Failures of Convergence
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Abstract: In thinking about the human condition in the 21st century, it is widely suggested that today technology has advanced to the point where it now has the capacity to fundamentally transform the conditions of human life. Proponents of what has come to be referred to as “NBIC technologies,” nano-, bio-, info, and cogno- technologies, predict a soon-to-be future in which these converging technologies will result in improved human performance and a golden age of social development transcending current crises. As Mihail Roco (chair of the US National Science and Technology Council subcommittee on Nanoscale Science, Engineering and Technology (NSET), and Senior Advisor for Nanotechnology at the National Science Foundation) and William Sims Bainbridge (Co-Director of the Human-Centered Computing at the National Science Foundation) note in their introduction to *Converging Technologies for Improving Human Performance*, “Caught in the grip of social, political, and economic conflicts, the world hovers between optimism and pessimism. NBIC convergence can give us the means to deal successfully with these challenges by substantially enhancing human mental, physical, and social abilities” (3). Critically appraising these calls for a convergence of technology on improving human performance, this paper draws on the formative work of Ernst Cassirer on philosophical anthropology, culture, and technology and argues that a more adequate account of convergence that addresses the place of the human being in a rapidly changing technological environment must begin from a stance that incorporates philosophical anthropology and a critical theory of technology.

I

Ernst Cassirer opens his 1944 *An Essay of Man* arguing that while self-knowledge is the highest aim of philosophical inquiry, today man’s knowledge of himself is in crisis. Cassirer points out that no former age was ever in such a favorable position with regard to the sources of our knowledge of human nature. As he notes: “Psychology, ethnology, anthropology, and history have amassed an astoundingly rich and constantly increasing body of facts. Our technical instruments for observation and experimentation have been immensely improved, and our analyses have become sharper and more penetrating” (EM 22). And yet, Cassirer argues, we have no method for the mastery and organization of this material. We have a mass of disconnected and disintegrated data which seem to lack all conceptual unity. The anarchy of thought, Cassirer notes, leaves us without a frame of reference or general orientation and our wealth of knowledge threatens to become little more than a mass of disconnected and disintegrated data. This, Cassirer notes, is a danger, a theoretical as well as a practical problem.

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1 In this essay I will employ the following abbreviations to reference works by Cassirer: EM: *An Essay on Man*, FT: “Form and Technology,” SMC: *Symbol, Myth, and Culture*, MS: *Myth of the State*, and PSF: *Philosophy of Symbolic Forms.*
As he writes: “That this antagonism of ideas is not merely a grave theoretical problem but an imminent threat to the whole extent of our ethical and cultural life admits of no doubt.” And on this point he cites Max Scheler who notes that “in no other period of human knowledge has man ever become more problematic to himself than in our own days” (EM 21 – 22). Cassirer’s later work, including An Essay on Man, The Myth of the State, and many of the essays collected in Symbol, Myth, and Culture, is particularly imbued with an awareness of “menacing danger” (SMC 60), as he refers to it in the essay “The Concept of Philosophy as a Philosophical Problem,” and the slow disintegration and the sudden collapse of social and political life in the last decades (SMC 233), as he puts it in the essay “Judaism and the Modern Political Myths,” written in 1944, the same year as the publication of An Essay on Man. Cassirer worries that modern philosophical thought has become increasingly pessimistic and fatalistic and that philosophy has abrogated its ethical responsibility to speak to these theoretical as well as practical crises.

Cassirer’s reference in An Essay on Man to Max Scheler is particularly noteworthy in this context as his 1928 work Man’s Place in Nature, from which Cassirer quotes, is widely regarded as the work initiating the German tradition of philosophical anthropology. For both Scheler and Cassirer, the way out of this crisis is a renewal of anthropological thought and, indeed, within the tradition of philosophical anthropology, Cassirer’s notion of a crisis in self-knowledge and the need to situate that crisis within anthropological thought was quite common. Similar sentiments can be found in the philosophical anthropologies of Arnold Gehlen, Helmuth Plessner, and Michael Landmann. In Man: His Nature and Place in the World, Gehlen observed that “Man is a being whose very existence poses problems for which no ready solutions are provided” (4). And Michael Landmann had this to say in Philosophical Anthropology, “Man has become problematic as never before; he no longer knows what he is, and he knows that he does not know it” (6). In his 1954 book The Social Self, Professor of Philosophy Paul Pfeutze eloquently gave voice to this sentiment, which he found widespread in 20th century culture. “There is,” he writes, a crisis and revolution in modern culture and in man's knowledge of himself which has occasioned a revival of interest in anthropology both in philosophical and in theological circles. Modern man has become a problem to himself, and all over the world men are inquiring with fresh zeal into the nature of man. What is man? What is the meaning of human existence? In the confusion of voices, a deep disquietude has fallen upon the human race. On all sides one finds moral disaster, political confusion, spiritual discontent, mental breakdown, and a growing suspicion, now amounting to a certainty, that during the last few centuries man has so far misinterpreted his own nature as to make tragic and catastrophic use of his powers and technics. (19)

There is, Pfeutze notes, the growing suspicion that until now we have gotten things wrong, misinterpreted our nature as human beings. And this misinterpretation is, at least in part, responsible for the tragic and catastrophic misuse of our powers and technics. In “Form and Technology” Cassirer as well references this awareness of our misuse of our powers and technics. He raises concerns over technology’s breadth and growing power (FT 2), its subjugation of modern culture, and its role in severing the human being from organic life. He quotes philosopher Ludwig Klages’ observation that the human being is possessed by technology, a vampiric and soul-destroying power (FT 31) and worries over the grave inner
damages of a technological culture which throw the human being into a “never ending vertigo” (49). Evident in “Form and Technology” is the debate, already extensive by 1930, over the impact of the primacy of modern technology and whether it should be blessed or cursed and whether it is a source or symptom of the crisis facing culture.

In light of this crisis of self-knowledge, Cassirer and these other figures turned to philosophical anthropology as a path out of the crisis. Each raises the anthropological question: what am I that I am a human being? Pfeutze speaks of the fresh zeal with which scholars were turning to the question of the nature of the human being, a zeal that brings with it a renewed hope that a new form of anthropological thought may rescue us from moral disaster, political confusion, spiritual discontent, and mental breakdown. Beneath the sense of crisis and catastrophe, then, lies the hope that if we can properly answer this question, if we can approach the anthropological question without misinterpretation, then perhaps we might avoid these mistakes, or at least go some way towards correcting them. For Cassirer too, as we shall see, the “clue of Ariadne” which will lead us out of this labyrinth lies in a fresh approach to the anthropological question and a recognition of man’s symbolic nature.

Fast forward some fifty years, though, and it is precisely the anthropological question, Cassirer’s question regarding self-knowledge, that is rendered problematic by the advance of our powers and technics, for those very powers and technics are now being turned back on the human being. Developments in genetic engineering, biotechnology, neuro-pharmacology, robotics and prosthetics raise the specter that the human being itself may be refashioned and reengineered. Indeed, in setting out to describe our current situation, it is clear that there is a widespread presumption that humanity may be at a turning point. Issuing from a variety of perspectives and motivated by a cross-section of theoretical concerns, comes the claim that especially owing to technological developments human beings are on the cusp of profound change. For instance, Susan Squier, Brill Professor of Women's Studies and English at The Pennsylvania State University, notes in Liminal Lives that biomedicine and biotechnology are reshaping our ways of conceiving, being born, growing, aging, and dying, changing the expected shape and span of human life. “The foundational categories of human life have become subject to sweeping renegotiation under the impact of contemporary biomedicine and biotechnology” (2). Duke University Professor of Literature Katherine Hayles agrees, suggesting that “technology has progressed to the point where it has the capability of fundamentally transforming the conditions of human life” (“Preparing the Humanities for the Posthuman,” 14). In his recent essay “Icarus 2.0” historian Michael Bess argues that we are in the early stages of an “epochal shift” that will prove as momentous as such great transformations as the transition from hunting and gathering to settled agriculture and the substitution of steam power for human and animal energy. We are, he suggests, at a turning point that will shake ethical and social foundations, as we apply the technologies of human enhancement (which he identifies as pharmaceuticals, prosthetics/informatics, and genetics) to the reinvention of our own physical and mental capabilities. “Though advances in each of these three domains are generally distinct from those in the other two, their collective impact on human bodies and minds has already begun to manifest itself, raising profound questions about what it means to be human” (Bess, 2008, 114). And like Cassirer, some fifty years earlier, Bess’ essay often refers to these developments as destabilizing, dramatic, and disorienting, emphasizing the sense of crisis that attends the birth of the posthuman. Today, though, that crisis extends to the very question Cassirer posed in his
Essay on Man: “What is man?” What is man when his nature can be reengineered through the technologies of human enhancement?

While Bess focuses primarily on biotechnology, others look more broadly at a host of technologies that are converging to radically alter human nature. In Radical Evolution: The Promise and Peril of Enhancing Our Minds, Our Bodies—and What It Means to Be Human, Joel Garreau, an American journalist and author, focuses on “the future of human nature” and explores the “biggest change in tens of thousands of years in what it means to be human” (2005, 3). Garreau’s discussion focuses on robotics, information science, nanotechnology, and genetics, which he refers to as the GRIN technologies, and ponders the questions “will human nature itself change? Will we soon pass some point where we are so altered by our imaginations and inventions as to be unrecognizable to Shakespeare or the writers of the ancient Greek plays?” (2005, 21). It is this fear that is the focus of Bill Joy’s essay “Why the Future Doesn’t Need Us.” Joy, cofounder and Chief Scientist of Sun Microsystems, has been having second thoughts about the computer revolution and in his essay explores how it is that “our most powerful 21st-century technologies—robotics, genetic engineering, and nanotech—are threatening to make humans an endangered species” (238).

Joy was responding in part to the growing interest in the Singularity, the notion of rapidly accelerating technological change first popularized by Vernor Vinge and most recently the focus of inventor and futurist Raymond Kurzweil’s book The Singularity is Near: When Humans Transcend Biology. In his earlier book, The Age of Spiritual Machines, Kurzweil argued that “the primary political and philosophical issue of the next century will be the definition of who we are” (1999, 2). In The Singularity is Near, Kurzweil points to a different kind of turning point and argues that the pace of accelerating change in technology will lead in the not-too-distant future to what Garreau refers to as an imminent and cataclysmic upheaval in human affairs (90) and what Kurzweil suggests will be a rupturing of the fabric of human history (23). As Kurzweil notes,

What, then, is the Singularity? It’s a future period during which the pace of technological change will be so rapid, its impact so deep, that human life will be irreversibly transformed. Although neither utopian nor dystopian, this epoch will transform the concepts that we rely on to give meaning to our lives, from our business models to the cycle of human life, including death itself. (7)

Kurzweil predicts that the Singularity will occur in 2045 (136), just a short 100 years following upon the publication of Cassirer’s 1944 An Essay on Man and his reflections on our crisis of self-knowledge. Far from Cassirer’s sense of crisis, however, Kurzweil hypothesizes that these technological developments will bring a period of limitless opportunity and advancement. While he recognizes that genetics, nanotechnology, and robotics and A.I. bring with them deeply intertwined benefits and dangers, he argues that in the end, “it is only technology…that will offer the leverage needed to overcome problems that human civilization has struggled with for many generations” (415). Do developments in the technologies of genetics, nanotechnology, robotics, and A.I. point to a way out of the theoretical and practical crises noted by Cassirer, Scheler, Pfeutze and others? Or will they only serve to deepen our crisis of self-knowledge as we confront anew our powers and technics, now focused more specifically on the human being? Recent
proposals emphasizing the convergence of technologies on the improvement of human performance promise a way of out of this dilemma and it is to those proposals that I turn in the next section.

II

In the United States, converging technologies refers to the synergistic convergence of nanotechnology, biotechnology, information technology, and the cognitive sciences, commonly jointly referred to as NBIC technologies. For several years now, the motivating force behind discussions of converging technology in the U.S. has been Mihail Roco and William Sims Bainbridge. Roco is chair of the US National Science and Technology Council subcommittee on Nanoscale Science, Engineering and Technology (NSET), and Senior Advisor for Nanotechnology at the National Science Foundation. Bainbridge, a professor of sociology, currently serves as Co-Director of Human-Centered Computing at the National Science Foundation. They have organized a series of workshops and conferences on converging technologies and published proceedings from the first four workshops (Roco and Bainbridge, 2002; Roco and Montemagno, 2004; Bainbridge and Roco, 2006).

Following a quick perusal of the published proceedings from the converging technologies workshops, one might be forgiven for thinking it a mistake to turn to a discussion of NBIC convergence in the midst of a discussion of crisis, epochal change, and transformative enhancement technologies. The synergistic convergence of nanotechnology, biotechnology, information technology, and the cognitive sciences would seem to have little to do with the broad, almost metaphysical discussions of the future of humanity initiated in the previous section. Certainly there is some truth to this sentiment, and much in these reports is devoted precisely to scientific and technical discussions meant to foster ongoing efforts of convergence among scientists, researchers, and engineers. And yet these reports are not limited to these matters in the least and in this section I will spell out some of their more radical elements connecting them to the concerns addressed in the previous section, focusing especially on Roco and Bainbridge’s overview of NBIC convergence and their vision for converging technologies.

As we have seen, extending from Cassirer’s 1930 essay “Form and Technology” through his later work, especially An Essay on Man and The Myth of the State, is an awareness of a sense of crisis confronting the human being, a crisis brought on by, among other forces, the development of modern technology. A similar awareness is evident in Roco and Bainbridge’s overview of NBIC convergence. And like Cassirer, this crisis has both a theoretical and a practical dimension. On the theoretical side, Roco and Bainbridge situate their discussion of converging technologies in a context that calls to mind Cassirer’s own reflections on the fragmentation of knowledge. Like Cassirer, they are preoccupied with the fragmentation and specialization of human knowledge and the question of forging a general orientation, a frame of reference. They bemoan the specialization that has splintered the arts and engineering and worry that no one can master more than a tiny fragment of human creativity. In several passages that call to mind Cassirer’s own interest in the Renaissance, Roco and Bainbridge suggest we need to return to a more holistic perspective and rekindle the spirit of the Renaissance. As they write in their overview to the report,
The evolution of a hierarchical architecture for integrating natural and human sciences across many scales, dimensions, and data modalities will be required. Half a millennium ago, Renaissance artist-engineers like Leonardo da Vinci, Filippo Brunelleschi, and Benvenuto Cellini were masters of several fields simultaneously. Today, however, specialization has splintered the arts and engineering, and no one can master more than a tiny fragment of human creativity. (2002, 13)

Repeatedly as well, the authors reference the holistic quality of the Renaissance as its hallmark: all fields of art, engineering, science, and culture shared the same exciting spirit and many of the same intellectual principles (2002, 4). With the development of science, that holism gave way to specialization and intellectual fragmentation, but Roco and Bainbridge argue that NBIC convergence will point the way to a new holistic spirit and a deeper level of unity based on the unity of nature.

Furthermore, Roco and Bainbridge, again in a move again suggestive of parallels to Cassirer, seem to intuit that this task is more than simply a theoretical need. We are, they write, “caught in the grip of social, political, and economic conflicts, the world hovers between optimism and pessimism” (2002, 3). And again they argue that NBIC convergence promises us relief, in part by providing the means to enhance human mental, physical, and social abilities (2002, 3). Bainbridge returns to this theme of crisis in a later essay on converging technologies, arguing that civilization is in such grave danger that we must seek a fresh foundation for our culture and institutions (197). Bainbridge foresees a crisis brought on by an impending demographic catastrophe due to the collapse of fertility, the distintegration of families and social bonds in an aging global population, and the continued conflict between secular and religious societies. This crisis points to two possible futures for humanity. The first is a “radical retrenchment that leads to a world fragmented among competing religious fundamentalisms” (198). The second is made possible by converging technologies: “A transcendence of the traditional human condition—made possible by the unification of all sciences and technologies, establishing a dynamic new creed to replace religion. This would open new worlds for humanity, not only in outer space, but also in the transformation of our own nature” (198). NBIC convergence, then, becomes a new creed to replace religion, and provides the way forward that allows us to address the theoretical and practical crises facing the human being.

On the surface, we can see several intriguing similarities between Cassirer and Roco and Bainbridge, including an awareness of a sense of crisis, an understanding of the fragmentation of knowledge, the need for a fresh examination of our situation, and a call for holism and the unity of knowledge. But where Cassirer suggests that technology is implicated in this crisis and that what is needed is a fresh approach to the anthropological question, Roco and Bainbridge suggest that NBIC technologies offer a way out of this crisis, especially if they can converge on the improvement of human performance. Indeed, converging technologies and improving human performance provide the framework in which to address the various crises Roco and Bainbridge reference. Where Cassirer turned to a philosophical anthropology, Roco and Bainbridge turn to science and technology, especially nanotechnology, and a vision of convergence that begins with the material unity of all matter at the nano-scale. It is the convergence of the sciences that initiate the new renaissance and that convergence is based on material unity at the nanoscale and on
technology integration from that scale. Roco and Bainbridge understand the natural world, human society, and scientific research as “closely coupled complex, hierarchical systems” (ix). They argue that we need to develop a hierarchical architecture for integrating the sciences beginning with physics as a base and moving up through chemistry and biology to psychology and economics (13). They suggest we should not be concerned with the charge of reductionism and that all the sciences can progress through convergence: “A trend towards unifying knowledge by combining natural sciences, social sciences, and humanities using cause-and-effect explanation has already begun and it should be reflected in the coherence of science and engineering trends and in the integration of R&D funding programs” (13). Roco and Bainbridge’s framework for convergence, then, is predicated on the material unity of nature, a hierarchical model of the disciplines founded on nanoscience, a holistic approach based on reductionistic and cause-and-effect models, all geared toward the improvement of human performance. More broadly, converging technologies serve as a model for other forms of convergence. Indeed, that authors suggest explicitly that we might once again achieve a golden age, a turning point, where “technological convergence could become the framework for human convergence” (2002, 6).

It is clear, too, that Roco and Bainbridge’s proposal for NBIC convergence has profound implications for how we understand the human being. Indeed, the broad scope and implications of converging technologies are immediately suggested by the titles of the various reports edited by Roco and Bainbridge, including Societal Implications of Nanoscience and Nanotechnology, Converging Technologies for Improving Human Performance, Converging Technologies in Society, The Coevolution of Human Potential and Converging Technologies. The broad sweep of these reports is also indicated by the regular references to the “immense individual, societal, and historical implications for human development” (2002 xiii) and to the future of humanity, a future in which “science and technology will increasingly dominate the world” (2002 xiii). Social progress, more than simply technological progress, is imagined to follow from the converging technologies. Bainbridge’s “Survey of NBIC Applications,” included as an appendix to the report Managing Nano-Bio-info-Cogno Innovations: Converging Technologies in Society, tabulates 76 predicted applications of converging technologies, and includes, among other items, improvements to the human body, making it more durable, healthier, more energetic, easier to repair, and more resistant to biological threats and aging; eradicating handicaps that have plagued the lives of millions of people; sociable technology will enhance human emotional as well as cognitive performance, giving us more satisfactory relationships not only with our machines but also with each other (2006, 342); devices connected directly to the nervous system will significantly enhance human sensory, motor, and cognitive performance (2005, 342). These efforts at improving human performance are justified in light of the crises we face, crises motivated in part by the very technologies we are being encouraged to embrace.

Roco and Bainbridge suggest that the way out of the dilemma posed in the previous section is to embrace technology, improve the human being, and transform society so that we are better able to meet the crises with which we are confronted. Their overview of NBIC convergence itself often converges on the utopian in this respect.

The twenty-first century could end in world peace, universal prosperity, and evolution to a higher level of compassion and accomplishment. It is hard to find the right metaphor to
see a century into the future, but it may be that humanity would become like a single, distributed and interconnected “brain” based in new core pathways of society. This will be an enhancement to the productivity and independence of individuals, giving them greater opportunities to achieve personal goals. (6)

Roco suggests that humanity will bond via this interconnected virtual brain of the Earth’s communities as we search for intellectual comprehension and conquest of nature (Roco 1999). In “Converging technologies and human destiny” Bainbridge suggests that NBIC convergence will not only bring together science and technology but will also unite “untraditional conceptions of reality with marvelously useful applications that cannot be ignored…Once we use the technology to transform ourselves, then the technology becomes more salient for our hopes and beliefs than any ancient myth could be” (202). Here too Bainbridge resorts to metaphor:

Humanity is crossing an abyss on a tightrope. Behind us is the old world of religious faith that compensated wretched but fertile people for the misery in their lives. On the other side, if we can only reach it, is a new land where we no longer have to live by illusions, where wisdom and procreation are compatible, where truth and life are one. Nietzsche warned that as we make this perilous crossing, we must not look down. (202-03)

Converging technologies, Bainbridge suggests, may be that tightrope that can carry us to the other side (209). Where once Cassirer urged a turn to philosophy of culture and a philosophical anthropology as a response to our crisis in self-knowledge, for Roco and Bainbridge that crisis calls for a focus on technology. Converging technologies, they suggest, provide a framework for reappropriating the holistic spirit of the Renaissance. A model for human convergence, NBIC technologies are the tightrope that will carry us beyond illusion and faith, to a world of enhanced human performance. What are we to make of this proposal? Does NBIC convergence provide a framework in which to address the dilemma of technology’s impact on the human being? In order to assess this vision of converging technologies I would like to return once more to Cassirer and indicate his efforts at addressing this crisis and what elements we might find in it to critique Roco and Bainbridge’s proposal. It is to that task that I turn in the next section.

III

In the midst of this very future-oriented, some might say utopian, discussion of the powers of nano-bio-info-cogno, turning back to Cassirer’s An Essay on Man as well as to an essay on technology written some eighty years ago might seem rather perverse. And yet, as we have seen, there are some interesting similarities, one might say convergences, between Cassirer’s project in An Essay on Man and the project of NBIC convergence as suggested by Roco and Bainbridge. These similarities include a concern over crisis, the fragmentation of knowledge, the perceived need to bring some unity and cohesion to this fragmentation, inspiration derived from the Renaissance, and an interest in the human being as key to this “convergence.” But here the similarities end and more interesting are the divergences between Cassirer and the proposed model of NBIC convergence. I maintain that in the search for a general orientation in which to address our sense of crisis, in discussions of converging technologies, changing societies, and improving human performance, NBIC convergence, predicated on a unified understanding of the
physical world from the nanoscale to the planetary scale, will prove inadequate to the task and is
deply problematic. More promising, I contend, is an alternative framework derived from a rich
and multifaceted understanding of the human condition such as found in Cassirer’s account of
the animal symbolicum. In order to support this claim, in this section I develop some of the main
features of Cassirer’s approach to philosophy of culture and philosophical anthropology,
including his thoughts on technology.

An Essay on Man suggests that to face squarely man’s crisis in self-knowledge we must arrive at
a theory of man. But in order to develop a satisfactory account of the human being we need to
understand the human being’s particular milieu, culture, and in order to come to grips with
human culture, we must engage in a study of the elements of culture, the symbolic forms. Our
crisis in self-knowledge, then, impels Cassirer down a path wherein he must confront the
multiplicity of symbolic forms: myth and religion, language, art, history, science, and,
importantly, technology. While Cassirer’s philosophical anthropology, philosophy of culture,
and philosophy of symbolic forms are complex, multifaceted, and spelled out over his lifetime,
permit me to identify five key elements of which we should take particular note that are relevant
to our discussion and which suggest Cassirer’s unique position in the debate over technology and
human enhancement.

First, Cassirer very explicitly situates the human being and culture in the organic realm. The
work of the biologist Johannes von Uexkull and his account of the outward life and inward life
of animals provides the backdrop to much of Cassirer’s philosophical anthropology. Uexkull’s
study of animal form provides a way of avoiding the dualism of biology/culture life/spirit that
Cassirer thought doomed previous philosophical anthropologies. As he puts it: “A philosophical
anthropology has to conform to the maxim of Spinoza that man is not be regarded as a ‘state in
the state.’ He is only a single link in the general chain of evolution. Cultural life is always bound
up with the conditions of organic life” (SMC 168). We must begin with the human being situated
in his physical environment. The human being cannot live without constantly adapting himself to
the conditions of the surrounding world (EM 3). Culture, the symbolic forms, do not represent
the alienation of the human being from nature or an organic realm. Rather, the symbolic forms
are the very conditions of human life (EM 25). And yet, while appropriating Uexkull’s scheme,
Cassirer argues that in the case of human beings, the functional circle between outward and
inward life includes a new element, the symbol. Man, Cassirer observes, no longer lives in a
merely physical universe but in a symbolic universe (EM 25). It is this qualitative change in
human life that precludes Cassirer in “Form and Technology” from judging technology
according to a standard drawn from mere organic life (FT 39).

Second, the distinguishing feature of the human being is not some new feature or property, not
some metaphysical essence. The human being’s distinctiveness is his work. “Man’s outstanding
characteristic,” Cassirer writes, “his distinguishing mark, is not his metaphysical or physical
nature—but his work. It is this work, it is the system of human activities, which defines and
determines the circle of ‘humanity.’ Language, myth, religion, art, science, history are the
constituents, the various sectors of this circle. A ‘philosophy of man’ would therefore be a
philosophy which would give us insight into the fundamental structure of each of these human
activities, and which at the same time would enable us to understand them as an organic whole”
(EM 68). In focusing on this functional capacity of the human being, Cassirer avoids identifying human nature with some timeless metaphysical essence or substance.

Third, Cassirer insists on the diversity of the symbolic forms. His philosophy of symbolic forms represents a decisive break with the neo-Kantian tradition with which he is generally associated in recognizing that science was not the only manner in which human beings attempt to understand the world. Kant’s Copernican revolution had to be extended to cover every principle by which human beings give form to the cultural world. In addition to investigating the function of cognition, then, we must also seek to understand the function of linguistic thinking, of mythical and religious thinking, artistic thinking. Each of these constitutes a symbolic form entirely independent of science with its own categories and concepts. Each is a particular way of seeing with its own measure and criterion of truth and meaning. As Cassirer notes: “None of these forms can simply be reduced to, or derived from, the others; each of them designates a particular approach in which and through which it constitutes its own aspect of ‘reality’” (PSF 1:78). In regard to myth, for example, Cassirer is clear that while science aims at obliterating every trace of the mythic view, science cannot completely suppress myth. As he notes,

In the new light of science mythical perception has to fade away. But that does not mean that the data of our physiognomic experience as such are destroyed and annihilated. They have lost all objective or cosmological value, but their anthropological value persists. In our human world we cannot deny them and we cannot miss them; they maintain their place and their significance. (EM 77)

The structure of An Essay on Man itself reflects Cassirer’s commitment to the integrity and importance of each of the symbolic forms, with separate chapters on myth and religion, language, art, history, and science. His goal in each these chapters is similar to the goal he sets for himself in “Form and Technology,” to gain insight into the inherent, immanent law governing each form (FT 10). Doing so establishes the heterogeneity of the forms of human culture.

Fourth, Cassirer situates his analysis of technology in the context of his philosophy of symbolic forms and in such a way that it would be inappropriate to conclude that technology represents the alienation of either culture or our nature as symbolic animals. In “Form and Technology,” it is clear that Cassirer wants to avoid overly quick and simplistic analyses of technology in terms of a blanket condemnation or praise of its effects or objects. “We may bless technology or curse it, we may admire it as one of the greatest possessions of the age or lament its necessity and depravity—in judgments such as these, a measure is applied to it that does not originate from it” (FT 10). Philosophy’s task is to inquire into the possibility of technology as a symbolic form, examining the form, meaning, and essence of technology. And in this context, Cassirer draws very close parallels between technology and language as symbolic forms, emphasizing “the affinity and internal connections that exist between technology and the pure form and principle of other basic powers of culture” (FT 11). Indeed, technology and language both emerge out of the magical-mythical world view and represent two sides of the human essence. The human being is both a rational being and a tool-forming being (FT 13-14). Both have their origins in the magical-mythical world view, but where this world view is defined by the immediacy of desire and subjective feelings of the wills, technology is defined by will and the growth in objectivity: “in place of merely libidinous desire, there first emerges a genuine, conscious willful
relationship‖ (22). Language and tool use constitute a turning point for the human being, opening up a world of symbolic meaning.

Cassirer argues that we witness in technology a “type of mediacy that belongs to the essence of thought” (23). “All thought in its pure logical form is mediated. It is directed to the discovery and extraction of a mediating structure, which joins the opening sentence and the ending sentence of a communicative chain. The tool fulfills the same function, represented here in the logical sphere, in the objective sphere of physical objects” (23). Language and tool use begin the human being on a slow and gradual process of growth—a progressive increase or strengthening of his self-consciousness. As Cassirer significantly notes, “A new world-attitude and a new world-mood now announce themselves over and against the mythical-religious worldview. The human being now stands at that great turning point in his destiny and self-knowledge that Greek myth embodied in Prometheus” (FT 28). As we saw earlier in the first section of this essay, theorists such as Hayles and Bess suggest that with the development of new technologies we are witnessing a turning point in human life. For Cassirer, it is perhaps more correct to suggest that what makes possible the 21st century references to a turning point lies far earlier in our history and with the development of the symbolic forms. The transition to the first tool, Cassirer suggests in “Form and Technology,” contains the turning point in knowledge (23), and that turning point comes in the opening up of the world of forms and culture and the break with the magical-mythic past, not in the particular developments of technology.

Cassirer’s analysis of technology as a symbolic form precludes him from embracing the philosopher Ludwig Klages’ account of technology as the alienation of human beings from their own essence (FT 29). In fact, contrary to Klages’ view, Cassirer, following philosopher of technology Ernst Kapp’s suggestion, points out that knowledge of the I is itself tied to the form of technical doing (FT 33). Agreeing with Kapp’s basic perspective and insight, Cassirer notes: “technological efficacy, when directed outward, likewise exhibits a self-revelation and, through this, a means of self-knowledge” (FT 35). Cassirer emphasizes the conclusion that follows from this insight: “with this first enjoyment of the fruit from the tree of knowledge the human being has cast himself out forever from the paradise of pure organic existence and life” (FT 35). Even when turning to modern, advanced technology, Cassirer continues to insist on the parallels between language and technology and draws the resulting inference that if we damn technology we must logically include in this condemnation “the totality of spiritual culture” (FT 39). Cassirer makes a similar point in An Essay on Man, rejecting Rousseau’s claim that it is a deterioration of human nature to exceed the boundaries of organic life: “Yet there is no remedy against this reversal of the natural order. Man cannot escape from his own achievement. He cannot but adopt the conditions of his own life. No longer in a merely physical universe, man lives in a symbolic universe” (EM 25). Throughout his philosophical career, Cassirer remained critical of life philosophy with its emphasis on organicism and the immediacy of life and he rejects any blanket condemnation of culture according to some organic standard. This is not to suggest, though, that Cassirer is not critical of modern technology. But in order to grasp his critique of modern technology, I need to address a fifth and final element of his account of symbolic forms, their unity in terms of a common end.

A fifth important point we must make is to note that for Cassirer the diversity of symbolic forms does not preclude their unity. In his account of the symbolic forms, Cassirer emphasizes the
perpetual strife of diverse conflicting forms. Philosophy, he cautions, cannot “overlook the tensions and frictions, the strong contrasts and deep conflicts between the various powers of man.” (EM 228). Each is a different step made by the human being in its reflective interpretation of life, an activity in which the human being attempts to make reality coherent, understandable, and intelligible. And yet this multiplicity of forms does not, Cassirer says, denote discord or disharmony and it is precisely the task of philosophy to understand the system of culture as an organic whole. Philosophy begins with the hypothesis that the heterogeneous activities of human culture can be brought into a common focus (EM 222). But while Cassirer recognizes what we might think of as a kind of convergence among the symbolic forms, it is not a convergence that can be located in either nature or the metaphysical essence of the human being (EM 222). Nor can the diverse and heterogeneous forms of human culture simply be reduced to one form or placed into a fixed hierarchy.

The question of the unity of the symbolic forms is in fact central to Cassirer’s understanding of the crisis of culture. “Unless we succeed in finding a clue of Ariadne…we can have no real insight into the general character of human culture; we shall remain lost in a mass of disconnected and disintegrated data which seem to lack all conceptual unity” (EM 22). As he makes this point in “Form and Technology”: “It belongs to the essential task of philosophy to penetrate into this human lawgiving, to gauge its unity and internal differences, its universality and differentiation” (11). The various and conflicting symbolic forms are a coexistence of contraries held together in a dynamic and functional unity by a conformity in their fundamental task (EM 222) which Cassirer identifies in the final paragraph of An Essay on Man as the task of freedom: “Human culture taken as a whole may be described as the process of man’s progressive self-liberation. Language, art, religion, science, are the various phases in this process. In all of them man discovers and proves a new power—the power to build up a world of his own, an ‘ideal’ world” (EM 228). In both “Form and Technology” and An Essay on Man Cassirer emphasizes how the world of culture, the symbolic forms, opens up to the human being a realm of freedom. In “Form and Technology” Cassirer suggests that with the development of tools the human being is “expelled onto a limitless path of creative work” (29). Similarly, in some of the most evocative paragraphs of An Essay on Man, Cassirer describes how Helen Keller’s grasp of the principle of symbolism is a magic key giving her access to the world of human culture. “A new horizon is opened up, and henceforth the child will roam in this incomparably wider and freer area” (35). We might say then that the symbolic forms converge on this task of freedom. It’s clear, though, that this task is an ongoing one. There’s a ceaseless struggle among the forms of human culture and we human beings have the task of bringing some equipoise to the centrifugal forces of human activity, in which especially the mythical elements are controlled by the constructive powers of logical and scientific thought, ethical forces, and the creative energies of artistic imagination (SMC 246).

Returning once more to Cassirer’s discussion of technology, these final points indicate the direction of Cassirer’s critique of modern technology. As we have seen, Cassirer rejects critiques of technology based on the claim that it alienates human beings from their organic life. As he notes, “The standard by which it alone can be measured can, in the end, be none other than the standard of mind, not that of organic life. The law that one applies to it must be taken from the whole of the mental world of forms, not merely from the vital sphere” (FT 39). But in situating technology within the “whole of the mental world of forms,” Cassirer argues that it threatens to
disrupt the equipoise of the coexistence of contrary symbolic forms. As he notes in “Form and Technology:

Moreover, as technology unfolds, neither does it simply place itself next to other fundamental mental orientations nor does it order itself harmoniously and peacefully with them. Insofar as it differentiates itself from them, it both separates itself from them and positions itself against them. It insists not only on its own norm, but also threatens to posit this norm as an absolute and to force it upon the other spheres. Here, a new conflict erupts within the sphere of mental activity, indeed, on its very lap. What is now demanded is no simple confrontation with “nature,” but the erection of a barrier within mental life itself -- a universal norm that both satisfies and restrains individual norms. (40)

While Cassirer observes that the human being is “thrown by technological culture into a never ending vertigo that moves from desire to consumption, from consumption to desire” (FT 49), he argues that this is not due to the form of technology but to its connection with a “certain form and order of commerce,” a concrete historical position (FT 50). The more basic problem is technology’s setting itself up as a leader and an end itself rather than a servant collaborating to carry out goals in the context of the ethical task of culture as man’s progressive self-liberation. The danger that technology presents is that it usurps the other symbolic forms, the unity of the symbolic forms, and sets itself up as the dominant if not sole symbolic form. Cassirer’s analysis of technology points the way toward a critique of Roco and Bainbridge’s proposal for NBIC convergence, to which I turn in the next section.

IV

In the previous three sections of this essay, I have drawn parallels between Cassirer’s and Roco and Bainbridge’s understanding of the crisis we human beings face in self-knowledge, owing in part to the advance of technology. Furthermore, I have sketched out core elements in their respective frameworks proposed to address this crisis, examining the main elements of Roco and Bainbridge’s vision for converging technologies focused on improving human performance, and Cassirer’s account of a philosophical anthropology focused on the human being as a symbolic animal. In this final section of the essay I would like to bring the two strands of this conversation into closer contact and from the perspective of Cassirer’s account of a philosophy of technology, a philosophy of symbolic forms, and his philosophical anthropology, argue that Roco and Bainbridge’s framework of NBIC convergence and the focus on improving human performance will prove inadequate to the task of confronting the stark issues we face as we contemplate the development of our technics and powers. Having spelled out some of the important elements of Cassirer’s account of a philosophy of culture, including his account of the human being, the symbolic forms, and technology, let us return to the epochal shift, the turning point, we are facing given the emergence of converging technologies and their impact on improving human performance.

Focusing on the broad elements of their proposed frameworks, the differences between Roco and Bainbridge’s and Cassirer’s frameworks could not be starker. For Roco and Bainbridge, the
focus remains almost exclusively on science and technology and the impetus largely has to do with managing a crisis rather than examining its underlying causes. They suggest that if we can put in place the appropriate bureaucratic and scientific structure we can forge a convergence of all disciplines around a unified set of causal principles that will powerfully give rise to a transformative science and technology that will in turn have radical implications for human society and the human condition. While occasionally incorporating the humanities into their account of a more holistic convergence and observing that proper attention must be paid to ethical issues and societal need, Roco and Bainbridge’s vision focuses on NBIC convergence with technological convergence providing the framework for the unity of disciplines, predicated on nanotechnology, the unity of nature, cause-and-effect thinking, and a hierarchy of disciplines. Furthermore, their model of convergence is built on the assumption that reductionism will lead to the unity of the arts and humanities with the scientific disciplines.

Like Roco and Bainbridge, Cassirer too is ultimately interested in a kind of convergence. But his deep and abiding interest in the forms of human culture convinced him that this unity cannot simply be read off of nature. There is only one world and we are a part of it but our efforts to understand and make sense of ourselves as part of this world are plural and divergent and resist the kind of linear, hierarchical, and ultimately reductive model proposed in many of the converging technologies proposals. Ultimately, the notion that technological convergence could become a model for human convergence is still held hostage to the mechanistic and machine metaphysic of the 17th century that Cassirer, in the best tradition of philosophical anthropology, attempts to move beyond. Science is one of the activities of the human being, but it is not the only one and as a symbolic form, neither science nor technology can serve as a model for convergence in the humanities or in human culture more broadly. Cassirer argues that in order to come to grips with the crisis of the fragmentation of human knowledge we need a philosophy of human culture and he offers a rich analysis of the various symbolic forms that are constitutive of human culture. “Every feature of our human experience,” Cassirer argues, “has a claim to reality” (EM 77) and each symbolic form has its value. “None of them is a mere illusion; every one is, in its measure, a step on our way to reality” (EM 78). Throughout An Essay on Man, Cassirer is critical of hypostasizing scientific models and principles as simply mirroring nature and providing unmediated access to reality.

Cassirer’s analysis of the form of technology also suggests that he would be skeptical of looking to technology for a model of convergence. Behind Roco and Bainbridge’s proposal for NBIC convergence focused on improving human performance is a recognition that the rapid progress of science and technology threatens to outstrip human capabilities. Their solution to that dilemma is to employ the very same science and technology to transform the human being and create a new and improved man better able to function in a society shaped by NBIC convergence. Cassirer’s analysis of technology demonstrates that he is no technophobe and he repeatedly rejects the false dichotomy of alternatively praising or blaming technology. He does caution, though, that the danger of modern technology is that it threatens to posit itself as an absolute norm relative to the other forms of human culture. It is in this context that Cassirer raises the charge voiced by the philosopher of technology Walter Rathenau that modern technology is the water jug of the Danaides, observing that the human being is thrown by technological culture into a never ending vertigo (FT 49). Reading the proposals for NBIC convergence, one can be struck by the perception that technological development and the
improvement of the human being become locked in a tight circle of constant innovation and development. A cycle from which, as Cassirer observes, there is no escape. The human being is to be improved by and for technology.

The difficulty, Cassirer argues, is that technology sets itself up as an absolute norm and an ethical task is transformed into a technical task to be managed. And yet, Cassirer insists, technology cannot be a leader here but a servant. We must bring to technology the ethical question, not draw our ethical concerns from technology. You cannot derive an ethics from within the culture of technology and the problems of technology cannot be undone by means of technology alone. Cassirer forces us to situate technology within the realm of the other symbolic forms and within the context of the task of the symbolic forms in terms of the progressive self-liberation of the human being. For Cassirer, progress, far from being a scientific task, is an ethical task and a perpetual one. As he notes in An Essay on Man, the ethical world is never given; it is forever in the making. Cassirer identifies in human culture a fundamental polarity between innovation and stabilization. “Man,” he writes, “is torn between these two tendencies, one of which seeks to preserve old forms whereas the other strives to produce new ones” (EM 224). Our task is to struggle to bring these forces into some equilibrium. There is equipoise to maintain here that cannot be sought from any one of the cultural forms but must be considered an ongoing dynamic task of the human being in culture. Taking all of our cues from technology and technical innovation will surely upset this equipoise.

Cassirer concludes “Form and Technology” suggesting that technology best understands its own meaning and narrative when it is “content in the fact that it can never be an end itself” (50). One goal of his essay is to understand technology within human culture and the other symbolic forms and caution us against creating ethical values out of technology itself. Technical enhancements are not, Cassirer might argue, the fundamental human enhancement. Rather, that is to be found in the spontaneous and productive construction of the symbolic universe (EM 221) and efforts to foreclose upon that capacity are at odds with our symbolic nature. The converging technologies reports do precisely that by virtue of their narrow, hierarchical and reductive approach to convergence. In their single-minded focus on NBIC technologies and their efforts to realign human knowledge on a foundation of the nano-sciences and the building blocks of matter, Roco and Bainbridge’s proposal for convergence work to marginalize human culture and transform our symbolic behavior into calculative behavior.

The failure of their proposal for convergence is apparent in their own symbolic constructs, including their references to global brains, tight ropes, and other metaphors. While Bainbridge suggests that converging technologies moves us beyond myth and illusion, and Roco and Bainbridge argue for a model of convergence predicated on science and technology, we have seen that at key moments in their exposition they fall back on precisely such myths and metaphors their framework seemingly excludes. Here we are in the realm of what Cassirer, in a different context, refers to as rationalized myth, “the blending together and even complete fusion of two contradictory and incompatible elements: of the elements of magical thinking and technical thought. The modern politician had to combine in himself two entirely different functions. He had to be a homo magus and a homo faber at the same time. He was the spokesman for and the priest of a new and entirely irrational and mysterious religion” (SMC
Converging technologies becomes a new secular myth, meant to replace outmoded religious myths no longer up to the challenge of facing the crisis we human beings face.

It is here that we witness the ultimate failure of convergence, the emergence of myth in the realm of science and technology. In Roco and Bainbridge’s recognition of a crisis in thought and in their efforts to forge a convergence of NBIC technologies, we see how myth cannot be denied. Man, Cassirer notes, is not exclusively a rational animal, he is and remains a mythical animal. Myth is part and parcel of human nature (SMC 246). Roco and Bainbridge would have us transcend the human condition in our embrace of converging technologies and yet their proposed framework fails to account for key elements of its own proposed vision. While NBIC convergence is predicated on technology, cause-and-effect thinking, and the material unity of nature, at key moments in its defense we see emerge elements of myth and metaphor, elements Cassirer was clear cannot be eradicated from human culture: “…there is no danger that mankind ever will forget or renounce the language of myth. For this language is not restricted to a special field; it pervades the whole of man’s life and existence” (SMC 245). Science too, no less than language and art, is a symbolic form, employs metaphor, and is intimately connected to mythic thought. Myth, Cassirer suggests, is the common background and common basis for all the symbolic forms and while science attempts to extirpate its mythic roots it can never free itself entirely from myth and metaphor.

Cassirer suggests that science offers us a freer and larger horizon of knowledge (EM 77). Science affords us the self-critical awareness of its mythic roots. But science too can turn dogmatic and Cassirer warns against hypostatizing the categories of science as the ultimate reality. As we have seen, Cassirer cautions against taking any of the forms, whether myth or science or technology, as absolute norms. This is precisely what happens in times of crisis and it is at moments of crisis that we are most susceptible to the power of myth. In such times, we are prone to distrust our formative and creative powers and fall back to the mythic. As Cassirer notes in his final work, The Myth of the State,

In all critical moments of man’s social life, the rational forces that resist the rise of the old mythical conceptions are no longer sure of themselves. In these moments the time for myth has come again. For myth has not been really vanquished and subjugated. It is always there, lurking in the dark and waiting for its hour and opportunity. This hour comes as soon as the other binding forces of man’s social life, for one reason or another, lose their strength and are no longer able to combat the demonic mythical power. (MS 280)

When man is confronted with a task that seems to be far beyond his natural powers, he returns to the realm of myth and magic. And it is here that we see the breakdown in the bureaucratic rationale for NBIC convergence. Where so much of the report is geared toward productivity, efficiency, promoting better lines of communication among scientific and technical disciplines, in the cracks of that bureaucratic scheme emerge myth and metaphor. And it is here that we most witness the failure of convergence. When science and technology turn dogmatic, when they abrogate to themselves the sole power to address the crises facing human beings, they outstrip their function as symbolic forms. For Cassirer, convergence cannot simply be read off of nature, nor can it come simply as a matter of coordinating a few specialized scientific and technical
disciplines. Technology is central to human life, as Cassirer makes clear in “Form and Technology.” But he also makes clear that technology cannot set itself up as an absolute norm forced upon the other symbolic forms (FT 40). Technology, he reminds us, cannot determine the goal, though it should collaborate in carrying it out (FT 50). As one of a number of symbolic forms, technology has a role to play in the human being’s ethical task of balancing the tensions and frictions, contrasts and conflicts between the symbolic powers of the human being (EM 228). Cassirer’s account of the animal symbolicum presents us with a rich and multifaceted philosophical anthropology that ultimately frustrates neater and simpler efforts at convergence. The task of coming to terms with our technics and powers and addressing the crises we face is a human crisis, not merely a technical crisis, and its resolution comes in our continued efforts to grapple with our symbolic nature.

Works Cited

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