In Memorium

Dr. Ji-Hyung Cho

Origins
Volume V Number 5
International Big History Association

Table of Contents

Remembering Ji-Hyung Cho

Pioneer of Big History in Korea

Dr. Seohyung Kim
Research Professor, Institute of World and Global History
Ewha Womans University

Professor Ji-Hyung Cho was a historian with a great vision. His field was the legal history of the United States. He was one of the most important members of the Korean Society of American History and his devotion to the association was enormous. When he was General Secretary, he began to publish a Newsletter to provide new information about American history and the current situations of members; he also held a regular forum to introduce new American history books and discuss relevant issues. Ji-Hyung had lots of interest in the revision of the Korean Constitution, so he had several projects that compared the American and Korean Constitutions. He realized the limitations of the Korean Constitution, and argued for changes in newspaper editorial articles and public lectures as a legal historian. He told me that historians have to care about their world all the time. The importance of new ideas and of support for social concerns are among the lessons we can learn from Ji-Hyung as a historian.

However, Ji-Hyung was also different from traditional historians. When I was a former student of his, Ji-Hyung always emphasized different historical perspectives within broader and wider historical contexts. Under his teaching, I realized the limitations of nation-focused history and even though my major is American history, I tried to seek inter-relationships and inter-connections within historical contexts. He always said that we must recognize clearly the current situation of our global era, and he thought it was his duty to teach new and different historical perspectives to students. For these reasons, Ji-Hyung held several international conferences, in which I met famous world historians such as Jerry Bently and Arif Dirlik and made special connections with them. He helped me to write my Ph.D. dissertation about the global reach of infectious diseases and encouraged me to be a global historian and to develop my research at global scale.

With these historical perspectives, Ji-Hyung started the special project, World Class University [WCU], in Korea seven years ago, and that is when I first met David Christian. This is the opportunity that started me teaching big history. I began teaching big history for the first time in Korea, translated big history books into Korean, wrote several articles about Korean big history education, participated in big history conferences and panels, managed teachers' workshops for big history as an extra curriculum course in middle school and high school, and started to publish 20 volumes of a big history series in Korean. I met lots of people interested in big history and in 'convergence education' that links the natural sciences and humanities. I could not have done any of these things without Ji-Hyung's help and support. He provided the chance for me to be the first big historian in Korea and always strongly supported my work in big history. And he launched a great plan for changing Korean education with the big history perspective. I received so much kindness and care from Ji-Hyung as his first and last Ph.D. student, and as a colleague for almost 20 years. I could not have accomplished any of my works in big history without his large vision and his support and devotion to big history.

Ji-Hyung was a special teacher. This year is the 20th anniversary of Ji-Hyung's arrival at Ewha Womans University. He became a full professor in his early thirties, so his academic curiosity was great. He tried to teach students how to understand the truth of history and to appreciate the multiple layers of different historical contexts. When I was a graduate students, he taught cultural history classes. His classes were difficult and

there was much to prepare, so after class, we would continue discussions on the relationship between text and context or definition, or on the role of power in history. Even though Ji-Hyung's classes were not easy, most students remembered his classes as the best and most impressive classes they took part in during their student days. There was no teacher who told us so persuasively of the importance of historical context and the diverse meanings of historical events in our times. Always his classes were so vibrant, and there was much to learn and much to ponder deeply. His teachings were precious and I will always remember them.

Ji-Hyung was also a fine and influential administrator. From 2008 to 2010, he was the Vice President of the Office of Research at Ewha Womans University. As Vice President, he tried to build better foundations for research. During his term of office, university research funds increased to over ten million dollars because of his strong support for university professors. There were several projects that Ji-Hyung helped and these became major projects in the University. As Vice President, Ji-Hyung always did his best to bring research projects to completion. His abilities as an administrator and his devotion to the university were beyond description. He was a respectful leader and all the staffs in the office of research remember him as an excellent administrator.

Ji-Hyung was a very nice and gentle man, with great consideration for other people. He was a great husband and father to his family in the United States. Even though they lived separately, he sacrificed much for his family over last 25 years. Because of his sacrifice and e fort, his two daughters have grown up well and I think that they are extremely proud of their father.

Now I wish him eternal sleep without any suffering or fear. Even though he is not with us, his passion for big history will be remembered forever and I will never forget his efforts and his dedication to big history. I am so appreciative of your condolences on the loss of Ji-Hyung, and I will follow his wishes to spread and develop big history in Korea with your support.

In Memory of Professor Ji-Hyung Cho

David Christian

Ji-Hyung died tragically young, when he still had much to offer Korean and global scholarship as a world historian and an advocate of big history. He will be missed greatly by his family and by a large community of friends and colleagues.

I came to know Ji-Hyung first in Cambridge, England, in 2008, and soon after at the founding meeting of the Network of Global and World History Organizations (NOGWHISTO), the organization that represents world and global history at the international level. As part of that process of creating a global community of world and global historians, Ji-Hyung played a leading role in establishing the Asian Association of World Historians (AAWH). He also organized the superb second conference of the AAWH at his home University, Ewha Womans University in Seoul, in April 2012, and agreed to be the editor of the Association's journal, The Asian Review of World Histories. With typical energy, passion and commitment he made sure that the Review would rapidly become the premier journal for world and global history in Asia. He also played a crucial role in organizing the next conference of the AAWH, which will be held in Singapore in May 2015.

In Dresden, in 2008, at the founding meeting of NOGWHISTO, Ji-Hyung proposed putting my name forward for a project that would bring me to Korea for five consecutive summers under the Korean government's World Class Universities program. While in Korea, I taught and lectured

on world history and big history, and taught annual big history courses for students at Ewha University. This was a wonderful opportunity for me, and over those years, the Institute for Global and World History at Ewha University, which Ji-Hyung established with the able support of Dr Seoyhung Kim, Dr Hyun Hur, and other colleagues, has become a major supporter of Korean historical research and education at very large scales. Ji-Hyung and Seohyung also became close personal friends during these five years, as they educated me about Korea s fascinating history and helped me see world history increasingly from an Asian perspective. Through them I made many very good friends in Korea, all of whom will surely miss Ji-Hyung as much as I will.

Ji-Hyung was a superb and creative organizer, and a generous supporter of his colleagues and friends. It became clear to me that, despite his expertise in US constitutional history, he was drawn increasingly towards the idea of a history of humanity, a history of what all human cultures have shared over the many thousands of years in which our species has lived on this planet. I believe this is also what drew him increasingly to the idea of big history, a new discipline that can help us see the unity of human history by placing that history within the even larger histories of the biosphere and the Universe as a whole.

Ji-Hyung was a fine colleague and a good friend. May he rest in peace

In Memory of Ji-Hyung Cho

Craig Benjamin

I write this brief essay in honor of Professor Ji-Hyung Cho in my capacity as President of the World History Association (2014-15) and Treasurer of the International Big History Association (2011-present). In both these capacities I was privileged to know Ji-Hyung for several

years. Our professional interactions during this period provided me with a real sense of his consummate professionalism, and his very deep concern for the future of global education in Korea and around the world. With his sudden passing at such a relatively young age, the community of world and big historians has lost a dear colleague and a staunch advocate.

Korea has a long history of tension between education curricula and political ideologies that are tightly focused on Korean culture, and those that embrace an interregional or global perspective. As a peninsula Korea has always been physically connected to the Asian continent, and during the last ice age was also connected to Japan. Early migrants to Korea thus brought with them cultural and environmental knowledge derived from their experiences on the mainland, and in turn passed many of these on to the Japanese archipelago. Cultural and technological transfers from other regions of Afro-Eurasia during the centuries of Han Dynasty colonization and the subsequent Three Kingdoms Period further 'internationalized' Korean culture and outlook. Queen Seondeok of the Silla (r. 632-647) introduced Confucian education systems into her court; and during the Chinese Tang Dynasty both the Silla and Parhae states sent large numbers of students abroad to study in Chang'an. Yet Silla scholars such as Kim Taemun were outspoken in their concern that Korean education was now so dominated by ideas from China that it was in danger of losing its cultural distinctiveness.

During the subsequent Koryo Era, the Kukchagam National University was established in 992, organized very much like a modern university into colleges that specialized in different subjects and disciplines, including Chinese tradition, law, calligraphy, medicine and accounting. Koryo King Seongjong (r. 981-997) was intent on spreading education throughout his country, and brought young men from local areas to the university to study what was essentially a Confucian curriculum. Mongol subjugation of the Korean peninsula put a halt to these efforts, but during the subsequent early Choson Dynasty educationalists re-embraced Chinese Neo-Confucian values. Despite this, Korean scientists and intellectuals made tremendous and often very original advances in arts, sciences, technology, language and education during the reign of the extraordinary King Sejong (r. 1418-1450).

In the nineteenth century, determined to keep at bay imperializing Europeans who were already carving up much of the rest of the world, Korea attempted to isolate itself from global affairs, until Japanese foreign policy resulted in a complete ideological reversal and a conscious attempt to reengage with the world. During the 35 years of Japanese occupation (1910-1945), education in Korea was skewed towards Japanese ideology and language. Since the end of the Korean War, South Korean society has placed a very high value on education at all levels, spending a much greater percentage of its GDP on education than most other developed countries. However, the curriculum that students must master in order to gain access to higher education through the College Scholastic Ability Test is tightly focused on mathematics, sciences and foreign languages, which leaves little space for world history or other global perspectives.

With this background in mind we must acknowledge the extraordinary efforts of Ji-Hyung Cho to champion a genuinely global perspective at Ewha Womens University in Seoul. Ewha was founded by a female American missionary in 1886, and has grown into the largest women's university in the world. Ji-Hyung was instrumental in securing a grant that brought pioneering Big Historian David Christian to Ewha for five consecutive summers, and as a result of those efforts, and those of his colleague Professor Seohyung Kim, both world and big history are now firmly entrenched at the university through the Institute of World and Global History. In addition, Big History is now being taught at a number of Korean high schools using the Big History Project curriculum, another development that can be directly attributed to the efforts of Ji-Hyung Cho, in conjunction with Seohyung Kim, David Christian, and the BHP team.

I had the honor of representing the World History Association at the 2012 Conference of the Asian Association of World Historians, which was held on the campus of Ewha University in Seoul. This was a splendidly organized event that included delegates from all over the world, and was further evidence of the commitment to global history education espoused by Ji-Hyung and his colleagues, despite the long history of tension between those educationalists espousing a Korean-focused technical education, and those championing genuine global cultural and historical awareness. With the death of Ji-Hyung Cho, Korean educators and the global community of world and big historians have lost a dear colleague and a staunch advocate, but his legacy will live on through the important role he played in instigating this innovative chapter in the long history of education in Korea.

Remembering Ji-Hyung Cho

Cynthia Stokes Brown

I HAVE A DISTINCT MEMORY of meeting Ji-Hyung and Seohyung at a World History Association conference, when David Christian warmly presented them to me. I can't remember exactly which conference it was, probably 2008 in Salem, MA.

That was the start of a happy friendship, which deepened over the next five years. In July 20 1 we were together in Beijing at the World History Association conference there. Several professors from my university, Dominican University of California, attended to tell about our work in big history. Afterwards, Ji-Hyung sent me photos of myself, which he said showed my enthusiasm for big history, and invited me to come to Seoul the next year, so that Korean scholars could hear about the big history curricular reforms at Dominican. Ji-Hyung in that email: "I hope

I could have many panels on big history since I love big history panels personally."

In April 2012 my husband, Jack Robbins, and I had the pleasure of flying to Seoul for the 2nd Association of Asian World Historians conference. I believe that the conference had more than one big history panel, all of which were received with great interest. The conference was a wonderful success in bringing together historians of Asia and the West.

The following summer the big history faculty at Dominican had the great pleasure of having both Ji-Hyung and Seohyung with us for a week for our fourth summer institute, at which we reviewed and improved our teaching strategies in big history. Determined as they were to learn how we made big history engaging to freshmen students, Ji-hyung and Seohyung eagerly participated in all our activities, from acting out the accretion of the solar system to forming an opinion snake about predictions for the future. I sat across from them at the final banquet, and together we celebrated having a worldview big enough to include everyone easily.

Yet the way I got to know best Ji-Hyung's thinking was yet to come. When David Christian set up the committee structure for the International Big History Association (IBHA), he appointed Ji-Hyung to the Publications Committee and made me the chair. David knew that Ji-Hyung was the only one of us who had actual experience editing an academic journal, the *Asian Review of World Histories*.

Our committee planned two projects, the first, to publish papers from our first conference, and the second, to launch an academic journal for the new field of big histor . Ji-Hyung contributed helpful suggestions based on his experience to both of these projects. We have accomplished the first project; the second we have deferred, deciding that we do not yet have sufficient active big history scholars. After planning what it takes to produce a high-quality academic journal, we understood better what Ji-Hyung had achieved in producing *The Asian Review of World Histories*.

During our committee work, Ji-Hyung's was supportive of most of our plans. One plan that he did not support was a proposal for IBHA to publish a volume of papers on religion and big history. Ji-Hyung argued that the proposed editor had the right to seek publication on his own, but that IBHA itself should not sponsor such a book. He thought that it might be appropriate later when IBHA had become more established, but meanwhile it was likely to have serious repercussions on IBHA and big history. He thought it would make as many deserters and enemies as friends for big history. This convinced our committee, which voted "no" to the proposal that IBHA should sponsor a book on religion and big history.

In the midst of this discussion Ji-Hyung told us of his decision to resign from the committee in August at the time of our second conference. We understood that the reason was his ill health, and sadly he was not able to attend the conference. He told us that he had enjoyed working on the committee and that he had learned much from our work together.

I greatly miss the wise advice of my friend, Ji-Hyung, and even more I miss his warm support and understanding. It continues to be a treasure to me that I found such close bonds with someone from the other side of the world. Our relationship confirms the global culture that we enjoy and the common empathy that humans from different cultures can have for one another. Knowing Ji-Hyung has in every way renewed my passion for, and commitment to, big history.

故조지형 교수님 추모의 밤

뜻깊은 자리가 될 수 있도록 함께 해주세요.

조지형 교수님을 그리워하는 분들께,

갑작스러운 조지형 교수님의 죽음 앞에 밀려드는 슬픔을 주체할 길이 없습니다. 긴 시간 동안 투병을 하고 계셨지만 늘 밝은 모습으로 잘 이겨내고 계셨기에 더 안타깝습니다.

선생님은 가셨지만 빅히스토리의 정신을 남기셨습니다. 선생님과 웃고 떠들며 세상에 대해서 이야기하던 사람들을 남겨놓고 가셨습니다. 이제 그 사람들이 모여서 선생님이 못다 이룬 빅히스토리의 꿈을 실현시키려고 합니다.
첫 발걸음으로 〈조지형 빅히스토리 협동조합〉을 만들어서 빅히스토리 컨텐츠 개발과 교육에 힘쓰려고 합니다. 선생님이 살아계셨다면 직접 하셨을 일을 남은 사람들이 대신하려고 합니다.

이 뜻깊은 출발의 자리에
조지형 교수님을 그리워하는 당신을 초대합니다.

김상욱·김서형·이명현·이정모·장대익
정지훈·조광수·최지은 드림

당신의 꿈이
역사가 됩니다.

행사 소개
추모 영상, 추억 나눔의 자리
조지형 빅히스토리 협동조합 안내 및
총회, 기념 촬영, 다과회 등

일시 : 4월 5일(일) 오후 6시
장소 : 서대문자연사박물관 시청각실
(서울시 서대문구 연희로32길 51
02.330.8899)

문의 조지형 빅히스토리 협동조합 간사 장영인
010.6235.0176

오시는 길
지하철
· 신촌역(2호선) 3, 4번 출구 → 서대문 03(마을버스)
· 홍제역(3호선) 4번 출구(홍은사거리 방향) → 7738(지선버스)
버 스
· 간선버스 110A, 153
· 지선버스 7017, 7720, 7738
하차 지점 서대문자연사박물관

조지형 빅히스토리 협동조합, 서대문자연사박물관

Big History Meets Psychology:
An Investigation of Psychological Practice in Light of the Origin Story of Our Time

Marc W. Ross, PhD
Calgary, Alberta

Abstract
Important themes or aspects of Big History will be highlighted and their possible connection to the field of Psychology will be described. These themes include the Goldilocks effect, increases in complexity or threshold moments, integration and collective learning. After describing these points of intersection we will turn the tables, so to speak, and see how certain psychological themes or theories might be connected to or inform the emerging field of Big Histor . These include filtering or cognitive biases/schemas, pattern recognition and meaning, and parts of the self. Let us begin with Big History and its implications for the field of Psycholog .

Big History: What it helps us understand in the field of Psychology

In this article we are going to investigate how Big History and Psychology might come into a more developed, mature relationship than is currently the case. In other words, we are going to see what Big History can offer in terms of metaphors and clarifications for the practice of Psychology, and vice versa. We begin with the former, move to the latter and conclude with possibilities for future directions. As an overarching metaphor, let us playfully imagine that Big History and Psychology are dating. The two perspectives or disciplines are seeking a fuller partnership and, potentially, even a wonderful and life-giving marriage.

Goldilocks effect

Many of us will remember that Goldilocks is the name of the young girl who found herself in the home of three bears faced with three porridges and three beds. (In the original story it was an old woman; the story itself evolves.) Goldilocks continued to choose the "middle way" or the space between the opposites. The story has been extrapolated to suggest that many aspects of life/immaterial life look for the right conditions, the habitable zone, that will allow for emergence and the generation of new levels of complexity and coherence.

The Goldilocks principle essentially states that something must fall within margins, rather than into extremes, in order to be stable. In astrobiology, this principle is used to refer to the placement of Earth in proximity to the sun because it is not too close, nor too far away, to permit the conditions for life to emerge. It is a trans-disciplinary term and is used in economics (e.g. moderate economic growth and slow inflation) and medicine (e.g. right dosage of drugs), among others (Wikipedia, 2015).

The Goldilocks principle can also be seen in the domain of Psychology. When dealing with mental health, practitioners are looking for the Goldilocks zone in their interventions and counseling overall.

Just as planetary conditions can be too hot or too cold, too gaseous or too solid, there are parallel tendencies in the human towards aversion or overwhelm, self-protective or salvific tendencies, chaotic or rigid ways of being (Siegel, 2012). Put differently, we tend towards avoidant or overpowering strategies in relation to challenge; we are too hot or too cold when faced with the vicissitudes of life.

In attachment theory, for instance, we are either anxiously avoiding relationships, anxiously ambivalent about them or securely attached in our pattern of relating (Ainsworth, 1969). These attachment "conditions" or tendencies affect the development of a human being in various areas like self-esteem, relatedness and the ability to tolerate discomfort in relationships. An ocean metaphor for this is to suggest that we fall into one of three major categories: an island, a wave or an anchor.

Another example of the Goldilocks principle in psychological action can be found in the process of learning. Recent studies have demonstrated that children gravitate towards representations that are neither too simple, nor too complex (Kidd, Piantadosi & Aslin, 2012). Similarly, research in the area of stress and its effect on performance indicate a similar pattern: some stress is good, too much stress is bad (Yerkes & Dodson, 1908). We flourish in the middle zone, in the Goldilocks region. Big History, you have officially met Psychology… [Both smile coyly at one another, hoping for the best].

Increases in complexity/threshold moments

In addition to fostering an appreciation for what lies between the extremes, Big History is described as centering around eight main thresholds, or leaps in complexity, that start with the Big Bang and move into the modern revolution and beyond (Christian, 2005). From the creation of new elements, to the birth of life on Earth, these threshold moments provide a kind of developmental storyline to the history of everything we know. The movement from simple building blocks into much more complicated arrangements of energy and matter, and eventually into mind, is part of the underlying sense of narrative that is so appealing in Big History.

Just as the universe increases in complexity over time, so does a human being throughout the lifespan, albeit over much shorter stretches of time. As Developmental Psychology suggests, we move from more basic operations to more complicated, integral relationships with ourselves, each other and the environment (Piaget, 1958). Understanding where a person is in terms of their physical, emotional, psychological, and moral development is critical for psychologists to providing effective therapy. For instance, if you were a teenage client and I used metaphors and cultural references that date back several decades, I might be missing the importance of matching my interventions to your developmental stage. This is basic Psychology 101, but important nonetheless.

Arguably, Big History is principally a cosmological narrative and the most all-encompassing narrative we have to date. Just as Big History helps us situate a human being in the vast, unfolding of the cosmos, so too, in the counseling room, narrative therapy helps people to understand and make meaning of the various changes and developments that they have experienced over their lifetime (White & Epston, 1990). Ideally, a person who starts to see his or her life as an unfolding story, coherent and meaningful, can begin to view challenges or problems as possibilities for growth and development into a more mature and healthy human being; the story can also be identified as the hero s journey (Campbell, 1949). Viewed from this lens, as we move through different stages of our life journey, we are often faced with what could be conceived of as "threshold moments." [Psychology looks over at Big History from across the crowded room and signals for him to approach, inviting Big History to step forward and flirt]

Integration

As a result of the developmental progression through universal and human unfolding, there is an increase in complexity in the cosmos and the self that allows for more and more consciousness, integration and possibility. The integrative quality that arises out of complexity, or through it, is also a metaphor for health and well-being in human Psychology. Siegel (2012) addresses the integration of the brain, nervous system, mind and relationships in his work on interpersonal neurobiology. In his own words he says:

"The mind is more than a process correlated to only neural functioning. Our mental experience also fundamentally arises from energy and information patterns that are shared with others and with our world. One of the profound implications of our exploration of the deep nature of mind is to expand our ways of understanding the power of relationships to support the health of our minds. When we view the mind as a self organizing, emergent process that arises from both relationships and from the body, we're in a new and stronger position to address the question of what our mental processes actually are and how to optimize our well-being." p. 34-36.

Less theoretically, psychologists often hear the stories of people who feel they have grown through the process of counseling. "I became more compassionate towards others after going through the anger management program and seeing more clearly how my actions impact others." In a branch of my work in the area of domestic violence, I hear these kinds of reflections fairly regularl . This potential move into higher levels of moral, social, intellectual and, in essence, psychological development, might be viewed as the correlation to an increase in complexity as described in Big History.

In Psychology and Big History alike, part of what allows for an increase in complexity is the integration of various disciplines and perspectives: cosmology, physics, biology, chemistry, archaeology, sociology, anthropology and many more. Similarly, various models of integral Psychology seek to integrate the many domains of life: sexuality; career life; relational understandings; biological maturation and change; cultural pressures and customs; leisure; meaning, etc. In the same vein, this article is an attempt to integrate Psychology and Big History, itself an expression of the human propensity towards greater levels of knowledge, understanding and synthesis.

Certain scholars suggest that the current threshold, the one that allows the universe to "know itself" through human self-awareness, is the most exciting (Swimme & Berry, 1994). The argument here is that there is an expression or aspect of the universe that is now becoming self-aware or conscious of its deepest history. This is part of the story of Big History, and of Psychology, I submit. As storying, integrating creatures who seek to make sense and meaning out of our experience, we can't help but see how things fit togethe . [Psychology looks good in her red dress, Big History takes the cue and has strolled over to make small talk. Things are heating up!]

Collective learning

Integration and synthesis infuse collective learning, which is a term used by Christian (2005) to refer to the unique capacity in humans to store information and share it through time with later generations. This ability, which he argues is unique to human beings, allows us to learn infinitely more than what we would be capable of learning through one human lifespan alone. The concept is used to describe, in part, cultural evolution throughout the human journey.

Bateson (1991), a scholar who influenced our understanding of schizophrenia, developed his "ecology of mind" to show clearly how various interrelationships and ecosystems work together to form intelligence and mutually enhancing connections. In his cybernetics and

description of feedback loops he, and others since then, have attempted to demonstrate how the individual, culture and the ecosystem are all deeply interrelated and interpenetrated; how we learn and adapt to each other and everything around us is all interrelated (Wilber, 2006).

In Psychology, the idea of collective learning is supported in multiple ways. Neural plasticity, for instance, helps us understand the process of collective learning. As neurons that fire togethe , wire together, so too do aspects of the natural and cosmic world. We are literally wired to absorb information from many different sources. Habits and tendencies, patterns of relating to oneself, others and the natural world all get wired in neurologically and behaviorally.

This can be a wonderful form of development when we integrate and adapt to the growing information available to us, but it can be problematic when we learn unhealthy ways of being that negatively impact our psychological health. A common predicament in this new millennium faced by clients of a psychologist relates to the challenge of collective learning: "It feels like everything is going so fast, it's hard to keep up with all of the demands at work, at home, technologically and politically, sometimes it just feels overwhelming. Like I wish I could just press pause or something…"

It seems plausible that a deepening understanding of human Psychology (itself an example of collective learning) might facilitate our understanding of collective learning and vice versa; a symbiotic relationship, so to speak. [Big History and Psychology are now chatting away and seem to be having quite the little conversation. Psychology giggles, Big History presses in daringly in the dimly lit bar room, and it looks like they are hitting it off].

Psychology: What it helps us understand in the field of Big History

Filtering or cognitive biases/schemas

Any story, narrative or set of ideas is naturally filtered through, or perhaps more appropriately, arises out of, an interpretive lens. Recognizing that Big History is a new, developing myth or narrative for our time, we see the very human tendency to turn scientific facts in the various scholastic disciplines into meaningful pieces of information, the tendency to filter the information and interpret it into something that makes sense. In The Believing Brain, Shermer (2011) shows clearly how the human brain is wired to create a belief and then fuel this belief with other bits of information to secure it in understanding. Once again, this is an old psychological principle: how we see the world affects what we see.

The capacity to integrate and create storylines is truly spectacular. And yet, as we venture forth in the quest for truth, it is incumbent on us to try and tease apart what is more true from what is less true. This is why, I propose, it is important to understand human psychology and how it affects Big History. It is imperative for us to understand how our mental schemas might be impacting our understanding of this grand new narrative. And with a recent landslide of understanding in cognitive behavior therapy and the neurosciences, we are seeing that our human capacity to comprehend the world and what is happening around us is filled with cognitive biases and heuristics (Kahneman & Tversky, 1978).

A classic example is the confirmation bias. We seek out information that fits with our understanding and current beliefs. And this bias arises out of the tendency to avoid "cognitive dissonance" - a way of protecting ourselves from an uncomfortable reality: either this idea is wrong or I am wrong. Could Big History be wrong? For readers of this article, that may

be an uncomfortable question. We are under the sway of "belief bias," a desire to confirm pre-existing beliefs and so on. [Psychology places her hand gently on Big Histories forearm, releasing a flow of chemicals and excitement in both].

Pattern recognition and meaning

A complicated nervous system and psychology are needed to understand time in a linear way, as well as to understand space on different scales. Human psychology, as far as we know, is necessary for any of the interpretations Big History makes about the events and unfolding narrative that arise from the scientific discoveries that are continuing to happen. Evolutionary psychology suggests that our ability to recognize patterns and formulate meaning likely began to arise hundreds of thousands of years ago on the African savannah.

Although imperfect and full of heuristic and cognitive biases, the human mind is now fully a meaning-making, pattern-recognizing system. In its ability to link various things together through symbols and language over time, we have the possibility for something like Big History to emerge. The fact that we are able to make sense of our experience and the enormous amount of information that is constantly available to us is part of the mystery of being alive. The human capacity to recognize patterns, trends and recurrences gives us a powerful evolutionary advantage over beings without the same ability.

Frankl (1959) suggested that our ability to draw meaning from the many aspects of life is a key component of the human psychological process. Further, he suggested that meaning is synonymous with survival and life. In a time when many religions and our secular, modern culture seem to be struggling with making life-enhancing meaning, could Big History be a powerful boost to our sense of purpose and belonging?

Perhaps, but finding meaning in the more mundane activities in life is also important for psychological health and seems to be much more widespread than we had previously imagined (Heintzelman & King, 2014). From this perspective, Big History comes from Psychology… and is more evidence that we are natural born storytellers and pattern recognizers. [Psychology, very excited by the way Big History is looking at her, spontaneously offers a kiss on his big beautiful cheek. She is very forward. Big History smiles from ear to ear!]

Parts of the self

We have various parts to our self (Jung, 1957). And ultimately, some argue, at the heart of the self is no self at all. The "self" is made of selves; the part that wants to fit in, the part that wants to do something unique, the part that gets sad, the part that loves to sit around and watch TV, the part that really wants to know the truth about the universe, etc. Are these parts in cooperation or are they in competition? Psychology suggests that the more cooperation there is, the better the overall health of the individual. With too much repression, inner turmoil, or self-criticism, a person begins to develop unhealthy ways of thinking, feeling and behaving.

All of the "parts" of the human family are struggling to find a coherent balance. The nations, the cultures, the religions, the philosophies, the ways of seeing and being in the world, all are differentiated, and are arguably needing to be integrated for greater health on this planet. As in the quest for a more personal, psychological health, Earth health or planetary health requires a new degree of synergy. Is Big History and its cosmological story part of that new synthesis---that greater, more holistic self?

In the counseling room, we sometimes suggest to clients that their struggles might be arising from an over-identification with certain parts

of the self. "I'm depressed." Which self is depressed? And what other parts of the self find that frustrating or resist those feelings? As with psychological health, in Big History we must guard against a tendency to cling to any part of the story too dogmatically. As has been mentioned previously in this newsletter, we should encourage diversity, criticism and skepticism. We should encourage the differentiation of all of the fields of human investigation; unity and diversit , feeding each other, moving into the future with greater boundaries and cohesion.

Once again, this is a metaphor for mental health in Psychology. The more we are differentiated from our family system or culture and truly independent or individuated, the more we can, paradoxically, be with our family and culture in a way that is transformative and holistic. Psychology is made up of parts, just as Big History is made up of disciplines and scientific discoveries, a new self is eme ging… that never existed to begin with… [Big History and Psychology have exchanged phone numbers and are saying good night to one another with a parting kiss and hug, both buzzing with a sense of possibility and hope].

Conclusion

[Psychology, resting in her bed that night thinking of the most wonderful time she had with Big History, gets up and starts writing the following in her journal…] Big Psychology, if we were to invent the term, might be the integration of various domains in Psychology: psychoanalytic, cognitive behavioral, positive, brief, body centered, emotional, relational and so on and so forth. So the big psychologist would be what? Perhaps more integral than someone who spends their entire lives studying psychoanalysis to penetrate that particular view of Psychology. An Integral or Big Psychologist would seek to have working knowledge of all the various schools of Psychology and their principles, in addition to having a coherent understanding of the evolution of the field over time. Not only this, the big psychologist would reach far beyond his/her traditionally viewed discipline and invite any and all discoveries being made by the human community into consideration and conversation. Is this possible? Desirable? Would this lead to new and better interventions? How can a big psychologist bring Big History into the counseling room to support clients in their quest to be healthier, happier human beings? [Tired, her mind spinning and excited about the future, Psychology lies down and falls asleep, dreaming about what the future will bring].

References

Ainsworth, M. (1969). Object relations, dependency, and attachment: A theoretical review of the infant-mother relationship. *Child Development* 40 (4): 969–1025.

Bateson, G., & Donaldson, R. (1991). *A sacred unity: Further steps to an ecology of mind*. New York: Cornelia and Michael Bessie Books.

Campbell, J. (1949). *The hero with a thousand faces*. Princeton: Princeton University Press

Christian, D. (2005). *Maps of time: An introduction to Big History*. Berkeley: University of California Press.

Frankl, V. (1959). *Man's search for meaning*. Boston: Beacon Press.

Heintzelman, S. J., & King, L. A. (2014). Life is pretty meaningful. *American Psychologist*, 69(6), 561-574.

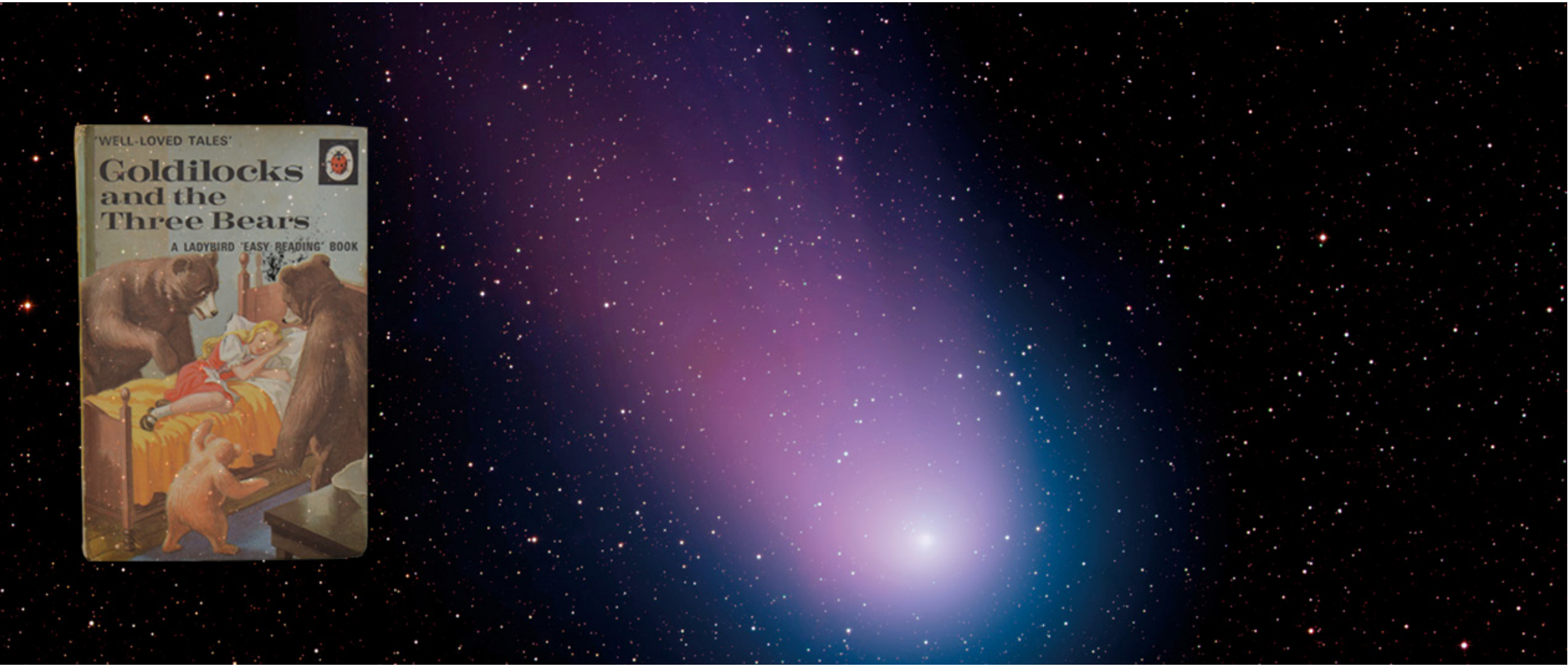
Jung, C. G. (1957). *The undiscovered self*. New York: New American Library.

Kahneman, D., & Tversky, A. (1973). On the psychology of prediction. *Psychological Review*, 80(4), 237-251.

Kidd, C., Piantadosi, S., & Aslin, R. (2012) *The goldilocks effect: Human infants allocate attention to visual sequences that are neither too simple nor too complex*. PLoS ONE 7(5).

Piaget, J. (1958). *The growth of logical thinking from childhood to adolescence*. AMC, 10, 12.

Shermer, M. (2011). *The believing brain*. New York: Times Books.
Siegel, D. (2012). *Pocket guide to interpersonal neurobiology: An integrative handbook of the mind*. New York: W.W. Norton & Company.
Swimme, B., & Berry, T. (1994). *The universe story: From the primordial flaring forth to the ecozoic era - a celebration of the unfolding of the cosmos*. New York: HarperOne.
Wikipedia (2015). Goldilocks principal. Retrieved from: http://en.wikipedia.org/wiki/Goldilocks_principle
Wilber, K. (2006). *Integral spirituality: A startling new role for religion in the modern and postmodern world*. Boulder: Shambhala Publications.
White, M. & Epston, D. (1990). *Narrative means to therapeutic ends*. New York: WW Norton.
Yerkes, R. M., & Dodson, J. (1908). The relation of strength of stimulus to rapidity of habit-formation. *Journal of Comparative Neurology and Psychology* 18: 459–482.



Did Galileo overstate the magnification of his telescope 16 times?

Fred Spier
University of Amsterdam, NL

In-Class Big History Observations

As part of teaching big history for small groups at Amsterdam University College, I am developing a series of observations that can be done by students in class across the entire range of big history. In doing so, the college has turned into a big history laboratory.

These observations have several educational goals. First of all, they show in practice that big history is entirely founded on careful scholarly observations and interpretations. A second major aim is that students experience how challenging, and exciting it can be to observe themselves.

While engaging in this wide range of observations, from looking at the sky, via the micro world, to human relationships, students experience that in basic ways they can actually make these observations themselves; that this may yield exciting results; that in doing so, they may understand better what specialists are doing, and what their results mean; and that they do not have to be afraid of engaging in conversations with experts. In sum: they acquire a big history mind set.

At first sight, some of these observations may appear to be far out of reach. Yet surprisingly, perhaps, many of them did not only turn out relatively to be easy to do with comparatively simple tools, but they also yielded unexpected, exciting, results. As a result, making such observations also shows how little we actually know with any precision about our own living environment, and, as a consequence, how much still can be discovered.

We seek to make observations that do not have predetermined results. There is little use, or so it seems to me, in asking these young bright minds to engage in demonstration experiments that at best show results that are already known. It is far more exciting to observe things that are not yet known.

The Internet is extraordinarily helpful in supplying further information, because it offers virtually immediate access to a great many resources that were almost inaccessible only a few decades ago, while many of them did not even exist at that time. This combination offers seemingly unlimited possibilities for big history research, as long as one fosters a big history mind set: the willingness and skills to combine information from all scholarly fields in new, academically meaningful, ways.

To my surprise, some of these observations turned out to be not only very helpful for teaching big history, but they also led to a few intriguing discoveries. This report is the first of a series of such observations with unexpected, exciting, results.

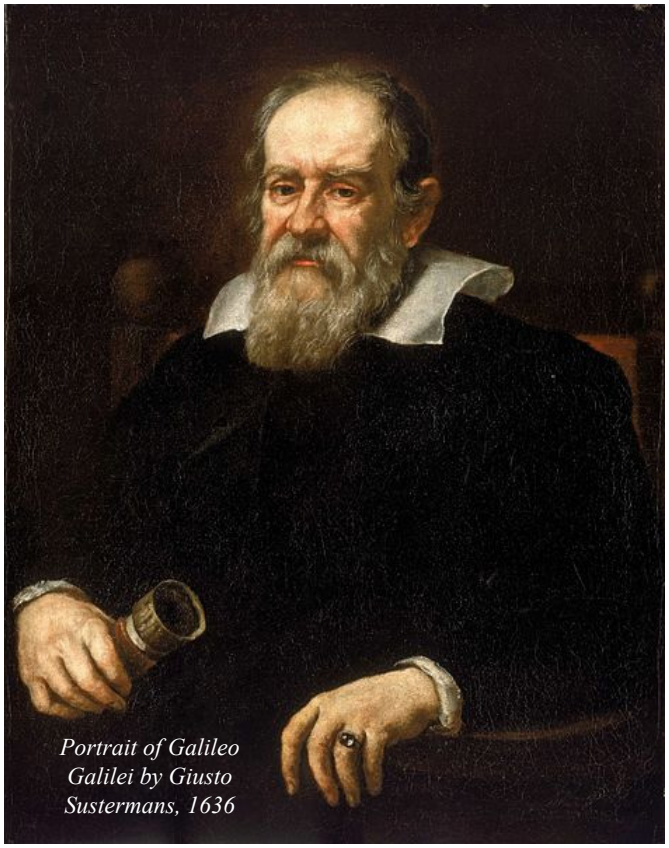
Did Galileo overstate the magnification of his telescope 16 times?

Observing the moon with a telescope

In March 2015, my son Louis and I set up a modest telescope (National Geographic 114/500 Compact Reflector Dobson Telescope). This instrument has a magnification ranging from 25x to 167x, depending on the eyepiece used. We connected it to our computer using a dedicated

telescope camera (Orion StarShoot Solar System Color Imager IV) which yields a magnification of about 100x on the screen

From the window of our home in Amsterdam we started observing the moon, and compared it with Galileo's observations as reported in his publication Sidereus Nuncius, 'The Starry Herald,' of March 1610, which contains observations that changed the world.



Portrait of Galileo Galilei by Giusto Sustermans, 1636

In that booklet, Galileo explained that he received news of the telescope's invention in Holland in 1609, and that he immediately proceeded to build several telescopes himself, each one with increasing magnification. As soon as possible he started his celestial observations and wrote them up. Already on "the first day of March 1610," the booklet was ready and had received the clerical imprimatur. Galileo made careful observations of, most notably, mountains on the moon as well as of the hitherto unseen moons of Jupiter. All of this was worldshaking, because in Europe it was assumed at that time that the moon's surface was perfectly smooth, while Jupiter tugging its moons along immediately suggested to Galileo that Earth could do the same with its single moon while circling the sun.

Interestingly, even though Sidereus Nuncius contained such potentially heretical views which were strongly condemned later, it had received the clerical imprimatur very speedily. I wonder why.

While it turned out to be relatively easy for us, using the computer, to take a reasonably sharp picture of the moon at about 100x magnification --even though the turbulent air over Amsterdam made the image move in and out of focus very quickly--, we were struck by how fast the moon moved off our screen as a result of Earth's rotation around its axis. We were not using a motor-driven equatorial mount that would compensate for that movement, but instead kept it steady on a homemade mount on a tripod.

Because Galileo did not use an equatorial mount either but a simple tripod much like ours, this made us wonder how he had been able to make detailed drawings of the lunar surface. And this becomes even more intriguing, because Galileo claimed that in order to make his observations, a magnification of at least 400x was required (SN, p.6)

On the same page he claimed to have checked this magnification using circles of different sizes: one that he was looking at through the telescope, and one next to it with the naked eye. If they looked the same size, this showed the magnification of his telescope. A truly ingenious solution!

However, the dimensions of his telescope are known, even though the original eyepiece is lost. By using these data, it is possible to calculate its magnification, which turns out to be about 25x, so the lowest magnification that our telescope can achieve. This magnification yields an image of the moon that is consistent with Galileo's drawings. It would also allow the moon's image to stay within sight for a sufficient amount of time to draw it carefully.

Already at 100x magnification it proved impossible for us to view the moon as a whole, simply because higher magnification decreases the image range. As a result the moon's image soon becomes bigger than the view in the eyepiece, or of the camera image on the screen.

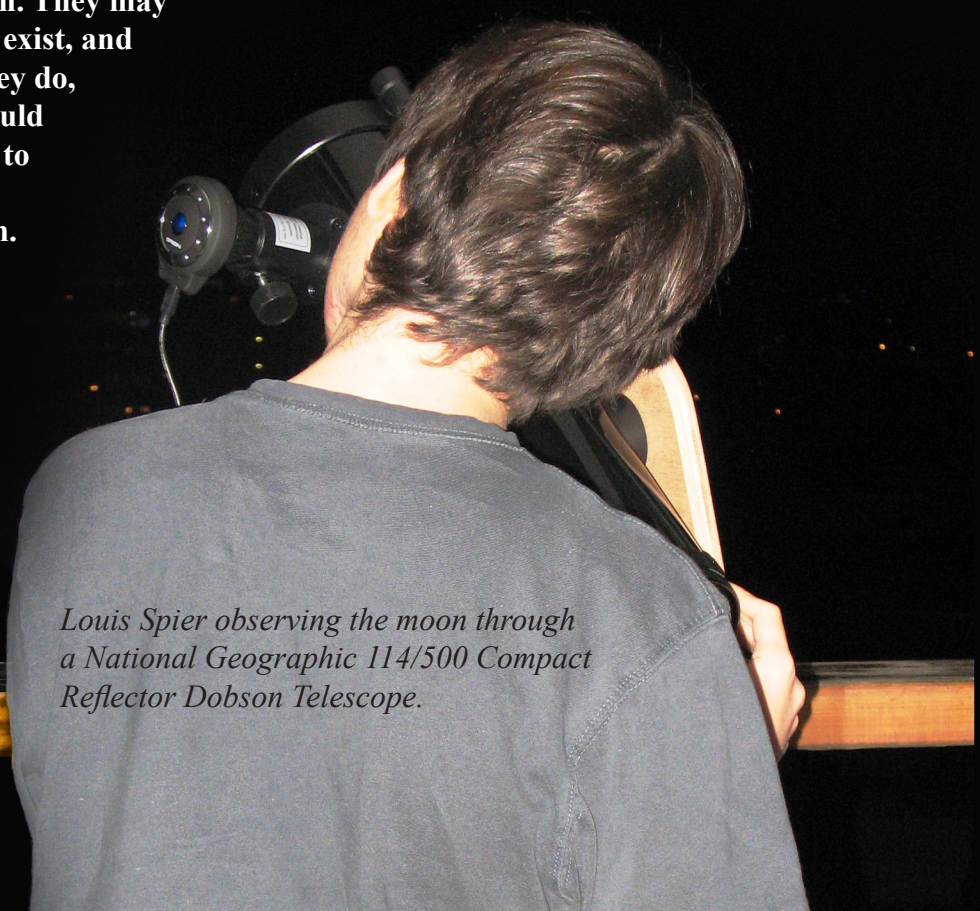
If Galileo's magnification had been 400x, he could not possibly have seen the moon as a whole the way he drew it in Sidereus Nuncius. He would also have had great trouble keeping it within his eyesight, because the moon moves across the sky as a result of Earth's rotation, as was noted above: the greater the magnification, the more quickly the moon moves through the field of vision, and the smaller the area becomes that can actually be observed. This is nicely explained on Making a Galilean Telescope.

On April 5, 2015, we were finally able to observe Jupiter and its four large satellites from our window. Much like observing the moon, it turned out that this could be done very well with a 25x to 50x magnification. Because our camera overexposed Jupiter and the resulting image did not show any of its moons (we still need to learn a lot), I recorded my observations much like Galileo had done before.

It was very exciting to watch all of that, and imagine how the great Italian scholar may have felt when he observed those moons for the first time, realizing full well what enormous consequences that would have for our world view as well as for his own career.

So clearly, Galileo's magnification claims were way off. Instead of a 400x to 1000x magnification, he only reached about 25x. This is still a most impressive achievement. I am sure only very few of us would be able to construct such a telescope today at home, designing it and grinding our own lenses without detailed instructions.

Interestingly, I have not yet been able to trace any academic reports saying that Galileo overstated his magnification so much. They may well exist, and if they do, I would love to see them. One



Louis Spier observing the moon through a National Geographic 114/500 Compact Reflector Dobson Telescope.

wonders why Galileo did so. He was otherwise a very careful observer.

As was noted earlier, Sidereus Nuncius was published within months after Galileo's first observations. Clearly Galileo tried to capture the market with his claims to fame. Perhaps he tried to keep competitors at a distance by claiming technical expertise that would discourage others to try as well, which would allow him some time to further explore the heavens and report discoveries without being upstaged by the inevitable competition.

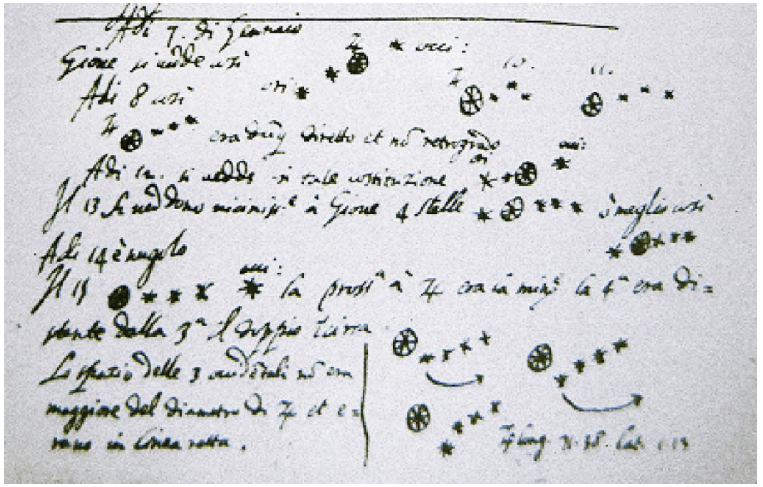
If so, this could be a potentially rich field for further exploration, not least because I experienced similar strategies, or at least suspicions of them, while doing biochemical research in the 1970s. So this may well be part of a more often used strategy in academia to keep competitors at a distance while claiming fame.

In addition, we learned that magnification becomes a relative term as soon as photographs are made, because the resulting pictures can be shrunk or enlarged at will, especially when they are digital. To some extent this also applies to earlier non-digital photos, and even to drawings.

As a result, what matters in such situations is not only the magnification reached by telescopes but even more the amount of light that they capture, which yields more detail as more light is captured. The amount of pixels that a camera captures is, of course, also of great importance.

In fact, telescopes are light buckets, similar to buckets that capture rain water. That is why water butts are connected with tubes to a roof, which collects all the rain water falling onto it. Roofs are simply the largest rain water capturing devices that are available in such situations.

Similarly, a telescope captures as much light as possible with its primary lens or mirror, while it subsequently concentrates and feeds it with lenses and sometimes also mirrors into the eyepiece or the camera, which acts as the water butt of a telescope. This is why astronomers want ever bigger telescopes, and why magnification is no longer stated, but rather the size of the main mirro .



From Galilleo's notebook on Jupiter
http://www.dioi.org/galileo/scans.pdf

All of these insights became clear to us while aiming our modest telescope at the moon. Furthermore, because we started our observations soon after the new moon, when only a small bright moon sickle could be seen, our first picture of it turned out to include exactly the area the Apollo 8 crew had in view while shooting their world-shaking Earthrise picture. An amazing coincidence!

I have not yet used the telescope in class, mostly because good observations must take place at night and are hard to schedule, because they depend so much on the viewing conditions. But I may try it in the future.

What I'm Doing on My Summer Vacation:

Teaching Big History in a Two-Week Course—Eek!

By Lucy B Laffitte, Ph.D.
Science Educator for PBS affiliate UNCTV

How did I get myself into such a jam you ask? That's what I asked myself when I saw the printed course description online. I've been accused of shooting first and aiming second by people who love me. So when I heard that the prestigious state funded North Carolina School of Math and Science was launching a summer program for middle and high school students, I knocked on their door and gave them my pitch.

How did I arrive at the notion that I would be able to teach a version of the grand synthesis in two weeks? Because I'd been preparing to do so since the age of eight.

The North Star for my life's work popped into view for me that year when Wellfleet Bay Audubon Sanctuary started a day camp and the Cape Cod National Seashore hired its first batch of park rangers. I spent the next ten summers soaking up everything they had to teach. In college, I chewed through every course about the natural world from astronomy to zoology. A rich and varied career as a naturalist (along with PBS television and a couple more degrees) kept my life history and field guide collections growing.

It wasn't until I stumbled across the Arrow of Time online at the Wright Center for Science Education web site in 2006 that my version of the grand synthesis burst into my head. As a home school teacher at the time, I quickly ramped up a course called Arrow of Time for middle schoolers through a community coop. I had a blast, the kids had a blast and a lone cosmic evolutionist in North Carolina was born. I went looking for venues in which to teach it.

A crooked door opened, one that I wasn't happy about entering, but I did so anyway. I found I could teach big history under the radar at one of those devilish for-profit colleges I'd stooped to work for after finishing PhD in the height of the great recession.

I taught big history spread over **two** 10-week classes. The first half was tucked into Geography 101, which started with the big bang and ended with the geomorphology of Earth. The second half was my version of Life Science 101, which started with extremophile archea and ended with the Jill Bolte Taylor TED Talk. I peppered these classes with my old favorites—content by Carl Sagan, David Attenborough, and Rachel Carson but freshened with TED Talks and Eric Chaisson. My brand of big history is told as a series of "begats." Physics begats chemistry, chemistry begats geology, geology begats biology, biology begats ecology, ecology begats anthropology, anthropology begats history, history begats the science of mind. Two years and 400 students later, I had my content well simmered into a meaty broth of presentations and assignments. Then I got wind of Grand Rapids.

In the fall of 2012, following the first biennial conference of the International Big History Association, I found myself beside the provost of North Carolina State University at the end of a lecture. At a pause in the polite but awkward chitchat, I made my pitch--with a perfectly timed and very suave name-dropping non sequitur. I asked if he knew what Bill Gates was up to these days. The provost blinked, shifted his weight,

and then turned toward me—a smile on his lips like one he might use to talk to 500 parents at a graduation ceremony—and said, "Why no, what *is* Bill Gates up to?"

He listened politely.

Then he shook my hand, perfunctorily gave me his card, and "Send me an email and I'll have my secretary set up a meeting in a month when I get back from Europe."

Sigh.

Remarkably, the Provost kept his word. In our meeting, he cut to the chase. "In what department should this course be taught? In what college?"

"From the Office of the Provost, of course. You are the only one who could legitimately offer it."

"I'm not an activist provost. I don't invent academic programs. But I'll tell you what…we are launching a new semester…it's a 3 week course 9-4 every day for 3 weeks in May. It's called May-mester." We need courses for that."

It was a start—a breach in the wall around the ivory tower. I partnered with a history professor, David, to teach a May-mester class at North Carolina State University. David had been the committee adviser for my minor in environmental history for my doctorate and was a razor sharp historiography teacher and East Asian scholar. He agreed to do the social science if I did the natural science.

We meet every Friday at a coffee shop from January through April to develop a syllabus. A marriage made in heaven it was not. By February, we were known in the cafe as the Friday morning boxing match. And it was brutal to watch. We were both intellectual pugilists and the problem was finding an epistemology we could agree on.

David was brilliant at pointing out the hidden agenda behind the writing of history. He delighted in questioning the motives of Bill Gates. He was a social constructivist and a relativist. There were no facts, no absolutes, and power plays were everywhere. His argument was that our modern understanding of the universe was a chimera of the zeitgeist—no more accurate than Ptolemy's.

I was an unreconstructed evolutionary biologist—arguing that Hubble's expanding universe and Chaisson's arrow of time meant everything in the universe could be organized on a timeline from early to late, or primitive to advanced, and that the fitness of life on Earth was improving over time.

"Fitness," David would bark at me, "is socially constructed; the only way to understand it is to look at the power structure defining the term.

"Fitness," I'd bark back, "is a hugely broad category of problem solving that spans mobility, the consummation of sex, investment in the young, and a thousand other variables. You can't look at the phylogeny of vascular plants and vertebrate animals and ignore this."

By the time May rolled around, we had three students sign up. With our guest speakers, the student teacher ratio was frequently 1 to 2--that's two instructors for every student. An architect who took the course said he loved it and that he learned the most when David and I would argue, which we continued to do every day of the course. Alas, there was no funding for a Big History 2.0 at NC State, and perhaps the boxers were a little weary.

David was a good influence on my big histor . He challenged everything that came out of my mouth. But he was also persuaded by my presentation on the problem solving that plants and animals did to crawl out of the ocean and take over the land--that lovely parallel progression from algae and fish to fern allies and amphibians to gymnosperms and reptiles to angiosperms and mammals. He hadn't known about the evolution of stars and was visibly wistful when I quoted Eric Chaisson: if stars evolve, are stars alive?

I also got to hear him present his version of big history. He had us look for the zeitgeist that generated the two metaphors that both echoed each other and shaped the modern world: Darwin's descent of man and the Adam Smith's invisible hand. David had us consider internet memes as the mutating DNA of modern cultural evolution. But he fought geographic determinism tooth and nail when I presented Diamond's guns, germs and steel hypothesis. Colonialist mendacity had to be reason for the lack of rise of the East.

But the best thing about the May-mester experiment was that it taught me how to compress big history.

Two years and two visits to San Rafael have passed since then. I spent a week at the 2013 Dominican Summer Institute (which I highly recommend) and a week at the 2014 Big History conference where I presented a little bit of my version of the grand synthesis.

I was struck by the dialectics that emerge in big history. The fierce arguments between a historian and a natural historian that I experienced echo in the conversation between Brian Swimme and Fred Spier, between Eric Chaisson and David Christian and between spiritualists and scientists. These philosophical splits seem to have a polarizing effect on what had appeared on the surface an amiable group of good folk.

But what does all this have to do with my upcoming summer vacation? Because I want to take care with how I traverse the tension.

I love the way Maria Montessori viewed cosmic education:

> "The universe is an imposing reality, and an answer to all questions. We shall walk together on this path of life, for all things are part of the universe, and are connected with each other to form one whole unity. This idea helps the mind of the child to become fixed, to stop wandering in an aimless quest for knowledge. S/he is satisfied, having found the universal centre of himself with all things'."

I am now more mindful of the fissures in Big History and less likely to be so certain about the notions of primitive and advanced and progress along the arrow of time. I love to have my emotions swayed and my imagination stirred by Duane and Brian. Their accounts give the narrative of Big History an uplifting arc. The living, learning universe version of Big History both ennobles the human endeavor and has compassion for the foibles of our species.

If I had to answer today the questions of middle schoolers that probe the edges of the fissure, this is how I would answer: Science searches for hard, absolute truth about the universe. History/religion recounts stories imbued with meaning about being human.

There may not be any progress in the arrow of time, but there is proof that there is an arrow. The universe *is* an imposing reality. We use science to probe that reality and history to tell us what it means.

If you want a report next fall on what I did on my summer vacation, just ask.

High-redshift proto-clusters candidates: Planck finds a gold mine

Luigi Toffolatti
Associate Professor, University of Oviedo, Spain

Cosmic history and evolution is one of the most attractive parts of Big History when it is introduced to the general public and students. Big History helps us to get closer to cosmologists and astronomers and their highly specialized field of study. Carl Sagan's insight that we are made of star dust, worked as a precursor for this interest about where this star dust comes from. The stars' evolution and their final death give us the answer to this question with different types of stellar nucleosynthesis processes for the different chemical elements.

The question is: How did all of this begin? How and when were the first stars were formed? How can we go back in time to the first thousands of million years of our Universe to get the answer?

The fascinating discovery that is presented here by the researchers of the Plank Collaboration (http://www.cosmos.esa.int/web/planck) of the European Space Agency (ESA) sheds light upon this part of Big History. They think they have found one piece that was missing in the cosmic structure formation: far galaxy proto-clusters exhibiting very intense star formation.

By combining observations made with European Space Agency's (ESA) (http://www.esa.int) Herschel and Planck space observatories, cosmologists have discovered what should be the precursors of today's vast galaxy clusters and of the so called "cosmic web".

One telescope found the treasure chest, and the other narrowed in on the gold coins. Data from two ESA space missions, Planck and Herschel, have together identified some of the oldest and rarest clusters of galaxies in the distant cosmos. Planck's all-sky images revealed these "clumps" of bright galaxies, while Herschel's dedicated observations allowed researchers to inspect these galactic gems more closely and confirm the discovery.

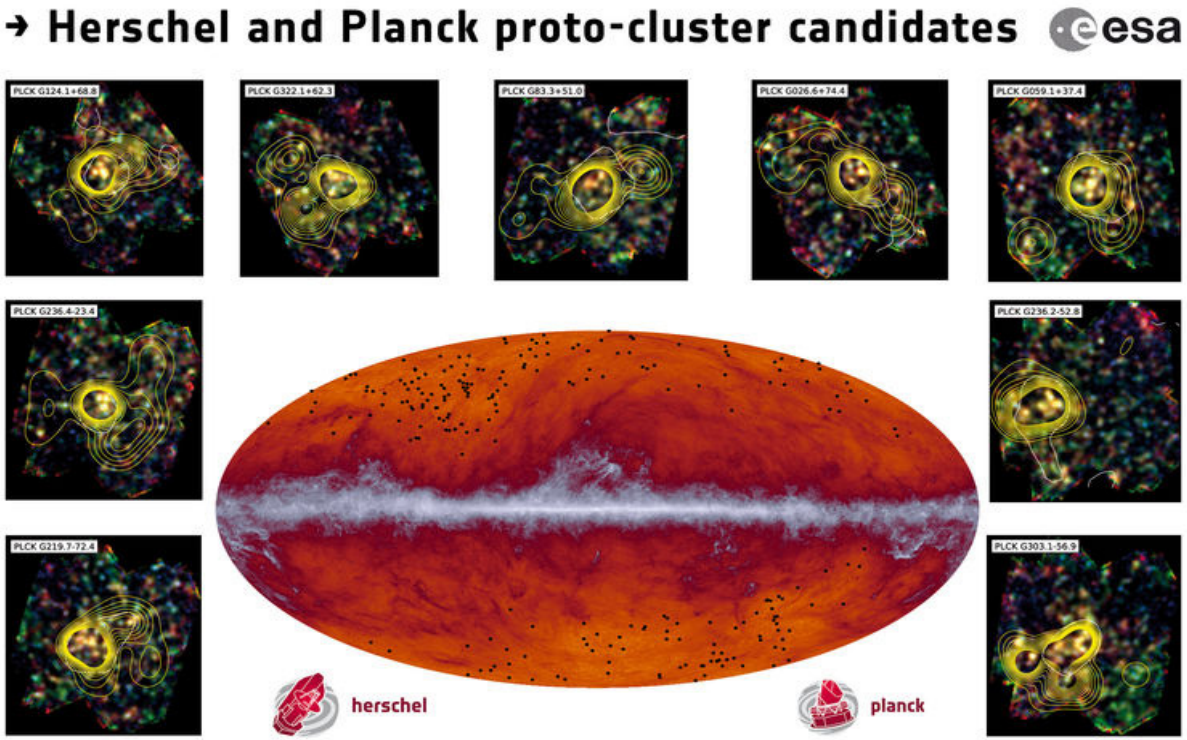
How massive cosmic structures like galaxy clusters assembled in the early Universe is a key question in modern cosmology. Pinpointing when and how they formed provides insight into the process of galaxy cluster evolution, including the role of dark matter in shaping these cosmic metropolises. Planck surveyed the entire sky in nine different wavelengths; its legacy is the most precise map ever of the cosmic microwave background (CMB), the relic radiation of the Hot Big Bang.

But it was by using the Planck resolution and sensitivity at shorter, sub-millimetre wavelengths, that 228 unusually bright sources were identified. This wavelength domain overlaps with that of Herschel, enabling the follow-up analysis of the sources in much higher detail. Indeed, Herschel's sensitivity and high angular resolution revealed that the vast majority of the Planck-detected sources consist of dense concentrations of bright galaxies exhibiting very intense star formation. While the astronomers have not yet conclusively established the age and luminosity of many of the galaxy concentrations, they are the best candidates yet for "proto-clusters", the building blocks of today clusters of galaxies. Moreover, these new findings o fer astronomers a portal back to this early time, about 10 to 11 billion years ago.

"Hints of these objects had been found before in Herschel data, but the all-sky capability of Planck revealed many more candidates for us to study," says Prof. Hervé Dole of IAS, Orsay, lead scientist of the analysis published in *Astronomy & Astrophysics*.

"This exciting result was possible thanks to the synergy of Herschel and Planck: while Planck can identify rare objects over the entire sky, Herschel allows us to scrutinize them in finer detail," says ESA's Herschel Project Scientist Göran Pilbratt. "Both space observatories completed their science observations in 2013, but their rich datasets still contain plentiful new information about the cosmos."

"We can say we have found something like a treasure chest with Planck," remarks Prof. Luigi Toffolatti, of the University of Oviedo (Spain), a senior member of the Planck Collaboration. "I'm very proud of this specific result because, exactly ten years ago, in 2005, we did very precise predictions on the detectability of these clumps of galaxies by Planck and Herschel and we got the confirmation that we were right, eventually!"



Notes

"Planck Intermediate results. XXVII. High-redshift infrared galaxy overdensity candidates and lensed sources discovered by Planck and confirmed by Herschel-SPIRE," is in press on *Astronomy & Astrophysics* (EDP Sciences) and is authored by the Planck Collaboration. (http://arXiv.org/abs/1503.08773)

The Planck Scientific Collaboration consists of all the scientists who have contributed to the development of the mission, and who participated in the scientific exploitation of the data during the proprietary period. These scientists are members of one or more of four specific consortia: the LFI Consortium, the HFI Consortium, the DK-Planck Consortium, and ESA's Planck Science Office. The two European-led Planck Data Processing Centres are located in Paris, France and Trieste, Italy. The LFI consortium is led by N. Mandolesi, Agenzia Spaziale Italiana ASI, Italy (deputy PI: M. Bersanelli, Universita' degli Studi di Milano, Italy), and was responsible for the development and operation of LFI. The HFI consortium is led by J.L. Puget, Institut d'Astrophysique Spatiale in Orsay, France (deputy PI: F. Bouchet, Institut d'Astrophysique de Paris, France), and was responsible for the development and operation of HFI.

New and Returning IBHA Members

One of the key purposes of the IBHA is for those of us who are interested in Big History to have a place to associate. It is a place to learn of other members' Big History activities and thoughts. So we are delighted to welcome this month's new members to the IBHA – and by the vote of confidence and recognition of the value of our association by those who have renewed their membership. It is a pleasure to have each of you with us.

Mojgan Behmand
Thomas Burke
James Cunningham
Debbie Daunt
Lindsey Dean
Michael B. Dowd
Duane Elgin
Kimberly Gilmore
Steven Gorosh
Orla Hazra
Peter Hess
Jess Hollenback
Jennifer Lucko
James D. MacAllister
Kenta Makuuchi
Julianne Maurseth
Anne Reid
Marianne Rogoff
Duncan Ross
Leslie Ross
Stephen Satkiewicz
Hiroko Shiota
Craig Singleton
Kenneth Solis
Harlan Stelmach
Jill Thomas
James Tierney
Fred Weishaupt


Third IBHA Conference
July 15 - 17, 2016
Amsterdam

IBHA Conference July 15 - 17, 2016
University of Amsterdam

The Board of the IBHA is delighted to announce that our third conference will be held in the beautiful and historic European city of Amsterdam from July 15 - 17, 2016. This will be the first IBH conference held outside of the United States, and we are looking forward to working with our colleagues at the University of Amsterdam to stage another unforgettable event. We are benefitting from the on-site expertise of Esther Quaedackers in planning for the conference, with her familiarity of Amsterdam.

This building is called the Oudemanhuispoort (Old Man's Home Gate). Part of it was built, as the name implies, as a home for poor old people in the early 17th century. In the late 19th century the University of Amsterdam started to use the building. Around that the same time book traders also moved into the little shops that line the main hallway of the building. The book traders are still there.

We have retained two hotels – IBIS Amsterdam Centre Stopera (http://www.ibis.com/en/hotel-3044-ibis-amsterdam-centre-stopera/index.shtml) within a 15 minute walk to the University of Amsterdam, and the Volkshotel (https://www.volkshotel.nl/) within a 15 minute metro ride to the University. The two hotels are totally different types of hotels; check the great reviews of these hotels on tripadvisor (http://www.tripadvisor.com/) . A walking tour and other pre-conference tours of the city are underway, and a post-conference tour that will visit many of the leading scientific facilities in Europe (Central Paris Louvre, CERN, Swiss Alps, European Southern Observatory, and cities along the Rhine River). We will keep all members fully informed as plans for the third IBHA conference evolve, but for now please mark the dates of July 15 - 17 on your calendars, and start planning to join us in Amsterdam in July of 2016!

If you have any questions – just email Donna Tew, IBHA Office Coordinator @ tewd@gvsu.ed

IBHA Members' Teaching and Publication

Olga García-Moreno, Walter Álvarez, Roland Saekow, and David H. Shimabukuro will shortly publish their article, "Introduction to Big History: The History of Cosmos, Earth, Life and Humanity" in *Enseñanza de las Ciencias de la Tierra*, 2014 (22.2), 140-146.; ISSN: (printed edition): 1132-9157 - (electronic edition): 2385-3484, the journal of the Spanish Association of Earth Science Education.

The abstract of the article states: "Big History is a new, interdisciplinary approach to unifying the scientific and scholarly knowledge of the history of Cosmos, Earth, Life and Humanity. In this article we present the 21st-century Big History vision of the place of humans and humanity in the Universe, and explain how Geology and the Earth Sciences are essential components of this vision, as key disciplines for understanding all of the history that has led to human beings and the world we live in."

Asociación Española para la Enseñanza de las Ciencias de la Tierra
Qué Hacemos
Los planes de actuación de la AEPECT se deciden en las asambleas generales de la asociación que se celebran cada dos años. Entre las muchas actividades que se realizan, las más relevantes y que gozan de mayor acogida son:

- Los Simposios sobre la Enseñanza de la Geología que venimos celebrando, con caracter bianual, desde hace más de veinte años. El primero tuvo lugar en la Universidad Complutense de Madrid en 1980.
- La publicación de la revista "Enseñanza de las Ciencias de la Tierra". Aparecida en 1992 y de la cual se editan tres números anuales.
- Otras publicaciones que se iniciaron con la serie Itinerarios, dedicada a la Geología de Campo y que han continuado con la serie Cuadernos didácticos y la edición de CD(s) de recogen diversas temáticas o recopilan trabajos publicados con anterioridad y que se reeditan utilizandos la nuevas tecnologías de la información.
- Las Expediciones Naturalistas son una de las actividades de la AEPECT más atractivas y que han tenido una gran acogida entre los asociados. Se ha viajado a Islandia, Australia y Nueva Zelanda, a los Andes y en un próximo futuro esta previsto viajar a Mexico. Otras expediciones de menor duración se han organizado a los Pirineos y Canarias occidentales.
- Las Actividades de formación se organizan por iniciativa propia de la AEPECT o en colaboración con distintas instituciones. Abarcan un amplio espectro de posibilidades y la mayor parte de ellas cuenta con un reconocimiento académico por parte de las autoridades educativas.
- Las Campañas de Colaboración con Bolivia en las que, cada verano, grupos de profesores de nuestra asociación se desplazan a Bolivia para compartir sus conocimientos y experiencias con nuestros colegas de aquél país, se donan libros y materiales didácticos diversos.

A summer course in Big History is being taught in southwest France at a resort near Biarritz, hosted by the University of Pau, July 13-17. Mornings will be spent learning about the grand narrative of Big History and investigating some of the cutting edge ideas and questions at the forefront of the natural and social sciences. Afternoons and evenings are open to relaxing on the beautiful beaches, doing sightseeing, and taking in the local culture. The course will be taught by the world's first PhD in Big Histor , writer of the Crashcourse Big History series, and a curriculum designer for the Big History Project, **Dr. David Baker**.

For registration and more information, please visit http://bcmss.sciencesconf.org/

You can also reach David at david.baker@mq.edu.au.

Call for Publications Lists

One of the most important things IBHA members can do to further the academic reputation of our exciting new field is to publish Big History works in established journals. That way we can reach a wider audience of experts from across the disciplines and demonstrate the virtues of the Big History approach.

In order to identify what has been published by Big Historians, the IBHA is working to create a Master List of Big History publications for display on the IBHA website. That way, people can see what journals and other platforms are open to Big History, but also where there are gaps holding an opportunity for publication in the future.

We invite IBHA members to send the bibliographical information about their Big History publications to david.baker@mq.edu.au and tewd@gvsu.edu.

Origins. ISSN 2377-7729

Please submit articles and other material to Origins, Editor, ibhanet@gmail.com

International Big History Association
Brooks College of Interdisciplinary Studies
Grand Valley State University
1 Campus Drive
Allendale MI 49401-9403
http://ibhanet.org/
616-331-8035

International Big History Association