What is Big History? Surely that question occurred to many of you when you first encountered the description of this session in our conference program. Hearing from my panel colleagues will hopefully give you a better understanding of the concept, which was originally formulated by David Christian. By Big history we mean a study of the past that embraces the whole of time, integrating the evolution of the physical universe, of our planet and its life forms, and of our own species with the history of humankind considered as a totality. Believing that human history is much more than the sum of its parts, we seek to construct the largest conceivable framework within which to impart coherence and meaning to the diversity of human experience. By delineating a skeletal outline of seminal developments that have shaped the context of human existence on our planet, we make connections between extended underlying patterns and attempt to integrate them into a single world view. Because we draw heavily, although not exclusively, on the findings of contemporary science—astrophysics, geology, chemistry, biology, paleontology, and anthropology—to establish humankind’s place in the grand scheme of things, our approach is broadly interdisciplinary; and because we are asking questions about the fundamental character of humanness, our scale of observation must
be as comprehensive as we can possibly make it. Recognizing the immense value of specialized knowledge (I myself retain an interest in seventeenth-century Austria) and our own reliance on highly focused research, we nonetheless see the progressive fragmentation of the academy as a fundamental roadblock to a more profound understanding of humankind’s shared past. In my own view at least, confining historical investigation exclusively to narrow perspectives robs our cherished discipline, noted for its inherent integrating and synthesizing qualities, of much of its explanatory power.

Briefly stated, I practice Big History because I appreciate its capacity to highlight interrelationships and dramatize common origins. Above all, I value what it reveals about our species. As esoteric and distant from everyday experience as theories of cosmic evolution may seem, they have a direct bearing on our understanding of human history. We are invariably startled by the brevity of the human experience when we place it against a cosmic backdrop. The Sun, our life-giving source of heat and light, has glowed in the heavens for less than a third of the time that has passed since the Big Bang. The Earth had turned on its axis billions of times before the earliest hominids made their appearance some five to seven million years ago. Societies we call civilized have existed for five thousand years; yet that time span is virtually nothing when compared to the 3.8 billion years since the oldest known terrestrial rocks solidified. The history of the United States becomes a blink of the eye in eternity’s presence, while the typical life expectancy of an individual human can scarcely be recorded at all on a cosmic timeline.

If a contemplation of time frames—or the size and location of objects—dramatically diminishes our significance, attention to the connectedness of the universe
begins to restore it. For what we discover everywhere we look are webs of relationships whose very existence suggests meaningful answers to questions about how we fit into the ultimate scheme of things. The achievements of modern science allow us to comprehend the formation of simple atoms out of energy, galaxies out of shapeless matter, heavy elements out of stars, and under the right combination of circumstances the molecular building blocks of life out of heavy elements. Quantum mechanics and relativity theory point toward a shared beginning of all energy and matter, just as our explanation of chemical evolution indicates a common origin for the physical bodies that make up the solar system, and our ideas about biological evolution underscore the kindred nature of every living organism on the face of the Earth. We possess sound evidence that many of the atoms essential for the existence of our planet and our own bodies were forged deep in the interiors of the earliest stars. It is the natural unfolding of the universe that has produced the wonders of life, and as offspring of the stars we surely do not stand apart from the cosmic realities that surround us. The potential for our very being may have been contained within the solar system from the very outset, as the presence of indispensable components of life such as amino acids prior to the formation of the Earth readily demonstrate.

My assumptions about why the history of humankind should be placed within the broadest possible evolutionary context orient my approach: what I choose to discuss and what I deliberately exclude in my attempts to make Big History manageable. Not surprisingly, conceptual definitions vary with the practitioners. David Christian works with the concept of communities, while Fred Spier draws on the idea of regime as a structuring principle for Big History. I follow Marshall Hodgson in using the word
transmutation to describe fundamental socio-cultural changes, but my approach parallels those of my Big History colleagues in the attention I direct toward critical episodes, principal thresholds, and major turning points. In the classroom as in my writing, I compress the treatment of physical and biological evolution so that I can emphasize the importance of prehistory and offer a more thorough analysis of human history since ancient Sumer. My approach does start with the Big Bang—that moment of creation roughly thirteen billion years ago when everything the universe could become was concentrated in a single, infinitesimal point which mathematicians call a singularity. I focus on the formation of matter out of energy and exotic micro-particles, relying on the assumptions of physicists and chemists to explain the formation of hydrogen and helium nuclei together with free electrons through a natural bonding process that started after 100 seconds, the emergence of the earliest complete atoms no later than 700,000 years after the Big Bang, the appearance of protogalaxies after perhaps a billion years, the formation of our own galaxy, the Milky Way, after another billion, and then the birth of our solar system under commonplace cosmic circumstances that prevailed in the wake of an ancestral supernovation just 6.6 billion years ago.

Drawing on the geologist’s theory of plate tectonics, I trace the evolution of the Earth’s structures, describing the favorable mix of circumstances on our planet which allowed life to commence as a natural consequence of the evolution of matter as much as 3.8 billion years ago. Taking care to define life’s distinguishing properties as well as the processes of biological evolution, I highlight the common ancestry and fundamental unity of all living things, placing life on a continuum that draws us back without interruption to the Earth’s first living cells, to the cosmic event from which our solar system emerged,
and ultimately to the formation of matter out of energy in the earliest stages of the Big Bang. I trace the probable development of the first single-celled microorganisms, the evolution of photosynthesizing blue-green algae, the transformation of simpler prokaryotes into eukaryotic cells, the evolutionary leap to sexual reproduction, and the proliferation of multicellular species in the Cambrian explosion beginning around 680 million years ago. I organize the colonization of the continents around the dominance of amphibians, reptiles, and mammals. This emphasis sets up a consideration of our primate heritage, from which we derived our superior hand-eye coordination, stereoscopic, color vision, larger, more complex brain, marked sociability, and unspecialized make-up.

While the practice of Big History requires careful treatment of each of these momentous evolutionary milestones in turn, my approach calls for extended coverage of hominid evolution, which commenced with the divergence of our earliest ancestors from the ape line some time between five and seven million years ago. I explore the interconnected development of those features which separated our oldest forebears from other hominoids—bipedal locomotion, habitual tool-making, and complex brain structures. In particular, I use the emergence of our lineage to explain the origins of culture and the characteristics of the gathering and hunting adaptation, the social context for ninety-nine percent of our presence on the planet. I stress the origins of gathering and hunting patterns among australopithecines, the evidence we have for the nuclear family and more sophisticated tool-making with *Homo habilis*, and the first manifestations of right-handedness, the controlled use of fire, and perhaps the rudiments of language that came with erectines, who ranged far beyond Africa into the temperate zones of Eurasia. With *Homo erectus* cultural evolution, based on the representation of ideas or events in
ways that imitated facets of the immediate environment rather than through the creation of symbols, began to outpace biological evolution more than a million years ago. Similarly, I describe the varieties of archaic Homo sapiens such as Neanderthals who expanded into the northern forests and Arctic tundra of Eurasia, and who embraced what we know as the full spectrum of human behavior by taking the first hesitant steps into the realms of art and magic more than fifty thousand years ago. Careful consideration of these predominant themes sets the stage for understanding the advent of anatomically modern humans and what I call the first great transmutation.

Current archaeological, genetic, and fossil evidence seems to indicate that Homo sapiens sapiens—beings with a physiology and behavioral potential virtually indistinguishable from humans currently inhabiting the Earth—first evolved from African ancestors beginning about 200,000 years ago. No later than 30,000 years ago they had become the sole surviving hominid type, and the anatomical attributes as well as the cultural capabilities that have subsequently characterized our kind were fully formed. Although the substantial evolutionary changes that led from Homo erectus to Homo sapiens sapiens had taken nearly 400,000 years to complete—a very long stretch of time from our perspective—those changes treated together look like an abrupt developmental leap when considered from the paleontologists point of view, especially if we keep in mind the relative immutability of our various hominid predecessors.

This sudden evolutionary spurt imparted to our kind a substantially expanded self-consciousness that give them an immediate, subjectively perceived, and much heightened awareness of themselves as distinct beings separated from the world around them. The
comparatively sudden acquisition of the capacity for abstract thought, epitomized by the unique ability of their minds to create symbols, apparently catapulted human beings through a sharp cognitive transition, one that produced a break with prevailing behavioral patterns. Symboling attained its ultimate expression in spoken language. But forty thousand years ago, anatomically modern humans were approaching the threshold of a revolutionary cultural breakthrough based on the symbolic expression of shared understandings that would mark a profound watershed in the human experience.

In crossing this Upper Paleolithic watershed, our ancestors fundamentally transformed their social structures, making gathering and hunting adaptations far more elaborate, diverse, and specialized than ever before. Bringing to a culmination trends in cultural evolution that went back to Homo habilis, they planted the seeds from which another cluster of revolutionary cultural innovations would eventually germinate. The pressing need of many Upper Paleolithic peoples for a formal expression of beliefs that would help them preserve values, heighten social cohesion, and overcome tension and uncertainty in their lives surely contributed to the relatively swift development of human aesthetic sensibilities, the capacity for mythic invention, as well as human spirituality and religious ritual that occurred between thirty and forty thousand years ago. Like the spectacular burst of innovations in art and religion, radical advances in Upper Paleolithic tool making reflected the newly enhanced symboling propensity of modern humans. Their expansion into most of the Earth’s habitable regions by the end of the Pleistocene could not possibly have occurred without the incredible repertory of behavior and sophisticated technology that prepared these tropical creatures to cope with the difficult challenges posed by such unfamiliar geographical terrain as high mountain chains or the fiercely cold
and inhospitably dry tundras of Siberia. At the close of the most recent ice age, as many as ten million *Homo sapiens sapiens* had established themselves as the most numerous and widely scattered mammals on the planet, a dominant species culturally equipped to manipulate the natural environment in a manner potentially beneficial to their well being, but simultaneously disruptive of the ecosphere’s sensitive balances.

At the same time, continuities running through the first great transmutation do become readily apparent when viewed from a world-historical perspective. More complex forms of hunting and gathering remained the universal means of subsistence until roughly twelve thousand years ago. With the Upper Paleolithic elaboration of the hunting-gathering adaptation, various distinctly human attributes, including the division of labor between the sexes, cooperation and sharing, and the bonding of males and females, received sharper delineation. However, despite its marked continuities, the first great transmutation did push humankind onto unfamiliar paths pointing toward a range of novel adaptations that spawned the lifeways of pastoral nomads as well as agriculturally-based, city-centered civilizations. With these outcomes in mind, my approach to Big History connects what anthropologists understand about the overarching patterns of prehistory with the large contours of world history over the last five thousand years through an analysis of two additional transmutations in the human condition: the origins of complex societies (c. 8500-c. 3500 BCE), and the global integration of human societies that began as much as a millennium ago and that has been unfolding at an accelerating rate in our times.
Since the basic components I associate with these transmutations are much more familiar to us all, I will refer to them only briefly in this paper. Suffice it to say that the second commenced with the global origins of agriculture and culminated in the breakthrough to those levels of societal complexity we call civilization in Mesopotamia, Egypt, and the Indus River Valley, whose shared attributes included hierarchy, specialization, and inequality, while the third transmutation has allowed humankind to transcend the developmental ceilings dictated by the second through processes of worldwide integration that are now drawing together hitherto separate peoples and autonomous regions in unprecedented ways. Just as developments in the early millennia of the Holocene were dominated by increasingly sedentary hunting-gathering societies subsisting on a broad spectrum of foods extracted from diverse environments, so the history of the last 5,000 years has been shaped in large measure by essentially autonomous city-centered societies spreading their networks of interaction throughout the globe as generations of people gradually made the adjustments necessary to function within much more complicated social systems. These two transmutations, like the first, must be understood in terms of historical processes unfolding over very extended periods of time and embracing a multiplicity of seminal elements, so that what we once called the Urban Revolution and the Industrial Revolution should be seen as components of much larger transitions in the human context, and certainly cannot be understood in terms of events unfolding in narrow geographical areas such as the Near East or northwestern Europe.

Despite obvious differences in the nature and intensity of the three radical transmutations in the human condition—the advent of *Homo sapiens sapiens*, the origins
of complex societies, and the global integration of the contemporary world—they were remarkably similar in certain fundamental respects. All three coincided with periods of unusual technological innovation that substantially altered how people related to their physical and social environments, and that supported bursts of rapid population growth by increasing, at least comparatively speaking, the carrying capacity of the planet. They all brought discernible breaks with existing cultural patterns and introduced modifications in the organization of societies that affected virtually every facet of human existence. By dramatically expanding the base of exploitable resources, most especially the energy extracted from the environment, these tremendous watersheds spawned true economic revolutions, the first resting on refined tool making, the second on agriculture and animal husbandry, and the third on the spread of industrialism. In all three, certain overriding patterns reached some kind of culmination while others were starting to germinate. And all three were genuinely global, not necessarily in the sense that societies around the world were in persistent interaction with one another, although that has clearly been happening in recent centuries, but in the sense that parallel responses to similar challenges were taking place in many parts of the world at approximately the same time. Viewed in terms of these basic similarities, the three great milestones in the human adaptation to life on our planet can serve as pivotal turning-points in an analytical framework capable of integrating the broad outlines of humanity’s total past into a single, overarching interpretation.

“That may be so,” you are probably saying to yourself, “but I still do not understand why he pursues this matter.” Big History obviously runs counter to nearly everything the academy has become since World War Two. At best, Big History must be
extremely difficult to implement well. When studied by a single scholar, it looks nearly impossible. My response, in closing, to this understandable reaction operates at two distinct but interdependent levels: the personal and the professional. With regard to the personal, I must now admit that I have had a propensity for Big History all along. When I made a commitment to the discipline while still a junior in high school, I immediately read H. G. Well’s *Outline of History* cover to cover, and was enthralled by the sweep of Well’s vision. Without realizing it at the time, my inherent interest in Big History was subsequently reinforced by exposure to William H. McNeill in graduate school. Since the completion of my formal training more than thirty years ago, I have continued to read and think very broadly despite pressures to specialize. Hence, I have been preparing literally for decades to engage in the teaching and writing of Big History. To those who argue that Big History is simply too far out of line with present practice to be viable, I reply that precedents do exist, as the work of the self-admitted non professional, H. G. Wells, in his *Outline of History* reminds us, and that different groups of serious scholars have been pursuing similar agendas by organizing professional organizations such as the World History Association or delineating unique fields of study such as Bruce Mazlish’s Global History. In recent years, the Organization of American Historians has reflected the impact of these efforts by attempting to internationalize the history of the United States. For me, the personal and the professional merge in the conviction that our times cry out for the perspectives of Big History, and in the sense that this enterprise may help us forge what William H. McNeill has termed myth-history, a myth-history fully appropriate for whatever the twenty-first century may hold in store.

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