force, or The Rhodian Genius: A Tale





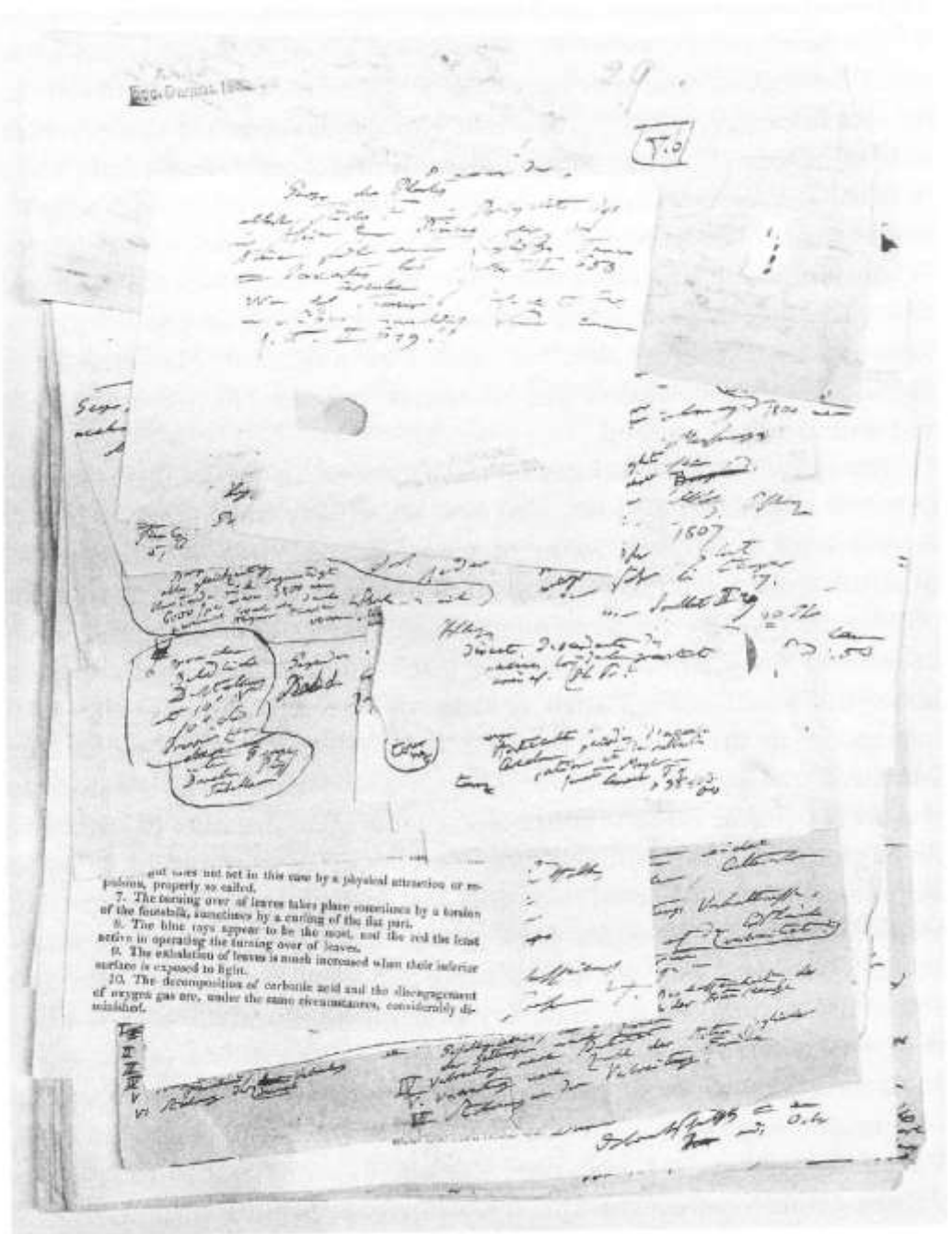
# Humboldt's Cosmos

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

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

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

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



Humboldt's lecture notes on plant geography

“I am going to press with my work, — the work of my life. The mad fancy has seized me of representing, in a single work, the whole material world, — all that is known to us of the phenomena of heavenly space and terrestrial life, from the nebulae of stars to the geographical distribution of mosses on granite rocks; and this in a work in which a lively style shall at once interest and charm. Each great and important principle, wherever it appears to lurk, is to be mentioned in connection with facts. . . .

My title at present is 'Kosmos; Outlines of a description of the physical World'. . . . I know that Kosmos is very grand, and not without a certain tinge of affectation; but the title contains a striking word, meaning both heaven and earth.”

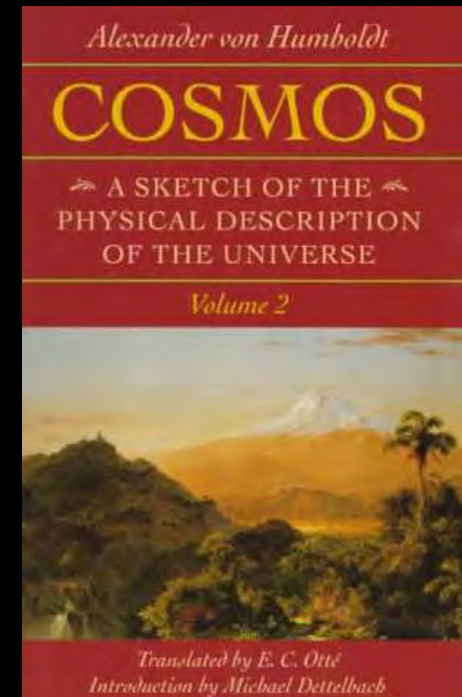
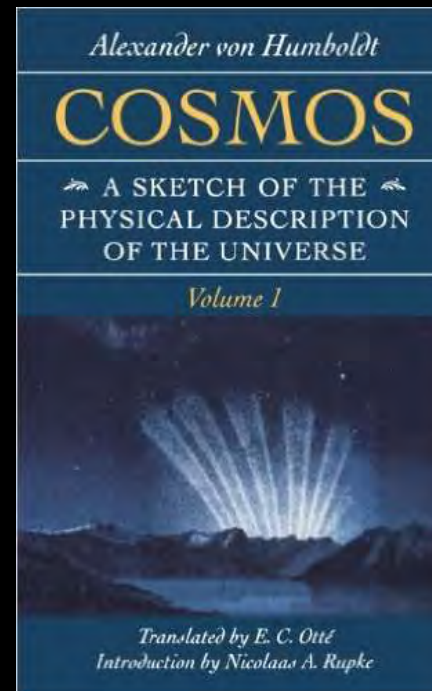
“Unity in diversity, and of connection, resemblance, and order, among created things most dissimilar in their form, one fair harmonious whole...” (Kosmos, 1845)





# *Cosmos: A Sketch of the Physical Description of the Universe*

- “the assemblage of all things in heaven and earth, the universality of created things constituting the perceptible world.” and “to show the simultaneous action and the connecting links of the forces that pervade the universe.”
- *Cosmos* was the scientific bestseller of the age - the first edition of the first volume sold out in two months in 1845
- Humboldt was 76 in 1845, the second volume published when he was 78, the third when he was 81, and the fourth when he was 89
- The fifth volume, however, was only half-written when Humboldt died in 1859

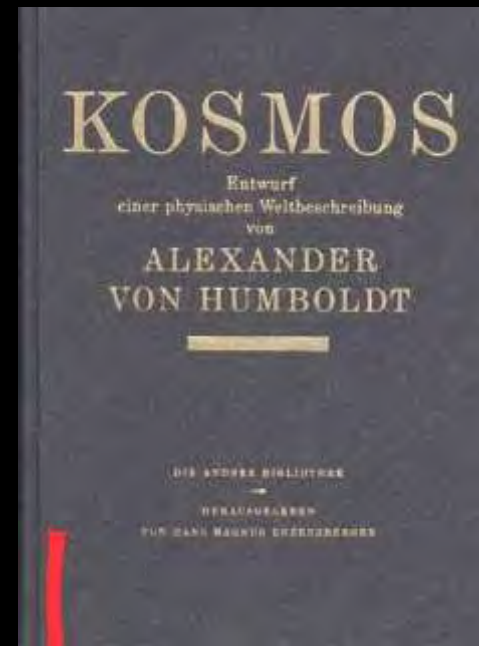


# Physical Cosmography (Cosmology)

## Imaginative Understanding and Science

### Humboldt's Cosmos "Order and Adornment"

- Physical Cosmography "the sublime consciousness of striving toward the infinite, of grasping all that is revealed to us amid the boundless and inexhaustible fullness of creation, development, and being."
- For Humboldt "cosmos" signifies both the "order of the world, and adornment of this universal order."
- Order refers to the observed fact that the physical universe, independently of humans, demonstrates regularities and patterns that we can define as laws.
- Adornment refers to human imaginative perception of beauty and wonder, which is also part of the universe. Beauty, "adornment," however, is perceptual, literally in the mind of the beholder.





## *Cosmos:*

### *A Sketch of the Physical Description of the Universe*

Humboldt's Plan (1845-1862)

- The first part – an outer or “objective” journey through the external world of the senses into space and back to Earth and into the interior of the Earth, then back to the living surface of the Earth.
  - “the assemblage of all things with which space is filled, from the remotest nebulae to the climatic distribution of those delicate tissues of vegetable matter which spread a variegated covering over the surface of our rocks.”
- The second part - an inner or “subjective” journey through mind, “the inner, reflected intellectual world.” an extended discourse chronicling the history of human attitudes toward nature, from the ancient Greeks to the modern era.
  - The second part together elements of history, philosophy, and religion in the service of a “poetic description of nature.”



# Humboldt's Influence on the United States

## Science, Politics, Art, and Culture

"An exhilarating carouse across dreamscapes and down mind shafts from Napoleon to Antarctica, from Chimborazo to Mount Shasta, from Walden Pond to Rachel Carson." —JOHN LEONARD, *Harper's Magazine*

### THE HUMBOLDT CURRENT

NINETEENTH-CENTURY EXPLORATION  
AND THE ROOTS OF  
AMERICAN ENVIRONMENTALISM

AARON SACHS



## The Passage to Cosmos

ALEXANDER VON HUMBOLDT  
and the Shaping of America



LAURA DASSOW WALLS

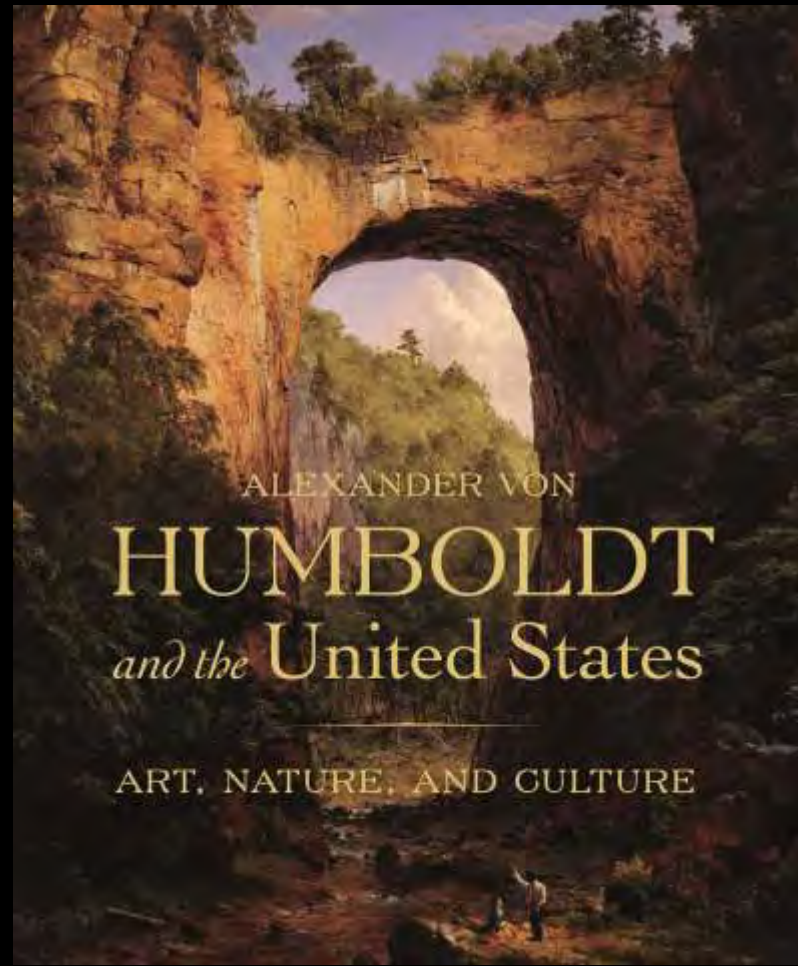


# Alexander von Humboldt and the United States: Art, Nature, and Culture

Smithsonian American Art Museum

<https://americanart.si.edu/exhibitions/humboldt>

James Smithson (founder of the Smithsonian Institution)



Charles Willson Peale  
Humboldt, 1804



Rembrandt Peale  
Humboldt 1809





# New World Politics – Cultural/Human Geography

## *Political Essay on the Kingdom of New Spain 1811*

- Statistical analysis of Mexico
- Criticism of Spanish treatment of indigenous population
- The most detailed, accurate map of the West



### Political Essay on the Kingdom of New Spain

VOLUME 1 *A Critical Edition*

ALEXANDER VON HUMBOLDT  
*Edited and with the Introduction by Peter H. Rasmussen and Thomas J. Barlow*



### Political Essay on the Kingdom of New Spain

VOLUME 2 *A Critical Edition*

ALEXANDER VON HUMBOLDT  
*Edited and with the Introduction by Peter H. Rasmussen and Thomas J. Barlow*



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

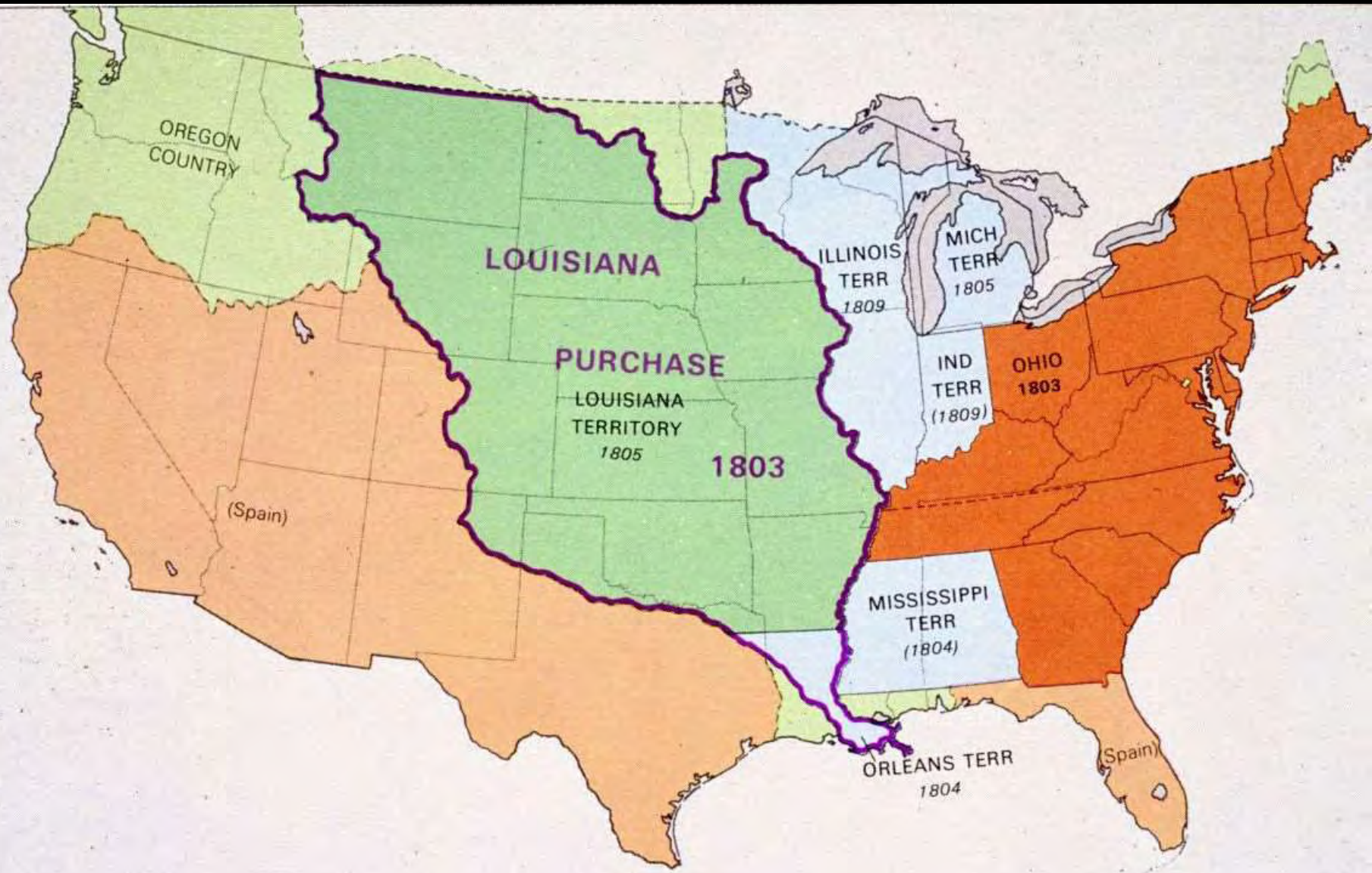


**Humboldt and New World  
Political Geography**



# Gallatin Copy of Humboldt's New Spain Map







# WILLIAM H. GOETZMANN

*AUTHOR OF THE PULITZER PRIZE-WINNING  
EXPLORATION AND EMPIRE*

## NEW LANDS, NEW MEN

*AMERICA AND THE SECOND  
GREAT AGE OF DISCOVERY*



### “Humboldt’s Children” Mentorship and Proxies

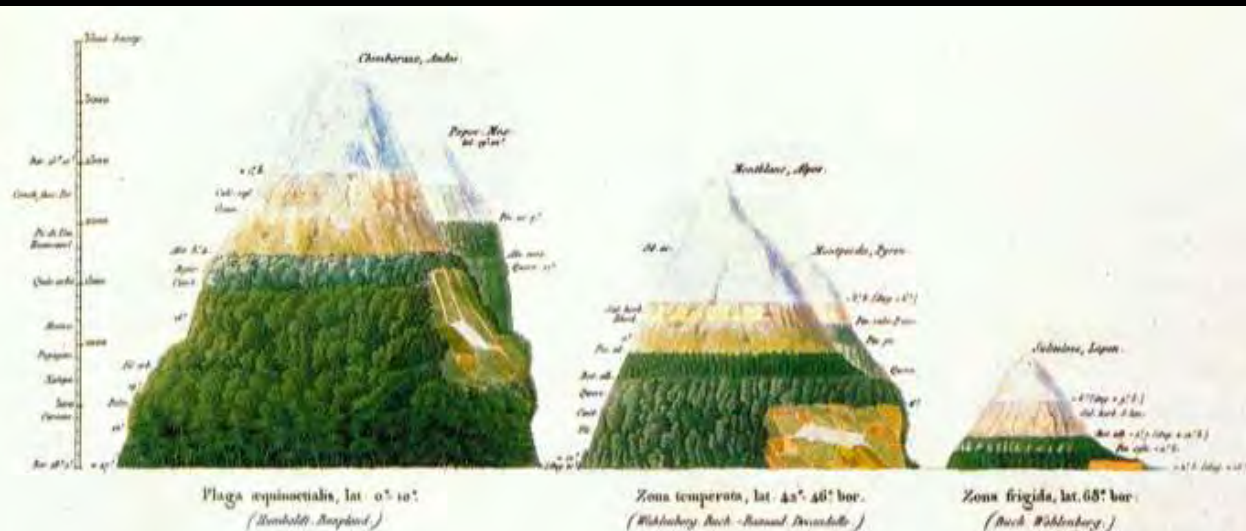
Humboldt the Scientific Model “came to stand like a colossus over the scientific exploration and study of the continents”

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



# Humboldtian Science – Descriptive and Explanatory

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



## Geographiae plantarum lineamenta.

Plantarum nomina appropinquata ad altitudinem qua quaeque crescere desinant. Numeri nudi significant temperaturam medium annuam, Thermometri cent. gradibus expressam; numeri unci inclusi, temperaturam medium mensis Augusti.

1. hexap. = 6 ped. par. = 1<sup>o</sup> 35.





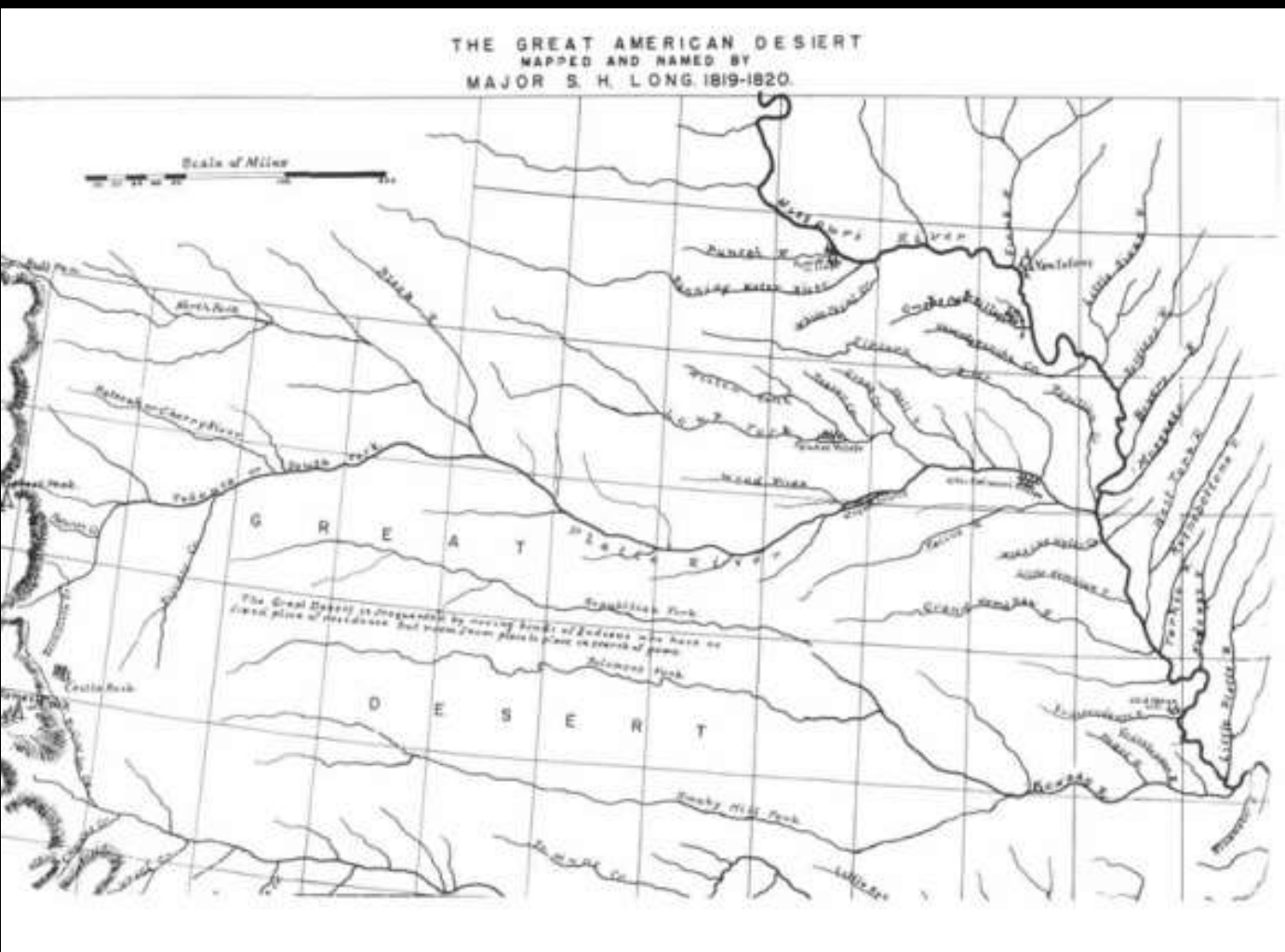
## Zebulon Montgomery Pike (1779 – 1813)

- 1805–1806 Northern reaches of the Mississippi River
- 1806–1807 Southwest to Spanish-colonial settlements of New Mexico and Texas.
- Publishes Humboldt's Map as his own – Entangled in the Burr Conspiracy

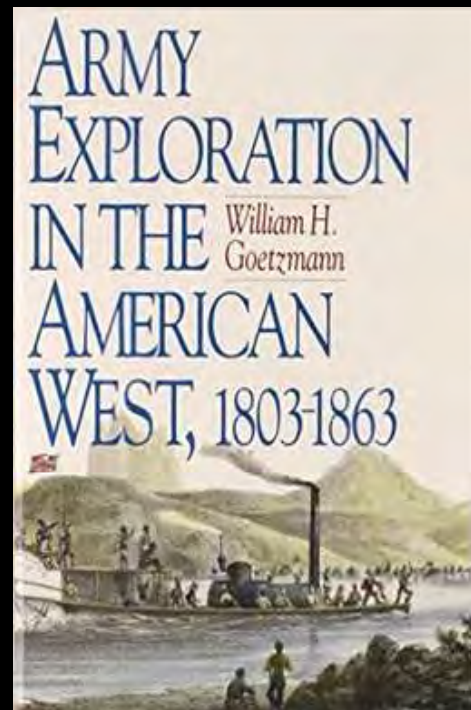


# The 1820 Long Survey and Humboldtian Science

- Humboldtian methodology - accurate measurement, best instruments
- Collaborative - brings scientific experts and artist-naturalist



Stephen Harriman Long  
(1784 – 1864)

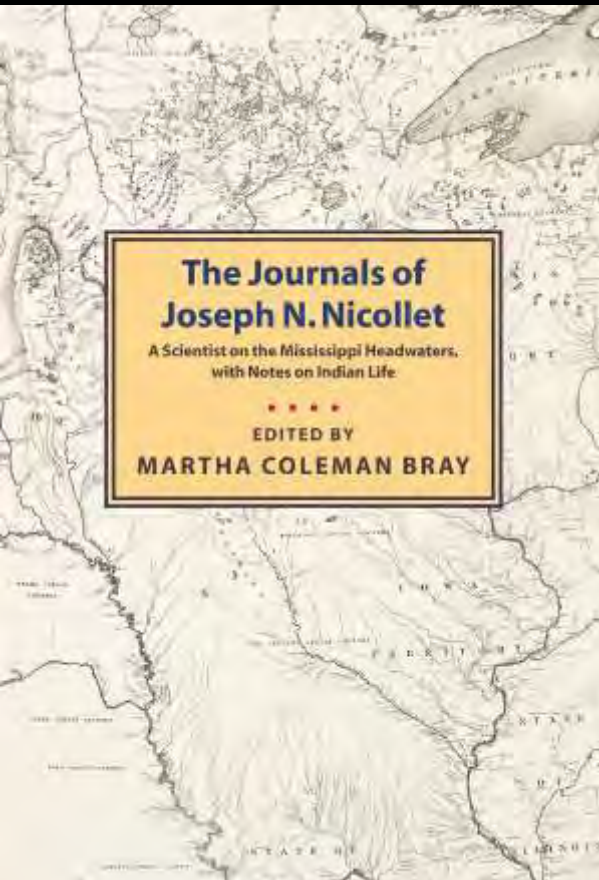




# Cartographic Proxy - Joseph N. Nicollet (1786 – 1843)

- French geographer who studied with Humboldt in Paris.
- With Humboldt's support, to America to correct the maps of the Missouri and the Upper Mississippi River basins.

1836-1840 three expeditions in the region between the Mississippi and Missouri Rivers – produces first accurate map.





# Mentors mentoring

Nicollet trains – John C. Frémont



## HYDROGRAPHICAL BASIN OF THE UPPER MISSISSIPPI RIVER

From Astronomical and Barometrical Observations Surveys and Information

BY J. N. NICOLLET,

*in the Years 1836, 37, 38, 39, and 40, assisted in  
1838, 39, & 40, by Lieut. J. C. Fremont, of the Corps of*

*Topographical Engineers*

*under the superintendence of the Bureau of the Corps of Topographical Engineers*

and authorized by

THE WAR DEPARTMENT

*Reduced and compiled under the direction of*

COL. J. J. ABERT

*in the Bureau of the Corps of Top<sup>g</sup> Eng<sup>s</sup>*

*by Lieut. W. H. Emory*

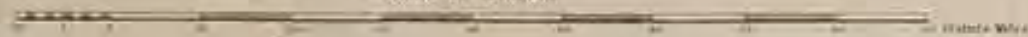
*from the Map published in 1842 and from  
other authorities in*

1843.

*Published by order of the U.S. Senate*

W. J. Stone & Co.

SCALE OF 1200,000





# “The American Humboldt”

John C. Frémont (1813-1890)

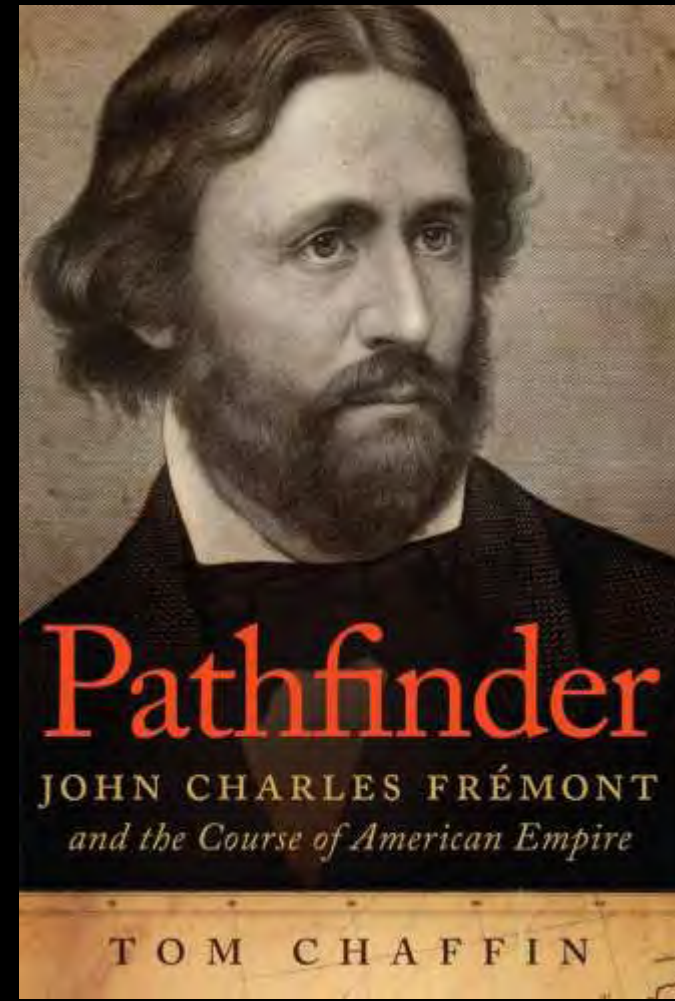
- During the 1840s, he led five expeditions into the Western United States and presented himself as “The Pathfinder” and the “American Humboldt” in his writing
- Writing and career shaped by his wife – Jessie Benton Frémont (1824-1902)

THE NARRATIVE PRESS  
REPORT OF THE EXPLORING EXPEDITION  
TO THE ROCKY MOUNTAINS  
*In the Year 1842, and to Oregon and North  
California in the Years 1843-44*  
JOHN C. FRÉMONT



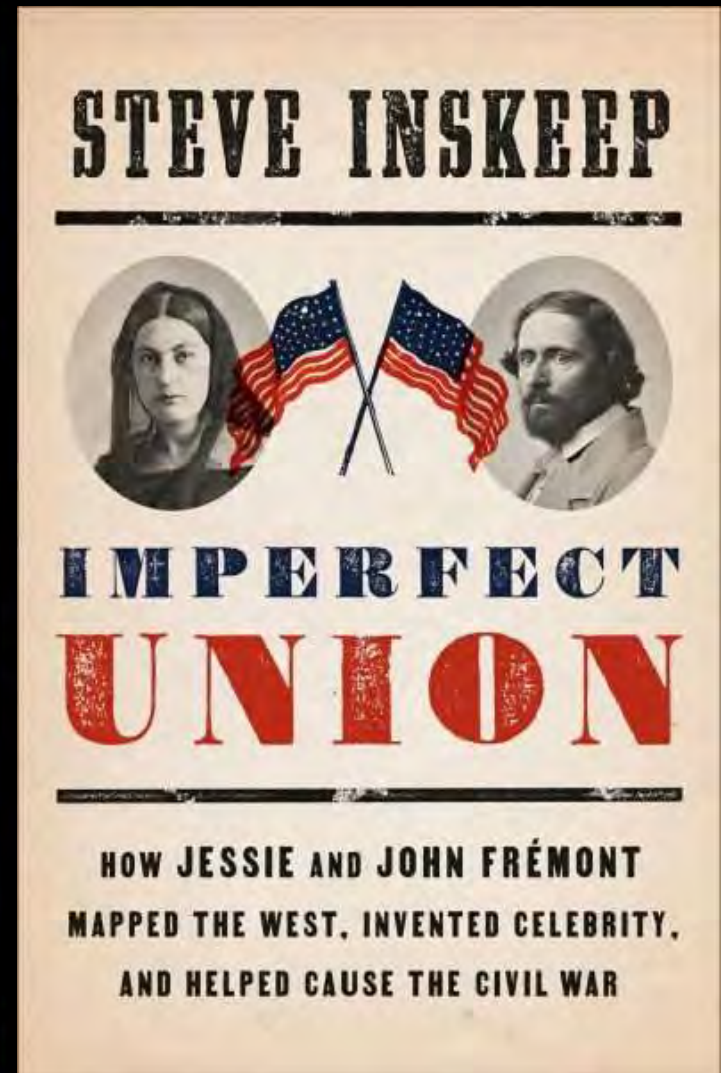
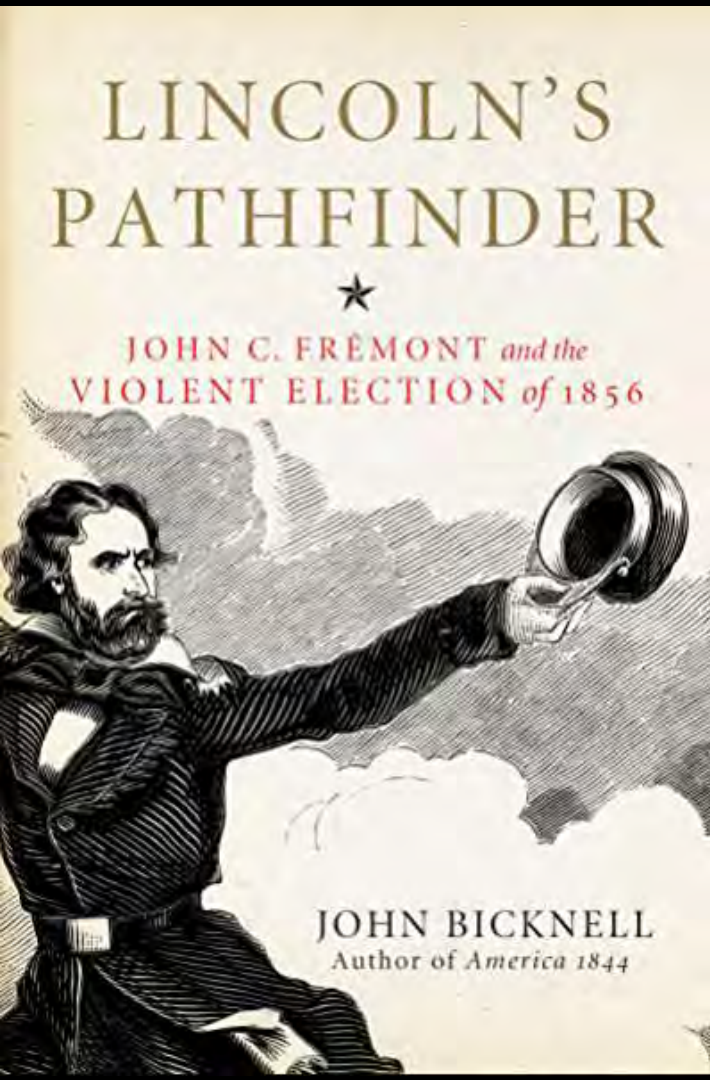
Fremont names a river  
after Humboldt.

Humboldt then  
explained to a friend,  
“I wish you to know  
that I am a river about  
three hundred and fifty  
miles long; I have not  
many tributaries, nor  
much timber, but I am  
full of fish!”



# Politics – Slavery and The 1856 Presidential Election

- Frémont runs for President "Free Soil, Free Men, and Frémont"
- Humboldt supports his candidacy for Frémont's anti-slavery stance





# Humboldt – Culture, Art, and Science

## Scientific Aesthetics – Particularity and Locality

“The heart of Humboldt’s aesthetics: 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 Passage*



### The Passage to Cosmos

ALEXANDER VON HUMBOLDT  
and the Shaping of America



LAURA DASSOW WALLS

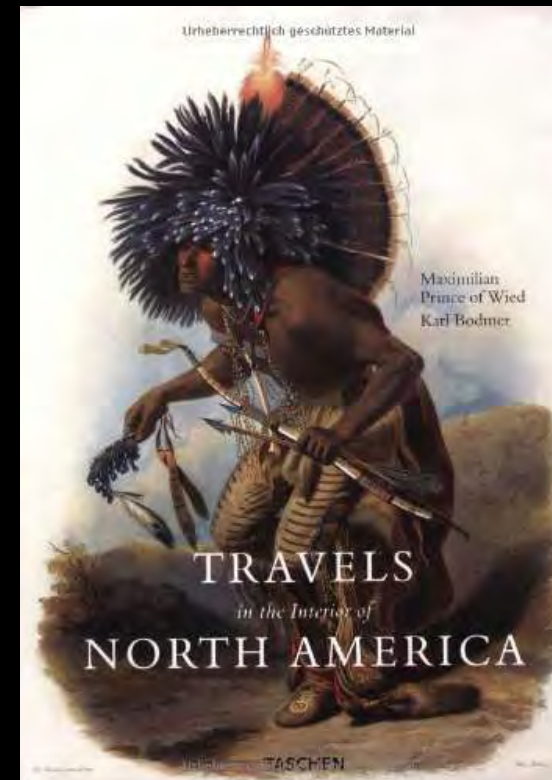
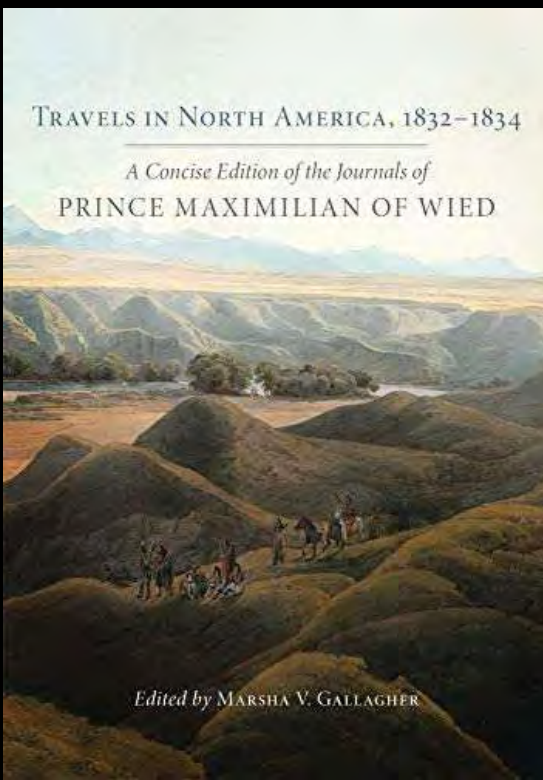
Titian Ramsay Peale II (1799 – 1885)  
Artist-Naturalist on the Long Expedition





# Humboldt's Proxy – The Cultural Anthropologist Prince Alexander Philipp Maximilian (1782 –1867)

- Studies at University of Göttingen with Blumenbach (Humboldt's mentor)
- With Humboldt's support and planning, Prince Max traveled through Brazil in 1815-17 and through the United States in 1832-34.
- For US trip, Humboldt insists Max takes an artist-naturalist



# The Artist Anthropologist

Karl Bodmer (1809-1893)

Swiss-French Artist



# KARL BODMER

A Swiss Artist in America 1809-1893 Ein Schweizer Künstler in Amerika







ANSICHT DER STONE-WALLS. | VUE DES STONE-WALLS.

VIEW OF THE STONE WALLS  
of the Grand Canyon







BISONTANZ DER MANDAN INDIANER

*von G. Schreyer del.*  
*W. H. Schreyer sculp.*

BISON-DANCE OF THE MANDAN INDIANS

*by G. Schreyer del.*  
*W. H. Schreyer sculp.*

DANCE DU BISON DES INDIENS MANDANS

*dessiné par G. Schreyer*  
*gravé par W. H. Schreyer*

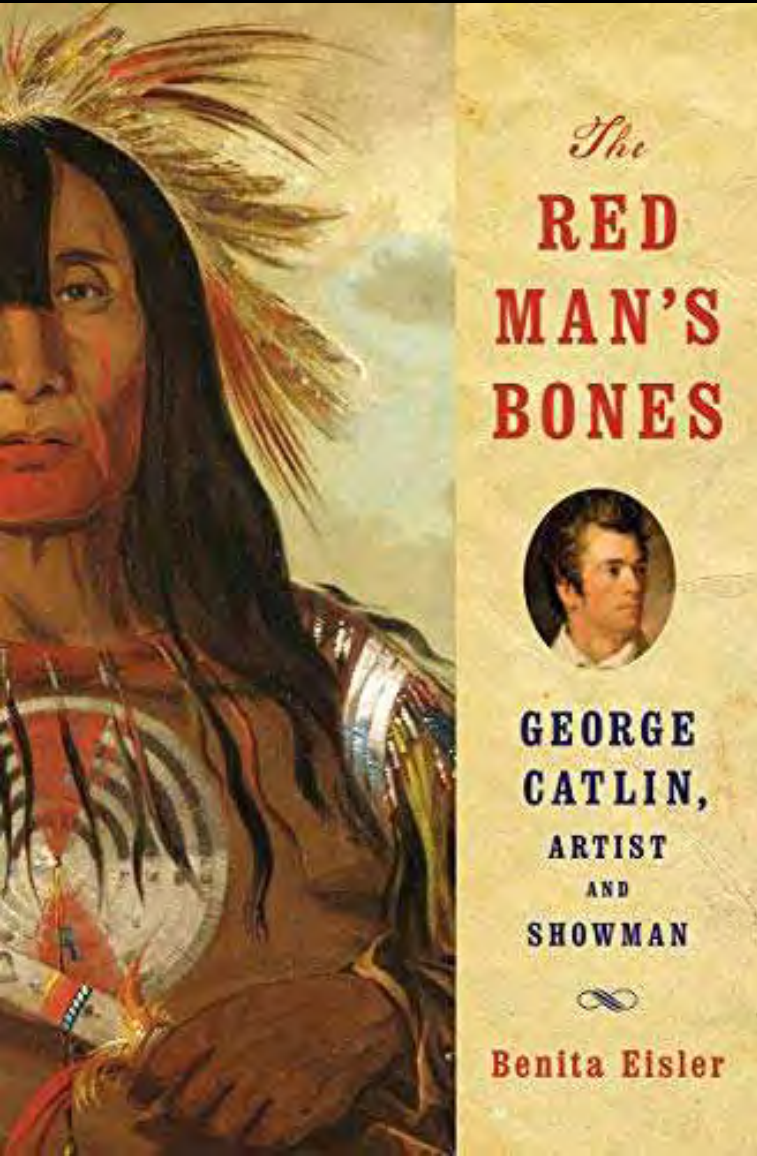


AROH-ZINDICCH  
 Aroon, Chief of the Aroon  
 Aroon, Chief of the Aroon



# The Artist Anthropologist (and Showman)

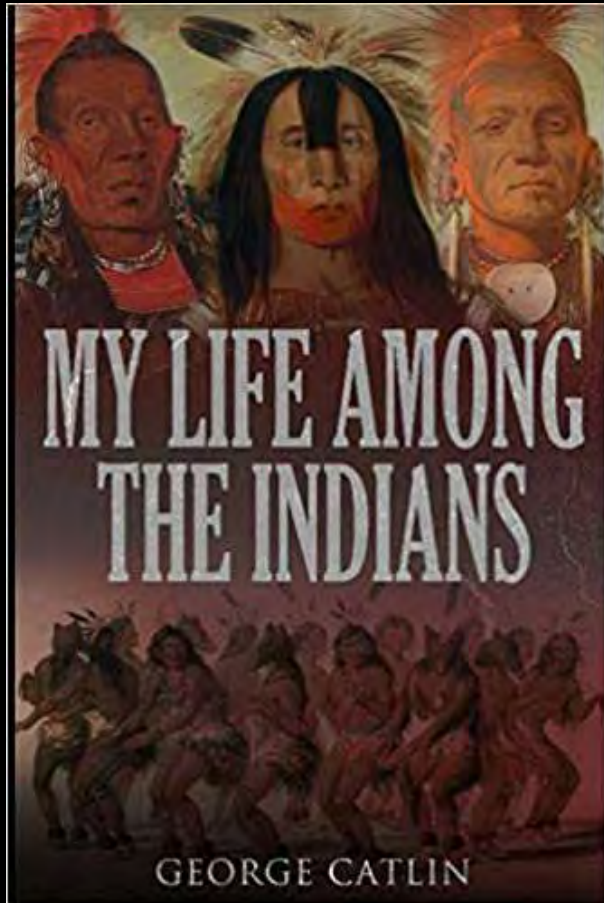
George Catlin (1796 – 1872)





George Catlin

Máh-to-tóh-pa,  
Four Bears,  
Second Chief  
1832





Karl Girardet, *Dance of the Iowa Indians for King Louis-Phillipe at the Tuileries*, 1845



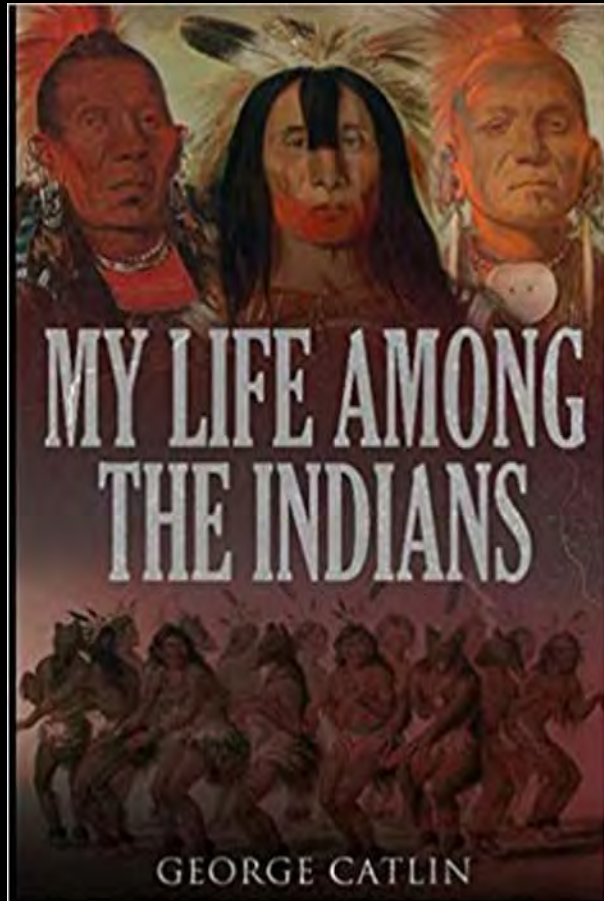


George Catlin

Shon-ta-yi-ga,

Little Wolf

1844–45





# The Artistic Humboldt of the New World

Frederic Edwin Church 1826-1900

The Natural Bridge, Virginia, 1852





## Frederic Edwin Church - Niagara Falls 1857

In *Cosmos*, Humboldt called for “highly-gifted young artists” to travel to the tropics to seize “the living image of the manifold beauty and grandeur of nature in the humid mountain valleys of the tropical world.”

Humboldt’s *Cosmos* was perfectly timed for the launch of Church’s artistic career. The book’s combination of scientific and aesthetic appreciation of the landscape—including the North American landscape—gave Church the framework for contributing to an American cultural identity grounded in that synthesis of art and science.

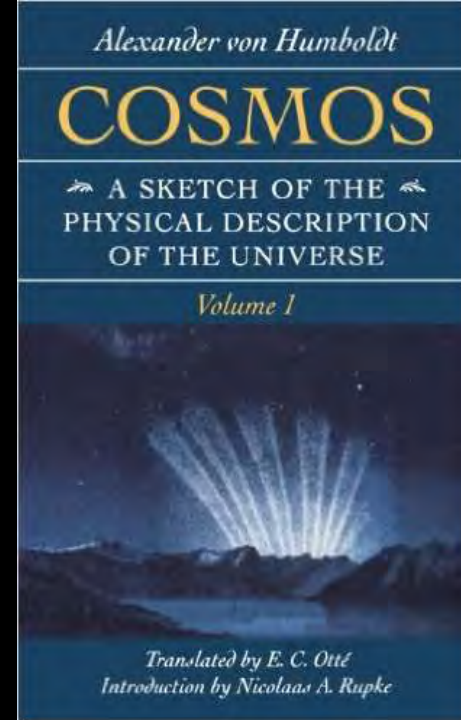


# The Artistic Humboldt of the New World

Humboldt had described landscape painting as a kind of visual poetry, requiring a heightened sense of awareness and aptitude on the part of the artist. Church marked one such passage in his copy of Cosmos:

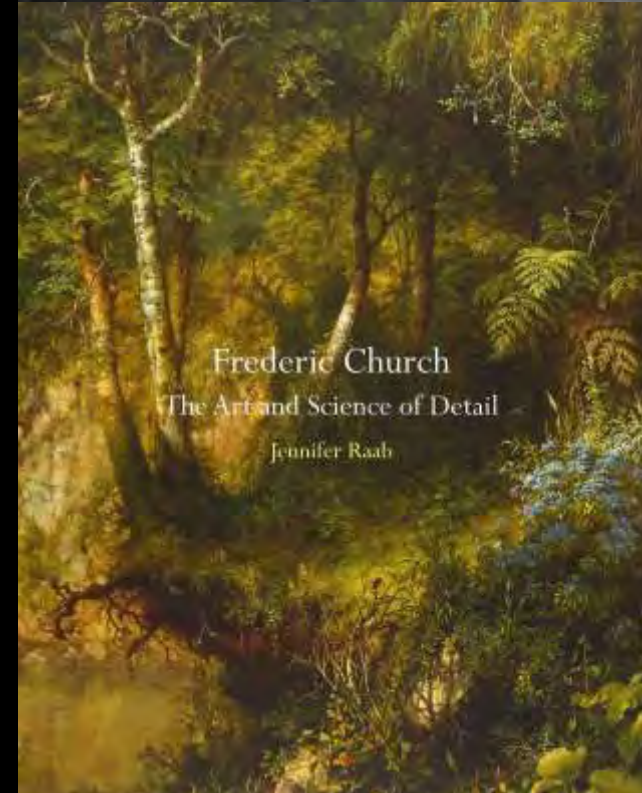
“The azure of the sky, the form of the clouds, the vapoury mist resting in the distance, the luxuriant development of plants, the beauty of the foliage, and the outline of the mountains, are the elements which determine the total impression produced by the aspect of any particular region.

To apprehend these characteristics, and to reproduce them visibly, is the province of landscape painting; while it is permitted to the artist, by analysing the various groups, to resolve beneath his touch the great enchantment of nature—if I may venture on so metaphorical an expression—as the written words of men are resolved into a few simple characters.”



# The Artistic Humboldt of the New World

- Humboldt envisioned the artist as a scientist and a poet, capable of distilling the essence of nature while retaining the specific character of the local landscape.
- Church's acute powers of observation were a perfect match for Humboldt's exultation in observing and marveling at these details in nature.
- It was Humboldt's second recommendation that rang true for Church: that the artist should also see the world as a scientist—well-read in natural philosophy and observant of nature and its processes, so that he could invest his works with scientific truth as well as aesthetic merit.





Morning in the Tropics ca. 1858



1853 - Church retraces Humboldt's Andes journey with Cyrus West Field





Alexander von Humboldt  
Tequendama 1810



Frederic Edwin Church  
Falls of the Tequendama near Bogotá 1864





The Andes of Ecuador 1855



Cayambe 1858





Cotopaxi, 1855



Oil Study of Cotopaxi, 1862





Chimborazo, 1864



Frederic Edwin Church  
Chimborazo, 1864





## Heart of the Andes, 1859 (5ft high, 10ft wide)

The picture was publicly unveiled in New York on April 27, 1859. Humboldt dies May 6, 1859. The work caused a sensation, and twelve to thirteen thousand people paid twenty-five cents apiece to file by it each month. The New York Times declared, Church was the “artistic Humboldt of the New World.”









Frederic Edwin Church  
Rainy Season in the Tropics, 1866



# The Artist Inventor - Samuel Finley Breese Morse (1791 – 1872)





Portrait of Marquis de Lafayette  
By Samuel Morse  
1826



# The Gallery of the Louvre 1831–33





# Humboldt, Electromagnetism, and Global Communication



Telegraph key and sounder. The key was used for transmitting the message, the sounder audibly operated, and enabled the operator to hear the incoming message.

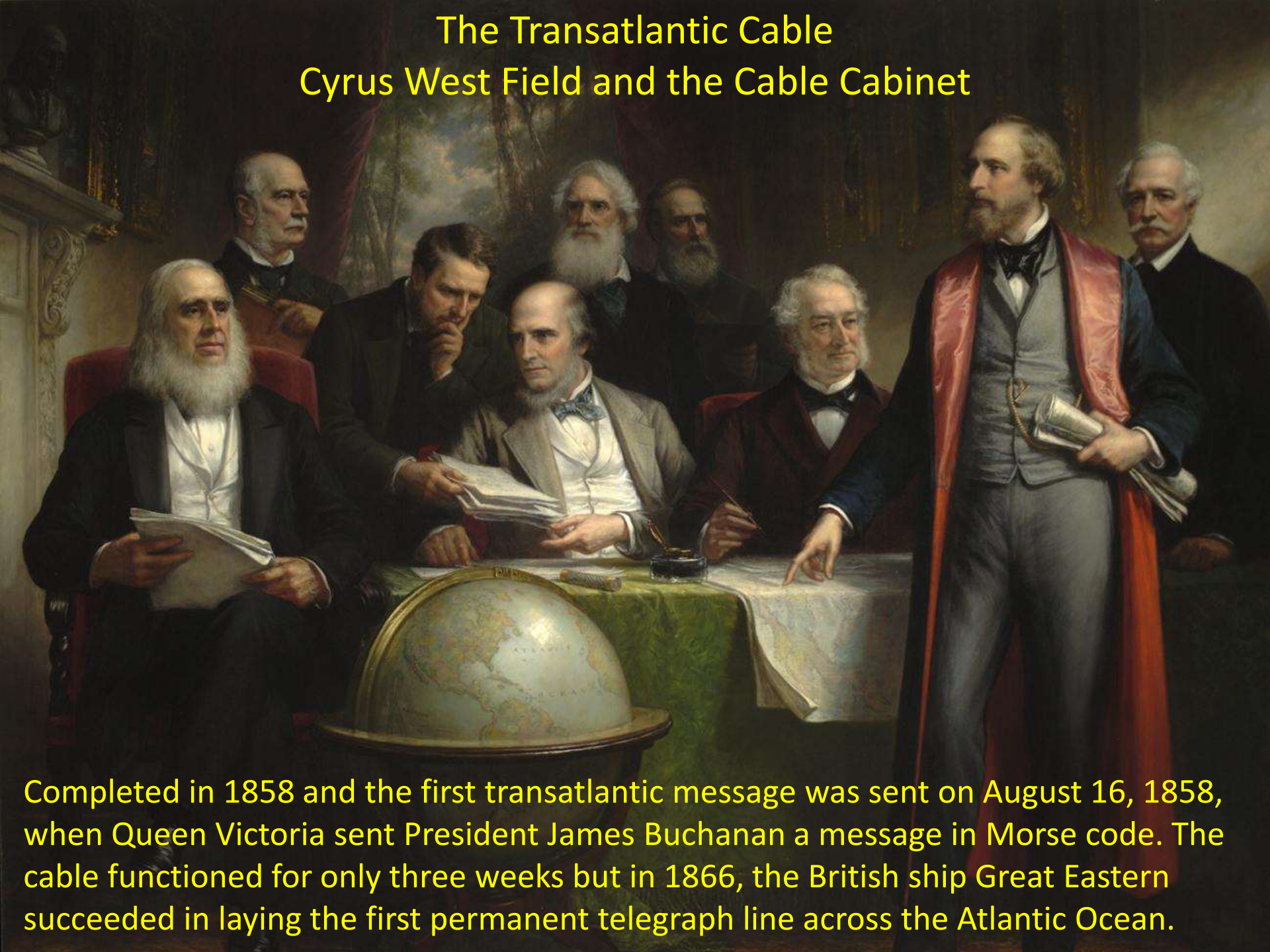
## International Morse Code

A	••	N	••	1	•••••
B	••••	O	••••	2	•••••
C	•••••	P	•••••	3	•••••
D	•••	Q	•••••	4	•••••
E	•	R	•••	5	•••••
F	••••	S	•••	6	•••••
G	•••	T	•	7	•••••
H	••••	U	•••	8	•••••
I	••	V	••••	9	•••••
J	•••••	W	•••	0	•••••
K	•••	X	•••••	.	•••••
L	••••	Y	•••••	,	•••••
M	••	Z	•••••	?	•••••



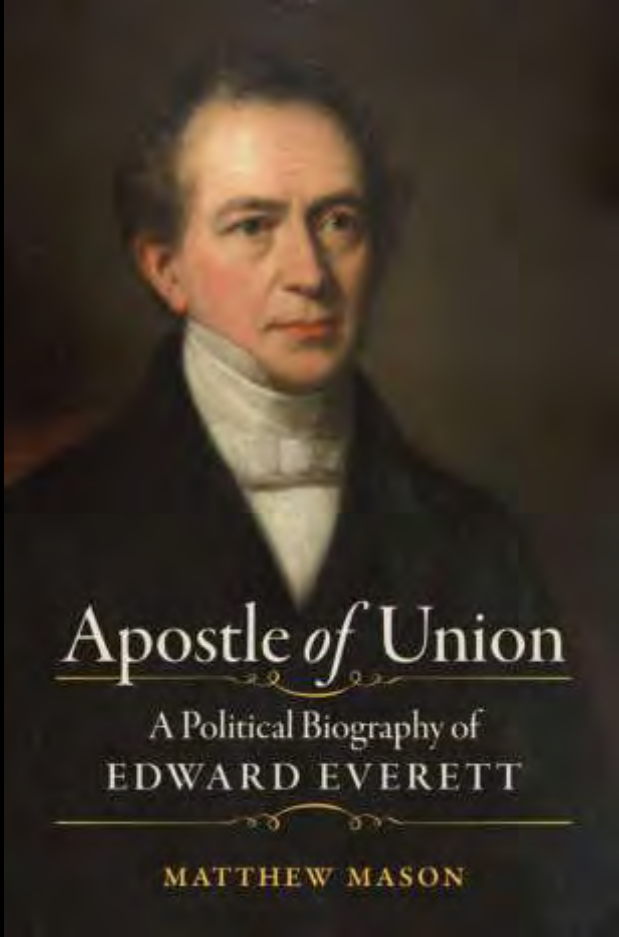
# The Transatlantic Cable

## Cyrus West Field and the Cable Cabinet



Completed in 1858 and the first transatlantic message was sent on August 16, 1858, when Queen Victoria sent President James Buchanan a message in Morse code. The cable functioned for only three weeks but in 1866, the British ship Great Eastern succeeded in laying the first permanent telegraph line across the Atlantic Ocean.





## Liberty and New World Culture

Before starting teaching at Harvard University, the two friends travel to Europe in 1815, enroll at University of Göttingen, meet and mentored by both Humboldt brothers.

Editors of the  
North American Review  
Humboldt articles

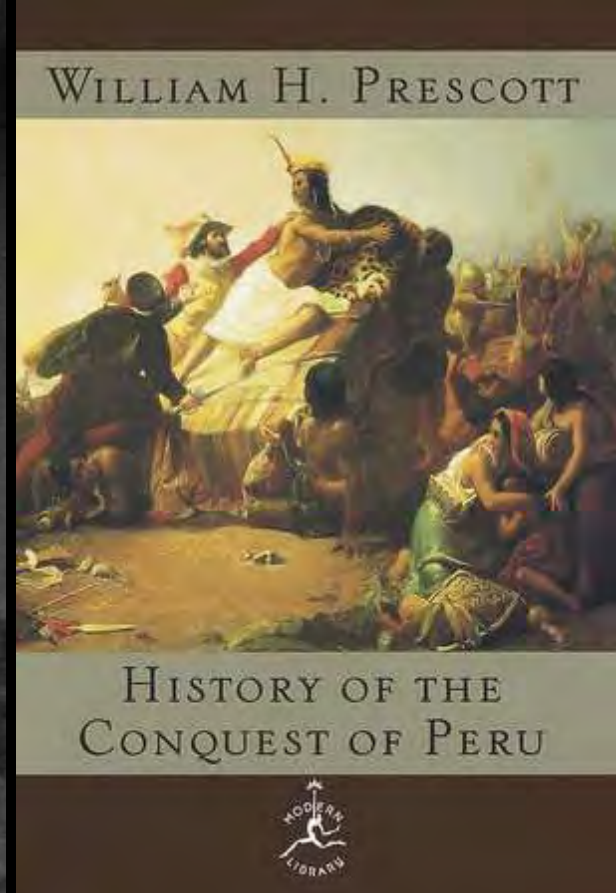
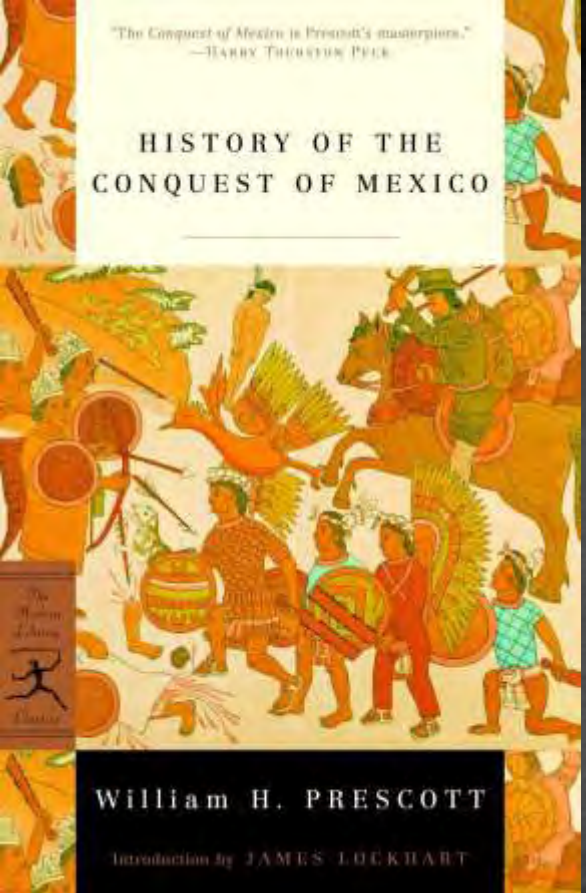


George Ticknor (1791 – 1871)  
Harvard professor and Hispanist, specializing in the subject areas of languages and literature. He is known for his scholarly work on the history and criticism of Spanish literature.

Edward Everett (1794 – 1865)  
U.S. representative, senator, the 15th governor of Massachusetts, minister to Great Britain and United States secretary of state. He also taught at Harvard University and President 1846 and Gettysburg speech.

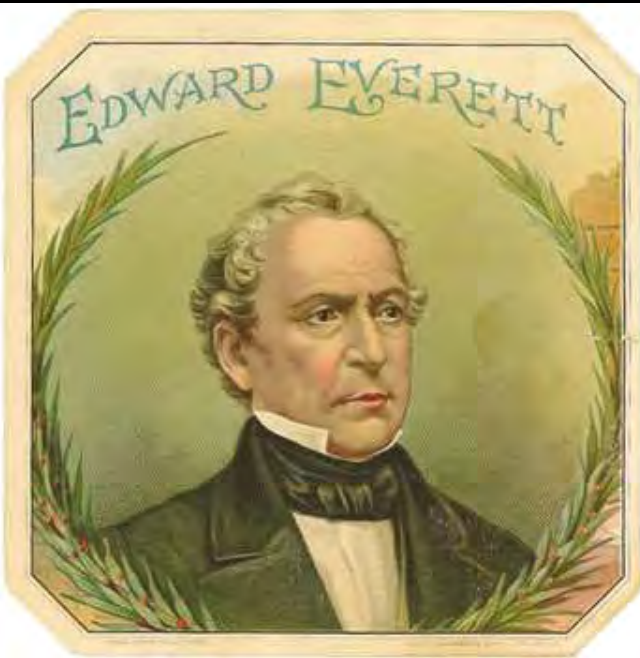
# The History of the New World

William H. Prescott (1796 – 1859)





## Mentors - Everett, Emerson, Thoreau, and New World Nature



Everett's student - Ralph Waldo Emerson (first reads Humboldt in 1821)

"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..." "Nature"

Emerson's student - Henry David Thoreau

"What sort of a science is that which enriches the understanding but robs the imagination?" *Journal*

# Humboldt the Universal Man - Ralph Waldo Emerson

“The universe is a more amazing puzzle than ever as you look along this bewildering series of animated forces.... While I stand there I am impressed with a singular conviction that not a form so grotesque, so savage, or so beautiful, but is an expression of something in man the observer.

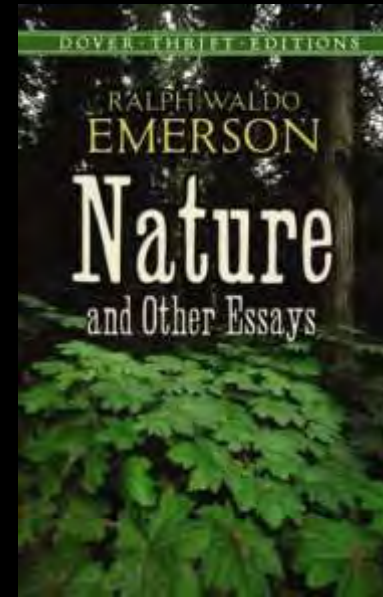
We feel that there is an occult relation between the very worm, the crawling scorpions, and man. I am moved by strange sympathies. I say I will listen to this invitation. I will be a naturalist.” “The Uses of Natural History” (1833)

“Humboldt was one of those wonders of the world, like Aristotle, like Julius Caesar...who appear from time to time, as if to show us the possibilities of the human mind, the force and the range of the faculties, — a universal man, not only possessed of great particular talents, but they were symmetrical, his parts were well put together.

As we know, a man’s natural powers are often a sort of committee that slowly, one at a time, give their attention and action; but Humboldt’s were all united, one electric chain, so that a university, a whole French Academy, travelled in his shoes.” 1860



1803-1882



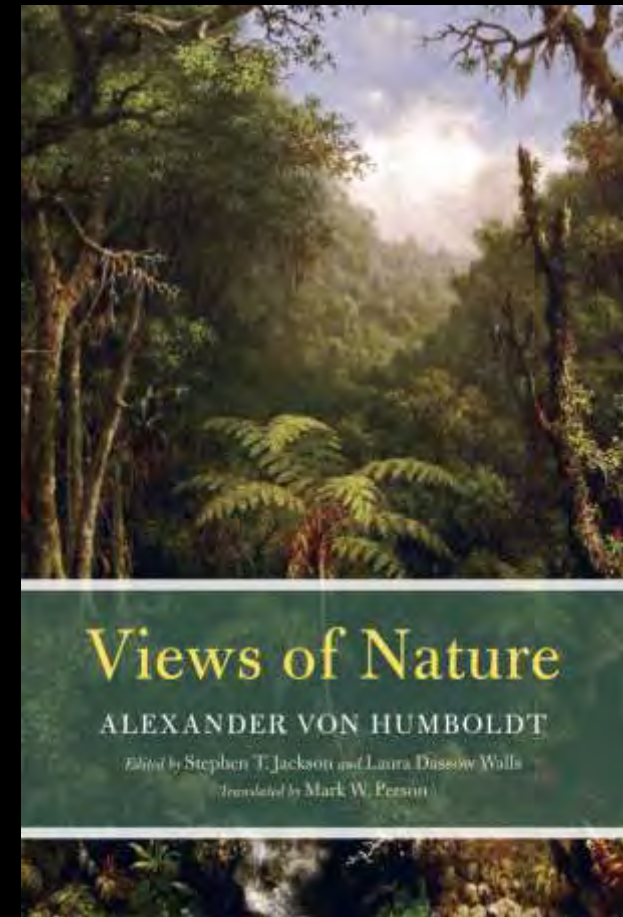
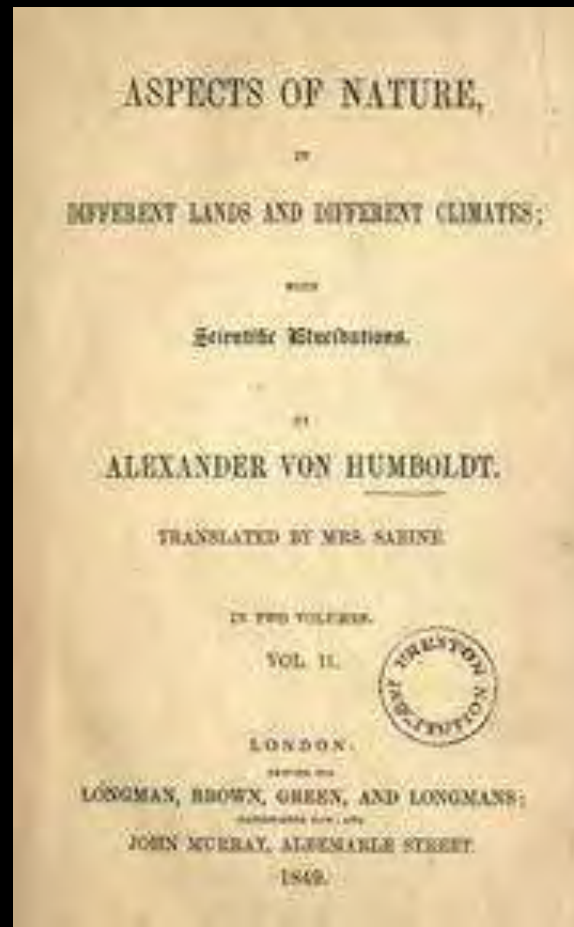
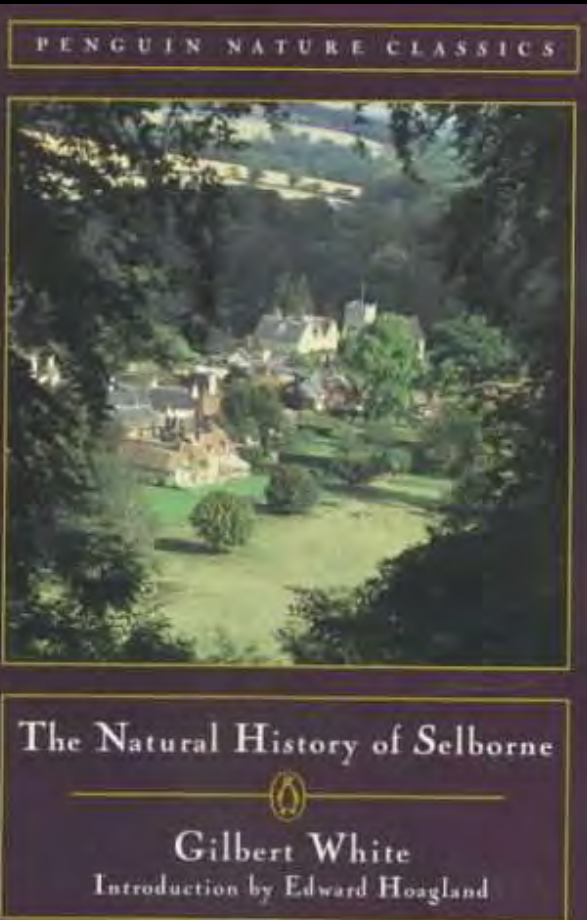


# Thoreau and Humboldtian Science

“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



1817-1862



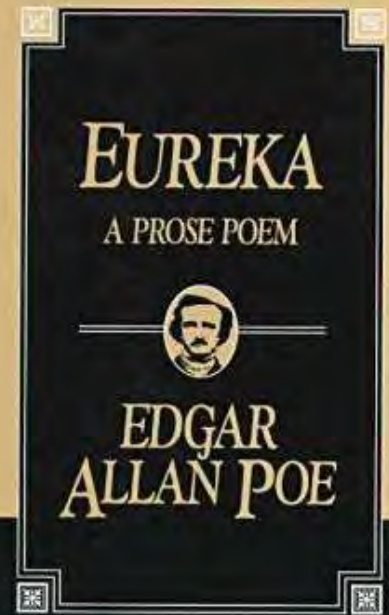
# Humboldt and the Cosmos - Edgar Allan Poe 1809-1849

*Eureka: A Prose Poem and An Essay on the Material and Spiritual Universe* 1849

WITH VERY PROFOUND RESPECT, THIS WORK IS DEDICATED TO  
ALEXANDER VON HUMBOLDT

“I design to speak of the Physical, Metaphysical and Mathematical -- of the Material and Spiritual Universe:- of its Essence, its Origin, its Creation, its Present Condition and its Destiny...I do not know a treatise in which a survey of the Universe -- using the word in its most comprehensive and only legitimate acceptance -- is taken at all... The nearest approach to such a work is made in the "Cosmos" of Alexander Von Humboldt. He presents the subject, however, not in its individuality but in its generality. His theme, in its last result, is the law of each portion of the merely physical Universe, as this law is related to the laws of every other portion of this merely physical Universe.”

“My general proposition, then, is this: -- In the original unity of the first things lies the secondary cause of all things, with the germ of their inevitable annihilation.”



LITERARY CLASSICS



Alexander von Humboldt  
**COSMOS**

A SKETCH OF THE  
PHYSICAL DESCRIPTION  
OF THE UNIVERSE

*Volume 1*



*Translated by E. C. Otté  
Introduction by Nicolaas A. Rupke*



Leaves  
*of*  
Grass.

---

BROOKLYN, NEW YORK,  
1856.

# Humboldtian Poetry

Walt Whitman, a kosmos, of Manhattan the son...

(from Song of Myself XXIV)

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, ...

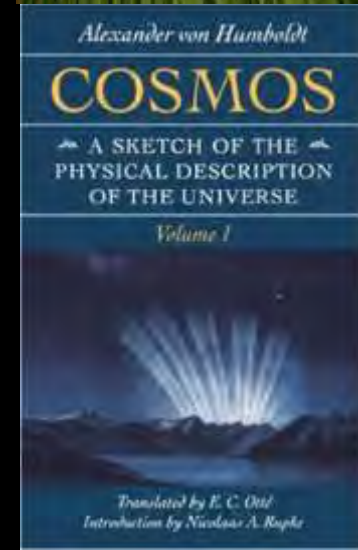
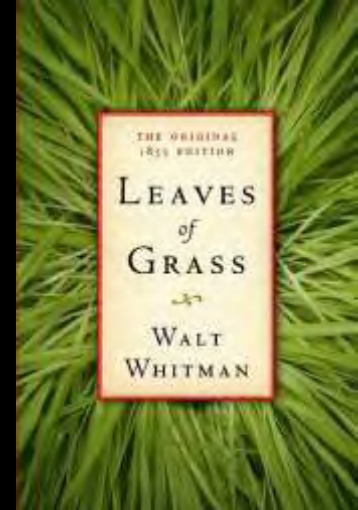
Who, out of the theory of the earth and of his or her body understands by subtle analogies all other theories,

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.  
1860

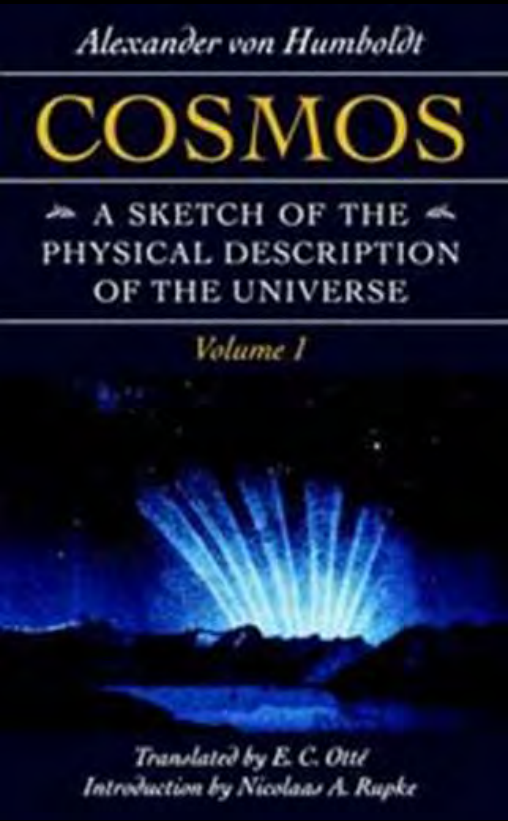
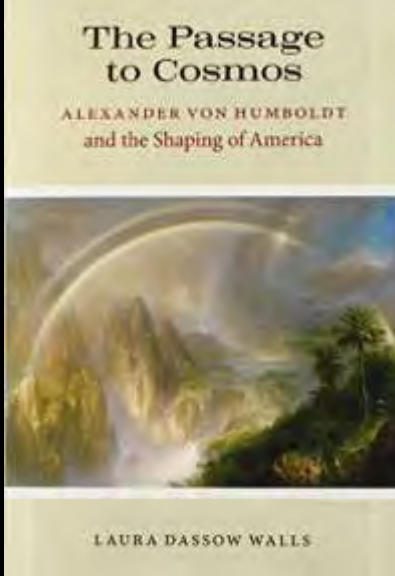




# Who includes diversity and is Nature?

“We have no language for speaking of humans and nature as a single, law-governed dynamically interactive and reflective whole...Cosmos was the fabric that Humboldt spent a lifetime weaving, the one fabrication that, he thought, would make all our technologies and visions and hopes and poems speak to each other.”

Walls, *Passage*, 317



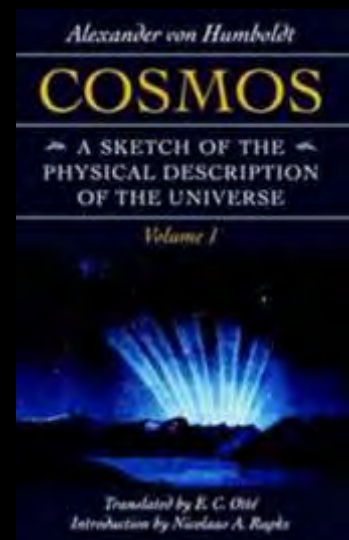
# Humboldtian Science – Science of Dynamic Change

“to discern the constancy of phenomena in the midst of apparent changes”

- One concept that is central to Humboldtian science is that of a general equilibrium of forces amidst change.
- Not balance and stability, but ordered dynamic change. (Resilience)

“The general equilibrium which reigns amongst disturbances and apparent turmoil, is the result of infinite number of mechanical forces and chemical attractions balancing each other out.” so that the universe persists amidst constant change. (Resilience)

“to recognize unity in the vast diversity of phenomena, and by the exercise of thought and the combination of observations, to discern the constancy of phenomena in the midst of apparent changes.”

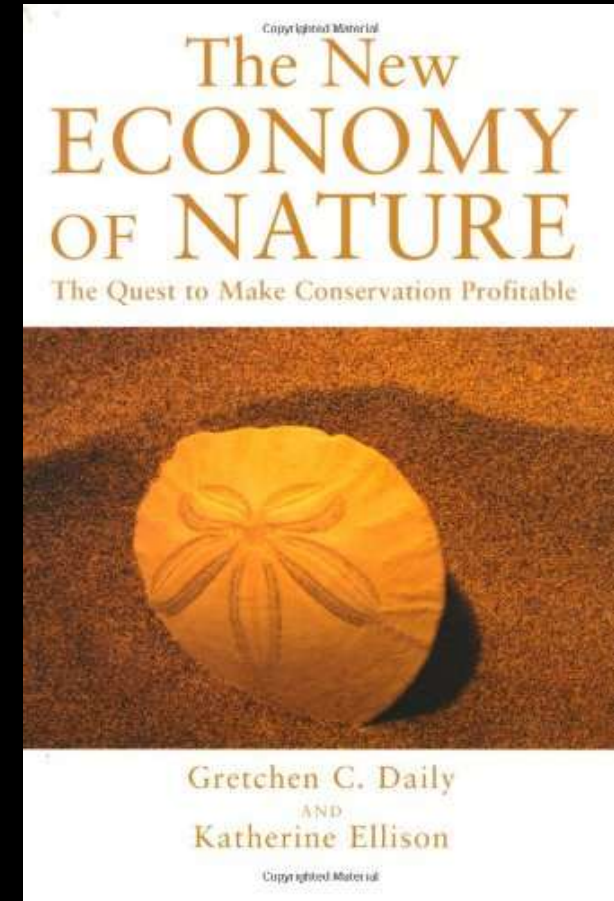
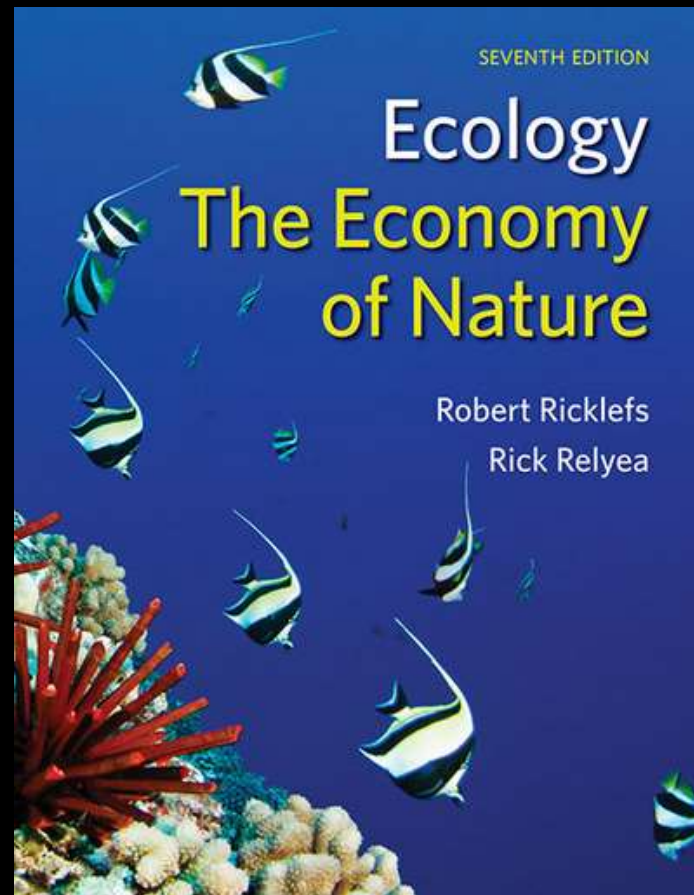
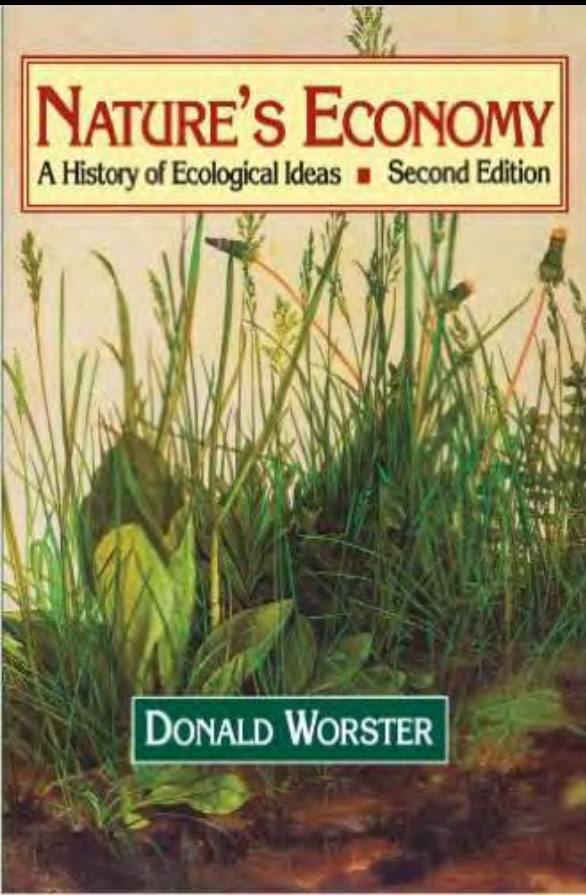




# Ecology – Science, Discourse, and the Order of Nature

“Every generation...writes its own description of the natural order, which generally reveals as much about human society and its changing concerns as it does about nature.”

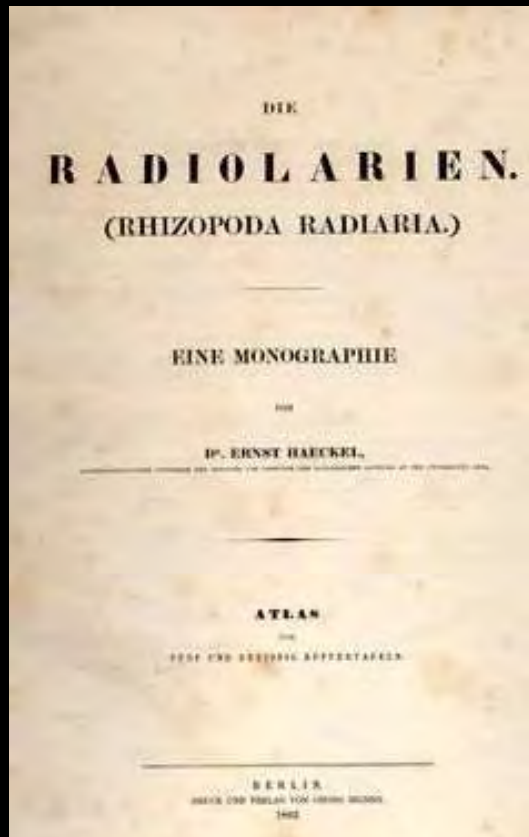
Donald Worster *Nature's Economy*



# Naming a New Science

Ernst Haeckel 1834–1919

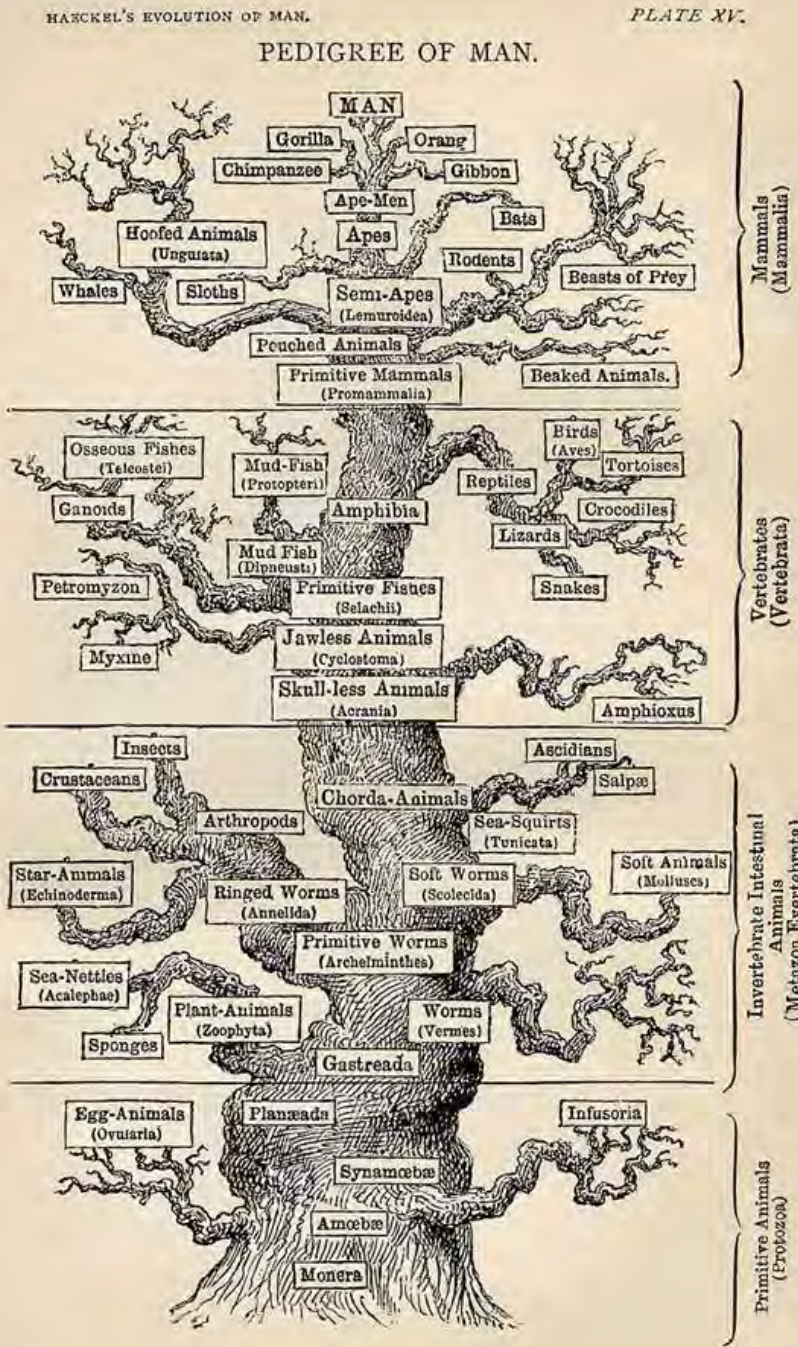
German biologist inspired by Humboldt and Darwin described and named thousands of new species, mapped a genealogical tree relating all life forms, and coined many new terms for biology, including phylum, phylogeny, stem cell, protista...and the name of a new science – Ecology.





# Haeckel and Evolutionary Biology

Haeckel promoted and popularized Darwin's work in Germany and developed the influential but no longer widely held recapitulation theory ("ontogeny recapitulates phylogeny") claiming that an individual organism's biological development, or ontogeny, parallels and summarizes its species' evolutionary development, or phylogeny.



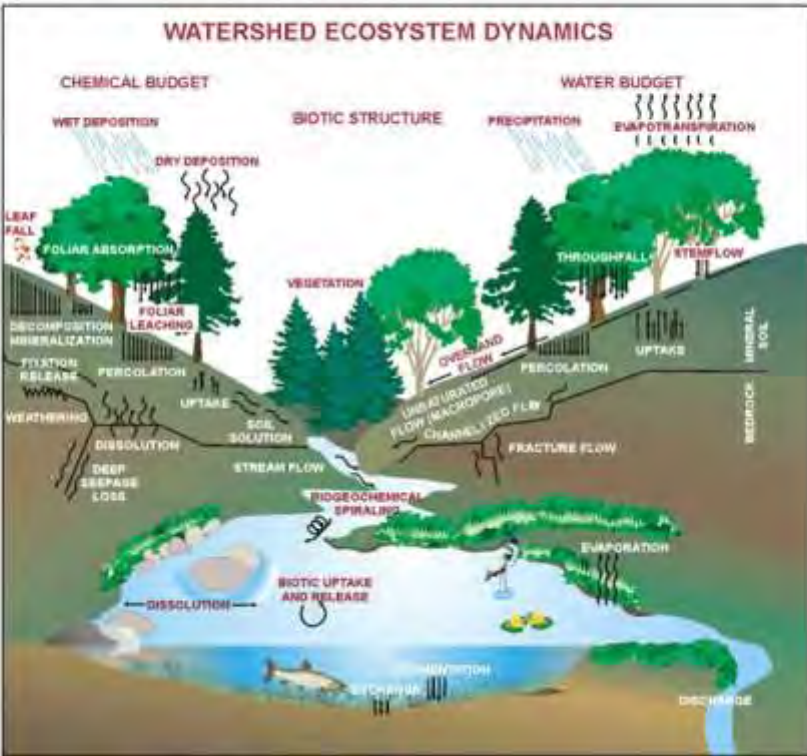
# Haeckel and Ecology

The study of Life Systems [ecosystems] – biotic and abiotic

In 1866, Haeckel coined the word “oekologie” for a science of the “relation of the animal both to its organic as well as its inorganic environment.”

The word comes from the Greek oikos, meaning “household,” “home,” or “place to live.” Thus, ecology deals with the organism and its environment.

## Ecosystem – Biotic and Abiotic







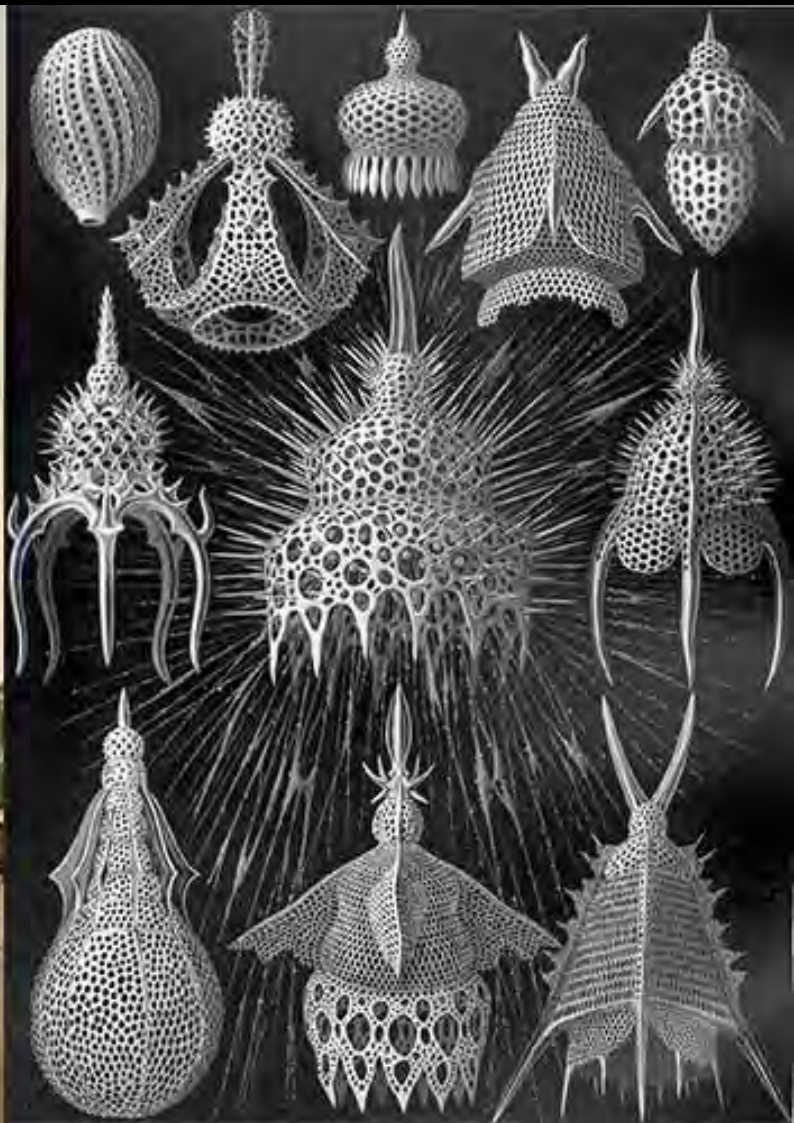
# Haeckel and Humboldtian Science – Imagination and the Visual Arts

*Kunstformen der Natur* (1904) *Art Forms of Nature*

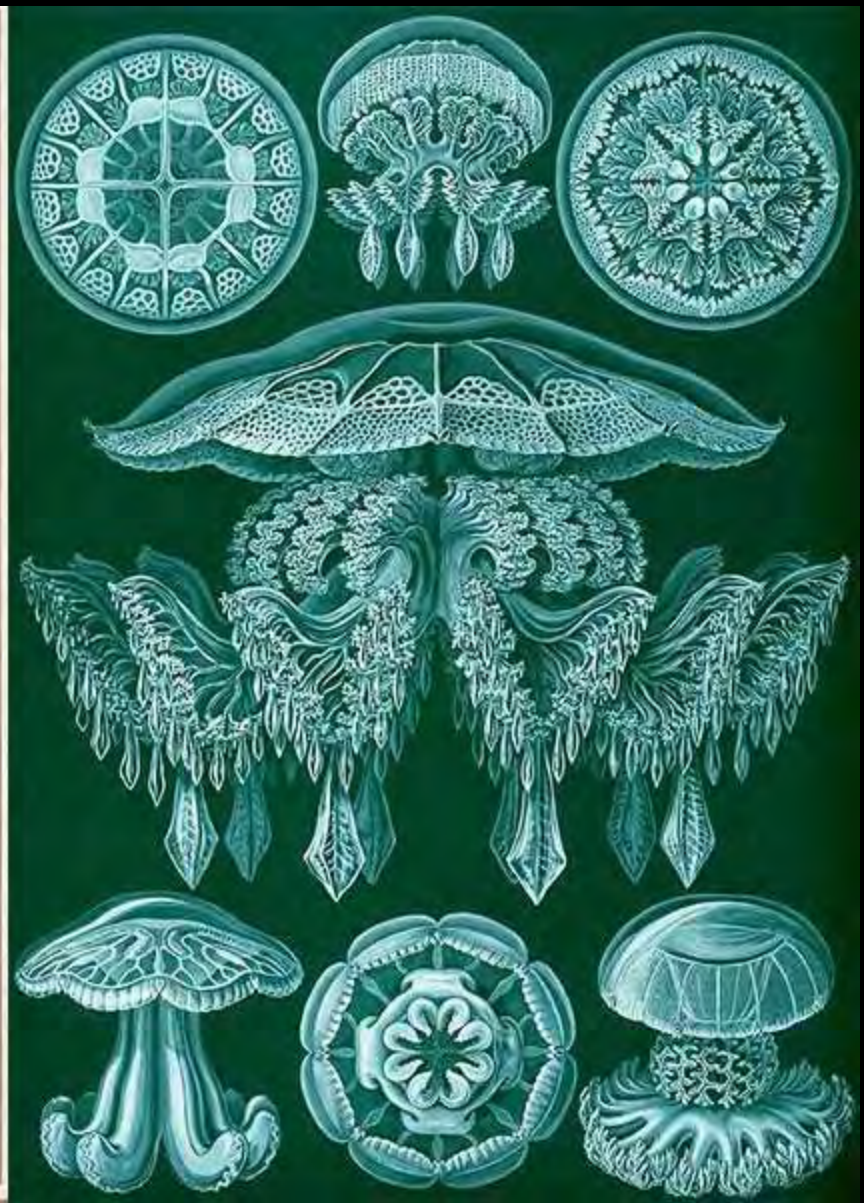
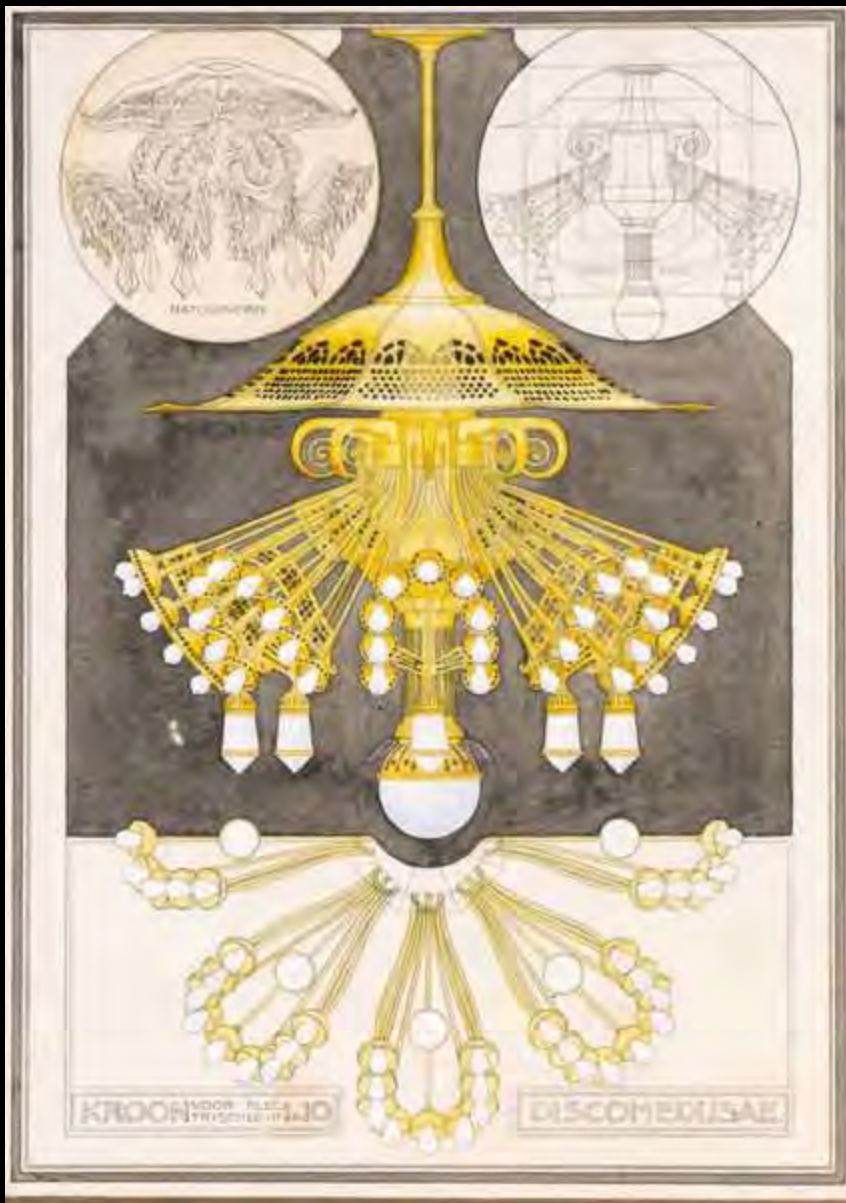
Porte Monumentale (Porte Binet) Exposition Universelle et Internationale de Paris 1900



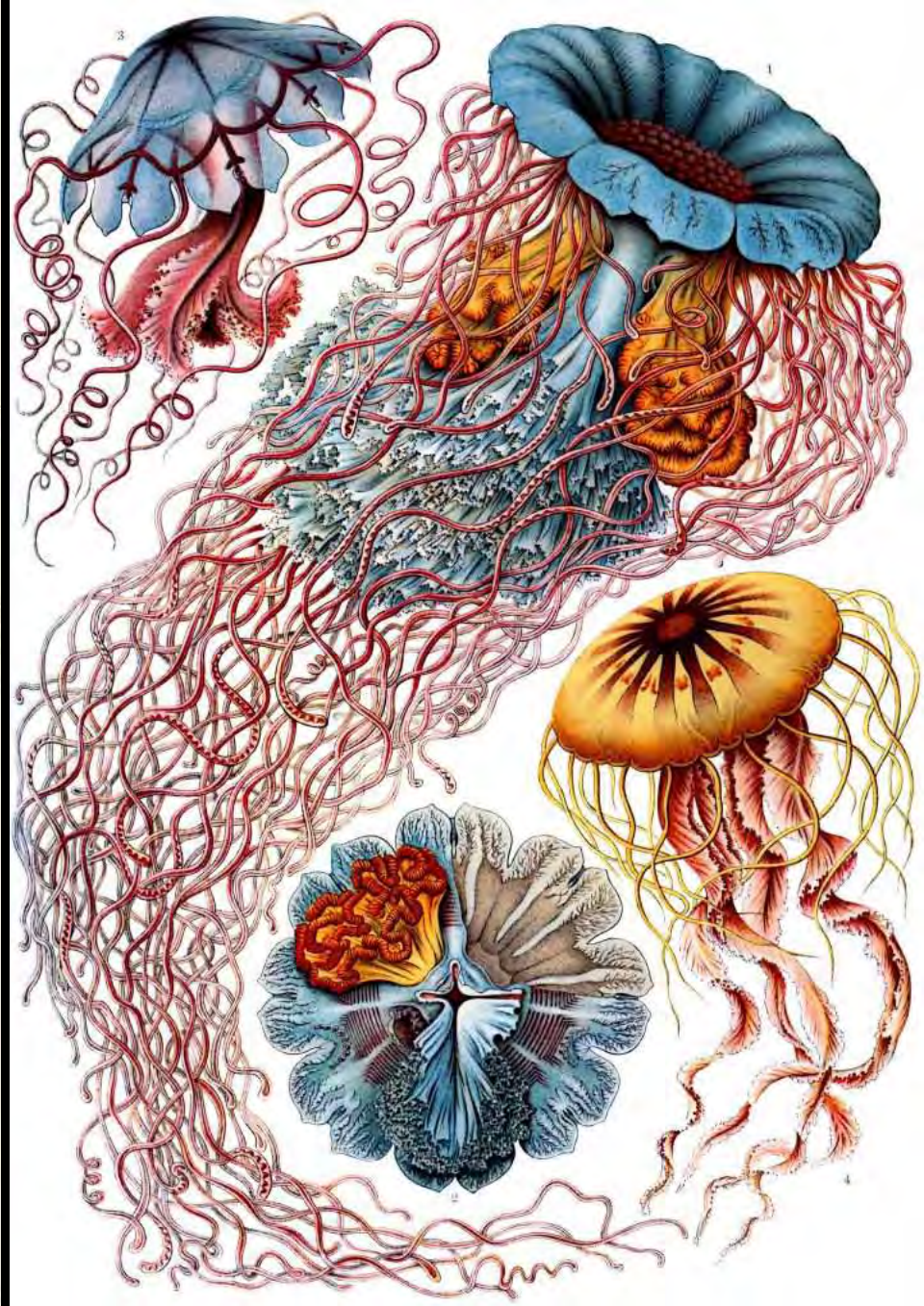
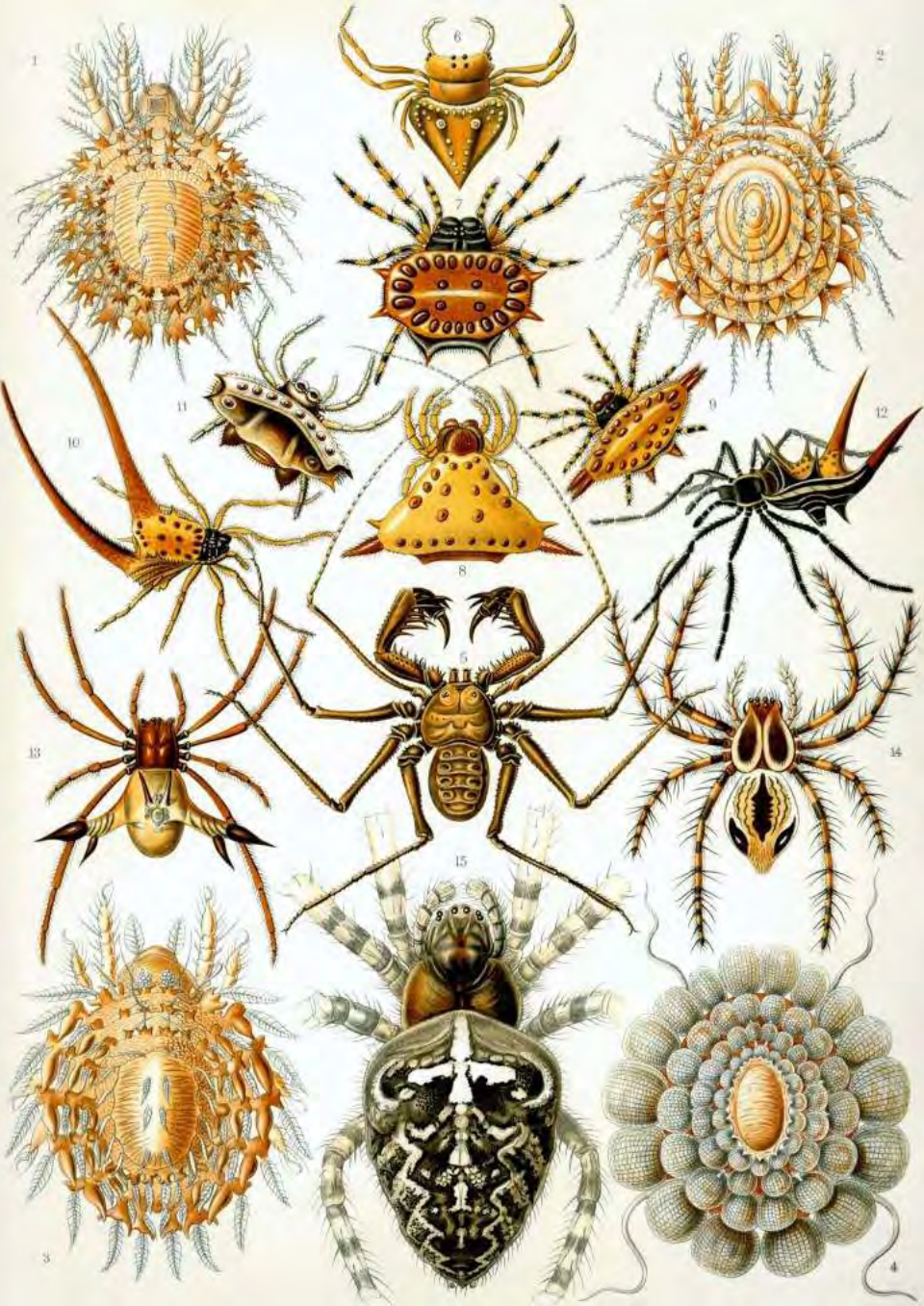








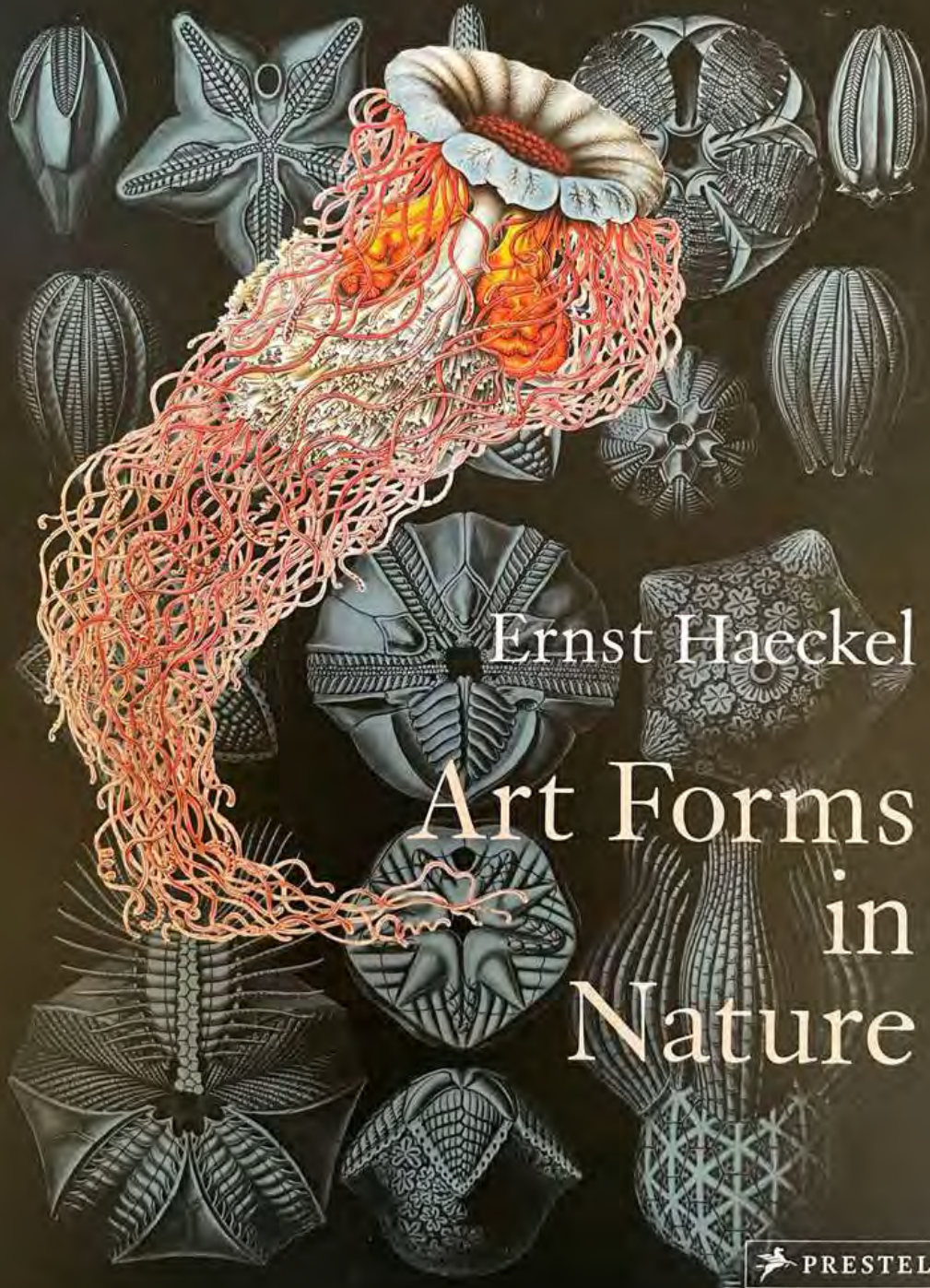




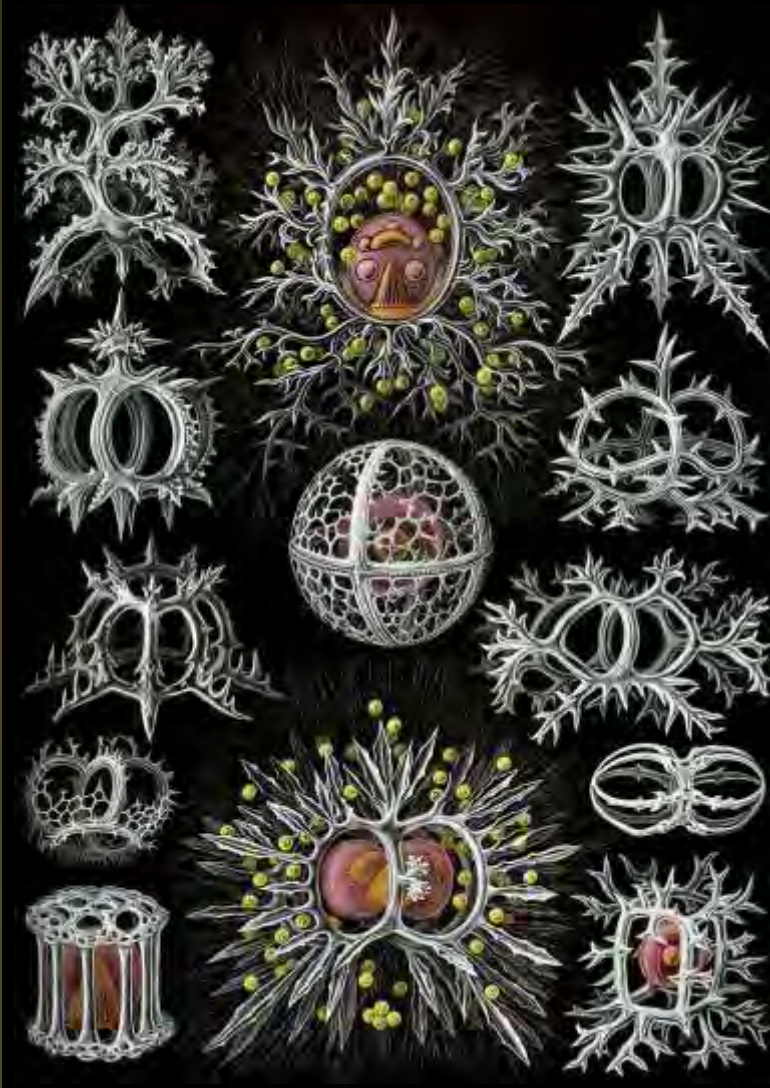






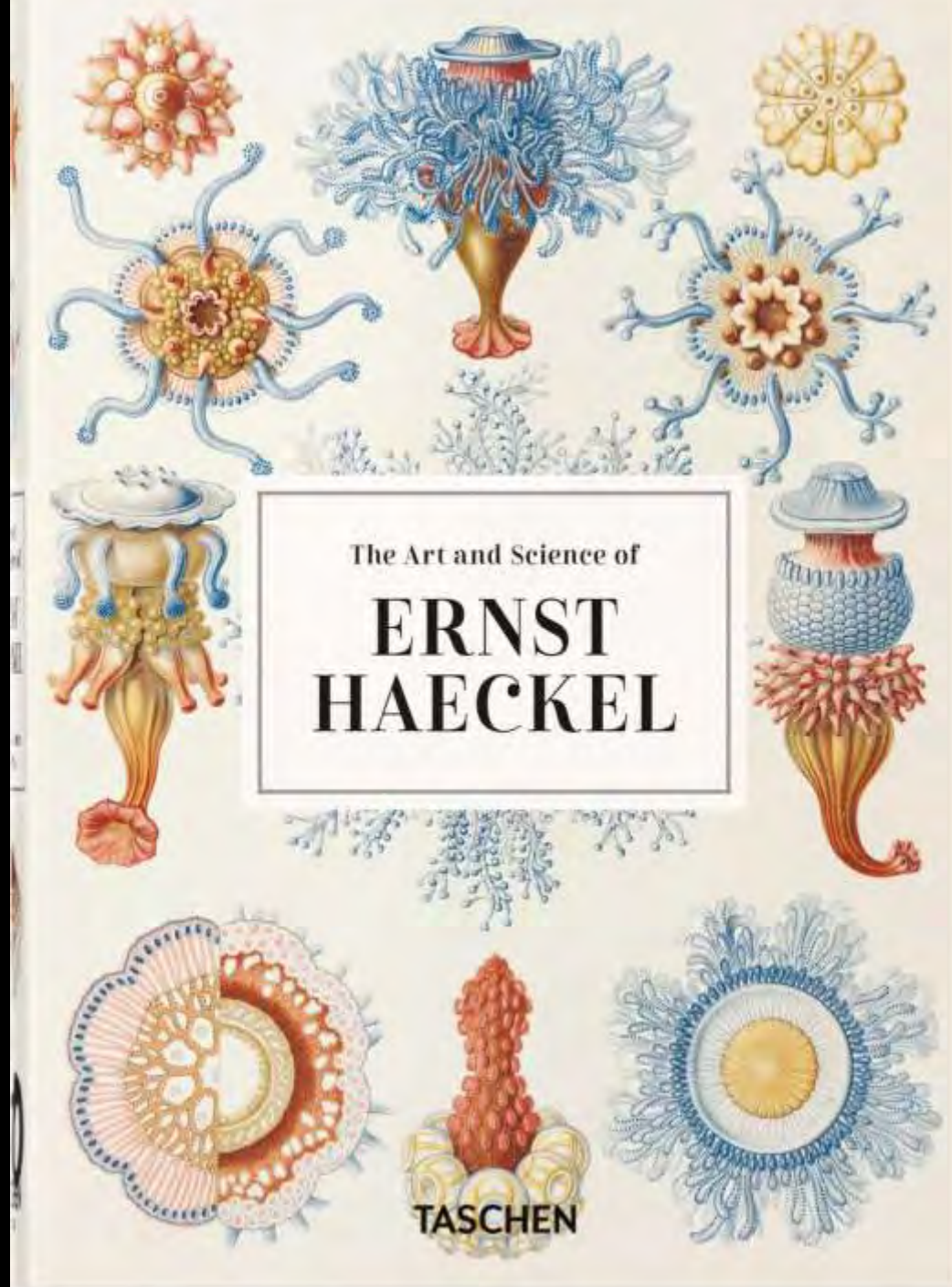


Ernst Haeckel  
Art Forms  
in  
Nature





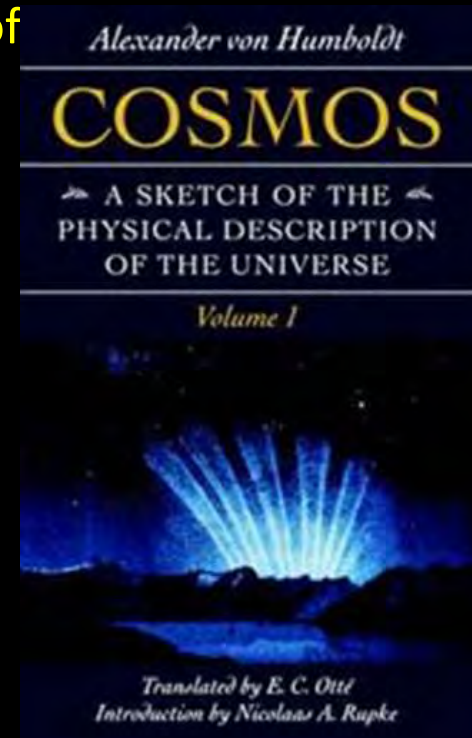
Ernst Haeckel 1834–1919





# Humboldtian Cosmos - A Vision of the Unity of Nature

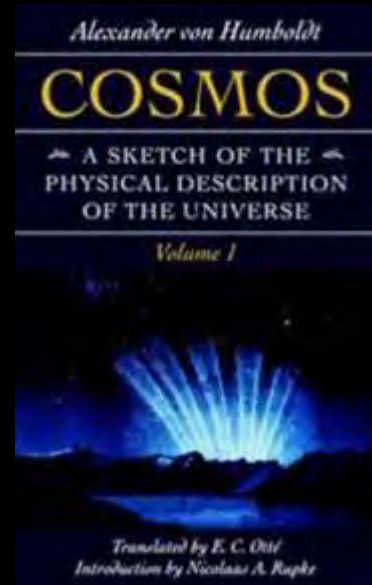
- The Cosmos is both ordered and beautiful.
- Nature and the human mind are a unity
- “Science begins where the mind takes hold of matter and attempts to subject the mass of experiences to a rational understanding; it is mind directed toward nature.” One simply cannot take mind out of the scientific equation.
- We must not “separate the sphere of nature from that of mind, since such a separation would reduce the physical sciences of the world to a mere aggregation of empirical specialties.”



# The Consolation of Nature

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

Cosmos 1:3





Applause





# Questions?







## Humboldt and the Geography of Nature

October – The Great Disruptors: Physical Geography as Modified by Human Action

November – The Earth Managers: New Science and Environmental Change

December – The Anthropocene: Gaia and the Geography of Nature

