

Natural History: Health, Wealth, & The Divine: Biodiversity & The Human Quest

Faculty: Robert A. Raguso, Director of Undergraduate Studies and Professor of Neurobiology & Behavior

Week One: July 5 – 11, 2026

Schedule: Monday - Friday, 9-12 and 1:30-3:30, except Wednesday afternoon.

Location: Kennedy Hall, room 461, some field work

Overview: This is a NEW COURSE, and there is no single text (yet!) that captures all that I will share with you this summer. Instead, we will sample a buffet of sources covering a grand historical (and prehistoric) sweep of time. I look forward to new themes and questions that will emerge from our shared explorations!

Required Reading: There is one assigned reading, a short review paper that I wrote, connecting Biodiversity and Coevolution to Ecosystem Services:

Raguso, R. A. (2021). Coevolution as an engine of biodiversity and a cornucopia of ecosystem services. *Plants, People, Planet*, 3(1), 61-73.

<https://nph.onlinelibrary.wiley.com/doi/full/10.1002/ppp3.10127>

Annotated Reading List: The following sources are suggested for context and enrichment. I have organized them loosely by day and topic, but you will find persistent themes that weave their way through the tapestry of our discussions all week long. Undoubtedly, each of you will add recommendations from your own personal reading and experience!

Monday, July 6, 2026: In the Beginning – The Biosphere and its Genesis

The Bible (Old Testament): Book of Genesis 1-11. No specific translation or printing – but this will get us started. We'll also discuss creation narratives from other, non-Judeo-Christian traditions.

Becoming Earth (2025 [Random House]) by Ferris Jabr. (Ch. 1). This exciting new book explores the (heretical!) idea that life, rather than being shaped and constrained by astro- and geophysics, has actively transformed our planet into Eden. Jabr deftly integrates writing about deep time with meditations about today's rapid transformation of the biosphere due to human activities.

<https://www.penguinrandomhouse.com/books/623907/becoming-earth-by-ferris-jabr/>

For less recent but equally engaging considerations of geology and deep time, I highly recommend John McPhee's Annals of the Former World (2000 [Farrar, Strauss & Giroux]), a compendium of several books (Basin and Range, In Suspect Terrain, Rising from the Plains, Assembling California) narrating the deep history of North America, and Bill Bryson's A Short History of Nearly Everything, (2003 [Broadway Books]) which addresses similar questions with Bryson's puckish sense of humor.

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Your Inner Fish (2008 [Random House]), by Neil Shubin (Chs. 1, 2). This book presents the most concise, cogent and powerful explanation of the predictive power of the fossil record that I know of. It is the perfect prelude to our field trip to the Museum of the Earth!

<https://www.penguinrandomhouse.com/books/166494/your-inner-fish-by-neil-shubin/>

Tuesday, July 7, 2026: Coevolution, Economics and Human History

The Botany of Desire (2002 [Random House]), by Michael Pollan (Chs. 1, 2 [apples, tulips]). Pollan is now established as an important voice in debates about nutrition, diet, sustainability and artificial intelligence, but this brilliant book was his opening salvo against plant-blindness. His premise is that despite being sessile, insentient and bereft of nervous systems, plants have deftly manipulated humans to do their bidding and thereby have molded human history in their own images, as it were.

<https://www.penguinrandomhouse.com/books/132200/the-botany-of-desire-by-michael-pollan/>

The radical notion that plants have (at the very least) co-domesticated humans finds traction here and, in the BBC, [1995, David Attenborough] series The Private Life of Plants:

<https://www.bbc.co.uk/programmes/b01qbw1w>

Tulipomania (2001 [Crown]) by Mike Dash (Chs. 10, 13). One of the major themes in our course is how human aesthetics (gems, flowers, perfumes), arguably an emergent property of our nervous systems, have driven cooperation, conflict and the narrative arc of human history. This book explores so many intriguing themes, from how the different aesthetic sensibilities of Ottoman and Dutch consumers shaped very different domesticated varieties of tulips, and how intense desire for scarce (and genetically unstable!) tulip varieties led to one of the first economic bubbles in history.

<https://www.penguinrandomhouse.com/books/36938/tulipomania-by-mike-dash/>

Orchid Fever (2001 [Vintage]) by Eric Hansen (Ch. 4). This remarkable book was a spinoff from Hansen's earlier journal describing his walk across Borneo (Stranger in the Forest, 1988), during which he encountered a strange subset of humanity (academic botanists, horticulturalists, plant poachers) with a shared, sometimes sinister obsession with orchids, also explored in The Orchid Thief by Susan Orlean. Unlike tulips, orchid diversity is off the charts (roughly 15% of all plant species are orchids) and orchid evolution has explored nearly all possible interactions with pollinators, especially deceptive ones.

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<https://www.penguinrandomhouse.com/books/74885/orchid-fever-by-eric-hansen/>

Wednesday, July 8, 2026: We Three Kings: Trade Routes, Scarcity and Wealth

A Natural History of the Senses (1990 [Vintage]) by Diane Ackerman (Ch. 1: Smell). Lushly written by one of Cornell's (PhD 1978) many home-grown writers, this book meanders through sensory experiences shaped and informed by the natural world. Not all readers have loved her exuberant and self-referential style, but to me her most salient point centers on the absence of an appropriate language with which to describe how we experience fragrances.

<https://www.penguinrandomhouse.com/books/445/a-natural-history-of-the-senses-by-diane-ackerman/>

A scientific counterbalance to Ackerman's flowery text is provided in this masterful review by anthropologist-linguist Asifa Majid:

Majid, A. (2021). Human olfaction at the intersection of language, culture, and biology. *Trends in Cognitive Sciences*, 25(2), 111-123.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(20\)30277-1?dgcid=raven_jbs_etoc_email](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(20)30277-1?dgcid=raven_jbs_etoc_email)

The Silk Roads (2015 [Vintage]) by Peter Frankopan (Chs. 1, 2, 8). In this amazing historical synthesis, the author reimagines central Asia as the crossroads of the ancient world, examining the millennial importance of "the 'Stans" as a crucible for faith, scholarship and commerce and the transition of the ancient world to a vast network linked by natural products, religious passions, imperial ambitions and pandemics.

<https://www.penguinrandomhouse.com/books/253699/the-silk-roads-by-peter-frankopan/>

A History of the World in 6 Glasses (2006 [Walker]) by Tom Standage (Chs. 9, 10: tea). As with Frankopan's later book, Standage adopts the interesting viewpoint of human history as a multifaceted gem, which he probes by examining the diversity of human beverages as distinct lenses through which to view history. For example, he contrasts the opposite impacts on clarity of thought and quality of convivial exchange between patrons drinking alcohol (a depressant) at a pub and those drinking coffee (a stimulant) in a café, and the effects of the latter on the Enlightenment.

<https://academic.macmillan.com/academictrade/9780802715524/ahistoryoftheworldin6glasses/>

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Cod (1997 [Random House]) by Mark Kurlansky (Chs. 1, 3). In this brisk, enjoyable read, Kurlansky explores the “discovery” of the Americas through one of history’s facets, the surprising importance of cod fisheries. From Viking voyages to the Boston Tea Party, this short book is full of jaw dropping surprises, including the key role of salted cod in the Triangle Trade (molasses – rum – slaves) between puritan New England, Europe and the West Indies.

<https://www.penguinrandomhouse.com/books/330809/cod-by-mark-kurlansky/>

Kurlansky’s follow-up, Salt (2003 [Random House]) is equally readable and jaw dropping, revealing how much of the history of war hinged upon access to salt deposits, and how the irregular distribution of same (as with gold, amber, lapis lazuli... quetzal feathers!) set the limits to empires and their defense. You’ll learn where Tabasco sauce really comes from!

<https://www.penguinrandomhouse.com/books/286432/salt-by-mark-kurlansky/>

Thursday, July 9, 2026: Nature’s Bounty: Ecosystem Services & Biomimicry

Biodiversity (1988 [National Academy Press]) ed. by E.O. Wilson (Ch. 10: The value of a weedy tomato, by Hugh Iltis). A remarkable essay that brings the reader on a low cost, low impact plant collecting expedition in the Andes that leads to an immeasurable economic payoff for the commercial tomato industry (increased pulp content and drought resistance), the ultimate payback of tax-dollar investment in exploratory research.

<https://www.nationalacademies.org/projects/DELS-BLS-19-P-150/publication/989>

Here are two examples of “frivolous” research that is constantly lampooned by politicians, such as (deceased) US Senator William Proxmire’s “Golden Fleece award”:

Pro: <https://www.taxpayer.net/golden-fleece-award/>

Anti: <https://www.penguinrandomhouse.com/books/216369/creativity-inc-the-expanded-edition-by-ed-catmull-with-amy-wallace/>

1. The discovery of **taq polymerase enzyme** at Yellowstone National Park, upon which all molecular biology, the human genome project and most modern medicine depend:

<https://www.nps.gov/articles/thermophile-yell.htm>

2. The discovery of **green fluorescent protein (gfp)** from jellyfish, now used as a marker gene for nearly all manipulative genetic research on agriculture and medicine:

https://www.nobelprize.org/uploads/2018/06/nobelguide_che.pdf

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Nature's Services (1997 [Island Press]) ed. by Gretchen Daily (Chs. 1, 2). This was one of the first edited volumes to tackle the question of assigning economic value to natural habitats, ecosystems, products and landscapes, a question that remains highly polarizing 30 years later. A key feature of ecosystem services is the invisibility of benefits that become apparent only when key systems are lost, such as mosquito control by bats, carbon sequestration by phytoplankton, the seeding of fisheries by coral reefs, tidal surge buffering by mangroves or crop fertilization by wild, unmanaged pollinators.

<https://islandpress.org/books/natures-services#desc>

Here you might return to Ch. 2 (Mammoth Grassland) in Becoming Earth by Ferris Jabr (see above), an intriguing discussion of how re-wilding Siberia with large ungulates might provide an ecological corrective for rapid thawing and carbon release (as methane) from the melting tundra.

30 Animals that Made us Smarter (2022 [BBC Books]) from the BBC video and podcast series narrated by Patrick Aryee. This is an easy read, written in conversational, informal style by the series host. It is valuable as a short catalog of biomimicry, ways that human industry and technology have been inspired by unapplied, discovery-based science.

<https://www.bbc.co.uk/programmes/w13xttw7/episodes/downloads>

1491 (2005 [Vintage]) Charles Mann (Ch. 6: Cotton and Maize). This book is simply amazing, documenting recent leaps in our understanding of pre-Columbian indigenous peoples in the Americas and their profound impact on the biota of the western Hemisphere. Ch. 10 (The Artificial Wilderness) is a devastating re-examination of the concept of unspoiled wilderness. Follow ups include 1493 (2011 [Random House]), which picks up the story of global change after the Columbian exchange, and The Wizard and the Prophet (2018 [Alfred A. Knopf]), which contrasts alternative world views (conservation/sustainability vs. technology-driven solutions) on how to address emerging environmental challenges.

<https://www.penguinrandomhouse.com/books/107178/1491-second-edition-by-charles-c-mann/>

Friday, July 10, 2026: Paradise Lost – Rapid Change in the Anthropocene

Several of the readings above (Mann – The Wizard and the Prophet; Jabr – Becoming Earth) provide roadmaps to thinking about a human dominated world. The selections below open

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windows into the past, particularly the “discovery” of biodiversity by Victorian naturalists foraging from post-glacial, industrially blighted landscapes in northern Europe.

[The Invention of Nature](#) (2016 [Vintage]) Andrea Wulf (Chs. 4-6). This is one of several recent books to explore the monumental intellect and cultural impact of Alexander von Humboldt, arguably the most famous man alive during an age of unusually illustrious folks (Napoleon, Jefferson, Beethoven). Beyond humanizing a legendary figure, Wulf reminds us that “natural philosophers” of Humboldt’s day did not differentiate between sciences, such that his own studies cut across (and in some cases invented) what are now separate disciplines (e.g. ecology, meteorology). Humboldt’s impact on a century of scientists (Darwin), artists (Church) and philosophers (Goethe) cannot be overstated.

<https://www.penguinrandomhouse.com/books/227866/the-invention-of-nature-by-andrea-wulf/>

Besides Darwin, two more acolytes of von Humboldt were Alfred Russel Wallace and Henry Walter Bates. Although they are now remembered as eminent, white-bearded scientists and pioneers in the study of evolutionary biology, Wallace and Bates were childhood friends sharing a passion for insects, who spent their early 20s on a shared expedition to Amazonia, financed by natural history collections sent back to Europe. The attitudes of Victorian writers have aged badly, making some passages painful to read, yet it is worth reading diaries of their travels to capture their euphoric sense of “Tropical Splendor” upon discovering unimaginably glorious species of animals and plants.

[The Malay Archipelago](#) (1869 [Dover]) Alfred Russel Wallace (Ch. XXXVIII: Birds of Paradise)

[https://wallace-online.org/converted/pdf/1890_MalayArchipelago_S715\[10th\].pdf](https://wallace-online.org/converted/pdf/1890_MalayArchipelago_S715[10th].pdf)

[The Naturalist on the River Amazons](#) (1863 [Penguin]) Henry Walter Bates (Chs. 1, 4)

<https://www.loc.gov/item/49032931/>

[The Sixth Extinction](#) (2014 [Henry Holt]) Elizabeth Kolbert (Chs. V-VII). An unsentimental, clear-eyed treatment of the rapid changes transforming natural habitats into human terraria. While the reader careens between catastrophic chapters of biodiversity loss, the emerging discourse is not about tree-huggers vs. cornucopian industrialists, but rather, whether humankind is knowingly degrading and destroying the life support systems upon which we all depend. A fitting place to end our week of explorations!

https://www.academia.edu/12525719/The_Sixth_Extinction_An_Unnatural_History_By_Elizabeth_Kolbert