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The twilight of the Baconian age and the future of humanity

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Abstract

Our times are the product of the unfolding of the Baconian program, articulated nearly 400 years ago by Sir Francis Bacon, which has been extraordinarily successful and has underpinned the worldwide expansion of Western civilization. However, in a paradoxical manner, the triumph of Bacon's program ended up undermining its own foundations. As we enter into the 21st century, we are witnessing the twilight of the Baconian age and we must embark in the search for a new program to mobilize human endeavors. This requires examining the logic and the underlying assumptions of the Baconian program, assessing the way in which they have been questioned by their own results and products, and exploring how to design and put in practice a new program to fully realize the human potential. This new program must build on the achievements of the Baconian age, but also acknowledge its limitations. This might, for example, call for putting emotions and feelings on a qualitative par with reason, and also for incorporating the contributions of non-Western cultural perspectives into the design of a new program for humanity. © 2000 Elsevier Science Ltd. All rights reserved.

A new and as yet fluid world order is in the making as we begin the transition to the 21st century and the third millennium. Profound changes in all aspects of human activity are challenging established habits of thought and forcing a reinterpretation of what is meant by progress and development.

Our times are the product of a particular set of historical processes that have their roots in the ancient civilizations of Greece, China and India, and which evolved slowly until the middle of the second millennium. These processes converged at the time of the Renaissance and the Scientific Revolution to shape the rise and worldwide spread of Western civilization during the last 500 years. With the benefit of hindsight, it is possible to argue that what gave this period of human history its unique character

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was the articulation and implementation of what may be called the “Baconian program” whose main architect was the philosopher Sir Francis Bacon, Lord Chancellor of the British Crown.

German philosopher Hans Jonas has defined the Baconian program in the following terms: “to aim knowledge at power over nature, and to utilize power over nature for the improvement of the human lot” [3, p. 140]. Three key features distinguished this program from other views on the production and use of knowledge current in Bacon’s time: (i) an awareness of the importance of appropriate research procedures (the scientific method); (ii) a clear vision of the purpose of the scientific enterprise (improving the human condition); and (iii) a practical understanding of the arrangements necessary to put the program in practice (scientific institutions and state support). Later, particularly during the Enlightenment, the idea of indefinite and cumulative human progress would become the driving force of the Baconian program. The combination of these three features and the belief in progress, all of them anchored in the firm conviction that humanity occupied the central place in a God-created universe, gave the Baconian program its powerful and unique character, which allowed it to withstand the test of time and endure until our days. Through its application the human condition has improved in ways that Bacon and his contemporaries could hardly imagine nearly four centuries ago.

The main engine that made the Baconian program run was a belief in the unending, linear and steady advance of humanity — the idea of progress — which mobilized human energies during the eighteenth and nineteenth centuries. Beginning with the Hellenistic and Roman notions that knowledge can be acquired step by step through experience and through trial and error, the idea of progress has evolved over the whole history of Western civilization. Cyclic conceptions of the universe, in which events repeated themselves over the course of a “great year”, had to be overcome before embracing a belief in the open ended and cumulative character of advances in human history. Faith in a divine design for the cosmos played a major role in the evolution of the idea of progress during the Middle Ages. The Renaissance added a revaluation of the individual and of human actions as a means to improve the human condition, while the scientific and geographical discoveries of the 16th and 17th centuries laid the ground for a belief in the inevitability of progress through the accumulation of knowledge.

With the emergence and subsequent triumph of rationalism during the 17th, 18th and 19th centuries, the idea of progress gradually lost its religious underpinnings. During the Enlightenment it became a thoroughly secular idea in which divine providence played a marginal role, if any. Progress acquired a distinctively social character and was seen as the almost inevitable result of human actions. Through the early 20th century, the general idea of progress would remain ingrained in Western minds as a positive driving force for improvements in the human condition.

However, the events that took place during the first 40 years of what British historian Eric Hobsbawm has called the “Short twentieth century” [1], challenged our beliefs in any notion of continuous and indefinite human progress. The decades that saw the carnage of World War I, the emergence of Communism, the rise of Fascism and Nazism, the Crash of 1929 and the Great Depression, the Holocaust, the Second

World War, and the atomic bombing of Hiroshima and Nagasaki, could hardly be considered conducive to harboring and nurturing the idea of progress. With the waning belief in the inevitability of progress, the achievements of the Baconian age also began to be seen as suspect.

A fundamental assumption of the Baconian program was that human beings occupy the central place in a God-created universe. Bacon's account and interpretation of the myth of Prometheus provides a clear statement of his view that divine intervention awarded us a privileged position in the cosmos. For him "Prometheus clearly and expressly signifies Providence... the special and peculiar work of Providence was the creation and constitution of Man" and

The chief aim of the parable seems to be, that Man, if we look to final causes, may be regarded as the centre of the world; insomuch that if man were taken away from the world, the rest would seem to be all astray, without aim or purpose... For the whole world works together in the service of Man, and there is nothing from which he does not derive use and fruit. The revolutions and courses of the stars serve him both for his distinction of the seasons and distribution of the quarters of the world. The appearances of the middle sky afford him his prognostications of weather. The winds sail his ships and work his mills and engines. Plants and animals of all kinds are made to furnish him with dwelling and shelter or clothing or food or medicine, or to lighten his labour, or to give him pleasure and comfort; insomuch that all things seem to be going about man's business and not their own [2, pp. 270–1].

This belief in our centrality would later be carried over into the secular realm and maintained in practically all narratives of human evolution, even though God would be dispensed with in most scientific accounts of the origin of the universe and of our species.

The assumption of humanity's uniqueness and superiority, and the centrality we have awarded ourselves in the cosmic order, have both come under attack from many fronts. New challenges to our inherited conceptions of reality and of what is to be human have emerged during the twentieth century, and especially during the last five decades. As a consequence, we are now being compelled to regard ourselves in a new light and from new perspectives. This is forcing us to reposition humanity in an ex-centric manner in relation to other living organisms and to the world that surrounds us.

Among the findings that require a revising of our concepts of human nature and a revision of the postulates of Bacon's program, it is possible to find:

- advances in particle physics, which have changed our ideas of physical reality and the notion that there exists an independent world "out there" separate from us as observers;
- discoveries in quantum cosmology, which are forcing us to modify our views regarding the origin and fate of the universe and of the place we occupy in it;
- findings about the nature of time, which require that we abandon the idea of an absolute and immutable flow of time as a backdrop to the progress of humanity;

- acknowledgment of the tight coupling that exists between human activities and physical ecosystems, which is forcing us to abandon the idea that nature exists for us to conquer and dominate;
- advances in biotechnology and genetic engineering, which are giving us the capacity to consciously alter the direction of our own biological evolution;
- developments in artificial intelligence, which have emerged to complement and challenge conventional ideas about the uniqueness of human reason; and
- new findings in information sciences and technologies, which are in the process of creating new levels of reality and of fundamentally altering the nature of human interactions.

These challenges are a product of the scientific and technological advances of Western civilization, which accompanied the unfolding of the Baconian program. Their combined impact, coming with thunderous force at the end of the 20th century, is forcing us to reassess the legacy of the Baconian age. In this light, Bacon's interpretation of the myth of Prometheus requires updating; Prometheus's story needs to be retold and reinterpreted in much more uncertain and ambiguous terms, without assuming that "Man is the center of the world".

In each and every of those fields, our knowledge is advancing with such speed that it is nearly impossible to provide an accurate picture of the breadth and intensity of the changes under way. As a consequence of these advances, we have been compelled to accept strange notions regarding the probabilistic nature of the physical world, which is no longer seen as something objective "out there", and to entertain even stranger conceptions about a multiplicity of universes, whose existence cannot be proved or disproved with the tools of modern science. We have had to revise our views of linear and absolute time, which can no longer be seen as providing a fixed backdrop for the idea of indefinite human progress. We have also been forced to abandon our human centered view of the environment, and to renew reciprocity linkages between human beings and the biophysical world that surrounds us.

At the same time, we are in the process of becoming responsible for guiding the biological evolution of our species, regardless of our readiness to accept such awesome responsibility; we have had to face the challenge of artificial intelligence, which has shown us that the capacity to reason is not an exclusive prerogative of human beings; and we have also been forced to cope with the swift emergence of cyberspace, a new level of reality, which has challenged the dualism that underpinned the modern scientific outlook. Last, but not least, we have realized that technological advances are transforming human interactions, fragmenting our selves and profoundly altering our sense of personal identity.

These challenges make it necessary to reconsider the foundations of the Baconian program. The methods of modern science have evolved gradually over nearly four centuries since the time of Bacon, Descartes, Galileo and Newton and the other fathers of modern science, but are poised to experience even more significant transformations as we move into the 21st century and a new millennium. Our efforts to improve the human condition have had a host of unintended negative consequences, which have made it impossible to unambiguously abide by Bacon's injunction to

employ knowledge for the benefit of humanity. The institutional settings for the generation and utilization of knowledge, together with the idea of public support for research, are experiencing wrenching transformations. In addition, confidence in the steady and indefinite character of human progress has been badly shaken by the human catastrophes of the 20th century. Moreover, the progressive loss of the ethical and moral dimensions that Bacon — in his deeply felt concern for the good of mankind — had built into his program, is one of the main reasons for the paradox that the program's success ended up undermining its foundations.

All of this suggests that we are witnessing the twilight of the Baconian age. Our attempts to cope with all the assaults on the Promethean centrality of humanity and the challenges to the Baconian program are creating confusion, anxiety and a widely shared feeling that humanity has lost its bearings.

As we move into a new century and a new millennium, humanity has embarked in a journey into uncharted territory; a journey whose destination we cannot, as yet, visualize clearly and which is forcing us to reappraise the human condition. Ambiguity and paradox accompany this transition, whose character and impact compares to that of the Renaissance. Since time immemorial, human beings have stood in sharp contrast with other species, as reflected in creation myths from around the world, which identify human beings as the highest of the animals and the lowest of the gods. However, while practically all civilizations award our species a special place in the cosmic order, the uniqueness, preeminence and centrality of humanity in relation to nature and to other living creatures has been a particularly dominant and recurring theme in Western culture.

Our uniqueness arises out of an unusual interaction between biology and culture. The human species is the only one that possesses highly developed symbolic language and is therefore capable of adaptation by cultural change. We are exceptionally poised to engage in and take advantage of the interplay between the biological and cultural dimensions of evolution. Underpinned by the development of language, the interplay between biological and cultural evolution provided the basis for the emergence of self-awareness, which developed largely through interaction with other selves. In turn, self-awareness allowed us to organize and integrate our physical and mental capacities to influence the environment, thus improving our evolutionary prospects. Associated with self-awareness is the fact that we can anticipate the inevitable cessation of our lives. We are cognizant of the finite character of our existence, of our inescapable temporality. This awareness has been a powerful evolutionary force, for it has motivated human beings to transcend the limits imposed by biological death.

Language and self-awareness allow for the emergence of intellectual pursuits, planned actions and purposeful behavior, as well as of all types of social activity. We are able to anticipate the results of our actions and to deploy our efforts in accordance to these anticipations. We have the capacity to defer the gratification of needs, and to coordinate and organize activities in time. Hope, expectation and purpose emerge out of this ability to anticipate and plan, which confer on humans a unique sense of the future.

Our biological and cultural heritage as members of the human species has endowed

us with a large number of subtly distinguishable emotions, which are aroused in specific ways by experiences and situations that have been common and important during the history of our species. From this perspective, we are the sum of our feelings and our common feeling pattern is what makes us specifically and truly human. What we are and what we do, and what we want to be and want to do, is the result of cultural and biological evolution, of the mix of acquired intelligence with specific genetic feelings that have evolved us to adapt to particular situations.

The capacity to integrate emotion and reason, feeling and thinking is a byproduct of the combination of biological and cultural evolution that is unique to our species. This integration gives rise to a prodigious diversity of individual and collective responses to the challenges posed by the physical environment, by our interactions with other human beings, and by our inner aspirations and motivations. The enormously large number of potential responses is filtered by relatively stable social constructs — institutions, values, shared myths, rituals — which create interlocking systems of order that hold human groups together and allow us to survive and flourish.

Our lives are not determined exclusively by either biology or culture, or just by passion or by reason. We make value judgements about what is better or worse, good or bad, by intertwining our feelings and our intellect. This gives rise to choice and freedom, with their inevitable corollary: responsibility. In contrast to other species, we are directly responsible for our individual and collective futures. Indeed, as a result of the success of the Baconian program, we have also become responsible for the future of humanity as a whole and for the future of other species in our planet.

The essence of the human condition can thus be seen to lie in the peculiar combination of biological and cultural evolution which, through the emergence of language and consciousness, bestowed on human beings an extraordinary evolutionary advantage over other species on Earth. But *we are now in the process of altering the context for both types of evolution and the ways in which they unfold*. We are transforming our biophysical environment to an unprecedented degree, modifying the patterns of human communication and interaction that shape culture, and creating new realities to project our feelings and to exercise our intellectual faculties. We are also augmenting our mental and physical capacities through a variety of artificial devices, and acquiring the capacity to control and direct our biological evolution. As the Baconian age comes to an end, we are changing the rules of the evolutionary game for the human species, and this will require a transformation of our concepts of human nature.

Amidst the confusion and turbulence we may venture that the human predicament at the twilight of the Baconian age is one humanity will have to face time and again. Our knowledge and capacities advance relentlessly — but the human mind continuously outpaces its own creations. By the time our understanding — let alone our habits, institutions and values — catch up with the products of our own intellect, we will have moved, once more, to uncharted territory. We do this by enlarging and transforming the realm of human experience; and also by creating new realities, generating new problems and discovering new mysteries to be unveiled. We may even consider this open-ended search for new interpretations of the human condition,

for novel ways to solve the riddle of our contingent existence, as a unique attribute of the human species.

Along the way, we reconstruct our own individual realities all the time and our collective realities every so often. However, we are living now in a unique period of human history in which reality is being reconfigured for all the members of our species. We are beginning a difficult transition towards something whose outlines cannot as yet be clearly discerned. At the dawn of the post-Baconian age we must embark in the search for a new program. Perhaps it will take several decades, or even much longer, before a new program for the whole of humanity will be articulated with the clarity and the coherence that we can now — nearly 400 years after the fact — attribute to Bacon's program.

This search must build on the achievements of the Baconian age, taking advantage of its enormous success — but at the same time acknowledging its limitations. Three indications suggest a possible direction for our search. In the first place, there is a need to expand what became a rather narrow range of considerations — referred almost exclusively to the exercise of our rational faculties — that were fully incorporated into the implementation of the Baconian program. Perhaps this calls for putting ethical, emotional and aesthetic questions — that is, feelings — on an equal footing with reason, integrating all of them into the design of a new program.

The second indication is derived from the fact that, in the process of putting the Baconian program into practice, Western civilization took the world by storm. In just a few centuries it altered all aspects of the human condition. Other cultures and civilizations had to absorb, adapt to and respond to the advances of the Western worldview. Along the way, the potential contribution of the outlooks and mindsets of other cultures was lost, or at least ignored. Perhaps it is time to reconsider this state of affairs and begin to recover a diversity of cultural perspectives on the human condition. However, we must do this while maintaining a firm and responsible ethical stand, avoiding those extreme manifestations of cultural relativism in which any and every behavior appears justifiable.

The third indication arises out of the enduring presence of the Promethean myth — extending over 2500 years — in Western civilization. The influence of Bacon's interpretation of this myth has persisted to our days, and we tend to see Prometheus — the titan who stole fire from the gods — as the symbol of the heroic quest for knowledge to be put in the service of humankind. However, this interpretation of the myth has nothing to say about the impact of this quest on the world that surrounds us, and on the way in which it transforms our own humanity. Neither has it anything to say about the fact that only a small portion of humanity has benefited from the bounty generated by this quest.

The future of humanity over the next century and the next millennium will be determined by our success in devising a new program to guide human evolution into the post-Baconian age. Perhaps one of the first tasks we face in this transition is to rewrite the myth of Prometheus, to reinterpret and broaden its thoroughly Western meaning and significance — possibly by incorporating elements from the creation myths of other cultures. As Guatemalan writer Augusto Monterroso reminds us in

his short story *The eclipse* [4], other civilizations have been able to acquire knowledge and penetrate the secrets of the universe without the valuable help of the West.

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