Educating *in* and for *uncertainty*. Climate Science, human evolution and the legacy of Arne Naess as guidance for ecological practice.

Margarita García-Notario, PhD.

garciam@plattsburgh.edu

Department of Modern Languages and Cultures.

SUNY Plattsburgh.

Abstract.

This paper reflects on how the issue of climate change and the general state of our planet is, among other causes, a main factor in the paralyzing divisions ailing Western societies. This situation, while unsettling to democracies, is promoting a kind of education *in* and *through* fear and I question if education can succeed under these circumstances without becoming indoctrination. This paper does not try to diminish the urgency and the importance of current environmental problems but rather expands today´s perspectives and incorporates research in more constructive ways of thinking and doing. I use scientific contributions in climatology, evolution, environmental conservation, economics, and neuroscience to bring new light to today's investigations about the human and the non-human world. Finally, I propose Deep Ecology's principles of *deep questioning, deep experience* and *deep commitment*, as a guide for new educational and ecological practices.

KEYWORDS: Climatology, Science of Evolution, Polyvagal Theory, Deep Ecology

Introduction. Distressing fears.

We seldom see anybody who is not uneasy or afraid to live.[1]

Ralph Waldo Emerson

I have noticed as a long-time teacher and researcher how much more fearful our youth are today about the future. Many colleagues share this impression: students are pessimistic and many (too many) suffer from anxiety and depression. Authors Jonathan Haidt and Greg Lukianoff cite a study published in the Journal of the American Medical Association showing an alarming spike in suicide rates between 2011 and 2015 among teenagers.[2] Haidt and Lukianoff blame principally the pervasive use of social media, but many college and high school teachers also report students' extreme anxiety over the ecological state of our planet.

The young have taken to the streets. They join large and vociferous movements demanding prompt government action to address and ameliorate the effects of climate change. Many are sure that their generation is doomed by today's environmental troubles, even if they lack rigorous scientific knowledge and instead base their conclusions on propagandistic slogans. Greta Thunberg has become a new star in the environmental movement and her message resonates with adults and youth. In a recent speech, Thunberg said, 'Adults keep saying we owe it to the young people, to give them hope. (…) But I don't want your hope. I do not want you to be hopeful. I want you to panic. I want you to feel the fear I feel every day. (…) I want you to act as you would in a crisis. I want you to act as if the house is on fire, because it is. (…) This is the biggest crisis humanity has ever faced.'[3]

Climate change is certainly an important challenge for humans, but is it the *biggest crisis humanity has ever faced*? A detailed scientific answer to that question is beyond the scope of this

paper, and I believe that we must confront bad news and not ignore or disguise it just to protect others from negative emotional responses. However, when an issue starts looking more like a political flag than a dispassionate examination of the scientific evidence and its effects are harming our youth, we teachers and philosophers of education must ask (more) questions. It is our stock and trade to search for truth and meaning and better perspectives. A perception of threat keeps us in a physiological defensive *flight or fight* state and blinds us from seeing the value of contrarian or different arguments. When the premises of the issues discussed rest on fears and prejudices, there is little progress or possibility of fruitful dialogue. We have the responsibility to present to students reliable scientific information that shows both the science that may suit our beliefs and preferences but also that which questions them. Like Socrates, we need to act as a gadfly on a horse [4] as we try to awaken students to reflect on positions and biases that could distract them from their true human interests in truth, justice, and wisdom. In the last few years I have followed closely these environmental challenges and proposed solutions. Some of my findings were very inspiring and gave me and my students renewed optimism in relation to our environmental concerns. In the next section, I present some recent and exciting research on climate change that highlights the relationship between climate and human evolution.

Climate change: friend or foe?

Rick Potts is a paleoanthropologist at the Smithsonian Institute. His studies of layers of rocks and sediments in West Africa made him question the traditional idea that it was the savannah, the grassy plain with few trees that had been human evolution's driving force. Instead, he and his colleagues realized that *variability* itself was the driving force of human evolution, and that our ancestors became our ancestors by adapting to change itself. This is a simple but

revolutionary idea: *human evolution is nature's experiment with versatility*. We are not adapted to any one particular environment or climate, but to many. According to these studies, humans are creatures of climate change.[4]

Early human fossils found in the African continent go back six million years and reveal ancient creatures walking upright on the ground, although they also spent time in the trees using them to sleep in and to escape predators. These creatures, our human ancestors, were at home in a combination of two worlds: the ape world and the early human world. DNA studies locate between five and seven million years ago the moment when humans and chimpanzees shared a common ancestor: Sahelanthropus Tchadensis. And they place around two million years ago our first human ancestor: the toolmaker or Homo Habilis. Africa was home to many varied human-like species and when scientists study their environment they find that climate instability pressured them all. In a period around 2,000,000 years,

> 'in the evolutionary blink of an eye, punishing drought periods alternated with storms and monsoons. Rivers and forests sprang up, then turned to dry grassland. (…) It was these periods of climate instability that seem to be the main clue to understanding the evolutionary leap from small bipedal apes to the larger-brain toolmaker Homo Habilis.[…] Today, climate change seems to threaten our survival, but it may have held the keys to the astonishing story of how we became who we are, because it didn't stop 2,000,000 years ago. These dramatic climatic upheavals would continue for another million and a half years, propelling our ancestors down a road leading, ultimately, to the smartest creature the world has ever known.'[5]

Theory and the fossil record also demonstrate in the science of conservation biology that evolutionary creativity is essential for long-term survival in a changing physical context. 'Ecotypes or ecological races arise in response to novel challenges, both biotic and abiotic. The future of endangered species is likely to depend on such processes. Failure to appreciate this is the single biggest flaw in the *climatic envelope* or *niche modeling* approach to conservation biology.'[6]

These studies are mindboggling and truly inspiring. Amid logical fears of what climate change may wrought, I welcome these revelations of how we became who we are, as it empowers me to recognize that since we have survived such immense challenges we will likely survive those to come.

Rambunctious gardens and skeptical environmentalists.

From the start of the modern environmental movement, arguments over the balance between humans and nature have polarized: anthropo-centrists versus eco-centrists. The effects of climate change have intensified the arguments. Many conservationists would like to keep humans at a distance from natural places, claiming that nature is only in balance without man. But is that accurate? Those appeals for *balance* conflict with one of humans' earliest observations, articulated by Heraclitus: *The only constant in nature is change itself.*

Writer Emma Marris claims that if we define *nature* as that which is untouched by humans, then we won't have any left. She proposes a new definition of nature -one that includes not only pristine wilderness but also the untended patches of plants growing in urban spaces- and encourages us to bring our children out to touch and tinker with it, so that one day they might love and protect it.[7] In her book Rambunctious Garden: Saving Nature in a Post-Wild World[8],

Marris questions the efforts of environmental conservation approaches to safeguard wild areas, since this prevents a fuller relationship with nature. Humans have changed the landscapes they inhabit since prehistory, and climate change means even the remotest places now bear the fingerprints of humanity. She and others claim that we need different approaches such as rewilding, assisted migration, and the embrace of so-called novel ecosystems.[9]

Some have put Emma Marris in a group called Modernist Greens. This group's soldiers don't dispute the ecological tumult associated with the Anthropocene[10]. But they look at the world with today's eyes and ask that we 'reconcile the needs of people with the needs of nature [… and] craft a new vision of a planet in which nature —forests, wetlands, diverse species, and other ancient ecosystems— exist amid a wide variety of modern, human landscapes.'[11] This approach helps parents of young children to catch their breath. Expanding the definition of nature gives us permission to go outside and offer children a friendlier way to exist in the world, indeed, *with* the world.

Bjorn Lomborg is a Danish economist who acknowledges the gravity of global warming,[12] but presents scientific and economic evidence to show that today's alarmism is misguided and keeps us from thinking intelligently about solutions. Lomborg and the Environmental Assessment Institute founded the Copenhagen Consensus in 2002, which seeks to establish priorities for advancing global welfare using methodologies based on the theory of welfare economics. Lomborg is concerned about the enormous cost attached to many of the proposed solutions to stop global warming and claims that many of these are often based on emotions rather than rigorous science. He warns that most proposed solutions would have little impact on the world's temperature for hundreds of years. Rather than starting with the most radical procedures, Lomborg argues that 'we should first focus our resources on more immediate

concerns, such as fighting malaria and HIV/AIDS and assuring and maintaining a safe, fresh water supply—which can be addressed at a fraction of the cost and save millions of lives within our lifetime.'[13] Lomborg's work opens a second level of thinking on global warming, one that argues panic is neither warranted nor a constructive place from which to deal with any of humanity's problems, let alone global warming. He warns, for instance, 'abandoning fossil fuels as quickly as possible, as many environmental activists demand, would slow the growth that has lifted billions of people out of poverty.'14

In spite of the general impression that things are terrible, Lomborg's research (together with others like Stephen Pinker, etc.[15]), shows that our world is mostly getting better for humans: global life expectancy has more than doubled since 1900[16] and is now above 70 years; health inequality has declined massively. The world is more literate;[17] child labor is decreasing;[18] violence is down; people are better off economically and poverty has dropped; more people have access to improved water sources; and the risk of death by air pollution has declined substantially…[19] There is much good news for both humans and the planet and both young and old people need to realize this. We should not drown in an ocean of threats so large that progress seems lost.

Whether Lomborg's claims are a better way for environmental solutions or not, I believe that the main challenge for educators (as opposed to indoctrinators) is to review *all* contributions and evidence with the intention to learn and improve, not to serve a more or less political status quo. It is quite disheartening to acknowledge that it has become fashionable to label an opponent as *anti-science* or as *science denier*, particularly in debates about the climate and agricultural biotechnology.[20] It would enrich all of us in academia and enliven our debates if we took to heart Alice Dreger's advice at the end of her book Galileo's Middle Finger: 'If you must criticize

scholars whose work challenges yours, do so on the evidence, not by poisoning the land on which we all live.'[21]

The human need for safety. The Polyvagal Theory[22].

Feeling safe is a very strong manifestation of our survival instincts and a *sine qua non* for living beings to progress and thrive. Dr. Stephen Porges' neurobiological discoveries through his Polyvagal theory provide new insights to the human necessity for safety. They give educators a refreshing perspective that enables us to understand the why and how of human need for contact and connection with each other. Moreover, it shows that, when we do not connect with each other, our physical and mental health suffer.

According to Porges many think that being safe means the absence of threats. But the mere removal of threats will not make humans safe. Feeling safe comes from having good social interactions, which comes from living in a trustworthy social system.

Evolution shows that we have a biological imperative to survive and in mammals and humans this imperative is realized by connecting with others. From this perspective, social polarization threatens the biological imperative, and according to Porges, today's situation (meaning the strong social and political divisions in a lot of the Western world) is evolutionarily unsustainable. When we detect danger or feel under pressure, we shift biological states and, as a consequence, we shift our bias: the way we see the world and others changes, and we get into a defensive state.[23] Polarization overrides dialogue and reciprocity; both are only possible when there are enough cues for safety. Understanding our neurobiology can help us realize that not all of our behaviors are intentional and that we co-regulate our health and behaviors through social interactions. Let me explain in more detail with the Polyvagal theory.

The so-called polyvagal system gets its name from the *vagus* nerve and has to do with the circuits regulated at the brainstem that send information through our nerves in a bidirectional way: up to the brain and down to the body. It regulates our human experiences of trust and safety. Humans need to feel safe to develop their curiosity and to be open to new information and experiences. When we feel unsafe, we start to see everything unfamiliar as a threat and this makes us unable to take in new information.

By bringing together psychology, neuroscience and evolutionary biology, the polyvagal theory gives a new understanding of the Autonomic Nervous System (ANS), by showing that it consists of 'three neural circuits that form a phylogenetically ordered response hierarchy that regulates behavioral and physiological adaptations to safe, dangerous and life-threatening environments.'[24] David Fuller[25] summarizes it as: 'a theory (…) that explains how our body and mind are intimately connected to our facial expressions, voice and social engagement system and therefore, to others.'[26]

The Polyvagal theory demonstrates that the regulation of our bodily functions follows an evolutionary trajectory and we find that the *vagus* system contains the different stages in the origins of life. Our most primitive autonomic system is the one we share with the oldest planetary living beings. It is the *older dorsal system* that connects directly to the gut, and its purpose is to maintain metabolic resources: oxygen and food regulation; if there is neither enough oxygen nor food, the system shuts down to conserve energy. This part of the *vagus* appeared first in evolution and it is non-myelinated. Physiologically, this part of the vagus, also known as parasympathetic system, is located in the brainstem and it appears simultaneously with the first biological instinct: the sexual instinct, which caused an explosion in the variety and in the possibilities of novelty in our planet. 'This biological innovation (sex) vastly increased the

possibilities for generating the variability, diversity and complexity of species that has produced the richness that is the wonder of life in this planet'.[27]

The next *vagus* area is the sympathetic system, which provides mobilization and is controlled by the limbic part of the brain that developed with the arrival of the reptiles. It is commonly known as the *flight or fight* response. It is at this moment when the next instinct, the "parental instinct" appears. Through it 'organisms are instinctively impelled to protect and nurture their offspring.'[28]

The newer *vagus* area is the one that develops with the arrival of mammals and brings the third instinct: the social instinct. This originates physiologically in the newest and youngest limbic area exclusive to mammals. Around 216 million years ago, the arrival of mammals brought an unusual characteristic: sociability. The new limbic area adds three neurological abilities: 1- an intimate and prolonged relationship between the newborn mammal and the mother (and sometimes the father). 2- The ability to maintain audio-vocal contact with the mother/father/group, and origin of the *separation cry*: a new behavior that attracts the attention and thus protection from the mother/father/group. 3- The ability to get pleasure through play.

This part of the *vagus* is different because it is covered with a fatty substance (myelin) which makes the communication with the brain much faster. The mission of this part of the *vagus* is to calm down and organize the older *vagus*: it connects with a different part of the brain and it does not go to the gut, but to the heart and to the facial and ear muscles: it brings our feelings to our face. When we feel safe, our heart makes our facial muscles relax, our eyes get crinkles and the orbital muscle connects with the middle ear muscle that gets tense and is then able to hear the higher pitch of the human voice. We can then quiet the lower predatory tones, causing us to relax, feel safe, and engage with others. When we feel in danger our brain has

difficulty finding safety and we are in fight-flight mode, a different physiological state called mobilization; if we can fight or flee, we have taken action to deal with the fear. In mobilization, we are more likely to misread other people's cues. The social interactional behavior is a neural exercise which uses newer mammalian structures aimed at inhibiting more primitive systems. Through gentle and appropriate touch, tone of voice, and smiles, people calm one another and making them feel safe.

The Polyvagal theory provides many insights with respect to our interactions with others and helps us see that many of the evaluations and actions that the nervous system makes are unconscious. Porges calls that evaluation *neuroception*: a knowledge that our body gains by picking up the external cues of safety. The moment that we perceive threats through neuroception, we lose our social engagement. Mammals and humans, with their more developed neurological system use their newest system (social engagement) first to co-regulate. However, when the newer (social) system fails, either by lack of appropriate social engagement or by neurological injury, the older systems of defense (fight or flight) are disinhibited. (Antonio Damasio explained this in his book Descartes' Error, by showing how the Jacksonian principle of dissolution worked in patients with neurological injuries). Newer systems override older systems, but if the perception of threat persists, the older system takes over.[29]

This new science has been revolutionary in therapeutic treatments because the therapists have gotten a much broader and deeper knowledge about how to read their patients' facial and body signs of anxiety, trauma, etc. Multiple techniques have been developed to help patients heal by restoring biological and psychological safety. This physiology lesson teaches us that the behaviors promoted by the newer vagus such as making eye contact, vocalizing with inflection and rhythm, observing our interlocutor's facial expressions and listening better, become great

tools to increase learning and to combat social polarization through the promotion of mutual understanding and cooperation.

In 2015, in a presentation at the ECER Conference in Budapest[30], Sharon Todd articulated brilliantly the problems and errors of the *Euro Vision*: the document that drafted the educational policy guidelines for the European Union. She claimed that it is a mistake to make education the solution for social uncertainty and expect that it can assuage the problems of the economy. She quoted Hannah Arendt to warn that this view of education 'puts the responsibility of solving and fixing the worlds' problems on the youth who have had no hand in causing these problems and suggests an inability to tolerate uncertainty itself.'[31] 'Humans may crave absolute certainty -says Carl Sagan-; they may aspire to it; they may pretend ... to have attained it. But the history of science—by far the most successful claim to knowledge accessible to humans—teaches that the most we can hope for is successive improvement in our understanding, (…) but with the proviso that absolute certainty will always elude us.'[32]

Uncertainty is the most *certain* quality of human life, but the level of uncertainty that allows human life to thrive has to be moderate and temporary, or we humans would spend our lives in defensive postures, which harms our bodies and keeps us from productive and insightful thinking and adaptation. It is necessary for the adults in the room to recognize when the input that the youth receive is too much and shuts them down. Adults have to act with the *old* wisdom characterized by truth and prudence or moderation.

Towards a new ecological practice. Some inspiration from Arne Naess.

Is there a different way through which the new responsibility that our generation feels towards the Earth could unite us in finding ways to act that are better for both the environment and humans?

In this final section, I would like to talk about the Norwegian philosopher, Arne Naess, founder of Deep Ecology, one of the earliest eco-philosophies that developed after scientific warnings about human culpability in ecological crises. He coined Deep Ecology's name at a conference in Bucharest in 1972, as an alternative or different orientation inside environmentalism to **superficial ecology**, which was a movement focused on the fight against pollution and the destruction of natural resources and whose main goal was the health and the wealth of people in developed countries. Without diminishing the importance of those concerns, **Deep Ecology** sought to be a movement that transcended the *superficial* vision, by raising important questions about our understanding of nature, of humans, and of the relationship between the two. Although Deep Ecology has been defined in various ways, I believe that Stephan Harding summarized its essence best with the slogan 'Deep Questioning, Deep Experience, Deep Commitment.' I find this slogan most appropriate to educational approaches that acknowledge the role of uncertainty in human life, and that use human tools to help us live better in the world that hosts us and whose destruction we would share.

Deep Questioning.

Naess claimed that humans act from a set of fundamental premises or beliefs, independently of their ability to verbalize them. Those premises give meaning to their lives. Upon recognizing the ecological crisis, Naess said that something *deeply ours* is damaged as well. The deep questioning that he encourages is active, encompasses the whole person, and is positive; it is not guided by a desire to undo what others have done. It is a kind of comparative and embracing questioning. The belief that *everything hangs together*, that all life is related, is the main propeller for new questions: what else is there that I don't see? What can the perceptions and knowledge of others teach me? This questioning process should always be open, and the conclusions should remain open to future corrections or modifications.[33]

A most fecund educational approach results from a way of living that is guided by an attitude of deep questioning and an ecological context that enriches it, because it forces us to recognize our relationship with the other (non-human) beings and it invites us to have an openness towards change, correction, and life, which is always expanding. This deep questioning also requires for Naess that reason and feelings do not act separately. We need to acknowledge our feelings and to investigate them; we must learn their lessons and use them to better ourselves and others (including the non-human world). Our feelings will help us engage in deeper experiences and, through them, invite deeper commitments.

Deep Experience.

The key role that feelings and emotions played in Naess's thought is the content of his last book, Life's Philosophy. Baruch Spinoza is a key philosophical influence on Arne Naess, who refers to Spinoza as (maybe) the least original among the modern philosophers, but the one

who has taken emotions the most seriously and the one who has reflected on them with the most depth. For Spinoza, 'the path to freedom is paved by emotions'; and humans can only progress and thrive through them and apathy (the absence of pathos: feeling, suffering) equals spiritual death.

Spinoza distinguishes between active and passive emotions in the same way that he distinguishes between the terms *action* (from the Latin: *actio-actionis*) and *activity* (from the Latin: *activitas-activitatis*). The true human doing (acting) is represented by the term *action* because it implies (requires) improvement. It is the kind of doing that affects us and transforms us as human beings. (In my opinion, we could call it *virtue*, as the good habit that guarantees our good behavior: it improves us). By contrast, *activity* is an external doing of our actions: it ends outside ourselves. Humans, according to Spinoza, need to be sure that they invest in the actions that transform them, that make them better human beings. It is a risk and a temptation to invest and engage ourselves in multiple activities (busyness) that have no good or permanent effects on us.

When Spinoza separates active from passive emotions, he gives little value to the latter, while Naess disagrees about the secondary role given to passive emotions. Naess claims that these can and should be used in a constructive way and that they have a very complex and indispensable role in human life. It is through negative emotions that we change course, for example. Emotions help us to act for passion and passionately. In today's context of the ecological crisis, emotions such as ire, fear, and deception can be great assets to force ourselves to work towards change. For both Spinoza and Naess, feelings are the main source of motivation and the most important tool to change what we are doing when we want to feel different.[34] We only progress in the things that are essential to humanity when we act through passion.[35] For

Naess, much of an individual's emotional maturation happens by transforming negative feelings into positive ones. What insightful guidance this is for today's educators and what a productive way to transform our despondence towards environmental damage into an effort to restore ourselves and nature.

Deep commitment.

Theodore Roszak warned in an interview in 1998[36] that the proliferation of bad news about the environment can paralyze, which in many ways inhibits creative change. The enumeration of one disaster after another sends us in search of the guilty ones but in a counterproductive way. We may be overdoing accusations and threats and creating wide-spread panic. When this happened in the early discussions about the environmental crisis and people couldn't take it anymore, they responded by making fun of the warnings and denying and evading the problem. Today we may be at the opposite side, making this crisis a black hole that eats up the good and the bad.

We need to aim towards compromise, towards working together even if in imperfect ways. 'Deep commitment is the result of combining deep experience with deep questioning, - writes Stephan Harding. - When an ecological worldview is well developed, people act from their whole personality, giving rise to tremendous energy and commitment. Such actions are peaceful and democratic and will lead towards ecological sustainability. This leads to 'extending care to humans and deepening care for non-humans'.[37] I am persuaded that this reflection is true and achievable. And I believe that we can obtain measurable and lasting progress, both in our environmental situation and in our democracies so embattled today by persistent ideological divisions.

Final thoughts.

This paper is an effort to articulate my concerns about today's educational messages and the way that they instill dread and doom in our youth; I wonder if it may be losing a sense of proportion and defeating its own purposes. I have felt that many of my students have overcome their fears by learning about our evolutionary history and the factors that have contributed to make us who we are today. I have confirmed that bringing controversial voices to the class, has enriched the students' discussions greatly and has encouraged them to review their previously unquestioned theses.

We humans are messy, and we struggle to balance our minds with our hearts. Nevertheless, it is good to know about the physiological mechanisms that support our behavior and to learn strategies to prevent reverting to actions guided by fear instead of sound emotions reason. In our uncertain future, it is important to be more mindful in the present. It is my hope that the examination of the biological imperative that we connect with others will encourage all of us to promote social engagement behaviors to improve learning and work environments, to think with serenity, to use our creativity in productive ways, and to stop avoiding the ideas that challenge our cozy biases. We must give them a chance to either correct us or confirm that we are on the right path.

---

[1] Ralph, Emerson. "Prose Works. v.2. - Full View | Hathi Trust Digital Library." *Hathi Trust*, Boston, J. R. Osgood and Co., 1872.

[2] Lukianoff, Greg, and Jonathan Haidt. *The Coddling of the American Mind*. (NY, Penguin, 2018).

[3] Greta Thunberg. Speech at the World Economic Forum Annual Meeting (2019).

[4] Potts, Richard, and Christopher Sloan. *What Does It Mean to Be Human?* (National Geographic Books, 2010).

[5] "Becoming Human Part 1 | NOVA | PBS."

[6] Arthur, Shapiro. "Professor Arthur Shapiro's Review of Emma Marris' Rambunctious Garden – Conservation Sense and Nonsense."

[7] Marris, Emma. "Emma Marris: Nature Is Everywhere -- We Just Need to Learn to See It | TED Talk."

[8] Marris, Emma. *Rambunctious Garden*. (Bloomsbury Publishing USA, 2013).

[9] Ibidem.

[10] The Anthropocene is a growing scientific consensus that the contemporary human footprint—our cities, suburban sprawl, dams, agriculture, greenhouse gases, etc.—has so massively transformed the planet as to usher in a new geological epoch.

[11] Kloor, Keith. (2012, April 12th) *The Great Schism in the Environmental Movement. Can modern greens loosen nature's grip on environmentalism?*

[12] See Lomborg's referenced books in the bibliography.

[13] Udgave, Dansk. "Bjørn Lomborg: Cool It."

[14] Lomborg, Bjørn. "The Danger of Climate Doomsayers by Bjørn Lomborg - Project Syndicate."

[15] Pinker, Steven. *Enlightenment Now*. (Penguin Books, 2019).

[16] Roser, Max, et al. "Life Expectancy - Our World in Data."

[17] Roser, Max, and Esteban Ortiz-Espina. “Literacy - Our World in Data.”

[18] Ortiz-Espina, Esteban, and Max Roser. “Child Labor - Our World in Data.”

[19] Lomborg, Bjorn. See note 14.

[20] Jr, Roger Pielke. “Why Discrediting Controversial Academics Such as Bjørn Lomborg Damages Science | Environment | The Guardian.”

[21] Dreger, Alice. *Galileo’s Middle Finger*. (Penguin Books, 2016).

[22] Porges, Stephen. “The Polyvagal Theory: New Insights into Adaptive Reactions of the Autonomic Nervous System.”

See also: Chitty, John. “The Triune Autonomic Nervous System.”

[23] Ibidem.

[24] Ibidem.

[25] Founder of the British Podcast *Rebel Wisdom.*

[26] Wisdom, Rebel. *Dr Stephen Porges: The Neuroscience of Polarisation (Pt 2 of 4)*. YouTube, 15 Aug. 2019, https://www.youtube.com/watch?v=vmkG5l7CaGw.

[27] Margulis, Lynn. *Symbiosis in Cell Evolution*. W H Freeman & Company, 1981. Quoted in Loye, David. *Darwin’s Lost Theory*, p. 78.

[28] Loye, D. Op. Cit. P. 81.

[29] Binz, Kevin. “Jacksonian Dissolution | Fewer Lacunae.”

[30] Sharon, Todd. “Sharon Todd | EERA.”

[31] Ibidem.

[32] Sagan, Carl. *The Demon-Haunted World*. 1st ed., (Ballantine Books, 2011), 28.

[33] This attitude was frustrating to some of Naess’ followers. Witoszek, Nina, and Andrew Brennan. *Philosophical Dialogues*. (Rowman & Littlefield, 1999), 35.

[34] Naess, Arne, and Per Ingvar Haukeland. *Life's Philosophy*. (University of Georgia Press, 2010), 78.

[35] Baruch Spinoza, quoted in Naess, *Life's Philosophy*. p. 9.

[36] Toms, Michaels. "Deep Ecology for the 21st Century. ." *New Dimensions Radio*, New Dimensions Radio, 1998, http://www.newdimensions.org.

[37] Harding, Stephan. "What Is Deep Ecology? | Schumacher College." *Schumacher College*, 28 Sept. 2007, https://www.schumachercollege.org.uk/learning-resources/what-is-deep-ecology.

Works Cited

"Becoming Human Part 1 | NOVA | PBS." *PBS: Public Broadcasting Service*, NOVA, http://www.pbs.org/wgbh/nova/video/becoming-human-part-1. Accessed 29 Oct. 2020.

Binz, Kevin. "Jacksonian Dissolution | Fewer Lacunae." *Fewer Lacunae*, 22 Apr. 2019, http://kevinbinz.com/tag/jacksonian-dissolution/.

Chitty, John. "The Triune Autonomic Nervous System." Colorado School of Energy Studies, Accessed 4 Feb. 2019, https://www.energyschool.com/. https://static1.squarespace.com/static/5be365255cfd79dc41e5dc90/t/5c05f753032be40de96a2ce9/1543894895695/triunewww14.pdf

Dreger, Alice. *Galileo's Middle Finger*. Penguin Books, 2016.

Emerson, Ralph Waldo. "Prose Works. v.2. - Full View | HathiTrust Digital Library | HathiTrust Digital Library." *HathiTrust*, Boston, J. R. Osgood and Co.,1872., Accessed 28 Dec. 2019, http://hdl.handle.net/2027/njp.32101013187024.

Fuller, David. "Dr Stephen Porges: The Neuroscience of Polarisation (Pt 2 of 4)." *Rebel Wisdom*, YouTube, 15 Aug. 2019, https://www.youtube.com/watch?v=vmkG5l7CaGw.

Harding, Stephan. "What Is Deep Ecology?" *Schumacher College*, 28 Sept. 2007, https://www.schumachercollege.org.uk/learning-resources/what-is-deep-ecology.

Kloor, Keith. "The Great Schism in the Environmental Movement. Can Modern Greens Loosen Nature's Grip on Environmentalism? ." *Slate.Com*, Accessed 10 Aug. 2019,

https://slate.com/technology/2012/12/modern-green-movement-eco-pragmatists-are-challenging-traditional-environmentalists-over-scope-of-nature.html.

Lomborg, Bjorn. *False Alarm*. Basic Books, 2020.

Lomborg, Bjørn. "The Danger of Climate Doomsayers by Bjørn Lomborg - Project Syndicate." *Project Syndicate*, https://www.facebook.com/projectsyndicate, Accessed 19 Aug. 2019, http://www.project-syndicate.org/commentary/climate-change-fear-wrong-policies-by-bjorn-lomborg-2019-08.

Loye, David. *Darwin's Lost Theory*. David Loye, 2007.

Lukianoff, Greg, and Jonathan Haidt. *The Coddling of the American Mind: How Good Intentions and Bad Ideas Are Setting up a Generation for Failure.* New York: Penguin Press, 2019.

Margulis, Lynn. *Symbiosis in Cell Evolution: Life and Its Environment on the Early Earth*. San Francisco: W.H. Freeman, 1981.

Marris, Emma. "Emma Marris: Nature Is Everywhere -- We Just Need to Learn to See It | TED Talk." *TED: Ideas Worth Spreading*, Accessed 10 Nov. 2019, http://www.ted.com/talks/emma_marris_nature_is_everywhere_we_just_need_to_learn_to_see_it?language=jv.

Marris, Emma. "Rambunctious Garden: Saving Nature in a Post-Wild World: Emma Marris: Bloomsbury USA." *Bloomsbury Publishing*, 7 Accessed Apr. 2019, https://www.bloomsbury.com/us/rambunctious-garden-9781608194544/.

Naess, Arne, and Per Ingvar Haukeland. *Life's Philosophy*. University of Georgia Press, 2010.

Ortiz-Espina, Esteban, and Max Roser. "Child Labor." *Our World in Data*, http://ourworldindata.org/child-labor. Accessed 29 Oct. 2020.

Pielke Jr, Roger. "Why Discrediting Controversial Academics Such as Bjørn Lomborg Damages Science | Environment | The Guardian." *The Guardian*, The Guardian, 23 Apr. 2015, http://www.theguardian.com/science/political-science/2015/apr/23/playing-the-ball-not-the-man.

Pinker, Steven. *Enlightenment Now*. Penguin Books, 2019.

Porges, Stephen. "The Polyvagal Theory: New Insights into Adaptive Reactions of the Autonomic Nervous System." *PubMed Central (PMC)*, 3 May 2018, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3108032/.

Potts, Richard, and Christopher Sloan. *What Does It Mean to Be Human?* National Geographic Books, 2010.

Roser, Max, et al. "Life Expectancy." *Our World in Data*, 10 Sept. 2019, http://ourworldindata.org/life-expectancy.

Roser, Max, and Esteban Ortiz-Espina. "Literacy." *Our World in Data*, http://ourworldindata.org/literacy. Accessed 29 Oct. 2020.

Sagan, Carl. *The Demon-Haunted World*. 1st ed., Ballantine Books, 2011.

Shapiro, Arthur. "Professor Arthur Shapiro's Review of Emma Marris' Rambunctious Garden – Conservation Sense and Nonsense." *Conservation Sense and Nonsense*, https://www.facebook.com/WordPresscom, 2 Apr. 2013, http://milliontrees.me/2013/04/02/professor-arthur-shapiros-review-of-emma-marris-rambunctious-garden/.

Sharon, Todd. "Sharon Todd | EERA." *EERA*, Accessed 11 nov. 2019, http://eera-ecer.de/previous-ecers/ecer-2015-budapest/programme-central-events/keynote-speakers/sharon-todd/.

Toms, Michaels. “Deep Ecology for the 21st Century”. *New Dimensions Radio*, New Dimensions Radio, 1998, http://www.newdimensions.org.

Udgave, Dansk. “Bjørn Lomborg: Cool It.” *Klimadebat.Dk - Dansk Forum Om Klima Og Energi*, 30 Jan. 2019, http://www.klimadebat.dk/bjoern-lomborg-cool-it-b33.php.

Witoszek, Nina, and Andrew Brennan. *Philosophical Dialogues*. Rowman & Littlefield, 1999.