

A Match Made in Science: Reconciling Big History and Montessori Education

Introduction

How did the universe begin? How did we appear? What is the meaning of our existence? Is our fate in our own hands, or are we at the mercy of uncontrollable forces? These questions have excited the curiosity and creativity of humans for millennia, and that being the case, they deserve a central place in every culture's education. Putting the biggest questions humans can ask at the center of a curriculum does invite controversy on many levels, but the benefits are well worth it: depth and diversity of thought, critical thinking, synthesis of oppositional ideas, and most important of all, the potential for students to arrive at their own profound conclusions about ethics, spirituality, and their role in shaping the future. If we intend to make learning more valuable than GPA points, we have to help our students plunge below the surface of academics in search of the deeper meaning they crave.

For the past four years, I have taught big history in a public Montessori high school because it offers a viable means of reaching this deeper meaning. By tracing the route from past to present at various scales, big history unifies otherwise disconnected subjects into a transdisciplinary "map" of space and time that orients students to the complex world in which they live. A traditional high school curriculum, on the contrary, produces a dizzying blur of bits of information that don't hang together or seem to hold any clues about anything very meaningful at all. Big history shifts the experience of learning from grasping at bits of information to assembling a mosaic into which every piece fits to form an emergent image of our origin story as we know it. Moreover, the curriculum of big history aligns so naturally with Montessori's cosmic education that it seems tailor made for use in Montessori adolescent programs. Although these two schools of thought line up so well structurally, and to some extent philosophically, there are some sticking points that have to be worked out before we can explore why big history makes such an ideal companion for Montessori education at the secondary level.

Understanding the Controversy

Montessori practitioners can be quite protective of the philosophy; that is, they want a faithful application of her methodologies as she laid them out in her writings and lectures because diluting her method in any way diminishes its potency. Therefore, the first question a Montessori teacher has to ask is whether the grand narrative of big history is out of place in the third plane of development (adolescence), given that Montessori designed her cosmic curriculum for the second plane based on the sensitive periods unique to children ages 6-12¹. As cosmic education is the core of Montessori philosophy, many would argue that it should be carefully extended within its own traditions and limited to the second plane of development. Although Montessori did not provide much guidance for the third

¹ Montessori observed that in the second plane of development, the imagination flourishes and the child is hungry for culture, so the universe story capitalizes on these sensitivities. It stokes the flame of imagination and generates curiosity to learn (though retaining facts is not the point of the cosmic curriculum) as well as a sense of connection with the living world in general and humanity in particular. Adolescence, on the other hand, has its own sensitivities unique to that plane of development (see endnote iii).

plane compared to the first and second, she did outline a syllabus² to complement the *Erdkinder* experience that she felt served the developmental needs of adolescence.³

While the manual work of *Erdkinder* is a quintessential feature of Montessori adolescent programs, big history can aid the intellectual work at this level, especially for those of us trying to maintain Montessori integrity in a public high school program that doesn't allow ample time for tending to livestock, running a shop, building a path, working in a garden, and so on. Since the state imposes graduation requirements and dictates to a large extent the curricula of mandated courses, the learning experience in a public high school program – even a Montessori one – quickly becomes mechanical and meaningless: “just tell me what to do and whether or not this will be on the test” is a mentality that students who are overwhelmed or weary with boredom adopt as a kind of survival strategy. I have found that incorporating big history into our program has helped students make connections among everything they study, which generates much more enthusiasm and genuine curiosity than studying for the sake of accumulating credits. My anecdotal evidence of this shift in mindset is enough to convince me that we ought to find a way to make big history work in the Montessori world. Additionally, though, for Montessori students who have experienced the cosmic curriculum, big history provides a logical extension and magnification of the elementary story. Even the eight thresholds of big history, which begin with the birth of the universe and end with humanity, feel very familiar to the student oriented to the five Great Lessons that move in the same macro to micro direction. Finally, although I realize some of my colleagues will disagree with me on this point, Montessori philosophy is not static or immutable. She wanted her method to incorporate the latest and best ideas from every field of scholarship, to orient the child and adolescent to the world they will inherit so that they might then forge a *new* world. Given that it rests on the most up-to-date scholarship of the twenty first century, big history can aid in this lofty goal. Or so it seems.

Montessori, Metaphysics, and Methodology

Montessori insisted that education is not about the transmission of information; rather, it is about nothing less than the “salvation of humanity and civilization.”⁴ Does big history hold the same

² Montessori, Maria. *From Childhood to Adolescence*, 71- 81 (Amsterdam: Montessori-Pierson Publishing Company, 2007). It is worth noting that the academic content of part three in Montessori's adolescent “Study and Work Plans” dovetails with Big History's last five thresholds. *The study of the earth and living things* fits within the fourth and fifth thresholds, and *The study of human progress and the building up of civilization* fits within the sixth, seventh, and eighth thresholds.

³ *Erdkinder* translates to “land-child,” and it is to the adolescent curriculum what Cosmic Education is to the elementary curriculum; it is based on the developmental needs of the adolescent for physical movement and manual work to balance their intellectual work. To contribute one's labor to a group of one's peers help adolescents experience “valorization,” which can be understood as the feeling of dignity and self-worth that comes from acting as an integral component of a society that is greater than the sum of its parts. From a Montessori perspective, the utilization of social and personal “super-values” is the paramount objective of adolescent education, as adolescence “is the time, the ‘sensitive period’ when there should develop the most noble characteristics that would prepare a man to be social...” (63). There is no doubt that *Erdkinder* should have a prominent place in any adolescent program that calls itself Montessori, but big history can weave together the academic threads of Montessori's Study and Work Plans and promote an intellectual understanding of one's place in society at a variety of scales.

⁴ Montessori, Maria. “Educate for Peace.” *Education and Peace*, 28. (Amsterdam: Montessori-Pierson Publishing Company, 2007).

conviction? Does it contain moral or ethical revelations that can guide us toward a more peaceful and sustainable future? Does the grand narrative of big history point humanity in a *certain* direction? The answer is yes and no, at least the way that I see it. Let me explain.

In his essay, “Big History is Not an All-Encompassing World View,” Fred Spier defines big history as a purely “academic enterprise,” and as such, it eschews “discussions about what is right and wrong; how to act; and how to interpret it in religious, spiritual, or metaphysical ways.”⁵ This position is grounded in methodological materialism, which aims to limit conclusions to the empirical world of matter and energy. Just as you can’t observe a physical God with a telescope or microscope, so too you can’t observe moral rules in subatomic particles, the arrangement of galaxies, or the DNA helixes of humans; thus, it would be an illogical jump for scientific materialists to make any claims whatsoever about spirituality or morality. Both topics simply exist outside the purview of scientific materialism.⁶ As Spier puts it, “There is simply no academic basis for assigning ethical values or moral rules based on empirical evidence and scholarly interpretations.”⁷ Here we have the “no” part of the answer to the questions above.

Cynthia Stokes-Brown explains methodological materialism as “a restriction on method,” which ensures “that researchers will not make any non-material assumption as a way to eliminate confusion when studying the natural world.”⁸ There are many benefits to such an approach, not the least of which being that it allows scientists to present a picture of the natural world untainted by personal bias (insofar as that is possible). But the other benefit of this method, which I consider to be the saving grace for how we can use big history in Montessori education, is that the metaphysical conclusions are up to the individual. Here, we have the “yes” part of the answer.

As Stokes Brown asserts, “People of various metaphysical positions need to realize that they can use the big history narrative as a foundation on which to add whatever cultural or religious metaphysical background they bring with them.” She goes on to explain that teachers of high school students should strive “to help them understand that they can assimilate the methodologically materialist big history narrative as a foundation, even if they already have a metaphysical framework that is not materialist.” Not only does this mean that students of faith are included in this narrative, but it also allows for Montessori’s metaphysical framework (i.e. the discovery of our cosmic gift/cosmic task) to stand on a big history foundation.

⁵ Spier, Fred. “Big History is not a World View.” *Origins*.

⁶ In “The Meaning of Big History,” Cynthia Stokes Brown clarifies that a methodological materialist need not come to metaphysical materialist conclusions. In other words, a methodological materialist (or ‘naturalist’) may still derive ethical beliefs from purely materialistic methods. Stokes Brown explains that, “A new ethics is emerging from naturalistic accounts of reality---not dependent on supernatural enforcement, and scientists are beginning to speak out on ethical issues in ways they haven't done before.” (e-mail message to author, March 7, 2016). Clearly science has something important to reveal to us about our behavior, and it can offer these revelations without making any divine leaps of faith or pawning off responsibility to a higher power. Therefore, to say that ethics is beyond the purview of science may be to deprive us of one of the most advantageous applications of science.

⁷ Spier, Fred. “Big History is not a World View.” *Origins*.

⁸ Stokes Brown, Cynthia. “The Meaning of Big History, Philosophically Speaking.” *Origins*.

Even though Spier wants to make a sharp distinction “between academic big history and one’s personal point of view,” he does allow for the same open-ended interpretations of big history as Stokes Brown: “It will be up to the persons who engage in big history to decide what ought to be done, as well as how big history can be accommodated in their religious, spiritual, or metaphysical world views.”⁹ So no, big history does not contain any pre-packaged moral injunctions, but yes, it can be used by individuals to arrive at their own moral conclusions. Practitioners of big history just have to understand that when we step into the metaphysical realm of spirituality and morality, we are going beyond the self-imposed limits of big history as a strictly objective and empirical discipline. I don’t see this caveat as proof that big history doesn’t work with Montessori philosophy, as I have no qualms about straying from the boundaries of big history to serve the bigger aim of Montessori education. In fact, it seems like a perfect match to me: Montessori philosophy can pick up right where big history leaves off! This is not to say that Montessori education tells students what moral lessons they ought to find in big history or cosmic education; rather, it’s just to say that such explorations are well within the purview of our discipline.

Crossing the First Threshold

Once we decide that big history has a place in the world of Montessori education, we come to the most polemical controversy of all: the apparent ideological impasse of science and religion, which the teacher must negotiate from day one. At the outset of this epic journey, as we cross the very first threshold of the Big Bang, we encounter the turbulence of different faiths, family values, and unexamined assumptions. So how we frame this whole study is absolutely critical. We should not shy away from the picture of the universe as modern science sees it, but if we alienate students of faith at this juncture, the rest of the story will almost certainly fall on deaf ears.

Emphasizing Big History as a modern origin story is critical because it shows that science and religion align in their desire to explain our origins. Here is our common ground, a shared starting point. Furthermore, such an emphasis is disarming because, like every other cultural or religious origin story, our scientific knowledge of the universe is not infallible or exhaustive. As David Christian admits, “Many of the stories we tell today will seem quaint and childish in a few centuries, just as many elements of traditional creation [stories] seem quaint today...In their day, all creation [stories] offered workable maps of reality, and that is why they were believed. They made sense of what people knew.” Similarly, a modern creation story “must start with modern knowledge and modern questions, because it is designed for people who live in the modern world. We need to try to understand our universe even if we can be certain that our attempts can never fully succeed. So, the strongest claim we can make about the truth of a modern creation [story] is that it offers a unified account of origins from the perspective of the early twenty-first century.”¹⁰

It’s fair to ask why the scientific perspective reigns supreme in big history and Montessori philosophy, especially if, just like religion, it can’t claim to have all of the answers. It comes down to the fact that science makes unbiased observations and is willing to change its story based on new observations, while

⁹ Spier, Fred. “Big History is not a World View.” *Origins*.

¹⁰ Christian, David. *Maps of Time: An Introduction to Big History*, 11. (Berkeley: University of California Press, 2005).

religion makes normative claims that tend to impose a predetermined and rigid worldview onto its believers. These worldviews imply moral judgments that can be twisted to justify egregious behavior. As a result, in the words of E.O. Wilson, “The cost to society of the bowed head has been enormous.”¹¹

We see the proof of this truism in the centuries-long holy wars of the Crusades, the tortures of the Inquisitions, and the heinous and cowardly acts of terrorism inspired by religious extremism that beleaguer our modern world. This is not to say that all people of faith are violent, as that would be a gross misrepresentation. In fact, violence, discrimination, and terror in the name of any religion are perversions of religious spirituality.

Nor is this to say that religion serves no great purpose in our lives. On the contrary, as Wilson acknowledges, religions “perform services invaluable to civilization. Their priests bring solemnity to the rites of passage through the cycle of life and death. They...comfort the afflicted and take care of the desperately poor. Inspired by their example, followers strive to be righteous in the sight of man and God.”¹² The unfortunate flaw among sectarian religions, though, is that all of them define themselves by competing creation stories, and “No matter how gentle and high-minded...the core belief assures its members that God favors them above all others....There is no way around the soul-satisfying but cruel discrimination that organized religions by definition must practice among themselves.”¹³

Simply put, religion sets up an “us and them” scenario, whereas from a scientific point of view, we are all part of nature, so we are all part of the same origin story. Every nationality, every culture, every ethical system, every belief from the dawn of civilization to the modern era is part of our big history. Of course, big history doesn’t validate one over the other. With that being said, it would be a mistake to exclude or even downplay the spiritual world from this academic narrative, because to do so would betray a bias and efface a vital part of our story.

Cosmologist Brian Swimme articulates well the inclusive quality of a scientific narrative: “The creation story unfurling within the scientific enterprise provides the fundamental context, the fundamental arena of meaning, for all the peoples of the Earth. For the first time in human history, we can agree on the basic story of the galaxies, the stars, the planets, minerals, life forms, and human cultures. This story does not diminish the spiritual traditions of the classical or tribal periods of human history. Rather, the story provides the proper setting for the teachings of all traditions, showing the true magnitude of their central truths.”¹⁴

Montessori also celebrated the inclusive quality of science, asserting that “The community of interests, the unity that exists between men, stems first and foremost from scientific progress, from discoveries, inventions, and the proliferation of new machines.”¹⁵ Montessori marveled at mankind’s genius made

¹¹ Wilson, E.O. *The Meaning of Human Existence*, 184. (New York: Liveright Publishing Corporation, 2014).

¹² *Ibid.*, 150.

¹³ *Ibid.*, 151.

¹⁴ Swimme, Brian. *The Universe is a Green Dragon: A Cosmic Creation Story*, 38-9. (Rochester: Bear & Company, 2001).

¹⁵ Montessori, Maria. “The Need for Universal Accord so that Man may be Morally Trained to Defend Humanity.” *Education and Peace*, 64. (Amsterdam: Montessori-Pierson Publishing Company, 2007).

manifest through scientific advancements. She understood that our ability to fly through the air, traverse the seas, and communicate with people all over the world had united us, at least in a superficial way. However, the technological advancements of science were less important to her than the metaphysical implications that scientific discoveries held¹⁶. In another lecture, she posits that, "...there is something that involves all mankind and perhaps even the universe itself, creation, cosmic harmony. This 'something' might be considered as involving a religious ideal. But what I should like to discuss is the possibility that science may have a predominant role to play in helping us discover this single universal mission."¹⁷ Although a religious woman, Montessori gave primacy to science as the ideal means of realizing our interconnectedness and purpose (i.e. cosmic task) on this planet.

Approaching the Ninth Threshold

Although a scientist by trade, Montessori warned that advances in science also invite new and complicated problems for humanity. In her time, she witnessed the Great War, the rise of Fascism, and World War II, so she understood all too well that despite the incredible outward progress of science and technology in the twentieth century, our inward progress had not kept up, which put us in a perilous situation: we existed at odds with one another and with nature itself, completely unconscious of our "terrestrial destiny and of the fact that the whole of humanity is so intimately united that it forms but one organized energy."¹⁸

Montessori lamented that, in the process of advancing our external world and extracting riches from the planet, "Men did not take care of humanity. Its growth was neglected and left to chance and thus remained inferior in development to the development of the environment in which he lives. He is without orientation and without control over his own creation."¹⁹ This was true in Montessori's time, and since we have been slow to recognize the danger, the situation is even more dire today. As Stokes Brown admits, "...our current pattern of living is not sustainable; something new and different must emerge, either from us humans or from the rest of the planetary system...Big history seems to indicate that humans are now at a major turning point in the whole story; we are not living at a time consisting of gradual, on-going change. We are living at a moment of great uncertainty in which our decisions will matter greatly and have unusual significance. The narrative of big history dramatically reveals this conclusion."²⁰

So, what will the next threshold be? I suppose that depends on if and how we utilize scientific methodologies to liberate ourselves from antiquated ideologies that have divided humanity since the

¹⁶ Here, of course, is where many big historians get off the Montessori bus.

¹⁷ Montessori, Maria. "Fifth Lecture." *Education and Peace*, 66. (Amsterdam: Montessori-Pierson Publishing Company, 2007).

¹⁸ Montessori, Maria. *Basic Ideas in Montessori's Educational Theory: Extracts from Maria Montessori's Writings and Teachings*, 130. (Oxford: Clio Press, 1997).

¹⁹ *Ibid.*, 131.

²⁰ Stokes Brown, Cynthia. "The Meaning of Big History, Philosophically Speaking." *Origins*.

dawn of civilization. Big history tells an uplifting tale of how mankind emerged from the abundant and complex creativity of life on this planet, and it leads to a host of harrowing conclusions about the deleterious byproducts of mankind's unbridled acceleration into the modern era: global warming exacerbated by deforestation and the burning of fossil fuels, mass extinctions from overhunting and destruction of natural habitats, pollution of the water and soil and air, and the proliferation of nuclear weapons that threaten the very existence of our species.

Does big history really lead us here just to abandon us? Does our strictly academic map of space and time disorient us at the very point when we need directionality the most, as we approach the next critical threshold in our epic journey? I think not. If a detailed and comprehensive scientific account of reality cannot tell us where to go from here, then we will be destined to remain victims of our own myopic prejudices and selfish pursuits. Without the lens of science to correct our vision, we will almost certainly stumble across the next threshold, falling deeper into war with one another and with nature itself.

However, with the corrective aid of an education designed to explore our origins, our human history, and yes, the very meaning of our existence, we can envision "A new world for a new man," which Montessori told us 80 years ago was "our most urgent need."²¹ This "new world," could also be our next threshold, one that marks our conscious departure from the Anthropocene into the Ecozoic era.²²

In 1932, Montessori gave an address to the International Office of Education in Geneva in which she made a prescient observation that "An immense chapter of history taking millennia to unfold has now closed."²³ She understood even then, long before all of the ramifications of industrialization had fully manifested, that we had brought ourselves to the brink of a new threshold. Although she portrayed the reality of the modern era in stark terms, she had faith in our ability to transform ourselves and our planet into a higher state: "we, the last earth-bound men, must make the great effort of lifting up our eyes and hearts to understand [the reality of our time]. We are undergoing a crisis, torn between an old world that is coming to an end and a new world that has already begun and already given proof of all the constructive elements it has to offer. The crisis we are experiencing...can be compared only to one of those biological or geological epochs in which new, higher, more perfect forms of life appeared, as totally new conditions of existence on earth came about."²⁴

As a result of centuries of empirical scientific inquiry, we have thrown off many of the superstitions and illusions that stifled our inward progress as we built up our complex external world. The "totally new conditions of existence" are defined by an emergent consciousness informed by science and freed from

²¹ Montessori, Maria. "Peace." *Education and Peace*, 21. (Amsterdam: Montessori-Pierson Publishing Company, 2007).

²² The Anthropocene is a new geological time distinction in which mankind represents a major geological force that is impacting the entire biosphere in deleterious ways. The Ecozoic era is a theoretical future time distinction proposed by Thomas Berry, in which mankind recognizes his interdependence with the planet and enters into a "mutually-enhancing relationship" with the Earth. Obviously, the Anthropocene and the Ecozoic represent two divergent paths for the future of humanity and the planet.

²³ Montessori, Maria. "Peace." *Education and Peace*, 22. (Amsterdam: Montessori-Pierson Publishing Company, 2007).

²⁴ *Ibid.*, 22-23

“old world” dogmas and doctrines. There is still work to be done, though, and the stakes are too high now to pledge allegiance to the creed that science has no say in ethics.

In closing, it seems appropriate to pose the question that Montessori concluded her speech with in 1932: “Who will sound the trumpet awakening [humanity]? Man today lies slumbering on the surface of the earth, which is about to swallow him up. What will he do?” It’s likely that the answer to this question will determine our next threshold. Education is our trumpet, but if sectarian groups, religious fundamentalists, demagogues, and profiteers are the ones who sound it, then mankind’s best and brightest scholars will indeed have taken us on nothing more than an academic enterprise. Montessori education is bigger than that, even if big history doesn’t want to be.

Endnotes