

Writing for STEM

English Composition

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Responsibility Matrix

Assignment (60% of grade)

Three essays and a final (might be a take-home depending on your effort this semester). Follow the essay guidelines for word count, number of sources, formatting, etc....

Attendance and Class Participation (40%)

Come Prepared and Participate:

Attendance, completion of readings, participation in student-led class discussions, and completion of in-class writing assignments are a critical part of your grade. This part of your grade also includes a quiz on five vocabulary words taken from each essay. As you read each essay in the anthology, keep a notebook of words and definitions you do not know.

My style? I do not fail anyone. You will earn the grade you receive. Your fate is in your hands. Effort is directly related to your final grade.

How to think for this class ...

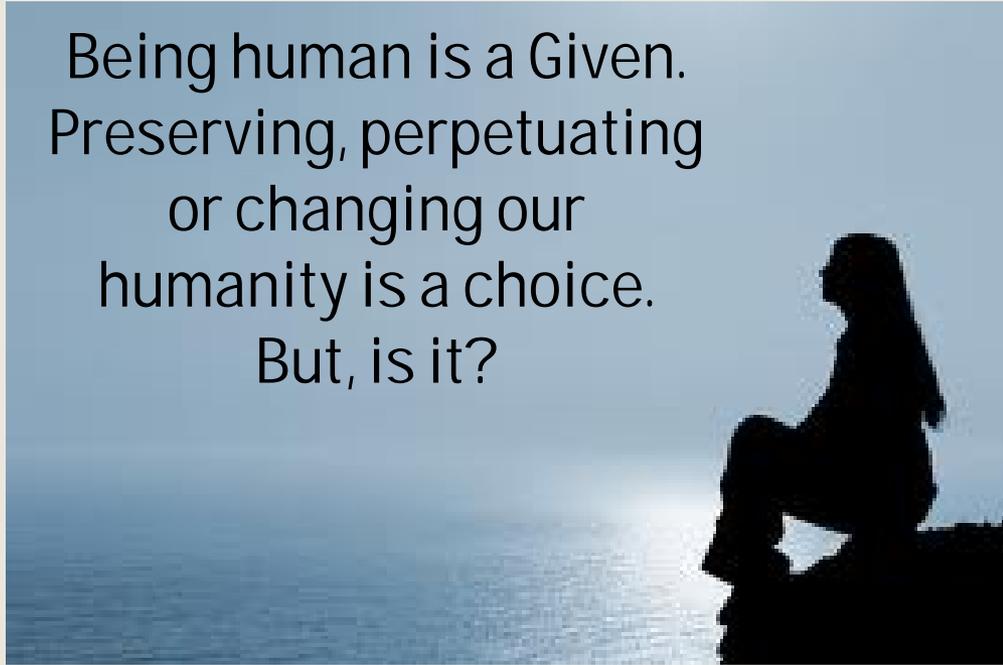
In this class we will NOT be looking for answers. Our quest will be for the next important question. During our class discussions, I'll ask you from time-to-time, "What is the next question?" as it relates to our discussion. Pay attention to the way that you are thinking when you are searching for questions as opposed to searching for answers.



Our biggest question?

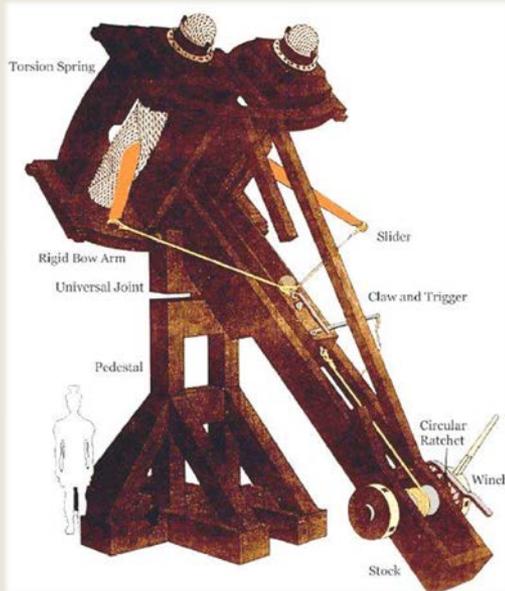
What does it mean to be human today? Tomorrow?

Being human is a Given.
Preserving, perpetuating
or changing our
humanity is a choice.
But, is it?



Science and Technology Content for English Composition Courses

Is it science vs. the humanities? Do you, as students, sometimes divide yourself and your fellow students up into “artsy” types and “science/math types?”



VS.?



The inescapable context of the “either/or” dichotomy-driven media culture of over specialization?

Conventional/Popular View of Science =

deductive reasoning, reductionism, abstractions, positivism/empirical evidence, overwhelming objectivity, abstractionism, either/or, black and white, finite, cause and effect, concrete, left brain, “all the answers,” consciousness is a byproduct of neural activity, a human being is no more than a highly sophisticated computer, the mind can be reverse engineered, science is not relativistic, the immediate end to the “animating principle,” Locke’s empiricism.

Materialist/Physicalist Monist: Nothing exists outside the tangible, material world, Consciousness is a simple by-product of the brain/central nervous system. Consciousness cannot “cause” anything.



Science Curricula?

vs.

Creative “Humanistic” view of science =

inductive reasoning, subjectivity, exploration, innovation, imagination, creativity, gray matter, infinite, entrepreneurial, art, “mystery embraced,” right brain, “answers are always and forever suspect and susceptible to reinterpretation,” consciousness is a synthesis of brain, body, and environment that is always in flux, science is not value free, Feyerabend’s *Against Method*, Kuhn’s *The [Real] Structure of Scientific Revolutions*, Karl Popper’s “critical rationalism” and rejection of classical empiricism.

Dualism: Either the mind and body work, in some way, independently, or there is a two way interaction between the two. (Can’t have one without the other.)

Relativism: Claims that truth, goodness, or beauty is relative to a reference frame and no absolute, over-arching standards to adjudicate between reference frames exists.



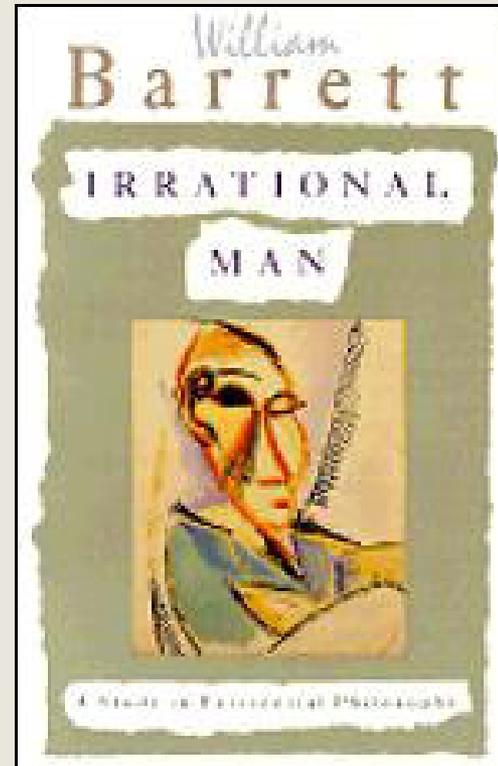
Humanities Curricula?

Science and Technology Content for English Composition Courses

Has the battle for specialized training in education won out? At the expense of humanities? Are the questions the humanities asks outdated? Or needed now more than ever?

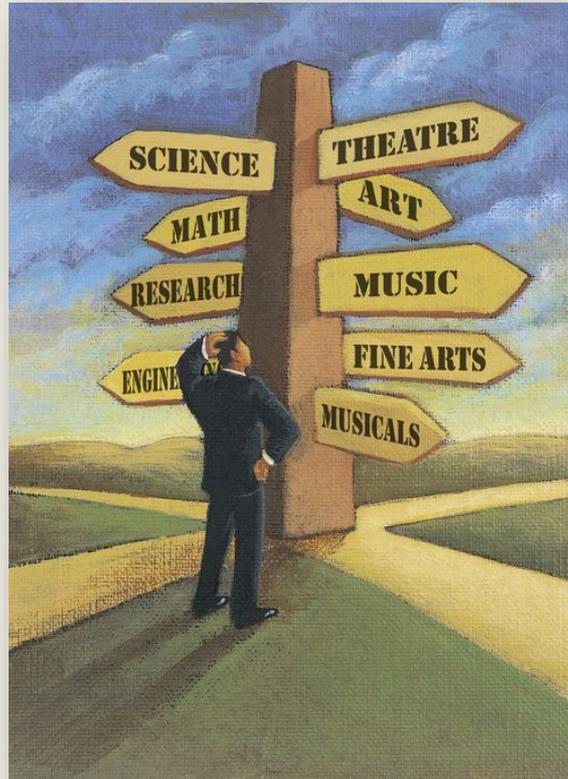
“Specialization is the price we pay for the advancement of knowledge. A price, because the path of specialization leads away from the ordinary and concrete acts of understanding the terms of which man actually lives his day-to-day life.”

—William Barrett, *Irrational Man*



Science and Technology Content for English Composition Courses

Science seems to have an “everything is empirical, everything can be reduced” image problem with many in the humanities and the humanities seem to have a “we will never know everything there is to know about any one thing, let’s party with subjectivity, and, yes, emotions matter” image problem with those in the sciences.



Is our responsibility to teach future STEM professionals austere methods in writing that only lend themselves to analytical organization, linear sequencing, and reductionist rhetorical strategies? Or, should we also explore the iconic humanities question when we develop our curricula/assignments— What does it mean to be human?—a question that lends itself to imagination, creativity, mystery in various contexts? Today, is there a better context than science and technology in which to ask this question?

Everything seems to keep coming at us at an accelerated, non-linear rate ...



“An analysis of the history of technology shows that technological change is exponential, contrary to the common-sense ‘intuitive linear’ view. So we won’t experience 100 years of [scientific and technological] progress in the 21st century — it will be more like 20,000 years of progress (at today’s rate). The “returns,” such as chip speed and cost-effectiveness, also increase exponentially. There’s even exponential growth in the rate of exponential growth.”

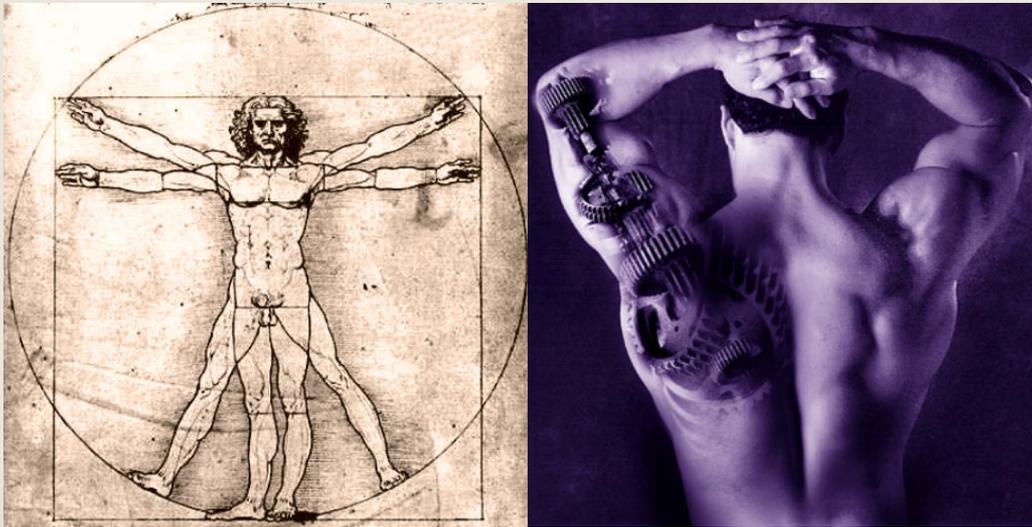
--Ray Kurzweil

<http://www.youtube.com/watch?v=EX69E-eoWVM> Ray Kurzweil: The Law of Accelerating Returns 4:00 – 7:00

Science and Technology Content for English Composition Courses

Previous to the 20th Century, science and technology were products of the metaphysical culture, the humanities tradition that—within political, economic, and social contexts—inspired critical and imaginative thought, argumentation, exploration into the pervasive question What does it mean to be human?

Today, is science and technology still part of this culture? Or, because of the accelerated, exponential rate at which technological change occurs, are we proceeding at a rate that precludes the possibility of asking? Even in the 20th century, we discussed, but did not necessarily vote on: gas combustion engines, the pill, computers, etc ...



Our biological bodies are inadequate, antiquated, dysfunctional, inappropriate for the challenges of any progress we can now readily conceive. We need technical updates, new ways to define health and advancement. It's only through science and technology that this can happen. Will we leave the old ideas of what it means to be human behind?

Science and Technology Content for English Composition Courses

“We are on the cusp of a twenty-first-century scientific renaissance. Science is driving our culture and conversation unlike ever before, transforming the social, political, economic, aesthetic, and intellectual landscape of our time. Today, science is culture. As global issues—like energy and health—become increasingly interconnected, and as our curiosities—like how the mind works or why the universe is expanding—become more complex, **we need a new way [or a return to the 19th century] of looking at the world that blurs the lines between scientific disciplines and the borders between the sciences and the arts and humanities.**”

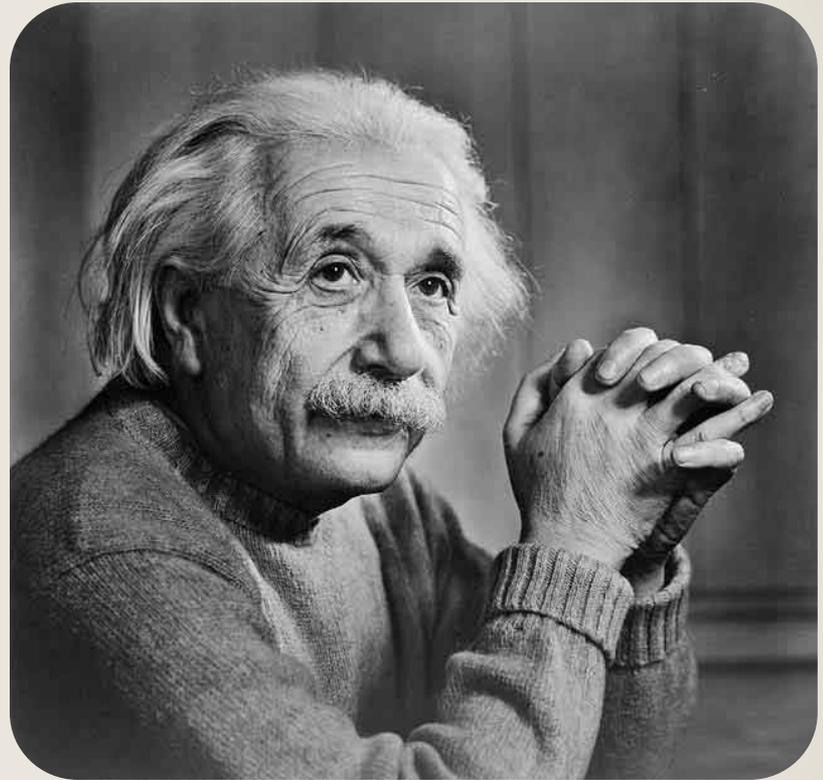
Adam Bly
Science is Culture

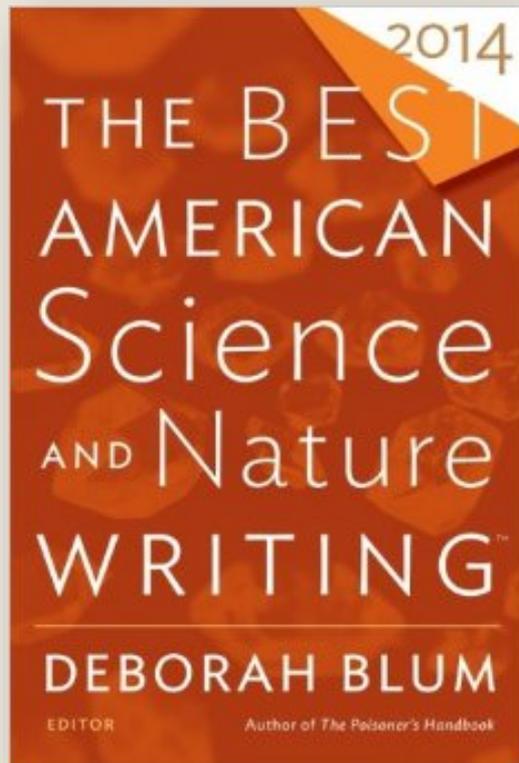


Science and Technology Content for English Composition Courses

Imagination is more important than knowledge, for knowledge is limited to all we know and understand, while imagination embraces the entire world, and all there ever will be to know and understand.

—Albert Einstein





Guest Editor Deborah Blum writes in the introduction: *In the stories we tell, the ones that really do justice to the scientific process, we show our readers that arc—the curving, complicated line that links discovery and development, choice and consequence. It sounds like such a simple thing. But it’s when we connect the dots that we can connect with our readers in a richer sense. We remind them of the role that research and its results play in their own lives.*

What's coming ...

<http://www.youtube.com/watch?v=8eprl7c0rks> Designing Humanity - Genetic Engineering, 3 min

<https://www.youtube.com/watch?v=bEdvQjTGYP8> We can reprogram life. How to do it wisely | Juan Enriquez, 15m

<https://www.youtube.com/watch?v=Syi9bqfFldY> Juan Enriquez: Will our kids be a different species? 17m

<https://www.youtube.com/watch?v=1Ugo2KEV2XQ> The coming transhuman era: Jason Sosa at TEDxGrandRapids, 15 min.

<https://www.youtube.com/watch?v=D5ShvYrYnxo> Future of the Mind, Michio Kaku, 13 min.

<http://www.youtube.com/watch?v=ofHhzzTA6bk> Dr. Michio Kaku on His New Book, "Physics of the Future: How Science Will Change Daily Life by 2100

<http://www.youtube.com/watch?v=fhJoSoqtiPg> - Michio Kaku on the Future of Science – 7:30

<http://www.youtube.com/watch?v=dTi4v3HveqE> Michio Kaku: The Dark Side of Technology 6 min

https://www.youtube.com/watch?v=VAh_vOWi-VY "Questions W/ Answers and Questions W/O Answers": Dr. Alan Lightman, 58:20

Method ...

<https://www.youtube.com/watch?v=e8-ugU0bpJs> Is science value- and emotion-free? - EO Wilson, 5 min

<https://www.youtube.com/watch?v=YltEym9H0x4> – Richard Feynman on knowing, 4min

<https://www.youtube.com/watch?v=9kirzr6lnSs> – Richard Feynman, Disrespect for Respectable, 9 min

https://www.youtube.com/watch?v=_sAfUpGmm4 – Feynman, the way nature works, 6 min

Humanity/Existence ...

<https://www.youtube.com/watch?v=qzQBFIrRpK> E.O. Wilson explains the meaning of human existence, in 6 min.

<https://www.youtube.com/watch?v=lx26k8LTCdI> E.O. Wilson: Science, Not Philosophy, Will Explain the Meaning of Existence, 9 min

<https://www.youtube.com/watch?v=4Qhlp-X3EHA> Dialogue: What is the Role of Science in Morality? 35 min.

Essay #1: *Mixed Up*, by Katherine Bagley

Essay Question:

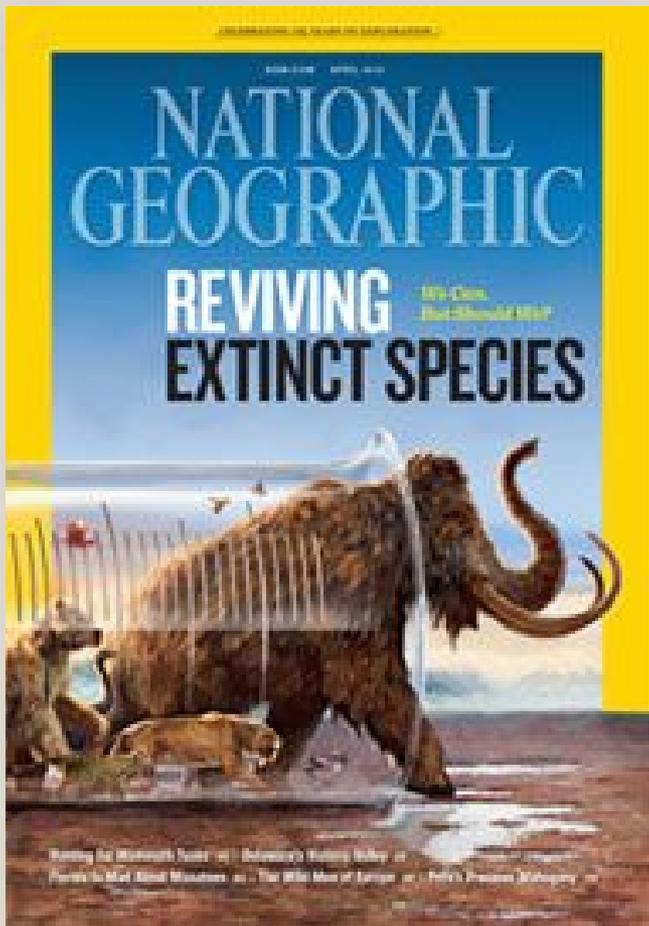
Changes in climate are causing shifts in habitat for many species, threatening their survival and “life as they’ve known it.” Hybridization is a result, where one species interbreeds with another. “Unnaturally speeding up the hybridization process can significantly affect biodiversity and the animals themselves,” Bagley writes. “Pairings in which one parent species is threatened usually hasten its decline, though scientists aren’t certain why one set of genes wins out over the other ...” In the essay it is mentioned that “Currently, the Endangered Species Act does not protect hybrids.” Write a response that addresses whether or not the Act should protect hybrids or not? What would be the consequences of protecting or not protecting hybrid species if either species is already endangered?



Golden Winged Warbler



Blue Winged Warbler



Are we headed for a dark future where "Watchers technology" is fully unleashed? Will it be a future where "man-made life" and bizarre human-animal hybrid creatures are free to roam and breed and spread across the face of the earth? Such notions would have once been too bizarre for most science fiction novels, but genetic engineering technology has advanced to such a degree today that it is really hard to say what "life" will look like on earth in the coming decades. At this point there are very few restrictions remaining on fields such as nanotechnology, biotechnology, synthetic biology, cloning and genetic modification. All over the world, scientists are feverishly combining different kinds of animals together, adding plant genes to certain animals, and even putting human DNA into plants and animals. Life as we know it is literally changing, and it is very hard to tell what the future is going to look like if all of this continues.

<http://www.youtube.com/watch?v=d-ZCuNKnxNE> Hybrids-Genetically Crossing Humans and Animals, 15 min

<http://www.youtube.com/watch?v=AdzepK-LVtU> The Age of Transitions (full length documentary), 58 min

<http://www.youtube.com/watch?v=CcnTdO47p0Q> Trans-Humanism / Genetic Modification of all Life / Nano-Technology / HAARP / Geoengineering – Film, 1:37:00



There've been interesting creatures popping up in the Arctic. Hunters have found white bears with brown tints—a cross between *Ursus maritimus*, the polar bear, and *Ursus arctos horribilis*, the grizzly.

<https://www.youtube.com/watch?v=ZHBI7ggw53o> The Top 10 Hybrid Animals - Real Hybrid Animals - Hybrid Animals List, 3 Min.

<https://www.youtube.com/watch?v=1NvBckGLNCE> 10 Most Amazing Animal Hybrids, 3.5 Min

Essay Question:

Hybridization

What question can you come up with that addresses this issue of hybridization? It isn't just happening "naturally" in the wild, but also through experimentation in laboratory research. Should this be illegal? Regulated? Is it ethical? What if this process of hybridization was practiced with humans? Are there any benefits? Is there ethical fallout? Biologist Richard Dawkins has written that "our ethics and our politics assume, largely without question or serious discussion, that the division between human and 'animal' is absolute." Argue, write an essay, whether you believe this statement is true or false, that the division between humans and animals is absolute. Why or why not?

Essay #2: *The Great Forgetting*, by Nicholas Carr

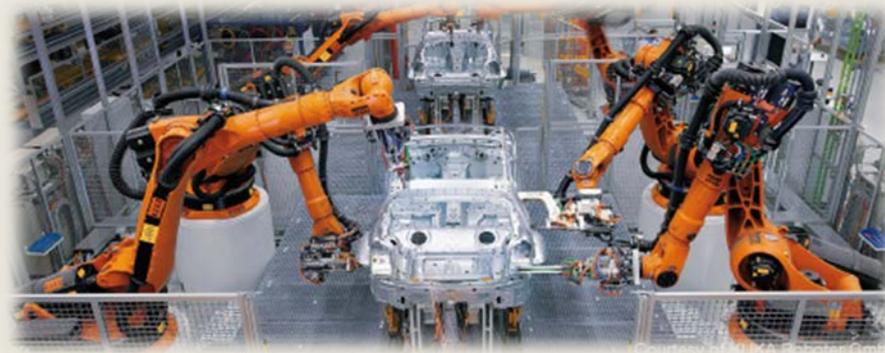
Essay Question:

Like much of Nicholas Carr's work, he exposes the affects that the culture of modern digital technology have on the way we think, the way we are rewiring our brains. For this essay response, respond (develop an effective thesis) to any of the following direct or paraphrased comments in *The Great Forgetting*:



P.10: *Because automation alters how we act, how we learn, and what we know, it has an ethical dimension. The choices we make, about which tasks we hand off to machines, shapes our lives and the place we make for ourselves in the world.*

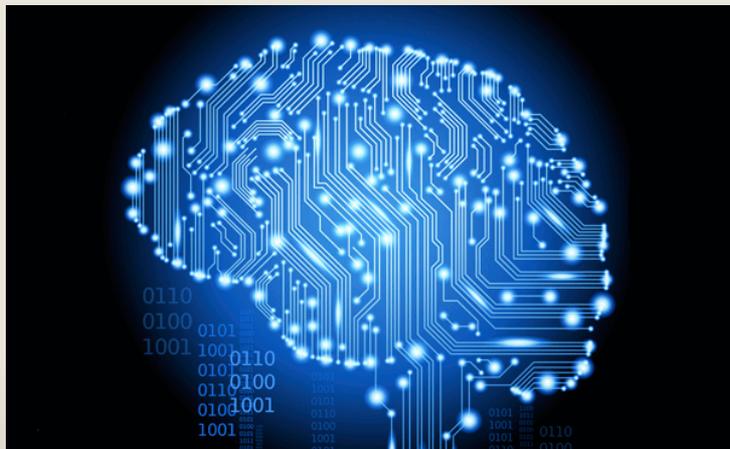
P.11: *Many software programs take on intellectual work—observing, sensing, analyzing, and judging, even making decisions—that until recently were the preserve of humans. Rather than opening new frontiers of thought and action, software (automation) ends up narrowing our focus. We trade subtle, specialized talents, for more routine, less distinctive ones.*



Essay Question:

Automation, What the Internet is Doing to Our Brains

Nicholas Carr's work on automation is an extension of his work on how the internet is affecting our thinking. Or, even, how digital technology in general is affecting the way we think. It is hard for those of you born in the era of digital communication to understand how different thinking today might be compared to how most people thought a generation ago. Cognitive skills like sustained focus and concentration, and memory seem to be profoundly challenged by our immersion in communication technology. For this essay, develop a position on whether digital communication technology is having a positive or negative impact on how our brains are functioning.



the Atlantic

Is Google Making Us Stupid?

What the Internet is doing to our brains

By [Nicholas Carr](#)

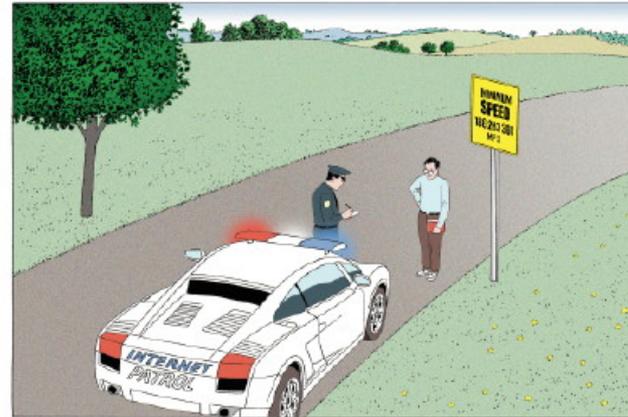
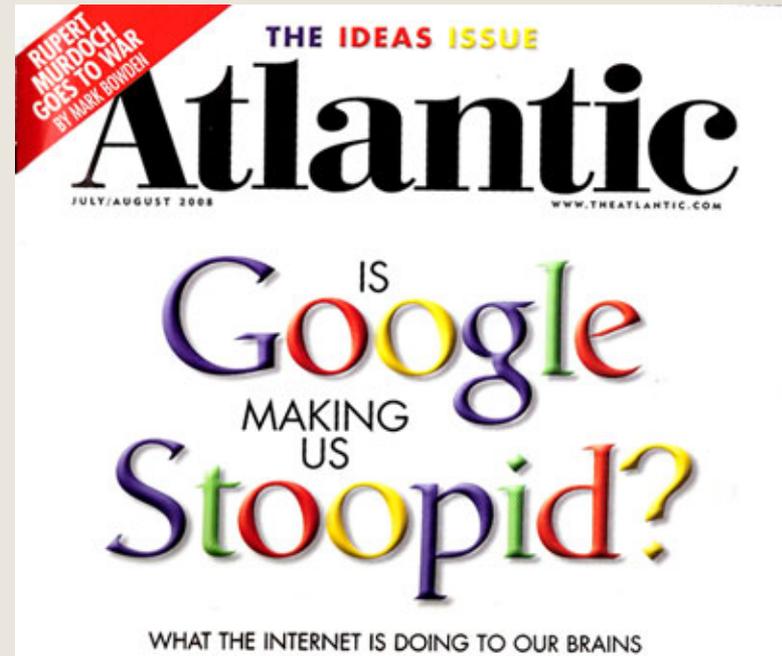


Illustration by Guy Bilout

"Dave, stop. Stop, will you? Stop, Dave. Will you stop, Dave?" So the supercomputer HAL pleads with the implacable astronaut Dave Bowman in a famous and weirdly poignant scene toward the end of [Stanley Kubrick's 2001: A Space Odyssey](#). Bowman, having nearly been sent to a deep-space death by the malfunctioning machine, is calmly, coldly disconnecting the memory circuits that control its artificial "brain." "Dave, my mind is going," HAL says, forlornly. "I can feel it. I can feel it."

I can feel it, too. Over the past few years I've had an uncomfortable sense that someone, or something, has been tinkering with my brain, remapping the neural circuitry, reprogramming the memory. My mind isn't going—so far as I can tell—but it's changing. I'm not thinking the way I used to think. I can feel it most strongly when I'm reading. Immersing myself in a book or a lengthy article used to be easy. My mind would get caught up in the narrative or the turns of the argument, and I'd spend hours strolling through long stretches of prose. That's rarely the case anymore. Now my concentration often starts to drift after two or three pages. I get fidgety, lose the thread, begin looking for something else to do. I feel as if I'm always dragging my wayward brain back to the text. The deep reading that used to come naturally has become a struggle.

I think I know what's going on. For more than a decade now, I've been spending a lot of time online, searching and surfing and sometimes adding to the great databases of the Internet. The Web has been a godsend to me as a writer. Research that once required days in the stacks or periodical rooms of libraries can now be done in minutes. A few Google searches, some quick clicks on hyperlinks, and I've got the telltale fact or pithy quote I was after. Even when I'm not working, I'm as likely as not to be foraging in the Web's info-thickets' reading and writing e-mails, scanning headlines and blog posts, watching videos and listening to podcasts, or just tripping from link to link to link. (Unlike footnotes, to which they're sometimes likened, hyperlinks don't merely point to related works; they propel you toward them.)



<http://www.theatlantic.com/magazine/archive/2008/07/is-google-making-us-stupid/6868/>

http://www.youtube.com/watch?v=W86P_FX6PdI Nicholas Carr: The Internet Weakens Deep Thinking, 5 min interview

<http://www.edge.org/video/the-age-of-the-informavore> THE AGE OF THE INFORMAVORE, Edge.org, 30 min

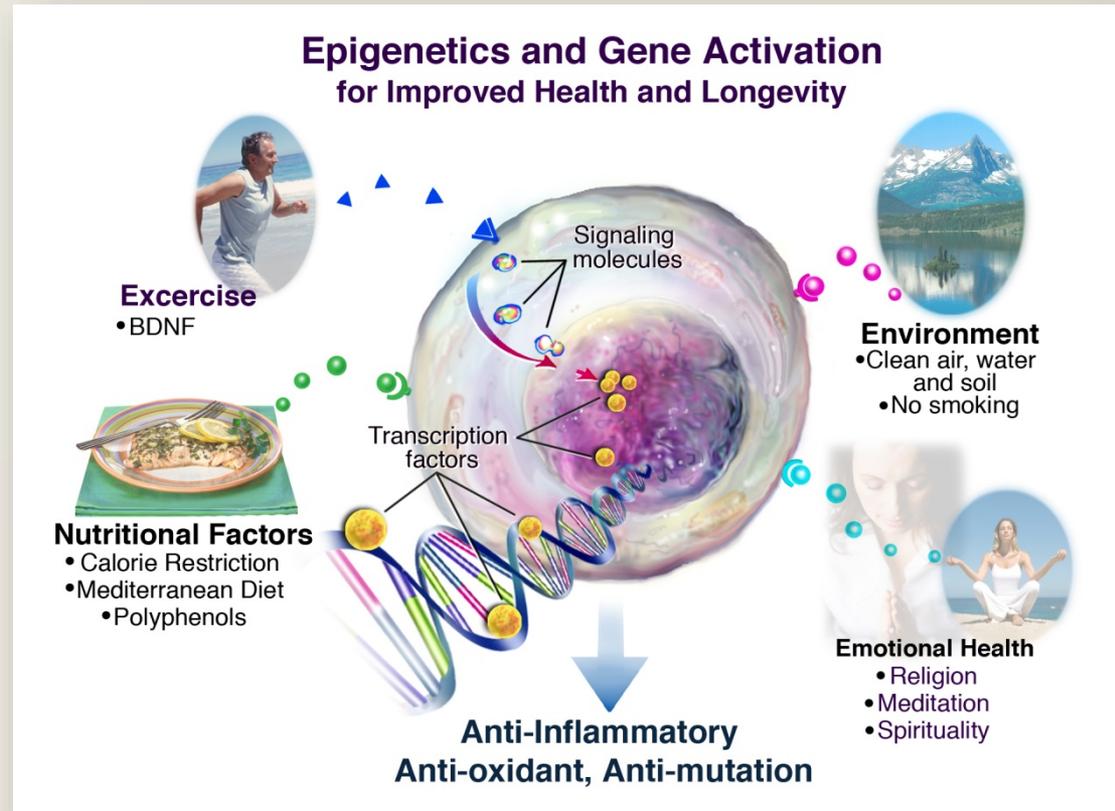
<https://www.youtube.com/watch?v=MtLVCPzIiNs> Sherry Turkle Alone Together, 16.5 Min

Essay #3: *The Social Life of Genes*, David Dobbs

Essay Question:

Most people think that our DNA gives us a “blueprint” for life, that our physical appearance and mental and emotional characteristics are pre-programmed according to our genetic code. The field of epigenetics points to the overriding influence environment can have on who we are. Compose a strong thesis and a well-developed essay in response to any of the following quotes taken from the essay:

P.24: *Why would we have evolved this way? The most probable answer is that an organism that responds quickly to fast-changing social environments will more likely survive them. That organism won't have to wait around, as it were, for better genes to evolve on the species level.*



Essay #3: *The Social Life of Genes*, David Dobbs

Essay Question, cont:

P.25: *The genes' ongoing, real time response to incoming information is where life works its many changes on us. This idea is both reductive and expansive. We are but cells. At each cell's center, a tight tangle of DNA writes and hands out the cell's marching orders. Between that center and the world stands only a series of membranes, porous membranes. Steve Cole then says: "We think of our bodies as stable biological structures that live in the world but are fundamentally separate from it, that we are unitary organisms in the world but passing through it. But what we're learning from the molecular processes that actually keep our bodies running is that we're far more fluid than we realize, and the world passes through us."*

P.26: Steve Cole: *"Everyday as our cells die off we have to replace 1-2% of our molecular being. We're constantly building and reengineering new cells, and that regeneration is driven by the contingent nature of gene expression. A cell is a machine for turning experience into biology."*

<https://www.youtube.com/watch?v=M4boKud1MRk> Epigenetics in NOVA SCIENCE , 13 min.

<https://www.youtube.com/watch?v=D44cu7v9x1w> Epigenetics Nova , 53 min.

<https://www.youtube.com/watch?v=JTBg6hqeuTg>, Epigenetics and the influence of our genes | Courtney Griffins | TEDxOU, 18 min

<https://www.youtube.com/watch?v=Udlz7CMLuLQ> Epigenetic transformation -- you are what your grandparents ate: Pamela Peeke at TEDxLowerEastSide , 21 min.

<https://www.youtube.com/watch?v=kp1bZEUgqVI>, Epigenetics, 9:30

Essay #4: *What Our Telescopes Could Not See*, Pippa Goldschmidt

Essay Question: In this beautifully written reflection, Goldschmidt recalls, with some measure of regret, that practicing the art and science of astronomy early in her career may have distracted her from the dehumanizing political fallout of the despotic military government of Chilean General, Augusto Pinochet. The essay, to some extent, illustrates how removed and neutral science can be from the sometimes destructive effects of human activities like politics. Is science (or should it be) a politically neutral endeavor? Or, will politics and the sometimes destructive tendencies and ambitions of human beings always play a role in science? What is the current relationship between science and politics? What subjects are vulnerable and why?



Atacama Desert

<https://www.youtube.com/watch?v=zrttEvYdTiY> A Typical Night of Observing the Southern Sky | Chile Chill | ESO Astronomy Space Science HD Video , 8 min.

<https://www.youtube.com/watch?v=H4Y2o1vS> NM Pure Nature Specials - Riddle of the Atacama Desert, 51 min.

https://www.youtube.com/watch?v=RdV_fZHCfco Starry Night in the Atacama | Chile Chill | ESO Astronomy Space Science HD Video, 6 min.



The military coup was supported by the CIA. Secretary of State Henry Kissinger played a direct role in the military plot. The U.S. feared a communist takeover.



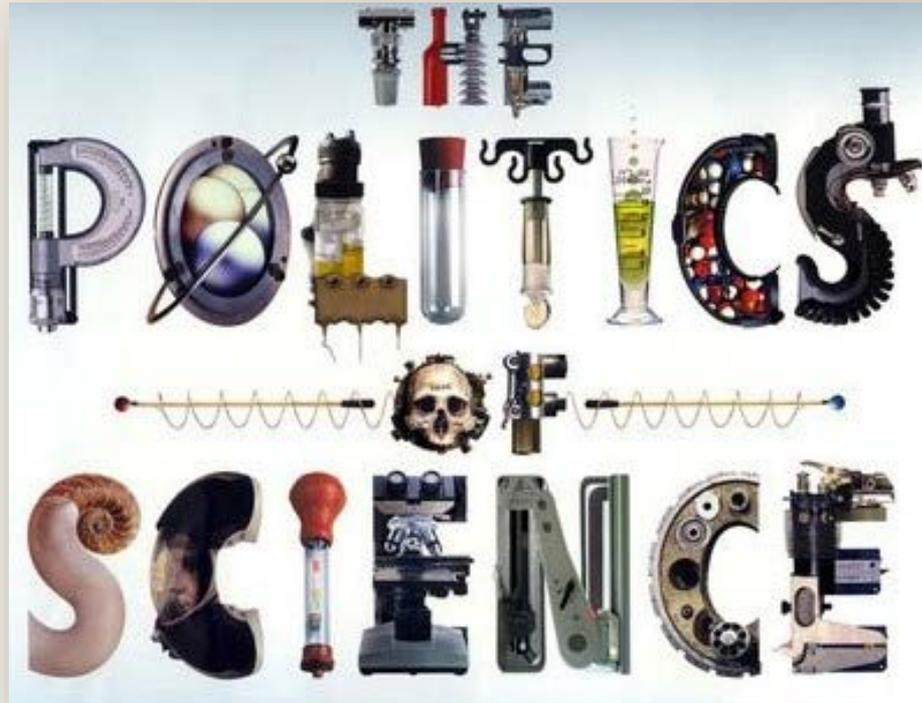
<https://www.youtube.com/watch?v=R-xnRLDM6rc> Crimes of Pinochet - Chile, November 1998, 18 min.

<https://www.youtube.com/watch?v=8R7MNnoYktM> CIA, Chile & Allende, 10 min.

<https://www.youtube.com/watch?v=pfRXLjhsSy4> Uncovering Pinochet's Secret Death Camps, 25 min.

Essay Question:

Read the essays and review the videos linked below. What is the relationship between science and politics and the public at large? Why is the public so mistrusting of science?



Why Do So Many Reasonable People Doubt Science?

<http://ngm.nationalgeographic.com/2015/03/science-doubters/achenbach-text> National Geographic

Americans, Politics and Science Issues

<http://www.pewinternet.org/2015/07/01/americans-politics-and-science-issues/> PEW Research, Go to “Interactive Maps.”

A Problem Like No Other: Science And Politics

<http://www.npr.org/sections/13.7/2014/06/10/320634230/a-problem-like-no-other-science-and-politics> NPR article

<https://www.youtube.com/watch?v=dohU61DuEaI> Neil deGrasse Tyson: Science and Politics, 5 min.

<http://www.cbsnews.com/news/rewriting-the-science/> 60 Minutes, Rewriting the Science of Climate Change, 3 min.

<https://www.youtube.com/watch?v=x7Q8UvJ1wvk> Who's More Pro-Science, Republicans or Democrats? - Neil deGrasse Tyson , 4:30

Essay #5: *A Race to Save the Orange by Saving Its DNA*, Amy Harmon

Essay Question:

This essay works to synthesize many of the global issues we face today. The orange (and orange juice) represent an important industry and an important fruit that contribute to overall nutrition. The orange has its own “natural” evolutionary history as does the bacteria that is now threatening its existence, or, at least causing a condition not conducive to human consumption. This is how nature works, everything is struggling to survive and function, everything is in flux. When it comes to humans making alterations on the genetic level to modify foods, as they have for centuries, as opposed to them happening due to other environmental influences, and preserve an industry and species of fruit, this concept has been propagandized by environmental groups claiming that these modifications are “unnatural.” Write an essay on whether you consume GMO’s (check your entire diet, you may be consuming them already and not know it) and whether you consider them to be natural or unnatural and why? Include a lengthy definition of what constitutes natural and unnatural and what determines either to be good or bad?



<https://www.youtube.com/watch?v=9mLTNDt-vqU> Bill Maher Talks Monsanto, Genetically Modified Food (GMOs) – HD 4 min

<https://www.youtube.com/watch?v=KNtCV67biBA> Neil deGrasse Tyson - responds to GMO Food Critics, 3 min

https://www.youtube.com/watch?v=M_ztZGbLEJ0 Genetically Modified Organism (GMO) - Myths and Truths, 7 min.

http://www.huffingtonpost.com/2015/05/11/bill-nye-gmos-changed-mind_n_7245092.html Bill Nye Explains Why He Changed His Mind About GMOs, 4 min.

Essay #6: *A Life-or-Death Situation*, Robin Marantz Henig

Essay Question:

For this response, after you've read and digested this emotional story, prepare your own living will. Yes, it still requires a thesis and outside sources, but, of course, can be written in first person.

Essay Question:

Do you believe someone close to death should be able to make the decision to invoke their own death? Do you believe in doctor assisted suicide? Why or why not?



Pros & Cons

Pros

- The right to die should be a fundamental freedom of each person
- Patients can die with their dignity intact instead of their illness reducing them to a shell of a person
- Health care costs can be reduced
- Tremendous pain and suffering of patients will be addressed
- Pain and suffering of patient's family & friends can be lessened and they can say their final goodbyes

Cons

- A request for assisted suicide is typically a cry for help
- Suicidal intent is typically transient
- Terminally ill pt who desire death are depressed and depression is treatable in those with terminal illness
- Pain is controllable
- Legalizing for those with terminal illness has spread to non voluntary euthanasia

<https://www.youtube.com/watch?v=VTBtHTyKUwo> End of Life Decisions: Why Aren't We Talking? – 2 min

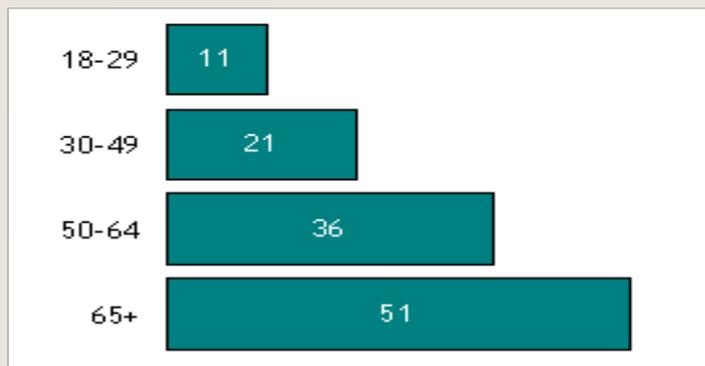
<https://vimeo.com/92617605> End of Life Decisions: Can We Talk About It? 2:30

https://www.youtube.com/watch?v=XDOzT3_HfwI Assisted suicide on TV for first time, 3:30

https://www.youtube.com/watch?v=s_IR5uSemSE Assisted Suicide | Harriet Scott's Story | Last Right Series, 15 min.

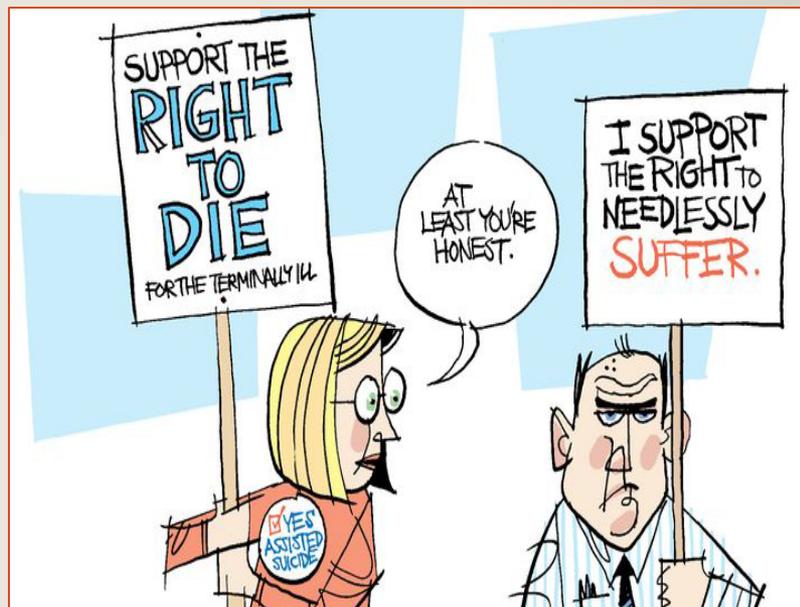
Planning for the Future

% who have written down their wishes for end-of-life medical treatment



Source: Pew Research Center for the People & the Press January 5, 2006 survey report "Strong Public Support for Right to Die."

PewResearchCenter



Opinion Still Divided on Doctor-Assisted Suicide

% of U.S. adults who say they approve or disapprove of laws to allow doctor-assisted suicide for terminally ill patients

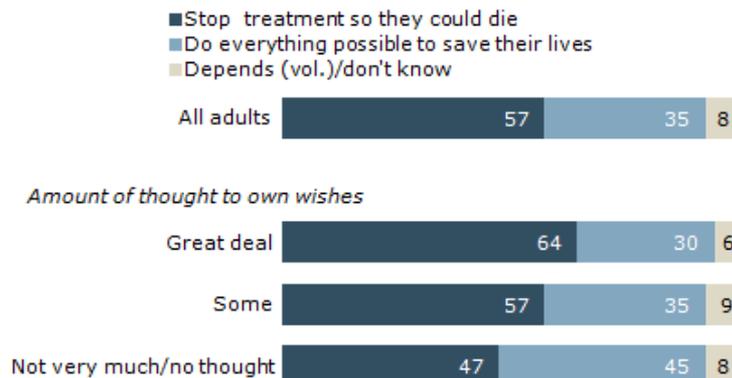
	2005	2013
Approve	46	47
Disapprove	45	49
Don't know	9	3
	100	100

Source: Pew Research Center survey March 21-April 8, 2013. Q26. Figures may not add to 100% due to rounding.

PEW RESEARCH CENTER

Personal Preferences by Prior Thought to Own Wishes

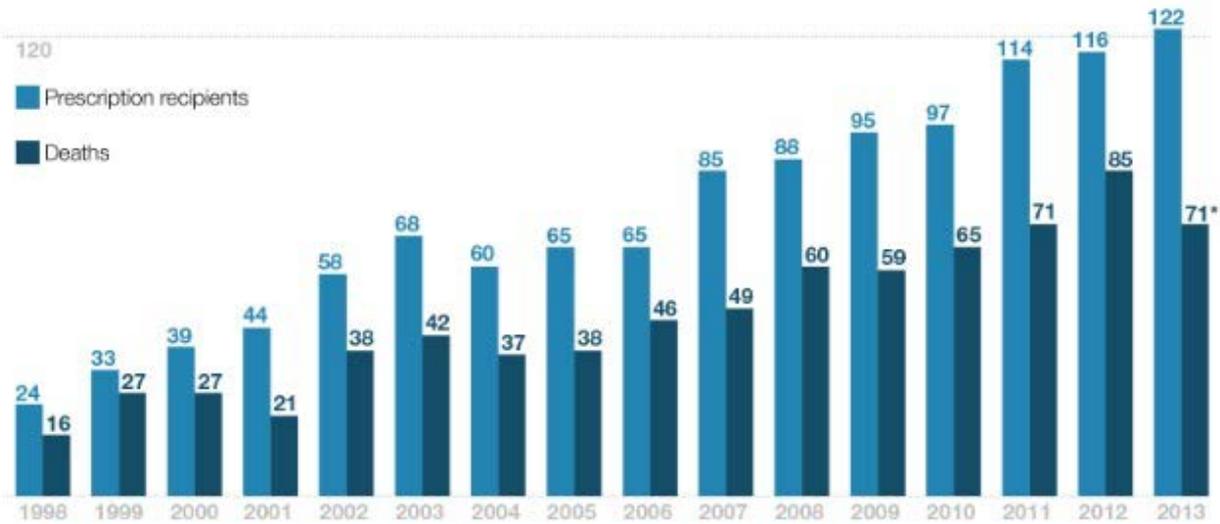
% of U.S. adults who say they would tell their doctors to ... if they had a disease with no hope of improvement and were suffering a great deal of pain



Source: Pew Research Center survey March 21-April 8, 2013. Q31. Figures may not add to 100% due to rounding.

PEW RESEARCH CENTER

Oregon Death with Dignity Act prescription recipients and deaths*, 1998-2013



Source: Oregon Health Authority

* as of January 22, 2014

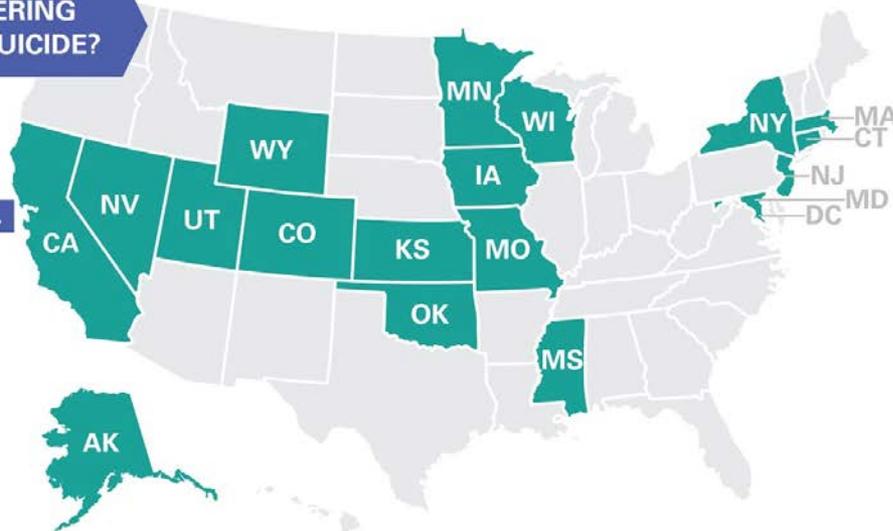
IS YOUR STATE CONSIDERING PHYSICIAN-ASSISTED SUICIDE?

In 2015, at least **18** states and the District of Columbia are considering whether to allow

PHYSICIAN-ASSISTED SUICIDE.

States considering legislation to allow physician-assisted suicide

*as of March 19th, 2015



Essay #7: *23 and You*, Virginia Hughes

Essay Question:

Buy a genetic test kit from 23 and You, or any other viable genetic ancestry service and, along with additional research on genealogy, write an essay on how the results affected you?

Essay Question:

Given all the privacy concerns surrounding commercial genetic testing, do you think the Genetic Information Nondiscrimination Act (GINA) passed by the U.S. in 2008 can really function to protect an individual's genetic information from insurance companies and potential employers who might use the information against them? Why or why not?



p.91: Risks and Considerations Regarding 23andMe Services:

- Once you obtain your genetic information, the knowledge is irrevocable.
- You may learn information about yourself that you do not anticipate.
- Genetic information you share with others could be used against your interests.

https://www.youtube.com/watch?v=-cu_OrctmeM What is genetic testing? 11 min.

<https://www.youtube.com/watch?v=OV6eWmaXsgU> 23andMe Genetic Testing: My Experience, 3 min.

<https://www.youtube.com/watch?v=jLm0UISmDsA> Sibling 23andMe DNA Test , 6 min.

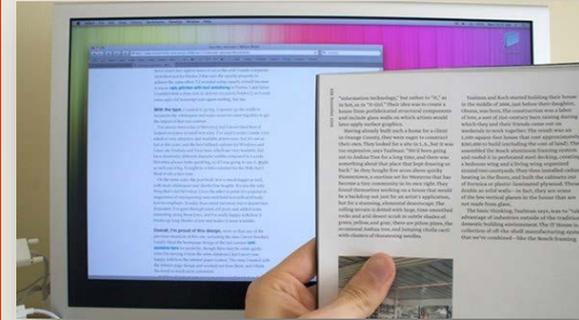
<http://www.nbcnews.com/nightly-news/genetic-testing-right-you-n362181> Is genetic testing Right For You: NBC News, 3 min.

<https://www.youtube.com/watch?v=Apjebtal8bQ> Ethical, Legal and Social Implications of Genetic Knowledge, 1:30

Essay #8: *Why the Brain Prefers Paper*, Ferris Jabr

Essay Question:

Does the written word appear more “immediate” on screens as opposed to paper? Is the printed word on paper becoming obsolete? Are books becoming obsolete? Given that a distinct set of cognitive skills are lost if one reads strictly from screens, is this a good or bad thing? Or, is it just inevitable that all of our written material will be screen-based in the future? As you respond to this question, keep in mind the title of the essay, “Why the brain prefers paper.”



p.99: ... we are not born with brain circuits dedicated to reading, because we did not invent writing until relatively recently in our evolutionary history, around the fourth millennium B.C. So in childhood the brain improvises a brand new circuit for reading by weaving together various ribbons on neural tissue devoted to other abilities such as speaking, motor coordination, and vision.

p. 101: ... seventy-two tenth-grade students studied one narrative and one expository text. Half the students read on paper, and half read PDF files on computers. Afterward, students completed reading comprehension test, during which they had access to the texts. Students who read the texts on computers performed a little worse ...

<http://www.wnyc.org/story/reading-screens-messing-your-brain-so-train-it-be-bi-literate/>

<https://www.youtube.com/watch?v=sKdGQ-p2sxA> e-books vs. print, long live the book? 10 min

<https://www.youtube.com/watch?v=IGsx-VJ3e8M> , Stephenn King on e-books, 4 min

https://www.youtube.com/watch?v=T5BiMf_wbcQ e-books vs real books, 6 min

<https://www.youtube.com/watch?v=D5vtXM2Q3Do>, Kindle vs Real Paper, 2 min

<https://www.youtube.com/watch?v=Urv1ldMUaLI> Adriaan Van der Weel_ From paper to screen reading: Implications for literacy and the book industry, 43 min

Essay #9: *O-Rings*, Sarah Stewart Johnson

Essay Question:

In this brilliantly structured and moving essay, Johnson makes several observations. On p.108 she quotes Edwin Mickleburgh who wrote in *Beyond the Frozen Sea* that “it [Antarctica] touches one so deeply that it is like a wound.” Then on p. 111 she observes the distinction between the “actuality” of exploration and the “romantic ideas” or notions that oftentimes drive it. What propels humankind to look beyond the obvious life-threatening hazards, the precarious conditions, to attempt any kind of exploration?



Captain Robert Scott led two British explorations to the Antarctic



https://www.youtube.com/watch?v=u0DSRM_novk, NEW 2015 - National Geographic WILD ANTARCTICA 2015 HD, 43 min.

<https://www.youtube.com/watch?v=b2Rp5pneE5I> Jeff Goldstein Interview on Human Exploration with the Ewing Marion Kauffman Foundation, 18 min

<https://www.youtube.com/watch?v=YzhSmnGcSkE> The Exploration and Colonization of Mars: Why Mars? Why Humans? | Dr. Joel Levine | TEDxRVA, 18 min

Essay #10: *When Animals Mourn*, Barbara King

Essay Question:

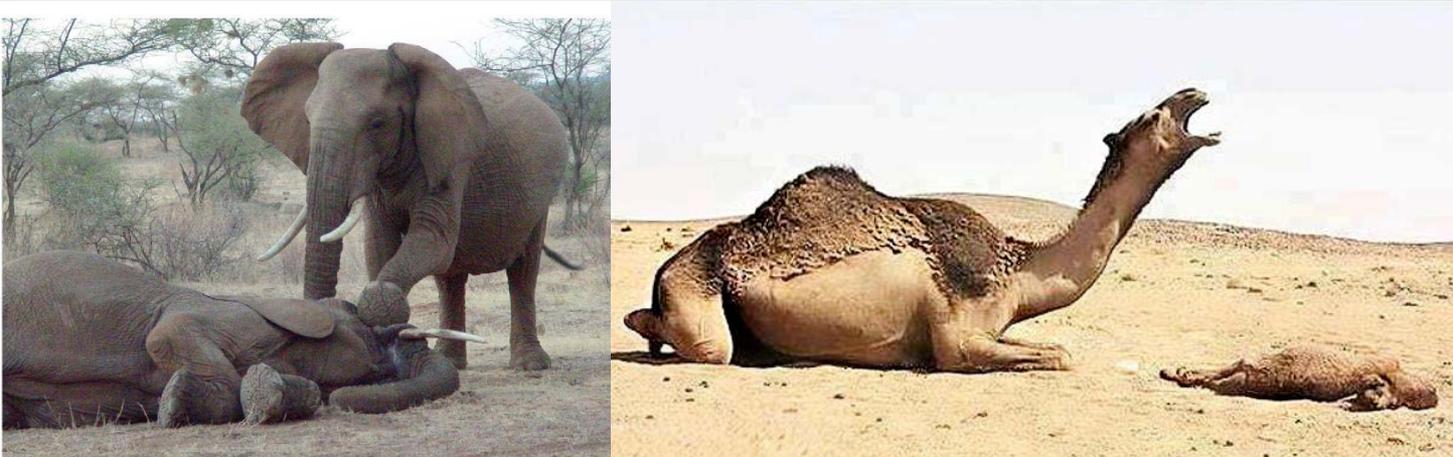
Although scientists struggle to admit their ideas and theories can be influenced by culture as opposed to direct observation and testing, when the history of science is examined, it's easy to see that ideas change over time. One can argue that there is an accumulation of observations and knowledge of the natural world that, regardless of culture reflects a more accurate understanding. But it's hard if not impossible to separate attitudes and ideas of the times and the influence they exert on how many of us, scientists and non-scientists alike, think. Why do you think the scientific community is now more open to the ideas that animals can mourn than, say, 100 years ago?

Essay Question:

Do you think or feel that animals mourn? Why or why not? Can animals love? Can they express sympathy? Empathy? Or is their behavior driven purely by instinct? If so, what is the difference?

Essay Question:

If the emotions that drive love and grief are adaptive, meaning the only reason we learned them was for survival, to perpetuate the species and our genetic lineage, why do you think that today there is a dearth of close relationships? That the need for intimacy is not as powerful a driver for survival. This is evidenced by the decline of marriage and having children. Is there a link?



p.115: On a research vessel in the waters off Greece's Amvrakikos Gulf, Joan Gonzalvo watched a female bottlenose dolphin in obvious distress. Over and over again, the dolphin pushed a newborn calf, almost certainly her own, away from the observer's boat and against the current with her snout and pectoral fins. It was as if she wanted to nudge her baby into motion—but to no avail. The baby was dead. Floating under direct sunlight on a hot day, its body quickly began to decay; occasionally the mother removed pieces of dead skin and loose tissue from the corpse.

p.117: To study and understand grief among animals, scientists need a definition that distinguishes it from other emotions. Whereas "animal response to death" embraces any behavior by an individual following the death of a companion animal, researchers may strongly suspect grief only when certain conditions are met. First, two or more animals choose to spend time together beyond survival-oriented behaviors such as foraging and mating. Second, when one animal dies, the survivor alters his or her normal behavioral routine—perhaps reducing the amount of time devoted to eating or sleeping, adopting a body posture or facial expression indicative of digression or agitation, or generally failing to thrive.

<https://www.youtube.com/watch?v=WwLdhn0aY2A> Do Animals Grieve?, 11 min.

<https://www.youtube.com/watch?v=HCePpwJ4GU0> King: "How Animals Grieve", 4 min.

<https://www.youtube.com/watch?v=ZcucZRQIY> A Dogs Mourning the Loss of a Friend Compilation 2014, 3 min.

Essay #11: *Where it Begins*, Barbara Kingsolver

Essay Question:

This poetic, lyric account uses many analogies, comparisons, even metaphor to connect the mystery, relief, and time of knitting to nature and the concept of naturalness. For this essay choose a hobby, or something you like to do, and write an essay using comparisons to nature, natural objects, movements, observations, ideas. Extend your analogies by including research, see where this paper takes you. Think of it as a process of discovery, not as something you already know beforehand, well before you sit down to write. Apply a theme like Kingsolver did, “Where it begins.”



<https://www.youtube.com/watch?v=dDI38WuGg1g> Nature as metaphor, beauty in shape and texture, 2 min.

<https://www.youtube.com/watch?v=A0edKgL9EgM> The art of the metaphor - Jane Hirshfield, 5:30 min

<https://www.youtube.com/watch?v=DauVUMGAbiY> Language, Metaphor & Reality, 39 min

<https://www.youtube.com/watch?v=5S1d3cNge24> Steven Pinker - The Stuff of Thought: Language as a window into human nature, 1:03.

Essay #12: *Danger! This Mission to Mars Could Bore You to Death*, Maggie Koerth-Baker

Essay Question:

In this essay, Koerth-Baker takes the reader on a tour of the dangers of boredom caused by isolation from stimulus, the senses deprived of environmental stimuli—astronauts in space, researchers in Antarctica, prisoners in isolation. Try and isolate yourself for 24 hours, really isolate yourself, no connection to the outside world. Write an essay on your experience with boredom, what you felt, how you experienced or handled what you felt. Tie in the latest research on boredom to your experience.



p.131: ...a number of scientists say that—of all things—boredom is one of the biggest threats to a manned Mars mission, despite the thrill inherent in visiting another planet.

p.132: Most living things constantly seek out sensory stimulation—new smells, tastes, sights, sounds, or experiences. Even single-celled amoebas will move to investigate new sources of light or heat.

<https://www.youtube.com/watch?v=YJ6pauEkU-s> Boredom, 3:20

<https://www.youtube.com/watch?v=dKyTmXMPgZY> How Boredom Can Be Good For You, 3:30

<https://www.youtube.com/watch?v=Giken-pu0d0> Boredom Equals Health Risk. 1 min

https://www.youtube.com/watch?v=Ps_YUEIM2EQ The value of boredom | Genevieve Bell | TEDxSydney, 15:30

Essay #13: *The Last World*, Elizabeth Kolbert

This essay reflects what many scientists feel is the greatest threat to human survivability, that climate change, accelerated by human activity, is causing an almost unprecedented decline in all life on earth, leading to the “6th great extinction” in geologic history.

Essay Question:

There are many climate change skeptics out there, many who do not trust science at all. An overwhelming majority of scientists across the world agree, the climate is changing and it is happening so rapidly that humans are certainly contributing to it. Those who do not agree are paid by those industries who have a financial interest in maintaining the status quo, like the fossil fuel industry. Do you believe this is true? Why or why not? Present both sides of the argument in your response and why the opposing view is incorrect.

Essay Question:

Do you believe humankind will ever go extinct? Why or why not? What will be the cause of this extinction? Are we in any way causing our own extinction? Our own demise?

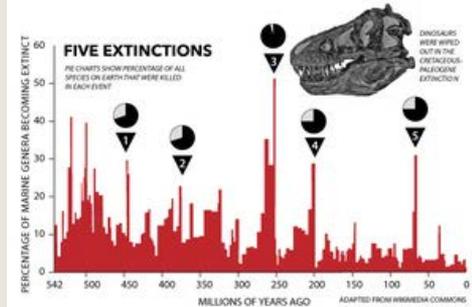
<https://www.youtube.com/watch?v=x1SgmFa0r04> NASA | A Year in the Life of Earth's CO2, 3 min.

<https://www.youtube.com/watch?v=suEzmyKazcE> The Sixth Extinction: Elizabeth Kolbert on How Humans Are Causing Largest Die Off Since Dinosaur Age, 13 m.

<https://www.youtube.com/watch?v=x00LP0QfRTk> Elizabeth Kolbert: "The Sixth Extinction: An Unnatural History" | Talks at Google, 40 m.

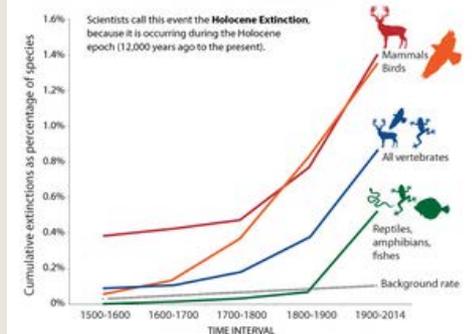


Even using the most conservative estimates, animals are going extinct more than a hundred times faster today than the average background rate. The species lost in just the past hundred years would have taken up to 11,400 years to be lost, if not for human activity.
ABOVE: TRILOBITES, WIPED OUT IN AN EXTINCTION EVENT 252 MILLION YEARS AGO. CREDIT: JOACHIM BARRANDE.

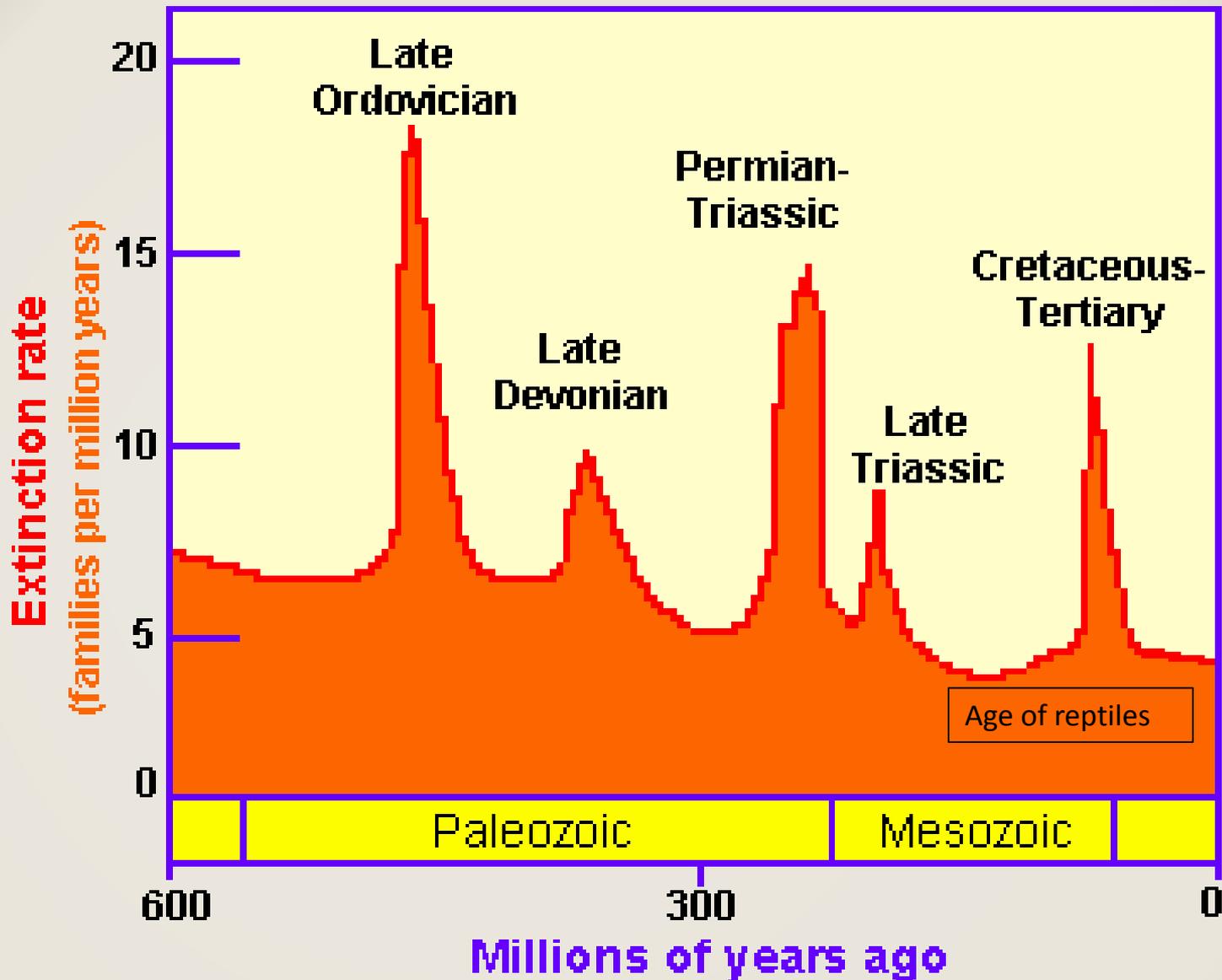


- 1. Ordovician-Silurian extinction:** between 447 million to 443 million years ago. Two pulses of extinction occurred, 4 million years apart, wiping out 60 to 70 percent of all species.
- 2. Late Devonian extinction:** 375 million to 360 million years ago. Extinction event lasted up to 20 million years, wiping out 70 percent of all species.
- 3. Permian-Triassic extinction:** 252 million years ago. Called "The Great Dying," Earth's largest extinction event wiped out up to 96 percent of marine species and 70 percent of terrestrial species. Trilobites were completely wiped out in this extinction.
- 4. Triassic-Jurassic extinction:** 201.3 million years ago. Up to 75 percent of all species wiped out.
- 5. Cretaceous-Paleogene extinction:** 66 million years ago. 75 percent of all species wiped out. All nonavian dinosaurs were wiped out.

A SIXTH EXTINCTION: THE HOLOCENE



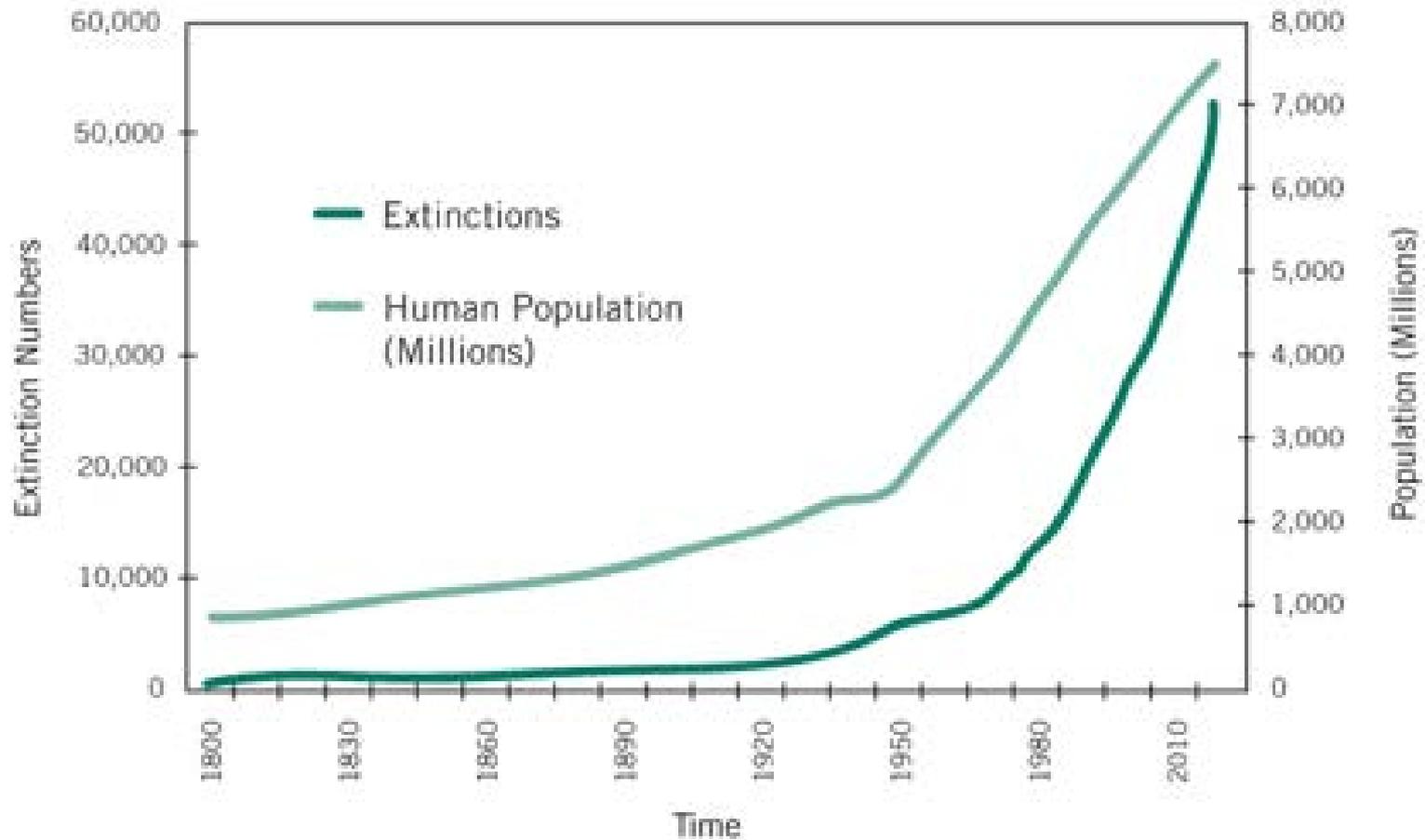
SOURCES: ACCELERATED MODERN HUMAN-INDUCED SPECIES LOSSES: ENTERING THE SIXTH MASS EXTINCTION. GERARDO CEBALLOS-NATIONAL UNIVERSITY OF MEXICO, AMERICAN MUSEUM OF NATURAL HISTORY, SHUTTERSTOCK, WIKIPEDIA.
KARL TATE / iLiveScience.com



<https://www.youtube.com/watch?v=1rVCHaCjzWc> NOVA SCIENCE NOW - MASS EXTINCTION - Discovery History Universe, 12 min.

Species Extinction and Human Population

Graph source: USGS

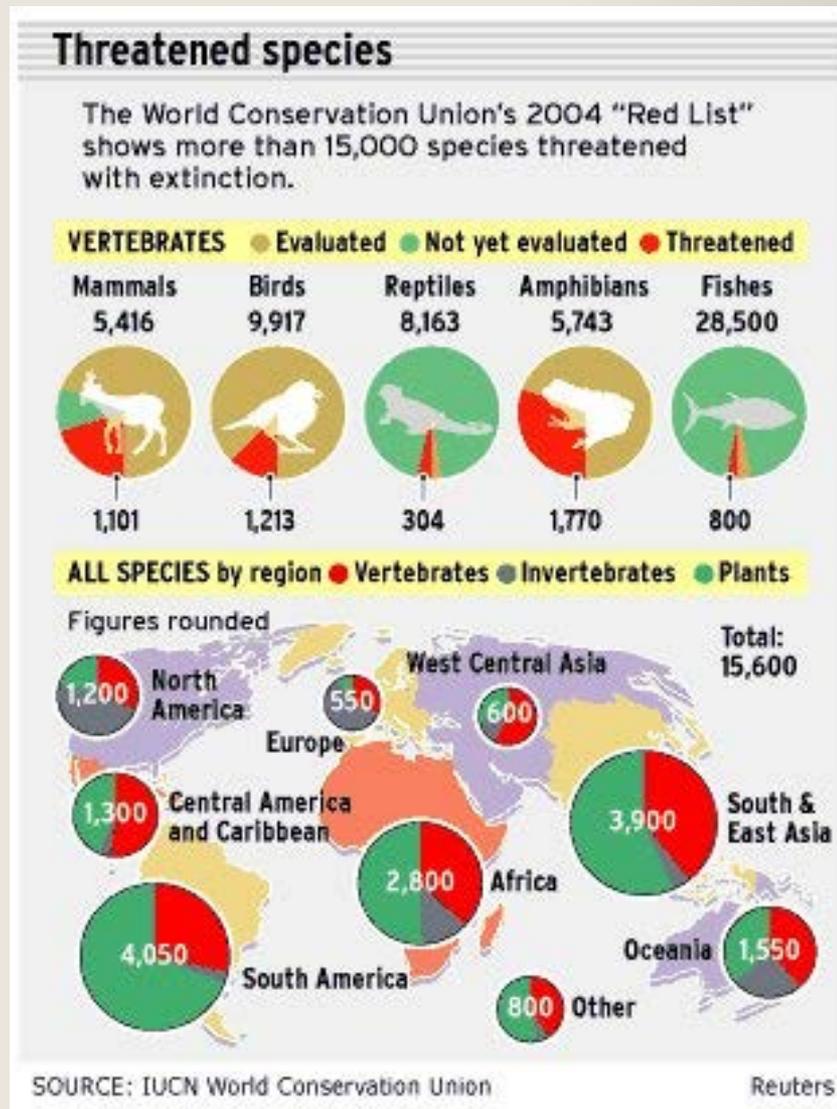


<https://www.youtube.com/watch?v=u4KRWoubPEo> A meteorite is not the greatest danger of environmental change - THE SIXTH EXTINCTION, 50:31

p.161: Why the Anthropocene?

- Human activity has transformed between a third and a half of the land surface of the planet;
- Many of the world's major rivers have been dammed or diverted;
- Fertilizer plants produce more nitrogen than is fixed naturally by all terrestrial ecosystems;
- Humans use more than half of the world's readily accessible freshwater runoff;
- People have altered the composition of the atmosphere.

Owing to a combination of fossil fuel combustion and deforestation, the concentration of carbon dioxide in the air has risen by more than a third in the past two centuries, while concentrations of methane, an even more potent greenhouse gas, has more than doubled. Just a few more decades of emissions may bring atmospheric CO₂ to a level not seen since the Miocene, 15 million years ago. A few decades after that it could easily reach a level not seen since the Eocene, some 50 million years ago. During the Eocene, palm trees flourished in the Antarctic and alligators paddled around the British Isles.



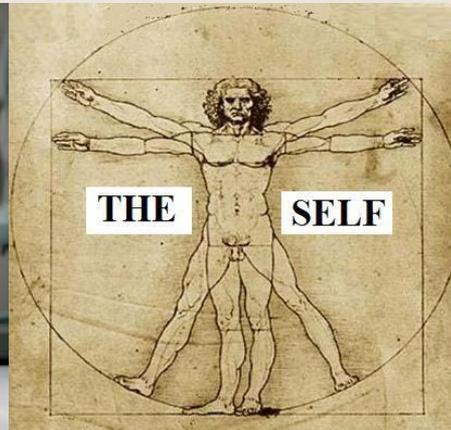
Essay #14: *Awakening*, Joshua Lang

At the heart of this essay is much of what plagues the growing disconnect and increasing animosity between the disciplines of science and technology, and the humanities and arts. Refer to the first 12 slides of this PowerPoint to review the argument and its fallout. One element that is not mentioned that this essay by Joshua Lang exemplifies is that, at its core, the disagreement focuses on how we should define ourselves as human beings.

Essay Assignment:

For this assignment, choose one of the questions below:

- Are we simply creatures of biology, or are we something more?
- What is consciousness?
- Can brains exist without minds?
- Can minds exist without brains?
- What is dualism and how does it relate to the current discussion?
- What is the “explanatory gap?”
- Is our sense of self an illusion?
- Are free will, agency, and intention illusions? (Use the current discoveries in neurological science in your argument.)



The self is the idea of a unified being which is the source of consciousness. Moreover, this **self** is the agent responsible for the thoughts and actions of an individual to which they are ascribed.

https://www.youtube.com/watch?v=iC3W_ORSJes Scream - The History Of Anaesthetics, 46 min

<https://www.youtube.com/watch?v=F1UmLU4TbcY> Anesthesia Awareness: Consciousness During Surgery, 2 min

<https://www.youtube.com/watch?v=N0hU6CZok34> Anesthesia and consciousness, Stuart Hammeroff, 5 min

<https://www.youtube.com/watch?v=B53OLVOKe8A> Neuroscience and the experience of the self, Robert Burton, 9 min

<https://www.youtube.com/watch?v=ir8XITVmeY4> What is consciousness?, The Economist, 13 min

<http://www.youtube.com/watch?v=qjfaoe847qQ> what is consciousness? 7min.

<http://www.youtube.com/watch?v=jTWmTJALe1w> Consciousness, Qualia, and Self (V.S. Ramachandran), 8min

<http://www.youtube.com/watch?v=TvmOjGMnap8> What Is Consciousness? - What The Bleep Do We Know, 5 min

<http://www.youtube.com/watch?v=y4y8mTRqXAo> Quantum Consciousness (Stuart Hameroff) 9 min

<http://www.youtube.com/watch?v=zGv1Nay2z-U> What is the self? 3min

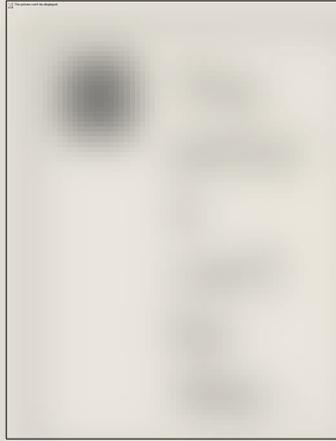
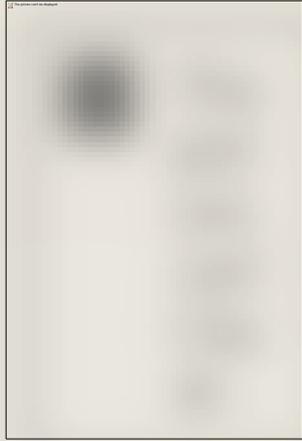
http://www.youtube.com/watch?v=cC-Je_Nt6Cs Dr. Quantum - The Real Self behind the Ego, 15 min listen only

<https://www.youtube.com/watch?v=Rx7erWZ8TjA> Do we live in a multiverse?, The Economist, 13 min

<https://www.youtube.com/watch?v=x-6hosFAObI> Is Consciousness More than the Brain? | Interview with Dr. Gary Schwartz, 14 min

<https://www.youtube.com/watch?v=4henADqIFto> Are Human Beings Robots? | Interview with Dr. Rupert Sheldrake, 22 min

“The Self” in the Future: Will it be Extinguished, by Neuroscience?



Hank Pellissier, *Ethical Technology*

Posted: May 16, 2012, *This interview was conducted via email, in early May 2012.*

Will “the self” survive because it can provide people with a greater sense of happiness? Or is it - perhaps along with the constructs “Free Will” and “Determinism” - doomed to the dustbin of history? **Should cyborgs, avatars, and a rewired human brain be developed with a stronger or weaker sense of self?**

An interview with **Dr. Garret Merriam**, Assistant Professor of Philosophy at University of Southern Indiana. *(The entire article is here on the site, it's that important. You can use this as a source.)*

Hank Pellissier: My understanding is that the notion of the “self” was rather “invented” by the Greeks; then it faded until it was brought back during the Age of Enlightenment - is this correct? Does this mean that the notion of the self is primarily a European idea?

Garret Merriam I think that while there is some truth to that, it's also an oversimplification. There is something like 'the self' that transcends cultures; even in prehistoric China people realized there was a difference between their being hit over the head with a stone axe and their neighbor being hit over the head with a stone axe. That basic sense of 'self vs. other' is neurologically hardwired and is not unique to humans; other primates, cetaceans, elephants, some bird species, octopi, and dozens if not hundreds of other species exhibit it, so it cannot be a cultural artifact.

But there is a more sophisticated sense of the term 'self' that is built upon that more basic sense that does seem to be a cultural creation. When we think about a written biography, an account of a person's whole life, character, personality and accomplishments as belonging to/constituting this single unified thing that we also call 'the self'? That has a distinctly Greek texture to it. It is this sense of self that's the controversial one, and what I think most philosophers mean when they debate the nature of 'the self' (and how I'll be using the term from here on out.)

Ancient literature in other cultures—Egyptian, Hindu, Chinese, etc.—that predate classical Greece don't seem to emphasize the significance of the individual ego in the way the Greeks did. It isn't wholly absent in these other cultures, but a rather arrogant Eurocentric bias blinded scholars to its presence in these cultures for some time. But the did Greeks focus on it more, develop it more, make it a more explicit and central part of their thinking on human nature. And while it did fade away during the Middle Ages, it never fully disappeared. (Stories from the high Middle Ages, like *The Decameron* and *The Canterbury Tales*, while not as 'self' centered as the plays of Sophocles, nonetheless have well developed characters that reflect their author's sense of 'self'.)

It came back like gangbusters in the Renaissance, with the invention of the personal essay (Michele de Montaigne) and later, in the Enlightenment with the development of the modern biography (Samuel Johnson). It reached its apogee with the Romantics (early 19th century) and started to crumble thanks to the work of Sigmund Freud by the turn of the 20th. The existentialists made a go at resurrecting it again, in the mid-20th century, but it's hard to say how well they succeeded, and inasmuch as they did, their notion of 'self' is pretty far removed from what the Greeks or the Romantics thought of as 'the self.'

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Garret Merriam: I don't think the notion of 'self' was a deliberate creation, so it would be wrong to say it was constructed in order to make us happy, or for any other conscious purpose. That having been said, there is a fair amount of empirical evidence, principally from positive psychology and social psychology, that suggest that people with a strong 'sense of self', a healthy ego, are happier than people without it.

Cross culturally, there is a key balance between what you might call a 'radical individualism' (in which the individual is the only thing that matters) and 'radical collectivism' (in which the community is the only thing that matters). Happiness seems to happen most when you're somewhere in the middle; you have strong community ties with good social capital, but a high premium is placed on individual rights and liberties. That is, cultures that have a healthy sense of self are happier, but when that is taken to an extreme you get what the sociologist Emile Durkheim called 'anomie'—a breakdown of social belonging and cultural identity. When that happens, people are just as miserable (but in different ways) as when they live under the thumb of a dictator.

How neuroscience will impact this is a complicated question, and I think it will depend a lot on how we as a culture manage the use and direction of neuroscientific research. Ideally, positive psychology will fuse with neuroscience (as it already seems to be doing, at least in a preliminary way). That will make the increase of human well-being one of the central goals of neuroscience in the 21st century. This will require a deep understanding of the sources of human flourishing, not simply medicating us until we stop asking troubling questions.

Suffice to say, I think it would be very peculiar indeed if neuroscience told us both that in order to live happy lives we have to have this very specific notion of 'self', while at the same time disproving the existence of such a 'self.' That's not to say it won't happen, but it would be ironic, tragic and just highly unlikely. Why would evolution produce such a tragic species as that, that so crucially depending on this rather culturally specific notion of 'self'? It's certainly not an adaptive trait, so it would have to be a side-effect of some kind. If so, then perhaps we could use neuroscience to correct for it.

But here of course is where the nightmare scenarios start to creep in. Once neuroscience starts tinkering around with those deep aspects of human nature, such as our (alleged) need for sense of self, where does it end? We may end up in a *Brave New World* where we don't just jettison the things that inhibit our

flourishing, but we also jettison the things that make us who we are. And if who we are is valuable, worth preserving, then neuroscience may become a threat our very existence.

I don't think there is any easy answer to problems such as these. But I am sure that the best way to position ourselves to find the answers is through neurophilosophy, by studying the developments in neuroscience and bringing them to bear on these kinds of traditional philosophical problems.

Hank Pellissier: This next question is rather far-out. The question is, if humans decided that it was more “fun” to have a “self” would it be possible to rewire the human brain, in any possible self, so that the notion of a SELF made more sense? Would it be possible to construct a cyborg, for example, that actually did have a self? Would that cyborg be at an advantage over humans, in terms of less doubt, stronger sense of identity, clearer goals?

Garret Merriam: Like I said in response to the last question, I imagine any engineering would likely work the other way: enhance human well-being by making us less dependent on such philosophically and scientifically dubious notions as ‘the self.’ But in principle it should be possible to work it the other way around. Whatever exactly the ‘sense of self’ is (assuming the ‘sense’ is real, even if the ‘self’ is not) it must manifest in the brain somehow, hence we should be able to measure it, manipulate it and control it.

In practice, however, I doubt it will work that cleanly. ‘Sense of self’ is not a specific thing, like levels of serotonin or norepinephrine. It's some kind of emergent property, and those are notoriously difficult to pin down and dissect. I think by the time we have enough technical facility to get our hands around something like that our conceptual apparatus will have changed drastically and we won't be nearly as invested in our notion of ‘self’ as we think about it today.

Hank Pellissier: Here's a (set of) questions—looking 200 years into the future, and imagining numerous different scenarios of advanced civilizations, what percentage of these possible advanced civilizations do you see as having: 1) No Self at all, no regard for the notion of Self, just seeing as an antiquated notion. 2) Same sense of Self as Earth today, general popular belief in it, except among scholars and neuro-intellectuals. 3) 100% Belief in a Self, either through some type of enhancement, or mind-file feature, or cyborg overthrow, or redefinition of the term.

Garret Merriam: 200 years out is a very long time-horizon. It's hard to grasp how many turns of the screw that is in terms of scientific advancement. I'm about as confident in any prediction that far out as I would have been in Socrates' predictions about the year 2000. That having been said, I don't think that should prevent us from trying, so long as we take our predictions with a large block of salt.

As such, I actually don't think any of these three is terribly likely. (1) & (2) both seem ruled out by historical patterns; our notion of self always changes with the culture, and given how many cultural changes we're going to experience in the next 200 years it's highly unlikely that our we'll have THE SAME notion of self. But by the same token, some notion of self has stuck around, in spite of these big upheavals, so I doubt it will be completely eliminated, either.

(3) seems like the most plausible of the options because there is some reason to think that a sense of self does make us live better, so enhancing that would make sense. However I think the very process of pursuing that kind of enhancement would change our understanding of what self is, so I don't think "100% belief in the self" would be a terribly accurate description. It will mean something pretty different. I'd call it something more like 'Self 2.0' (or rather 5.0, or 10.0, or even larger, depending on how you parse the history.)

Hank Pellissier: Do you think the notion of the "Self" is a wishful-thinking fantasy, a desire for something positive that doesn't exist? Do you see it as misinterpretation of how the brain works? Do you think "the self" has desirable qualities that future advanced civilizations will seek to incorporate into new minds?

Garret Merriam: I think 'misinterpretation of how the brain works' is probably it. We've known since Freud that we're not terribly good at understanding what's going on for us through simple introspection, and the 'evidence' (such as it is) for 'self' seems pretty much entirely from introspection. As I've said, there does seem to be some positive value in it, but I suspect we'll figure out a way to keep that value without holding on to this particular concept—we can take the cake out of the box, as it were.

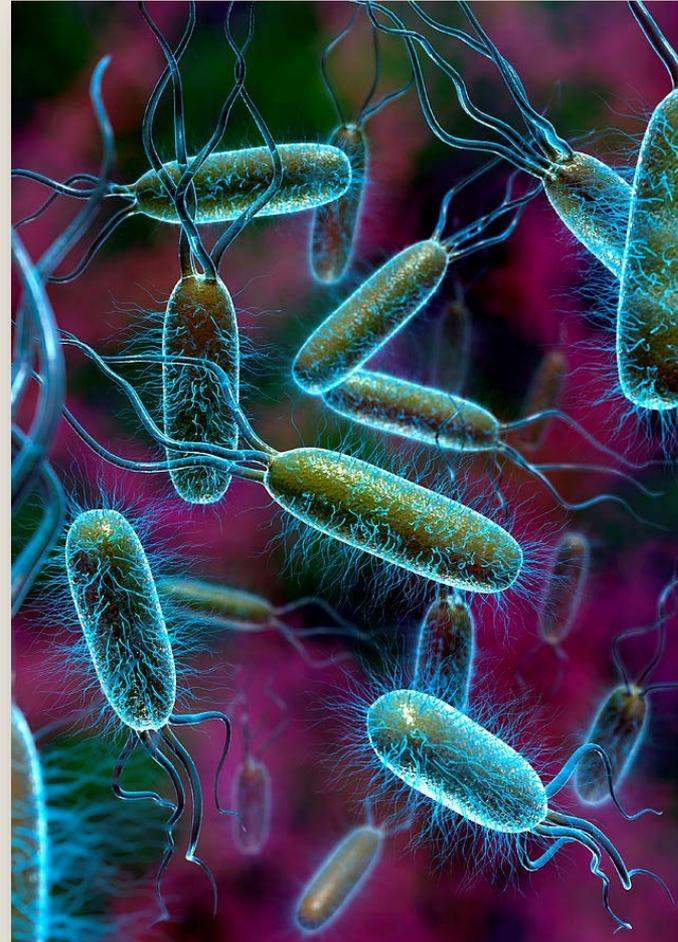
Dr. Garret Merriam was previously interviewed by Kristi Scott in an IEET article entitled, "[Transhumanism and Neurophilosophy](#)"

Essay #15: *Imagining the Post Antibiotics Future*, Maryn McKenna

“Before antibiotics, five women died out of every one thousand who gave birth. One out of nine people who got a skin infection died, even from something as simple as a scratch or an insect bite. Three out of ten people who contracted pneumonia died from it. Ear infections caused deafness; sore throats were followed by heart failure.”

Essay Question: Answer McKenna’s question on p. 193: In a post antibiotic era, would you mess around with power tools? Let your kid climb a tree? Have another child? Why or why not?

Essay Question: Write a report on the viability of phage therapy and why it is not readily applied in the U.S. today? Research any “political” implications.



<https://www.youtube.com/watch?v=o3oDpCb7VqI> Maryn McKenna: What do we do when antibiotics don't work any more? 17 min

<https://www.youtube.com/watch?v=wLrGS4zKYpg> Life in a Post-Antibiotic World: VICE on HBO Debrief (Episode 6), 4:30

<http://www.pbs.org/wgbh/frontline/film/hunting-the-nightmare-bacteria/> PBS, Hunting Killer Bacteria, 54 min.

Essay #16: *The Return of Measles*, Seth Mnookin

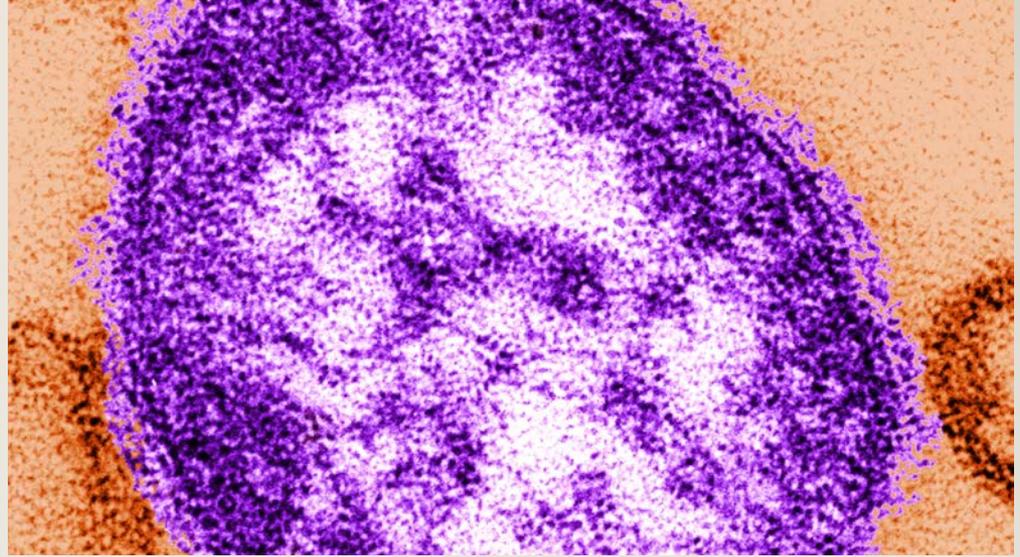
There seems to be a significant number of reasonable people who do not believe irrefutable scientific evidence, evidence that we now count on for survival and good health: Children need to be vaccinated; Water needs to be fluoridated; Climate change is real and accelerated by human activity.

Essay Question: Write an essay on why you think reasonable people refuse to believe scientific evidence, that these are all conspiracy theories designed to benefit others and not themselves? Use the Pew research Center's report:

<http://www.pewinternet.org/2015/01/29/public-and-scientists-views-on-science-and-society/>

Essay Question: Write an essay on the disparities between religion and science. Use, as one of your references, the Pew Research Center's report found at

<http://www.pewinternet.org/2015/10/22/science-and-religion/>



Essay #16: *The Return of Measles*, Seth Mnookin

<https://www.youtube.com/watch?v=VPOrnU3ImxI> FRONTLINE | The Vaccine War | PBS, 54m

<https://www.youtube.com/watch?v=y0opgc1WoS4> Measles Explained — Vaccinate or Not? 5:33

<https://www.youtube.com/watch?v=LImk-KdMT1w> Measles Virus as a Cancer Fighter - Mayo Clinic, 2:51



Americans Believe in Science, Just Not Its Findings

What's behind the "debate" over issues like climate change and vaccination? Can evidence change people's minds?

JULIE BECK, 1/29/2015

A [new report by the Pew Research Center](#) found that 79 percent of the 2,000 adults surveyed think science has “made life easier for most people.” Seventy-one percent think that investment in science ultimately pays off.

But on certain hot-button scientific topics of our day, Pew found wide gaps between what the public believes, and what scientists believe. You can probably guess which ones.

Genetically modified foods: 88 percent of scientists say they’re “generally safe” to eat; 37 percent of the public agrees.

Vaccines: 86 percent of scientists believe they should be required in childhood, compared to 68 percent of the public.

Climate change: 94 percent of scientists say it’s a “very serious” or “somewhat serious” problem; 65 percent of the public agrees. 87 percent of scientists blame humans; 50 percent of the public does too.

Evolution: 98 percent of scientists say they believe humans evolved over time, compared to 65 percent of the public.

If you've ever dipped a toe into the toxic water of a comments section, these numbers aren't particularly surprising. For every science article published online, there's someone ready to jump in and call it pseudoscience. (Michael Shermer in *Scientific American* [has written](#) that "the term 'pseudoscience' is subject to adjectival abuse against any claim one happens to dislike for any reason.") But the numbers also show that most people trust and value science in a general sense, they just aren't aligned with it so much on these specific issues.

There's certainly room for debate in science, and the process of answering a question almost always extends beyond the scope of a single study. The problem is that evidence can't be refuted by just saying "no," but facts often have little bearing on how someone feels. That [climate change is real](#) (and caused by humans), and that [vaccines are safe](#), are two of the most evidence-heavy, backed-up statements we have in modern science. Whether people believe them may have nothing to do with whether they trust scientists or not.

"There is this really strong conventional wisdom that the U.S. is experiencing some kind of creeping anti-science sensibility in the public, and this explains why we have conflicts over things like climate change or evolution," says Dan Kahan, a law and psychology professor at Yale Law School. "It's a mistake to think that has to do with disagreement about the authority and value of science in our society."

The Pew numbers show the public's support for science, he says, even though the commentary in the report emphasizes that the percentage of people who think science has a positive effect on society decreased slightly from the last time Pew did this survey in 2009. Kahan thinks that focus is playing into the narrative of distrust.

"It's almost as if they don't want to pop the conventional wisdom balloon with the needle of their own data," he says, adding, "If we're going to get really anxious that 4 percent less of the public thinks science is the greatest thing since sliced bread, what are we doing with the fact that [13 percent of scientists don't think humans are responsible for climate change]?"

If not distrust, then what accounts for the gaps? Some people might not be aware of what scientists think. In the Pew report, 37 percent of people said they didn't think scientists agreed on climate change, and 67 percent thought scientists don't have a clear understanding of GMOs' health effects. Or, they think the scientists actually support their beliefs. This is particularly true of climate change, Kahan says.

"People on both sides of the issue think science is on their side. It's like when nations at war each think God is on their side, and they think the other side is godless."

In the time of the Internet, someone can find evidence (real or not) to support almost any belief he wants. There's an understandable bias toward valuing evidence that reinforces already-held beliefs: [Kahan's research](#) has shown that people tend to ascribe more legitimacy to the experts who agree with them.

"The reasons people decide to believe things are complicated," says Eula Biss, a professor of English at Northwestern University and the author of [On Immunity](#), a book examining why people fear vaccines. "With vaccines, some people are primed to be suspicious because of what they know about the historical relationship between the medical establishment and women, or what they know about the history of corruption around pharmaceutical companies. People are drawing on real knowledge, but they're allowing the answer to one question to be the answer to another."

For their part, scientists in the Pew survey faulted the media and the public itself for the existence of these gaps. The "public doesn't know much about science" was reported as a major problem by 84 percent of scientists, and 79 percent considered "news reports don't distinguish well-founded findings" a major problem. About half of scientists said oversimplification by the media and a public that expects solutions too quickly were major problems.

Fair enough. The translating of dense, precise scientific studies into digestible, clickable news stories is a tricky business. When a publication mistakenly says a single study "proves" something, or, heaven forbid, implies causation where there is merely correlation, those who know better are eager to jump in and point out the mistake. And it probably doesn't help the publications' reputations as legitimate sources of information. Of course, no matter how careful a writer is to say "associated with," to transparently point out small sample sizes, to repeat the scientists' claim that "more research is needed," you'll still get commenters crying "pseudoscience."

But the clarity, accuracy, and availability of information, while important, is not a magic elixir to change hearts and minds. For example, [in a recent study](#), telling people that the flu vaccine doesn't cause the flu made people less likely to vaccinate, even if they accepted the information as true. (Though, for what it's worth, despite the recent hubbub over anti-vaxers, vaccination rates in the U.S. are [still very high](#).) And Kahan says that asking people whether they believe in evolution, as Pew did, has nothing to do with how well they understand the theory.

There were also large disparities on issues like whether it's safe to eat foods grown with pesticides (scientists: 68 percent; public: 28 percent), and whether the world's growing population will be a problem (scientists: 82 percent; public: 59 percent).

"It doesn't measure science literacy, it measures whether you're religious," he says. "It's just an expression of identity."

Adding to the puzzle is the notion that stories can sometimes be more powerful than data. As Vanessa Wamsley [previously wrote in *The Atlantic*](#), a personal anecdote from a friend can feel more immediate and important than, say, a statement from a government agency.

Biss told me about a story she heard from a reader of her book, who changed her mind in favor of vaccination after she had a child with a birth defect who was “profoundly vulnerable to any respiratory illness,” Biss said. “And her baby died. It’s an incredibly heartbreaking story, but after she lost that baby, she was really open to thinking differently about medicine ... Information alone is not going to do it. Something else has to be given to you that changes your willingness to hear that information.”

“Bombarding people with knowledge doesn’t help,” Kahan says. And he points out that the scientists’ beliefs about where the public’s beliefs are coming from are similarly not completely knowledge-based, for the aforementioned reasons. “They’re committed to believing what they’re going to believe, just like the public is... It doesn’t do anything to explain things to people, but here I am just explaining the facts over and over again.” He laughs. “Maybe the joke’s on me.”

“As an educator, I just cannot accept that,” Biss says, of the idea that information can't change minds. (As a journalist, I, too, would rather not accept that.) “I really have a lot of faith in people’s ability to not just learn, but change. Part of what my book is about is changing my mind.”

In communicating science, there’s personal narratives and there’s facts, but there’s also analysis of the facts, and the philosophies behind that analysis. Biss thinks that where facts alone might not change someone’s mind, those other things might. Of course, not every article can be a deep analysis, sometimes you just need to say what happened. But people with different values and beliefs might interpret the same straightforward article very differently.

“We build philosophical structures, and when we encounter information, we plug it into those structures,” Biss says. Maybe building up another structure around scientific evidence, and putting it in context—not just the context of other research, but the historical, social, and philosophical context—could reach some of the people in the gap.

That’s a tall order, admittedly, for the people doing the writing, and probably unattainable a lot of the time. Still, “I don’t think it’s time for us to throw up our hands and say nobody’s listening,” Biss says.

Essay #17: *Ants Go Marching*, Justin Nobel

As global travel and trade for and between the human species has become increasingly easier, it also has increased the spread of many forms of bacteria, virus, fungi, and many types of invasive insects, fish, reptiles, shell fish, birds, and mammals. Climate change is another variable causing the spread of invasive species.

Essay Question: Write an essay on an invasive species that has penetrated the State of Maryland. How is it affecting the ecosystem? What is currently being done to eradicate or control the invasive population?



<http://www.cbsnews.com/news/the-threat-of-invasive-species/> CBS Invasive Species, 8:50

<https://www.youtube.com/watch?v=QKx1KPRFxlI> Invasive Species in Maryland, 2:30

<https://www.youtube.com/watch?v=pnYbErObqOs> Snakehead fish: Can invasive species be eaten out of existence?, 3m

<https://www.youtube.com/watch?v=hGk2-5CMsYA> Md. sends in goats to save endangered turtles 2:20

Essay #18: *TV as Birth Control*, Fred Pearce

This essay seems to clearly indicate that there is a direct correlation between fertility rates and television programming aimed at lowering them. The most influential format seems to be soap operas with relevant themes and identifiable characters. Other trends like the empowerment of women and lower rates of domestic violence also seem to be quantified via data from new television programming reaching audiences never before reached.



Essay Question: There used to be studies that indicated the opposite is true, that TV and reality were firmly separated when it comes to violence or any behavior. Now it seems this is not the case, TV programming or video games can have a profound effect on family dynamics and social roles and behavior as the above data indicate. How has society been influenced in unrealistic ways by too much TV? How has it shaped values and perceptions and understanding in negative ways?

<https://www.youtube.com/watch?v=N1Twefdhui8> New study: Children's TV viewing affects behavior, 2min

https://www.youtube.com/watch?v=zw_7CJ5ozaM How Television Affects Your Brain Chemistry, 3:44

<https://www.youtube.com/watch?v=Nq9Gg7A-YEE> TV = Mind Control, 8:47

<https://www.youtube.com/watch?v=v2SdEpHjrjw> How TV Affects Children's Brains, 16 min, Ted Talk

Essay #19: *The Madness of the Planets*, Corey Powell

Some scientists believe and search for an underlying, grand unification theory of everything, an idea or set of ideas, expressed mathematically, that explain, through the application of laws, how and why everything exists as it does. By reducing all entities into a grand cause-and-effect relationships, all existence will be explained. Recent observations of our solar system and how it has evolved reveal underlying, unexplainable uncertainties and chaos that are impossible to package into a nice, neat, comfortable set of absolute predictions.

Essay Question: Determine whether you believe the universe, your life included, is guided by a set of laws or are we just along for the ride, trapped in chaos and uncertainty, that there is no grand purpose or design? Be careful if you are tempted to use religion to explain your answer. If you believe in a God, an omnipotent, omniscient being/entity, than the implication is that there are underlying laws and principles that guide everything in existence. If you use this approach, you will need to make sense or explain of why uncertainty or chaos exists. Is it just a test of faith or is it real?

<https://www.youtube.com/watch?v=JnlkKdDXk-I> Chaos Theory, 4:48

https://www.youtube.com/watch?v=EF5Wvi_lly4 An Introduction to Chaos Theory with the Lorenz Attractor, 10:20

<https://www.youtube.com/watch?v=WepOorvo2I4> Chaos & Butterfly Effect, 60 symbols, 12 min



Essay #19: *The Madness of the Planets*, Corey Powell

Quotes

p. 222: The solar system around us is rife with instability.

p. 222: Earth was forged in chaos, lives in chaos, and may well end in chaos.

p. 223: There is no clean separation between the unsettled past and the present.

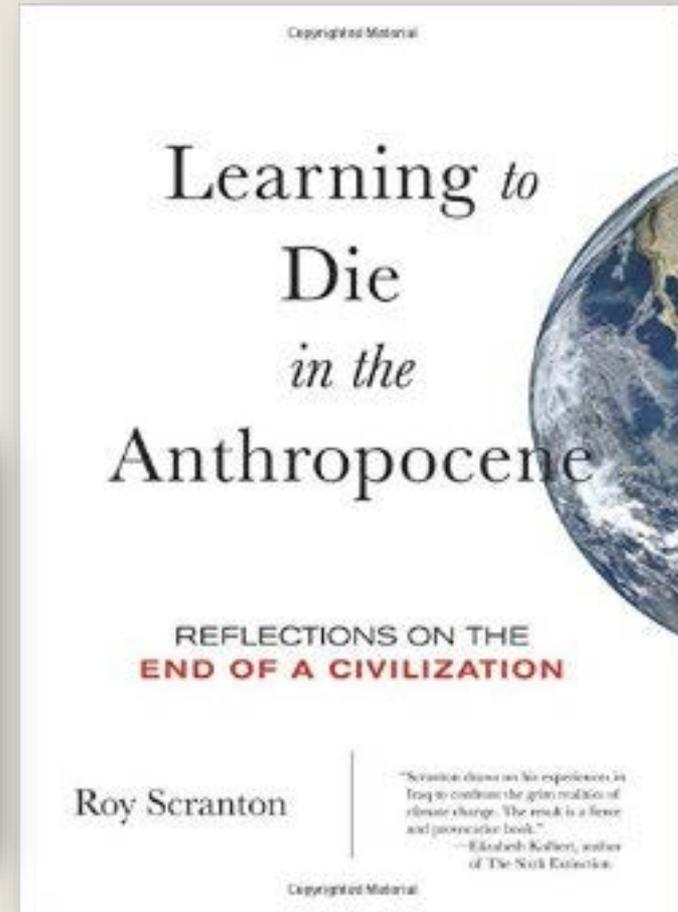
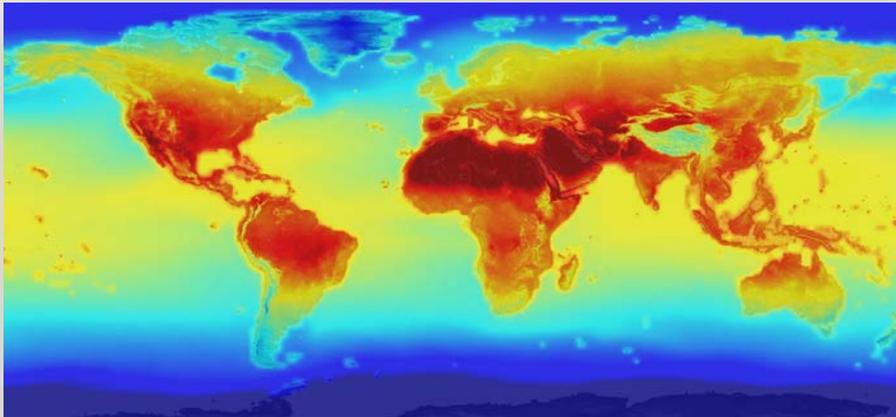
p. 223: Over time, every object in the solar system that can be destroyed, scattered, or ejected will eventually be destroyed, scattered, or ejected. This is how earth came to be. This is how it exists today.

p. 224: The belief that the Earth and the rest of the solar system were born in largely their present form—the arrangement and characteristics of the planets almost preordained—has deep, clinging roots in the history of science. (Is it possible these ideas were influenced by religious stability?)

p. 229: We are back to the probabilistic view in which nature builds some inherent uncertainty into the system.

Essay #20: *Learning How to Die in the Anthropocene*, Roy Scranton

This provocative essay comes from the book, *Learning to Die in the Anthropocene: Reflections on the End of A Civilization*, by Roy Scranton. Please refer to the PowerPoint devoted to the book for assignments.



Essay #21: *Under Water*, Kate Sheppard

This essay pits the politics of what essentially can be defined as “climate change,” a term that is rejected in conservative ideas, against the realities of flooding, how the argument has to be reframed in order to make progress against another idea, that of the federal government wasting money by allowing development and restoration to continue in flood-prone areas.

Essay Question: Why is it that the Federal government continues to spend far more money restoring and rebuilding areas devastated by flooding caused by climate change, instead of being more proactive and preventing development or offering buy-outs to home owners?

Essay Question: If you had an opportunity today to purchase beach front real estate along the eastern seaboard of the United States, with the contingency that you would not be able to purchase flood insurance, would you do it? Why or why not?



<https://www.youtube.com/watch?v=-JbzypWJk64>
South Florida's Rising Seas - Sea Level Rise
Documentary, 26:36

<https://www.youtube.com/watch?v=4VB6biwqMsg> US Blizzard VIDEO : Heavy Snow, High Winds, Coastal Flooding Hits, 5 min

<https://www.youtube.com/watch?v=YdEeMVtcmVY> U.S. Coastal Flooding On The Rise, Government Study Finds, 1 min

<https://www.youtube.com/watch?v=xt1OfZdSfxk> Miami Beach Tackles Tidal Flooding & Sea Level Rise, 2 min

Essay #22: *Twelve Ways of Viewing Alaska's Wild, White Sheep*, Bill Sherwonit

It is obvious where writer Bill Shorwonit's philosophical and political sympathies are when it comes to wildlife. When he was researching this story, he came across an account by hunter and conservationist Charles Sheldon who wrote of his 1906 sheep hunt when he shot 8 rams. Shorwonit, despite recognizing that there is a danger in evaluating the moral codes and value systems of another era from a contemporary standpoint, was appalled at the account, how easy it seemed for Sheldon to engage in such "blood sport, a selfish and harmful act fed by pride and ego."

Essay Question: Under what, if any, circumstances is trophy hunting acceptable? Make sure your sources include research into the philosophy of animal rights whether you agree or disagree.



Charles Sheldon



Bill Shorwonit



Dall Sheep

Essay #22: *Twelve Ways of Viewing Alaska's Wild, White Sheep*, Bill Sherwonit



Trophy Hunting



Vivisection

<https://www.youtube.com/watch?v=XirT209xW7M> Dall Sheep in the Mountains of Denali National Park, 6 min

<https://www.youtube.com/watch?v=QjM5iMLI7TA> Trophy hunting debate, 9 min

<https://www.youtube.com/watch?v=3qryomzklLM> 5 worst trophy hunters, 3 min

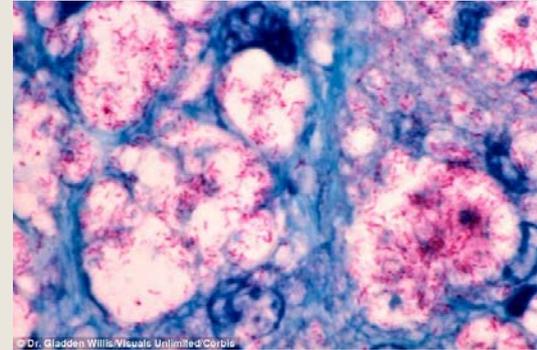
https://www.youtube.com/watch?v=p_LONVLgUYI Elephant hunting with .50cal machine gun, 3 min

<https://www.youtube.com/watch?v=l0QXUHeGeOc> animal testing ethics, 8:30

Essay #23: *The Separating Sickness*, Rebecca Solnit

Leprosy is a debilitating disease with a long social and literary history. Perhaps, no other condition has been so stigmatized and its sufferers so ostracized.

Essay Question: Write a history of the disease of leprosy focusing on how those with leprosy have been ostracized. What was misunderstood about the disease at the time?



<https://www.youtube.com/watch?v=7O6qT7kFmrw> Leprosy: The Biblical Disease, 2:30 min

<https://www.youtube.com/watch?v=du1k6LR6GI0> Living With Leprosy, 4 min

<https://www.youtube.com/watch?v=s28fCIQKJTA> 12 Year Old Girl Cannot Feel Pain Due to Genetic Disorder, 1 min

Essay #23: *The Separating Sickness*, Rebecca Solnit

Essay Question: Write a response to one of the following paragraphs from the Solnit's story:

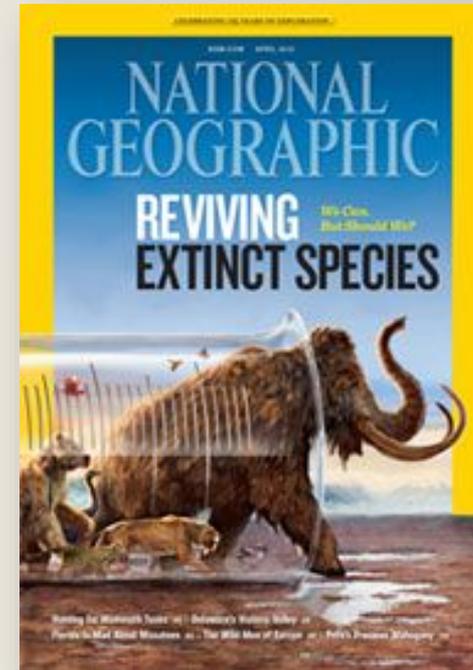
p.273: Brand concluded that “shared pain is central to what it means to be a human being,” but we are a society that values the anesthetic over pain. We hide our prison, our sick, our mad, and our poor; we expend colossal resources to live in padded, temperature controlled environments that make few demands on our bodies or our minds. We come up with elaborate means of not knowing about the suffering of others and of blaming them when we do.

p.273: Choosing not to feel pain is choosing a sort of death, a withering away of the expansive self. When Robert Jay Lifton went to investigate the psychology of survivors of the atomic bombings of Hiroshima and Nagasaki, he coined the term “psychic numbing” to describe the survival strategy of dissociation and apathy—“a diminished capacity or inclination to feel.” In such extreme circumstances it was necessary or at least understandable, but even there Lifton called in “dehumanization” and cautioned that it comes to resemble what has been called ‘miscarried repair.’ ... Decades later, when he looked at the numbing of those who used the atomic bombs and those of us in whose name they were used, he reverted again to medical metaphor: ... “A barrier designed to prevent the spread of a threatening disease, the ‘illness’ we block off in this case being what we did in Hiroshima.”

Essay #26: *Bringing Them Back to Life*, Carl Zimmer

This essay implicates far more than the idea of bringing extinct species back to life. It implies the manipulation of genes to create new and different life forms.

Essay Question: Zimmer asks many questions around this issue, but there is one, rather abstract, very ethical question that persists. Write an essay that responds clearly to the question: “Should we try to bring extinct species back to life? Why or why not?” Be detailed in your response.



SCIENTIFIC AMERICAN™

Efforts to Resuscitate Extinct Species May Spawn a New Era of the Hybrid

What does de-extinction mean for biology and the environment? By [David Biello](#)

<http://www.youtube.com/watch?v=d-ZCuNKnxNE> Hybrids-Genetically Crossing Humans and Animals, 15 min

<http://www.youtube.com/watch?v=AdzepK-LVtU> The Age of Transitions (full length documentary), 58 min

<http://www.youtube.com/watch?v=CcnTdO47p0Q> Trans-Humanism / Genetic Modification of all Life / Nano-Technology / HAARP / Geoengineering – Film, 1:37:00

Essay #26: *Bringing Them Back to Life*, Carl Zimmer

Human-Animal Hybrids, Human Cloning and Bizarre Genetically Engineered Life Forms—Is This the Dark Future that We Are destined For?

<http://futurestorm.blogspot.com/2010/12/human-animal-hybrids-human-cloning-and.html>

Are we headed for a dark future where "Watchers technology" is fully unleashed? Will it be a future where "man-made life" and bizarre human-animal hybrid creatures are free to roam and breed and spread across the face of the earth? Such notions would have once been too bizarre for most science fiction novels, but genetic engineering technology has advanced to such a degree today that it is really hard to say what "life" will look like on earth in the coming decades. At this point there are very few restrictions remaining on fields such as nanotechnology, biotechnology, synthetic biology, cloning

and genetic modification. All over the world, scientists are feverishly combining different kinds of animals together, adding plant genes to certain animals, and even putting human DNA into plants and animals. Life as we know it is literally changing, and it is very hard to tell what the future is going to look like if all of this continues.



Essay #24: *Trapline*, David Treuer

Essay #25: *The Rebirth of Gorongosa*, E. O. Wilson