Origins

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The Seamless Robe of Nature

International Big History Association

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International Big History Association

An Introduction to **Barry Wood** and ***The Seamless Robe of Nature***

Lowell Gustafson
Villanova University

Barry Wood began *The Magnificent Frolic* (1970) while he was teaching high school (1964-66) and completed it during the summer (1967) of his two years of master's study (1966-68) at University of British Columbia. He admits now that the title is badly dated. His editors at Westminster Press chose it; they wanted to create a "counter-culture" image. The book attempted to argue that theology needed to harmonize with the broader knowledge of science, and also with other world religions. The book was published in 1970, after Wood had moved on to doctoral studies at Stanford. It was endorsed by Bishop John A. T. Robinson, the British author of *Honest to God* (1963) and several other books, and by Alan Watts, author of some 20 books on Eastern religion (*The Way of Zen*, etc). Watts and Wood became good friends in California; they did a 2-day joint seminar on his houseboat at Sausalito in July 1972.

After completing all his doctoral work except the dissertation, disruption, vandalism, and war protest at Stanford prompted Barry to write a second book, *The Only Freedom*, over the summer of 1970. Westminster Press accepted it quickly, and published it in 1972 during the second week in his new faculty appointment at the University of Houston.

The printing of *The Magnificent Frolic* was substantial--25,000 copies--which is why it turns up fairly regularly on the second-hand book market today. The print run of *The Only Freedom* was considerably smaller; it shows up occasionally on the second hand market, but rarely. Both books are dated and long out of print.

Wood is a Canadian by birth, now a naturalized American. He earned his BA in English from University of Toronto, his MA in English from University of British Columbia, and his doctorate from Stanford University. He had full funding from the Canada Council, allowing him to complete considerably more than the required courses in English and American Literature. He took seven extra quarter-long courses to add a second major in Humanities (basically, a substantial shelf of the "great books"), and took five extra courses in Religious Studies, adding up to a minor, with an emphasis in world religions.

Wood has taught English at UH for 45 years, as well as the two-semester humanities sequence and "Introduction to World Religions" for ten years at Lone Star College. While in Malaysia

(1987-1991), he taught both literature and American Studies for State University of New York (Buffalo).

Wood grew up reading everything in sight (the legacy of a particularly attentive mother and grandmother). By age 12, he had science on the brain. He started reading in high school—*The Universe and Dr. Einstein*, George Gamow's *The Creation of the Universe*, Norman Berrill's *You and the Universe*, *Man's Emerging Mind,* Rachel Carson's *Silent Spring*, also her books *The Sea Around Us*, and *Under the Sea Wind*, *Only One Earth* by Barbara Ward and Rene Dubos, and so forth. Wood followed the ocean-bottom discoveries (the mid-Atlantic ridge; spreading ocean floor; drifting continents) during the International Geophysical Year (1957-58) that led to the master geological theory of plate tectonics; later, he followed the launch of COBE (1989) and the confirmation of the Cosmic Background Radiation (CBR). Still later, he followed the sequencing of the human genome, filling in a chapter of evolution that connects us with early life, all the way back to bacteria. Sometime around 2003 or 2004, Wood decided he wanted to teach all this but couldn't figure out how--until, one day, the course title "Cosmic Narratives" flashed across his mind. (This is summarized in his contribution to Barry Rodrigue's second volume.) With help from an associate dean, they got it installed as a non-departmental course by using an unused college-course designation--ILAS (Interdisciplinary Liberal Arts and Social Sciences); then as a core-curriculum course. Details on this are included in the September 2011 article in the IBHA Newsletter about the creation of the course.

While at Stanford, in anticipation of the first Earth Day (April 1970), Wood wrote a dozen or so editorials for the *Stanford Daily* on ecology, overpopulation, and resource depletion. (He was early on those subjects, too.) One of his students last year got into the *Stanford Daily* archives and, surprisingly, discovered all of his editorials; he had no idea they still existed, or even that this student newspaper had been archived.

Barry Wood developed his big history course, "Cosmic Narratives," at the University of Houston in 2009. He is a founding member of IBHA and has made several presentations at our biennial conferences. The following excerpt is taken from Wood's book, *The Magnificent Frolic*, published 47 years ago (1970), an early presentation of big history by a member of IBHA. The term he used in this excerpt is cosmism, the evolution of the whole cosmos.

Following this excerpt, "Updates: 1970-2017" notes revisions in scientific information that have surfaced since Wood's book was written.

So it is with pleasure that we reproduce here Barry Wood's early piece on big history, "The Seamless Robe of Nature."

The Seamless Robe of Nature

Barry Wood
University of Houston

From *The Magnificent Frolic*, Chapter 2

A mother cat will care for and protect her litter with the same dedication as a human mother. And her kittens, like children, will spend the hours in play, often pestering their mother until there is nothing left but immediate discipline. In her domestic concerns, nature brings forth a similar pattern in a thousand different ways. But while we may be comforted by our oneness with the world, we also suspect that we may not be quite "with it." Intelligence has lifted us above the security of ignorance. What is man among the stars? Our galaxy, a typical star cluster, contains more than 100,000 million flaming suns, and is but one galaxy amid an estimated ten billion.[1] The light from the farthest of these galaxies has been speeding through space (at 186,000 miles a second) for two billion years, beginning its journey about the time the first protozoa were swimming in the first terrestrial seas. The length of this journey has given life on earth time to evolve an eye, a brain, and a telescope, so that we are now ready to intercept these distant rays of light as they arrive . . . .

We share this universe with stars we can never reach, but we make a mistake if we oppose ourselves to those stars. In the instant when the eye catches the image of a star, a vital connection is made . . . . The perceiving mind and the perceived star are incomprehensible apart from one another, and neither the external source of light nor the configuration of nervous energy in the brain is really a star. . . . In the moment of seeing, the material star and the mental star are bound together as tightly as a hand is bound to an arm . . . . [O]ur bodies are made up of the same stuff as the stars—hydrogen, oxygen, nitrogen, carbon, and minute traces of a few more elements—and the proportion of these in the human body is related to the proportions in the stars. The story behind these building blocks of the universe is one of the most fascinating stories that can be told.

The elements found everywhere—in bone and brain, grass and mountains and sun—have been numbered according to weight from one to ninety-two, that is (in a convenient shorthand), from hydrogen 1 to uranium 92. . . . We can simplify a complex and largely unmapped structure if we say that these elements are constructed out of three elementary particles known as protons, neutrons, and electrons. Hydrogen 1, the simplest of the elements, consists of one electron revolving around a nucleus of one proton. To this basis structure neutrons (neutral) may be added, but the essential fact is that the proton (positive) and the electron (negative) balance each other electrically, making this close-knit unit possible.

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1 Note that facts that have been superseded since this was first published are noted in "Updates: 1970-2017" at the end.

The addition of one proton and one electron to this hydrogen 1 atom magically changes it to another element, helium 2, and the further addition of one electron and one proton turns it to lithium 3—and so on, right up the atomic scale. This principle of "addition" produces all the marvelous range of elements from hydrogen 1 to lawrencium 103—including substances as different as oxygen 8, chlorine 17, cobalt 27, tin 50, iodine 53, and the gold 79 that has sparked centuries of searching for the fabled "philosopher's stone," as well as a rush into the wilderness of California and the Yukon. Yet what has been called the "addition" of particles masks a mystery, for something much more complex is going on than mere putting together of pieces of stuff like blocks. Every element is totally new, displaying unique qualities, and nothing in either the basic particles or in hydrogen 1 provides a single clue about the results of "adding" more particles.

These elements are scattered throughout the universe in varying amounts, but the amounts are of profound significance, for they tell a story of their own. Hydrogen 1 is most abundant, making up the bulk of most stars, most of the interstellar dust, and ultimatelay accounting for 55percent of the total matter in the universe. Helium 2 accounts for 44 percent, and the other ninety elements account for the remaining 1 percent. Within this 1 percent there is a similar pattern or occurrence. The next three elements on the scale (lithium 3, beryllium 4, boron 5) are nearly absent, but then come carbon 6, nitrogen 7, oxygen 8, and neon 10—together making up nine tenths of everything that is not hydrogen 1 or helium 2. The remaining tenth contains all the other 83 elements, with an extra large amount of iron 26. Above iron, certain elements occur so sparsely that their value increases in proportion to their position in the series.

Now these relative amounts of the elements indicate the way in which they are formed. Scientists now believe there is a continual process of element-building going on in the universe, evidence for which is overwhelming. . . . The H-bomb is really man's duplication of the first step of element building, the conversion of hydrogen 1 to helium 2, and the explosive power of this process is a clue about where the additional steps must take place: inside the stars . . . the biggest furnaces the universe has to offer. Moreover, the evolution of a star, right up to its final explosion into space, is intimately linked to that process of element building.

Intergalactic and interstellar space is filled with raw hydrogen. Given time enough, such cosmic dust forms huge globules, brought together by the force of gravity, and in time a star is born. As these hydrogen globules condense, they become more closely packed and the internal temperature begins to rise. At a temperature of twenty million degrees, hydrogen 1 "burns" to form helium 2, giving the star a helium core. This helium core slowly grows, releasing immense heat to its outer levels, and causing it to swell into a red giant, a swelling that accounts for about 99 percent of the star's lifetime. But during this during this growth, at about 200 million degrees helium 2 starts to "burn" to form carbon 6, oxygen 8, neon 10, and magnesium 12. These elements are prodeuced for some time (for the star has reached a temporary end point), which asccounts for the high abundance of these four elements throughout the universe.

The temperature continues to rise, more rapidly now, and at one billion degrees minute quantities of oxygen 8 and neon 10 "burn" to form a whole new series: silicon 14, phosphorus 15, sulphur 16, chlorine 17, argon 18, and calcium 20. And with a further doubling or tripling of the temperature, traces of this series convert to chromium 24, manganese 25, and iron 26. At this point, with fewer than one third of the elements produced, the red giant has exhausted its resources. Its end product, iron 26, is by far the most abundant element on the whole atomic scale above silicon 14, suggesting that red giant stars have been piling up iron 26 at this barrier for billions of years, like the terminal moraine of a glacier. Beyond this point, however, the fusion of the elements must go, for many elements have not appeared, including the crucial nitrogen 7, without which life as we know it could not exist. Yet nothing typifies the creativity of the universe more than nature's way past the iron 26 barrier.

A red giant, at the crucial iron 26 barrier, is an extremely unstable star, so that, as shrinking progresses and temperatures rise, a breaking point is reached. The central core of heavy elements suddenly collapses completely: the temperature soars to 100 billion degrees, and then the whole star blows up in an explosion visible for perhaps a million years. It becomes a supernova, visible in our own galaxy to the naked eye, hurling its dust into space at thousands of miles per second. In one stupendous event, a whole star, full of elements produced by a kind of stellar "cooking," is scattered through billions of miles of space in all directions, becoming a cloud of dust like the cloud from which it was born. But there is a difference, and a crucial one for everything to follow, for now the hydrogen is "contaminated" with minute traces of elements up to iron 26.

Again the process occurs. Another star is born, another cosmic fire is built. Time is no barrier, so that even with the unimaginable slowness of this process there is time for an endless number of such processes to occur. And it is going on before our eyes, in the hearts of all the stars. But a second stellar furnace works differently, for the hydrogen 1 now contains the contaminating elements, carbon 6¸ oxygen 8, and neon 10, from the beginning. New ingredients enter the oven and new paths are followed in the "cooking." Hydrogen 1 burns to helium 2 with a new process involving carbon 6, and changes occur right up the scale. The crucial missing nitrogen 7 appears, all the other missing ones up to iron appear, and the barrier at iron 26 is hurdled. And the subsequent supernova scatters every known element into the vast reaches of space. The contaminating elements from the first furnace have turned out to be the fertilizing catalysts in the second, and the minute traces of the elements now scattered through space are the stage props for the cosmic design of life itself, including the mind of man, who contemplates its wonder.

In the past generation, evolution has become part of the mental furniture of the educated layman . . . . But evolution must now be replaced by *cosmism*—the evolution of the whole universe—for evolution begins with the formation of the stars and the processing of star dust itself. Moreover, the evolution of the elements is going on today, as spectrum analysis shows, and supernova explosions are constantly occurring, scattering their creative enrichment through the galaxies. Thus, in the words of one astrophysicist, "The everyday objects with which we are familiar may be regarded as souvenirs of a stellar interior."[1] . . .

The evolution of a star is but a part of the building of a whole galaxy. Billions of stars condensing out of hydrogen, like the condensation of steam into water droplets on a cool windowpane, produce a galaxy of stars, and all the features of a fully developed galaxy—the slow rotation, the localized star clusters within it, and the spinning of the individual stars—go back to the original turbulence of the contracting hydrogen gas from which the galaxy has condensed. Within the trailing galactic arms are found many specialized clusters: double and triple stars revolving around their own center as they are swept along in the larger system, and planetary systems revolving around a central parent "sun." And it is here, in a trailing galactic arm, on a tilted planet swinging round an average star, that man finds himself, peering out at the rest.

The planets provide a different kind of stage for a new kind of drama. A planet in a galaxy is as fragile as a seashell on a stony ocean shore. The parent sun must be stable and the surrounding space must be free of the explosive disturbance of the red giants. Here is found a quietude that is entirely different from the roaring stellar smelteries. . . . [I]f the temperature falls within the crucial range of liquid water, another kind of change is possible, for a whole multitude of the ninety-two elements are stable enough to combine in endless procession. Thus we come to a planet called Earth, where all is precisely right for the most to occur. The icy poles and scorching equatorial regions are moderated by the correct planetary tilt and spin, and the flow of tide and wind from these extreme regions produces comfortable temperate and Mediterranean regions. In this ideal cosmic climate the most spectacular steps of change and development are possible, changes that lead to life itself.

The earth in its early days must have been, literally, unearthly . . . . The whole interior bubbled and boiled, continually fracturing the upper crust with lava-like material thrust up from below. . . . All the water of the present oceans shrouded the world in clouds—the earth was darker than a starless night. But finally the rains began, and they never ceased for thousands of centuries, for the water fell on burning rock and immediately sizzled back to the sky as steam. When finally the escape of heat to space allowed the water to remain, it inundated the whole land, speeding up the cooling and hardening of the rocky crust. The ceaseless beating of the rain . . . dissolved the surface chemicals, ground the rocks to sand, leached out the salts, and carried it all down to the rising seas—and the ocean became the warehouse of the world's riches . . . .

Here was the very womb of life. . . . It seems probable that the first living cells rounded themselves off from the surroundings in a warm, sunlit, mildly salty, tropical sea. . . . A million years—or a hundred million—is time enough for the slowest chemical building to occur, and time enough for the chemistry to build in every possible way, even along blind alleys that led to nothing more. . . . Life from this point of view is the natural outgrowth of chemicals growing and changing under the auspices of sunlight and sea, warmth and stillness and time.

Living beings are chemicals in a state of stability, a dynamic equibrium between too much growth and too much death. . . . Yet the marvelous balance of life between these extremes was being learned when life was little more than a chemically rich sea. In one sense, the emergence of life was a miracle, considering the forces of heat and cold and sudden change to which we are still susceptible. On the other hand, life was inevitable, given enough time. Indeed, it was accomplished in a surprising short time, for the millions of years it took are as nothing beside the unimaginable slowness of a condensing galaxy or a building star. While life has evolved to self-consciousness, our own sun has progressed no farther than the cooking of hydrogen 1 to helium 2, and has at least four billion years ahead of it. The more we look at the slow march of chemistry, the more natural it seems; it has a rightness and a flow that draws us to its truth. Life is therefore no accident or freak but the expression of the universe itself, occurring wherever conditions are right. . . .

Life is like the rainbow in the sun-shower, the sparkle on the sea, the whitecap on the waves; it takes so much to produce so little, yet the result is worth all the rest. . . . Every step up the evolutionary ladder gives meaning to what has gone before. The one percent of matter that comprises all the higher elements justifies the ninety-nine percent that is only hydrogen and helium. A single flaming star gives meaning to the infinite blackness, and a tiny fragile planet completes the largest sun. It takes a bed of coal to make a diamond, a whole mountain to make a peak, an ocean to produce a living cell, and a thousand species to make a human. This is the pyramidal structure of the universe: things of value rest on a huge foundation. It takes a whole human race to produce just one Plato, Beethoven, or Michelangelo. Could it be otherwise? But is it not the Platos and Beethovens and Michelangelos who define the greatness of the rest of humanity? And is it not this human greatness which is the glory of a galaxy, or of a whole universe?

The chemicals of life, even in their simplest prelife forms, show an uncanny responsiveness to light . . . . All protoplasm, including the living cells of men and maples and microbes, is irritable—that is responsive to what goes on outside itself. It is light responsive without eyes, nervous without nerves, contractile without muscle tissue of any kind. . . . Responsiveness to light, irritability, and general sensitivity lead to specialized cells of various kinds, and these in turn lead to nervous organs for more refined awareness. These organs, through increasing complexity of impulse, develop nervous connections and gradually evolve into specialized centers of sensitivity—eyes and ears and taste buds. Refinements appear, more stimuli enter the system, and a central switchboard develops to organize the impulses. And this switchboard, already manifest in primeval sea worms and starfish, is the beginning of a brain. Sensitivity becomes perception, irritability becomes awareness, and the imprints of experience on the cells of the organism are the beginning of learning. . . . [T]he most wondrous fact is that everything, all of life and man himself, is somehow implicit in the basic stuff of everything . . . stardust itself.

Yet we need not to look to the stars to confront the miracle. We are made out of bread and milk and meat and fruit that have grown out of the dust of the earth—"dead" matter. Life exists because the possibility for life is present in the soil and water of the ground on which we walk. Man is built out of matter forged in the stars, dust on the surface of a planet arranged into living form, and carries the whole history of the universe along within himself. Ultimately, he is a harmony of hyrdrogen, a dance and pattern that has been building up note by note, chord by chord, through endless time. Yet he is not only a pattern of matter in the universe; he is also a design that reflects what the universe has done, and who finally contains an image of the universe in his own mind. He is, in fact, so much a part of all the rest that he might well be considered a symbol for the cosmos, a point in the total design where everything the universe has ever done comes together and thinks about itself, marvels at itself, tries to understand itself, and sorrows over itself. In Hamlet's words, "What a piece of work is a man!"

Notes

Robert C. Calhoun, "Stellar Evolution," *Introduction to Space Science.* Ed. by Wilmot N. Hess. Gordon and Breach Publishers, 1965, p. 769.

Updates: 1970-2017

The last forty-seven years require updates in this account of big history, which makes no mention of the "big bang," Fred Hoyle's derisive term coined in the 1940s. In 1970, many cosmologists had concluded that the universe was eternal and were thus uneasy with the theory of an originating event. The idea of the big bang gained traction with Steven Weinberg's *The First Three Minutes* (1977), and study of the Cosmic Microwave Background (CMB) first imaged by the Cosmic Background Explorer (COBE) in 1989.

In 1970, the Mount Palomar telescope, then the largest in the world, could penetrate 2 billion light years into space and the number of galaxies within view was estimated at ten billion. Since then, larger telescopes have multiplied this distance to more than 12 billion light years and the estimate of galaxies in the universe has increased to 350 billion large galaxies and seven trillion dwarf galaxies, grouped in clusters and superclusters arranged like strings of jewels around immense empty spaces.

Stellar evolution, as the first chapter of cosmic history, was suspected by the late 1940s. It was first worked out in a 100-page essay published in *Review of Modern Physics*, "Synthesis of the Elements in Stars" (1957) by E. M. Burbidge, G. R. Burbidge, W. A. Fowler, and F. Hoyle, commonly referred to in scientific circles as B^2FH.

The origin of life in a "warm little pond" was proposed by Charles Darwin in *Origin of Species* (1859). Recent discoveries of the early atmosphere of the earth along with sea-bottom exploration suggest deep-ocean black smokers as an alternate location for life's origin.

Big History Symposium in Italy

A group of researchers and students met last November for an exchange of ideas and experiences on the importance of Big History at all levels of Italian education.

The abstract of some of the contributions are presented as follows:

A research team has studied and tested teaching methods for introducing "Big History" themes and topics into Italian schools. This experimentation was supported by the OPPI (Organization for the training of teachers) and was directed towards a class of students ages 16-18. Almost all of their teachers were involved in the educational project. The students studied the online course "The Big History Project," making extensive use of group work. The results of this experimentation are very encouraging and enabled the research team to develop a model to offer to other schools. More information is available at: http://ibhanet.org/resources/Documents/Conference2016/Papers/AdalbertoReportFinale.pdf

The Tree of Life is the symbol of Milan Universal Expo

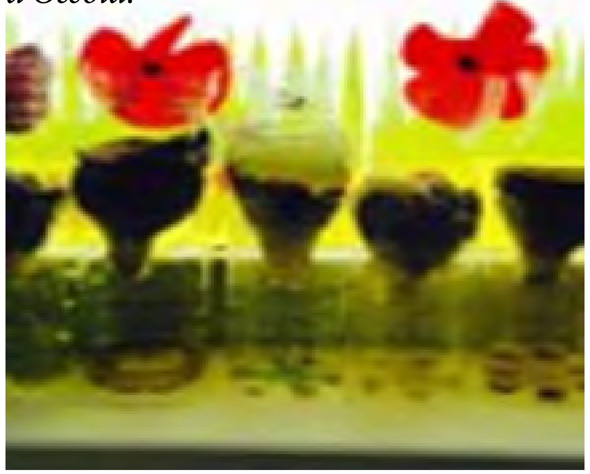
Report by **Prof. Giovanni Abrami**, Padua.

(From the presentation of Adalberto Codetta, teacher trainer and educational researcher, Milan).

In 2014-16, some classes in their first two years at "Liceo Banfi" High School participated in research within the context of Big History, followed by fieldwork. The disciplines involved had cross-cultural exchanges of information needed to organize the interdisciplinary work. The students worked in an area of the Val d'Ossola in order to collect the different areas of knowledge needed, as well as to develop the skills necessary for the audio/video and other electronic devices used for the elaboration and documentation of the data collected. However, some points of criticism appeared due to the short time available to the students. Among the results obtained, there was the production of a video-documentary after the first year and, at the end of the second year, a final ecotourism proposal for this area was developed. The validity of the approach applied to the studies is demonstrated by the large interest that followed after the distribution of the history of this territory, with possible implementations in tourism and in other local activities.
(Adapted from the presentation of Prof. Marina Porta, Milan).

We spoke as representatives of the students who had undertaken the Big History Project. The first year we familiarized ourselves with the concepts, learned the content, developed our speaking and video skills, and finally produced a documentary that explained Big History in a way that the students could understand. The second year we tried to analyze the Ossola Valley in northern Italy, as seen through the lenses of the Big History Project, and ultimately produced an application that serves as a touristic guide to the valley. Our work was appreciated, so we were invited to the International Big History Association Conference, where we spoke about our work process and also listened to the experience of Dutch students, who participated with their version of the Big History Project.

Here is a picture of some samples collected during the geotour in Val d'Ossola.



(Adapted from the presentation of Liceo Banfi students).

The work in Ossola Valley was coordinated by Il Geco Organization, devoted to educational projects in geosciences. The Big History of the Valley was related to the geological evolution of the Alps, selecting thresholds and, consequently, intervals of geological times in a logarithmic scale, each interval being assigned to a different group of students. Il Geco then provided students with a ppt presentation of the geologic evolution of the valley articulated in seven selected time intervals. Each interval was described through an example of a representative geosite within the Valley and hints on interdiscpilinary links. The final input was a two days guided tour of the Valley covering the above mentioned geosites. With this background students were provided a key to read from a Big History point of view the whole Valley.
(Adapted from the presentation of Prof. Giovanni Grieco, Milan).

The "Evo-SETI" (short for "Evolution and SETI") mathematical theory was created by this author. It is a statistical way to describe the Darwinian evolution of life as well as the civilizations of human history, and possibly also Big History. The reached degree of evolution is the Shannon entropy (measured in bits) of certain probability distributions called b-lognormals. It allows a numeric estimate of the evolution gap between different civilizations. For instance, the Spanish were 3.85 bits/individual more advanced than the Aztecs when they clashed in 1519, and that's why the 20 million Aztecs could be defeated by a few thousand Spanish. Let's hope that the same is not going to happen when humans discover the first extra-terrestrial civilization by virtue of SETI (Search for Extra Terrestrial Intelligence).
(From the presentation of Dr. Claudio Maccone, SETI astronomer, Turin).

The meeting in Milan was organized following the last IBHA conference in Amsterdam, where the paper on a "New Periodization for Big History" was presented (see: Origins, Vol. VI, N. 7). Some content of the first book written in Italian about Big History was presented which includes the historical facts related to a period from the Big Bang till the end of the Ancient Age. Among the topics developed in this book one finds: the language and concepts of Big History, relations among the three contexts of the Universe (cosmological, biological, and anthropological) and an insight into the cultural anthropology of human societies. Although there was not enough time for an appropriate overview, the main concepts that sustain the Big History approach were put into discussion. It was a stimulus for a new conference that could be organized in the near future, including the 25 participants at the meeting and other interested people. For this purpose, an Italian network is going to be organized with the aim of also participating in the activities of the Big History European Network.

Cúpula en Galleria Vittorio Emanuele, Milán, Italia

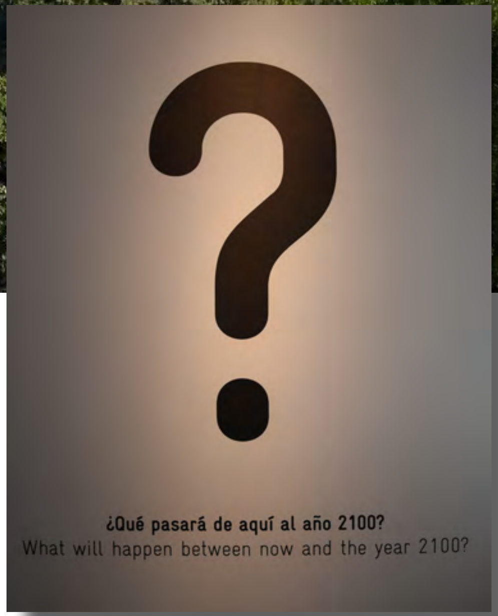
Professor Olga García Moreno of the University of Oviedo selected to present a Big History exhibition at the Museo Nacional de Ciencia in Madrid, Spain

El Comercio

Professor Olga García Moreno of the University of Oviedo has organized an exhibition on "Big History: Humanity's Place in the Cosmos" at the National Museum of Science and Technology in Alcobendas, in Madrid. Her proposal was selected from among the 235 submitted by universities throughout the country along with seven other projects. Together, the eight projects in total in the exhibition cover different areas from the origin of humanity (where "La Gran Historia" is located) to challenges for the future. This set of projects was selected to show a sample of research projects in the Spanish Universities.

The Museum states its objective of this exhibition as demonstrating the importance of research carried out in academic institutions of higher education for the improvement of territorial and social development and quality of life of citizens.

"La Gran Historia" will be located in Madrid for another 5 months and later in A Coruña for 6 more months.



Universidad de Oviedo


La Gran Historia
Nuestro lugar en el Cosmos
UNIVERSIDAD DE OVIEDO
Miembros del equipo en la Universidad de Oviedo:
Diego Álvarez Lao, (Dpto. Geología), Miguel Arbizu Senosiain (Dpto. Geología), Nilo Bobillo Ares (Dpto. Matemáticas), Marco de la Rasilla Vives (Dpto. Historia), Alejandro García Álvarez (Dpto. de Historia), Olga García Moreno (Dpto. Geología – Centro de Investigación en Nanomateriales y Nanotecnología), Joaquín García San Segundo (Dpto. Geología), Joaquín González-Nuevo González (Dpto. Física), Belén López Martínez (Dpto. Biología de Organismos y Sistemas), Armando Menéndez Viso (Dpto. de Filosofía), Laura Miralles López (Dpto. Biología Funcional), Laura Miranda González (Dpto. Historia del Arte y Musicología), Antonello Novelli Ciotti (Dpto. Psicología - Instituto Biotecnología), Ícaro Obeso Muñiz (Dpto. Geografía), Ángel Rodríguez Rey (Dpto. Geología), Luis Vicente Sánchez Fernández (Dpto. Medicina), Luigi Toffolatti Ballarin (Dpto. Física), Pablo Turrero García (Dpto. Geología), Museo de Geología y Equipo de investigación de El Sidrón.
Colaboradores externos:
Walter Álvarez (Universidad de California-Berkeley), Fred Spier y Esther Quaedackers (Universidad de Ámsterdam), César Augusto Duque Sánchez (Universidad de Extremadura), Laura Piñuela y José Carlos García Ramos (MUJA).
Universidad de Oviedo
La Gran Historia
La Gran Historia es una nueva aproximación al conocimiento que engloba, desde un punto de vista científico, pedagógico, unificador e interdisciplinar, la historia del Cosmos, la Tierra, la Vida y la Humanidad.
Mediante la investigación en la Gran Historia se pretende entender el lugar de la humanidad en el universo y crear, a partir de los últimos avances en las distintas disciplinas de las ciencias y las humanidades, un mapa de conocimiento actualizado y científicamente contrastado, donde poder ubicar los desafíos del siglo XXI. El modelo simple que se adopta en la Gran Historia para explicar la evolución del universo es el aumento de la complejidad.
Este proyecto integra la investigación de distintos grupos de la Universidad de Oviedo en diferentes disciplinas -Historia, Antropología, Economía, Filosofía, Física, Matemáticas, Medicina, Biología, Geología- mediante el análisis de las condiciones específicas para la aparición de formas cada vez más complejas, así como la divulgación de los resultados en un contexto integrador.
La aparición del aprendizaje colectivo, como propiedad singular del género humano, es analizada para entender la evolución y la historia humana. La importancia de estudiar el origen de nuestra especie en un contexto tan amplio como es la evolución del Cosmos (en sus 13 800 millones de años de historia) radica en la gran aceleración que este aprendizaje colectivo ha causado en el aumento de la complejidad en el universo.
Investigaciones de las poblaciones humanas del pasado mediante estudios en Antropología Física.
Reconstrucción del paleoambiente pleistoceno: fauna glacial.

The Big History exhibit is placed within the museum's regular collection on energy, physics, astronomy, optics, electromagnetism, chemistry, navigation, geology, and archaeology.

Fred Spier's Web Page Now Available in Spanish: http://www.granhistoria.info/

La gran historia

El libro

El autor

Blog del autor

Enseñando la gran historia

Otros recursos

Comentarios

El lugar del hombre en el cosmos: La «Gran Historia» y el futuro de la humanidad

Este sito web ofrece una gran variedad de información sobre el libro de Fred Spier **El lugar del hombre en el cosmos: La "Gran Historia" y el futuro de la humanidad**, publicado en 2011 por Editorial Crítica/ Planeta de Libros, Barcelona, España.

En esta página también puede encontrarse relevante información general acerca de la Gran Historia, incluyendo links a otras páginas, la mayoría en inglés, que pueden ser de gran ayuda para comenzar a familiarizarse con la Gran Historia.

El libro presenta un repaso completo de la historia desde el origen del universo hasta el día de hoy. Para ofrecer este repaso, el libro propone un sencillo modelo original que explica los más importantes principios subyacentes de la Gran Historia, incluyendo la historia humana. Este modelo aún no ha sido cuestionado y es adoptado cada vez por más docentes, de manera destacable en las producciones relacionadas con el Big History Project, proyecto financiado por el cofundador de Microsoft, Bill Gates.

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 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.

Abel Alves	**Mark Gregory**	**Alina Shron**
Karl Benne	**Anton Grinin**	**James Tierney**
Hope Benne	**Eric Holmstrom**	**Ann Travis**
Carl Johan Calleman	**Deborah Johnston**	**Sam White**
Mark Ciotola	**David LePoire**	**John Wolf**
Penelope Corfield	**Robert Moore**	**Heathe Kyle Yeakley**
Ian Crawford	**Charles Percival**	
Michael Duffy	**Marina Porta**	
Ken Gilbert	**Stephen Satkiewicz**	

IBHA members are from:

Argentina	France	Norway
Australia	Germany	Peru
Austria	Hong Kong	Russia
Bahrain	India	Serbia
Belgium	Ireland	South Korea
Brazil	Italy	Spain
Canada	Japan	Sweden
Chile	Korea	United Kingdom
China	Netherlands	United States
Denmark	Nicaragua	

UvA MOOC

In our big history MOOC, renowned scientists and scholars from the University of Amsterdam and beyond will take you on a journey from the Big Bang until today while addressing key questions in their fields. After completing this journey you will have developed a better understanding of how you and everything around you became the way they are today. You will also have gained an understanding of the underlying mechanisms that have helped shape the history of everything and how they wil help shape the future. Last but not least, you will have developed the skill to use this knowledge to put smaller subjects into a bigger perspective with the aid of the little big history approach, which can help you develop some new ideas on these smaller subjects.

You can take the course for free on Coursera, YouTube and the experimental platform Chronozoom, or use (parts of) the course to put your own lessons or courses in a broader perspective.

Stand With Us.

Be A Force For Science.

Become a Member for as little as $50. Plus upgrade to print delivery of *Science* for only $19 more and you will receive a free long-sleeve T-shirt!

The AAAS states that by joining it, you are committed to advancing science, engineering, and innovation. As we all know, big history has been made possible by the fusion of the sciences and humanities. Below are a few recent articles about the controversies science is facing in our current society.

Donald Tump's War on Science
Lawrence M. Krauss
New Yorker, December 13, 2016

Why Trump Will Lose His War on Science
Jeffrey Kluger
Time, January 26, 2017

March for Science

Trump's 5 Most "Anti-Science" Moves
The president-elect has taken what is widely seen as a hostile stance toward the scientific community. Here's why
Andrea Marks
Scientific American, January 18, 2017

President Trump and science: 10 things to look for (and fear?)
By Jeffrey Mervis
Science Magazine, January 23, 2017

Trump's Views on Science Are Shockingly Ignorant
His statements show a disregard for science that is alarming in a candidate for high office
Scientific American, November 1, 2016

Professor Smith Goes to Washington
In response to the new president's stances on a range of issues, more scientists are preparing to run for political office.
Ed Yong
The Atlantic, January 25, 2017

Donald J. Trump
@realDonaldTrump
Follow

The concept of global warming was created by and for the Chinese in order to make U.S. manufacturing non-competitive.

8:15 PM - 6 Nov 2012

104,792 67,024

Your Big History Accomplishments

Please send Lucy Laffitte, IBHA Board Member and Secretary at lucy.laffitte@gmail.com,

- the bibliographical data of any big history related publication,
- citation information about any related presentation to a professional, university, or public organization
- course syllabus for any big history course you have taught,
- the names and contact information of any associations that are related to the field of big history,
- or other information of your big history initiatives and accomplishments.

Macquarie University Begins New MOOCs Rooted in Big History: **Solving Complex Problems**

SOLVING COMPLEX PROBLEMS will teach you revolutionary new problem-solving skills. Involving lectures from over 50 experts from all faculties at Macquarie University, we look at solving complex problems in a way that has never been done before.

To solve complex problems, whether it is the challenge of developing a new product, or Einstein's task of trying to explain how gravity worked - and literally everything else in between - it is not enough to take the problem and apply already existing skills. The skill that has always led to big breakthroughs in any field or industry is the skill of seeing something in a new way. That is the vital skill you will learn in this Coursera specialization.

Achieving this expanded view of a complex problem is simple, effective, and sorely needed in today's world.

To see a complex problem in a new way, you need to contemplate it from different angles. Eventually, you may arrive at the angle that gets you to the next stage of solving the problem. We call this 'TURNING THE CRYSTAL'. You look at one facet of the problem; then another, then another, and gradually a complex picture builds of how a problem is constructed. It then becomes possible to deconstruct that problem, and to solve it successfully, with some highly creative innovation.

At the heart of this specialization are crucial skills that are applicable to any career path, industry, or field.

Projects Overview
The first course of the specialization ANALYZING COMPLEXITY will teach you what unifying patterns lie at the core of all complex problems.

The second course of the specialization EVALUATING PROBLEMS will show you how humans think and how to utilize different disciplinary approaches to tackle problems more effectively.

The third course of the specialization CREATING INNOVATION will teach you what is at the core of all innovations that solve complex problems and how to foster methods to make big breakthroughs possible.

From the very start of the specialization, your assignments will be geared toward tackling a complex issue of your choice which you face in your career path, industry, or field. Each phase of the course builds up to a briefing paper that analyzes, evaluates, and attempts to solve a highly complex problem. The specialization advances your knowledge of your own discipline by teaching you to look at it in new ways and it fosters your own revolutionary new innovations.

COURSE 1
Analysing Complexity

Week I. "What is Complexity?" - What is at the core of all complex problems
Week II. "Complex Physical Systems" - What complex problems all have in common in the inanimate world
Week III. "Complex Adaptive Systems" - What complex problems all have in common in nature
Week IV. "Complex Cultural Systems" - What complex problems all have in common in human society
Week V. "Complexity, Fragility, and Breakdown" - Why complex problems arise
Week VI. "Complexity in the Anthropocene" - What complex problems face us today

Course 2
Evaluating Problems

Week I. "Thinking about Thinking" – How problem solving evolved in nature, how the mechanics of our brains work, and the psychological biases that can emerge when we think.
Week II. "Philosophy, Science, and Problem Solving" – How humans have

historically approached problem solving, from ancient times to the present.
Week III. "Approaching Problems in the Natural Sciences" – How people in the natural sciences deconstruct problems.
Week IV. "Statistics and Problem Solving" – How statistics can be used to evaluate problems and think critically.
Week V. "Approaching Problems in the Humanities" – How people in the social sciences and humanities deconstruct problems.
Week VI. "Evaluating the Anthropocene" – How to evaluate the problems of the Anthropocene.

Course 3
Creating Innovation

Week I. "What is Innovation?" – What lies at the core of all innovations.
Week II. "The Evolution of Human Creativity" – How humans developed the ability to innovate and think creatively.
Week III. "Innovation in a Complex Global Network" – How innovations emerge from human networks.
Week IV. "Planning Innovation" – How organisations seek out and create the right conditions for new breakthroughs.
Week V. "Market Innovation" – What makes innovations more likely to emerge in a market setting.
Week VI. "Innovation in the Anthropocene" – How innovations are crucial to meet the problems of the 21st century.

Capstone
This is the CAPSTONE where the scaffolding of our problem solving and innovation skills will bear fruit in a series of preparatory assignments to make your briefing paper as effective as possible.

MACQUARIE
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Your Professors

David Baker	David Christian	Shawn Ross
Associate Lecturer	Professor	Associate Professor

Macquarie University is leading the way in transdisciplinary research and ground-breaking methods for teaching. The Big History Institute at Macquarie involves experts from across the natural and social sciences to transcend disciplinary silos and look at complex issues in a new way that harnesses the best methods and ideas of all beds of human knowledge.

Macquarie is a hub of inspired and unconstrained thinking. Macquarie was founded with a unique purpose: to bring minds together unhindered by tradition. Created to challenge the education establishment, Macquarie has a rich track record of innovation. Macquarie actively shapes the complex issues that define the future of humanity.