The Future History of Consciousness

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Abstract: Consciousness is the key fact of life, yet the study of it is in its infancy. Spirituality and science both hold valid truths in this field, and they are bound to meet in a practical sense as science is moving rapidly into the subjective areas such as dreams, thought processes, and awareness. We are on the edge of a momentous shift in knowledge and ability with consciousness, driven by exponential change in theory and technology.

"The only way of discovering the limits of the possible is to venture a little way past them into the impossible." (Clark, 1962, p. 32)

For every one of us, the experience of consciousness is the key fact of life—its highs and lows, agonies and ecstasies, beauties and transcendences, poetry and squalor, fears and loves, the tingle and spark and slap of every moment. Experience happens to the individual, and is filtered through billions of unique bodies and minds. For millennia, the turn and shape of consciousness has been a personal matter, subject only to the influences on an individual: reading, thought, diet, illness, drugs, meditation—but no more. The times are changing, and the twenty first century will see a revolution in the way we understand, work with, and experience consciousness. We can prepare for it, brace ourselves, use it wisely, or let the rising swell sweep us out to a vast and uncharted sea.

The understanding of consciousness and the mind is in its infancy today, especially as it relates to technology. Tools to analyze the brain at the working level of neurons are just emerging, and maps of the brain are about as detailed as Columbus used when sailing out for the New World. But watch out. The future is tapping on the windowpane, asking to come in. Neuroscience, computational models of cognition, and analytical tools are racing ahead, but nobody knows what is around the next turn.

Technology is not a settled field; I suspect it never will be. It is moving too fast, and its knowledge and effects are multiplying at an exponential rate. Nobody knows what will be possible in fifteen years, much less a thousand. A thousand years from now there will be human beings, but will they have the same limbs and organs as today? Will they have new senses, augmented brains? What will they think, dream, imagine? What stories will they tell their

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children? Will they be as gods, and look back with fondness on their mortal ancestors of the 20th century?

"Two voices speak for the future, the voice of science and the voice of religion. Science and religion are two great human enterprises that endure through the centuries and link us with our descendants" (Dyson, 1998, pp. 6-7).

In my life I have sat around campfires, and dissected corpses; pored over Sanskrit verses, and visualized tesseracts; I have listened intently to the voices of science and the spirit. They both speak with authority, and both have a claim to describing reality. How can that be?

For several hundred years, religion and spirituality have railed against the notion of scientific reductionism, seeing it as a kind of blindness to a true understanding, and the depiction of the world as mechanical, inert, dead. William Blake wrote, "May God keep us from single vision & Newton's sleep" (Blake, W., quoted in Damon, 1965). Science is rejected by theologians east and west as the great Satan.

A hundred years ago Sri Aurobindo described two negations. "Thought comes to deny the one [spirit] as an illusion of the imagination or the other [physical reality] as an illusion of the senses." (Sri Aurobindo, 1972, p.7). He was addressing the problem of how the mind responds to two radically different experiences (physical sensation versus the inner spirit), and how a strong belief in one leads to an absolute denial of the other. It is more than a difference of opinion or culture. It is a complete denial of the one by the other. He wrote that at the dawn of relativity and quantum theory, but it is still valid. The paths of science and spirituality were never farther apart than they are today.

The divide between singularitarian technodreamers and spiritual savants is as wide as the universe. You will not find chanting or prayer at a transhumanist conference, nor will you find a demonstration of artificial intelligence at a spiritual gathering. They are members of separate clans who speak different languages. Chakras? fMRI? Reincarnation? Neural decoding? Even their gods require interpreters if they want to speak to each other. Language, books, computers and networks have each brought spectacular leaps forward in the development of consciousness.

But we stand on the edge of a shift that will dwarf all the preceding. Imagine: it is a few years in the future, and machine learners will be reading through millions of books and journals, billions of web pages, trillions of pieces of information, to save, categorize, parse, summarize, and synthesize. Then in the blink of an eye, a natural language interface will be marketed, allowing you to have a discussion with this worldwide exocortex, a brain outside your brain holding the world's knowledge. A year later there is a brain-mind interface available that gives you instantaneous access to the world brain. And then you can talk to anyone, anywhere, through this medium, with the power of thought alone.

Through this series of inevitable, fantastically realistic, and fully practical steps we have entered a new world, where our understanding of knowledge, wisdom, education, and the very nature of humanity has shattered, and must be put back together again, like Humpty Dumpty.

It is premature to postulate a theory of everything, one that would link the arrows of Kurukshetra to the arrow of time, the eight siddhis to Hebbian synaptic learning. No person today has caught the formula that can simultaneously measure enlightenment and Kolmogorov complexity. We need a Turingesque Patanjali, an Einsteinian Aurobindo. Unexplored mountain ranges loom austere and white in the distance, harboring unmet and unimaginable civilizations.

Some believe that a single parsimonious equation holds the key, a lucky theory found in a dusty book or in the racetrack trails of bosons around a supercollider. They look with sinking hope to quantum mechanics, holography, zero-point energy, entanglement, or field theory. Despite long debates and enthusiastic conferences, however, none have explained mind or consciousness. Not really. They have not solved problems in cognition, generated testable and falsifiable hypotheses, created syntheses between existing accepted sciences, or opened new areas for investigation. What we have right now are philosophies, intriguing analogies, tantalizing hints, vague abstractions—not workable solutions.

Are we due for a Kuhnian revolution? Yes and no. Kuhn saw one half of the problem; his conceptual beast, hopping on one leg, can't quite run the race. Science walks on two legs: theory *and* practice, idea *and* technology. The two are not separable. As Freeman Dyson (1999) notes, tools bring observation that stimulate new theories, and theories stimulate the development of new technologies, in an ever-increasing progression.

Humanists, priests, and hippies perennially wring their hands over the encroachment of the machine, and with good reason. The ugliness of concrete bunkers, the fumes of combustion engines, and the narrow lanes of rational argument have choked the human spirit. But we need to look beyond the past, zoom in with the eye of imagination and see what is happening: exponential change, driven by information technology. We are asleep at the wheel— governments, institutions, universities, humanity. "God will grow up while wise men talk and sleep" (Sri Aurobindo, 1972, p. 55). What will we do when our Lilliputian world is shaken by the first steps of this Titanic Being?

> Humans are not evolutionarily prepared for exponential change; it has rarely happened in the past, and has never been sustained as it is today. "It's as if you kneel to plant the seed of a tree and it grows so fast that it swallows your whole town before you can even rise to your feet." (Lanier, 2010, p. 8)

Or try taking a checkerboard, and put one grain of rice on the first square, two grains on the next, four on the next. Watch out: by the last square of the checkerboard, the final amount would be enough to cover India with a blanket of rice two meters deep. Exponential change is unthinkable for the human mind.

The word du jour to describe the point of explosion is singularity. The idea has caught fire among those who dream of radical technology—immortality, vast augmented intelligence, disembodied light-speed travel among the stars, the Last Generation, Humanity 2.0 playing at will with the structure of space and time.

A singularity in mathematics and physics represents a phase shift, a radical transformation, a boundary point where reality morphs beyond recognition. The phase shift that modern

visionaries are speaking of is consciousness, though they use the word intelligence. John von Neumann used it first in this sense, saying that we are "approaching some essential singularity in the history of the race…" (quoted in Dyson, 2012, p.299). I.J. Good spoke of it in 1965 as an intelligence explosion, adding "the first ultraintelligent machine is the last invention that man need ever make" (Good, 1965, p. 3). In the 1980s Vernor Vinge established the word singularity as a technological tipping point.[2]

Slow down, says 'the pessimist'. Humans occupy an insignificant corner of the cosmos; our frail and fugitive species has arisen in the last fraction of cosmic time. Not so, says Big History: the cosmos, life, and mind are a continuous, connected process. Each step tends toward greater complexity and consciousness.[3] In this cosmic view, science and technology are the growth tip that Gaia is using to feel her way into the future. Language, writing, books, science, computers, and networks form a progression through time; they are naturally artificial extensions of human consciousness. Each was a leap forward allowing the knowledge and ability of our species to extend beyond what a single person could understand, remember, or accomplish.[4]

In this idea of a continuous process linking the evolution of the cosmos, the emergence of life, the development of intelligence, and the emergence of science we can find a first hint of how science and spirituality may be integrated.

A snail, crawling on the Grand Canyon of geologic history, fails to feel the tectonic shift. Forty years ago a brain-computer device (cochlear implant) was considered science fiction, yet these implants are routine today.[5] Ten years ago nobody thought that a computer program could beat the world chess master. Five years ago the notion of working with single neurons through light (optogenetics) was unheard of. Three years ago the idea of telekinesis (moving matter by thought) was still a dream. A year ago recording inner consciousness, such as dreams, was unimaginable. Last year the notion that a computer could out-perform people in answering questions in natural language, over the entire realm of human knowledge, would have been laughed at. Yet all of these impossibilities have come to pass, and the trend is accelerating. This future isn't what it used to be. Denial of scientific progress in the realm of mind and consciousness is like closing your eyes to avoid a lightning strike.

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[2] The first description of this was "intelligence explosion" by the mathematician and cryptologist I.J. Good, in 1965. See "I.J. Good, "Speculations Concerning the First Ultraintelligent Machine", *Advances in Computers*, vol. 6, 1965. "Let an ultraintelligent machine be defined as a machine that can far surpass all the intellectual activities of any man however clever. Since the design of machines is one of these intellectual activities, an ultraintelligent machine could design even better machines; there would then unquestionably be an 'intelligence explosion,' and the intelligence of man would be left far behind. Thus the first ultraintelligent machine is the last invention that man need ever make."

[3] See Fred Spier's *The Structure of Big History*, or David Christian's *Maps of Time*. Kevin Kelly also discusses this in *What Technology Wants*. "Big History studies the past across physics, astronomy, geology, biology, and human history. As it does so, it seeks common themes, paradigms, and methods…" (*Big History,* p. xxiv). The six epochs that Ray Kurzweil describes (physics, DNA, brain, technology, mind-machine interface, singularity) describe a similar continuity and progression.

[4] *Hamlet's Blackberry* by William Powers (2010) describes these revolutions as technologies "of the mind," and examines their potentially disruptive influence.

[5] After all, the auditory nerve has 16,000 channels, and at the time one or two channels were the only technology possible. See *World Wide Mind* (2011) by Michael Chorost.

If you want a glimpse of this future history, there is a borderland where science and consciousness meet, in the dead of night, glance at each other in passing, dimly recognize the other, and set up housekeeping. That borderland is science fiction, where telepathy and reincarnation, transcendence and uploading, biology and spirit come together to romp and beget strange offspring. Many a programmer is steeped in spiritual visions from science fiction literature, and many a meditator grew up on dreams of lasers, computers, and robots. Science and spirit may be segregated in the halls of Academe, but in the lands of literature and the imagination, they are producing chimera worthy of the 21st century.

If technology were to enable a leap in consciousness, it would precipitate a Cambrian explosion of creativity, development, and transformation. Why? Even in a mundane sense, consciousness is the force behind the major events in life and the world. Ants may build hills, but humans terraform the world.[6] Consciousness acting through human beings is the predominant force for better or worse on all life on the planet. Its development is more earthshaking than any other, including Darwinian evolution. In one possible future, humanity may evolve into something different, a transhuman and perhaps non-human species. Such a being will have a mind that is unknowable, beyond today's conception. This is because that it will stand beyond today's human.

Okay, let's face it; it's time to set down our prejudices, walk across the aisle, and shake hands.

Science and spirituality need to be brought together in practice. The theories and descriptions of the one must connect with and explain those of the other. Their phenomena must be related. Their tools and techniques must work together. There is no other future. Unfortunately, nobody even knows how to begin. Prayer and machine algorithms, incense and fMRI, meditation and brain-mind interfaces, the occult and optogenetics exist in two mutually-exclusive universes. The twains need to walk hand in hand, but they appear to walk right through each other, ghostly presences inhabiting different dimensions.

Science is rapidly moving into realms long thought to be the exclusive domain of the Romantic poet and the armchair psychoanalyst: dream, thought, awareness, meditation. Science is breaking down the barriers and letting light into rooms long locked with scriptural mantra and ecclesiastical legerdemain. The meeting of science and spirit is inevitable. Truth be told, they have been enmeshed in the mind for thousands of years, unbeknownst to all but the rare polymath. As soon as there were tools, they were used for spiritual practice as much as for tilling the earth or cooking food. Language, books, and the arts all use technology, understood in the wider sense, and the practice of spirituality has made these an essential part of its practice throughout history.[7]

The study of consciousness itself is fraught with disagreement—optimists expect a techno-rapture any day, pessimists deny that humanity will ever change. A vast muddled middle, go happily about their lives, unaware that the tsunami is racing for their cozy beach huts.

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[6] For an ecstatic meditation on this idea, see the short video by Jason Silva: http://vimeo.com/29958619.

[7] Many modern writers (e.g. Kevin Kelly, David Deutsch, W. Brian Arthur, William Powers, and David Nye) see a linked series of successive technological "revolutions" starting with language and progressing up to current information technology.

Spirituality has ignored science, assuming that growth can only occur through the innate tools of consciousness itself: concentration, prayer, meditation, visualization. Even if we set aside a protected corner in the temple of mind for them, the future will not be limited to purely interior practices. In a few short years, less than a generation, it will include the rapidly advancing techniques of neurology, brain-machine interfaces, nanotechnology, algorithms, implants. Wild branches of the scientific vine are pushing into the temple, cracking the comfortable walls that have stood for millennia, bringing a paradoxically organic growth spurt. The resultant symbiosis of spirit and science will be stranger than technologists or mystics have imagined.

"We are creating a blueprint together—a design for our collective future. The possibilities for… spiritual progress are tremendous" (Rushkoff, 2011, p.8). Spirituality is facing its most important challenge in history. Will we be able to detect and measure spiritual consciousness? Will an artificial entity supersede humanity? Will thought projection or telepathy become routine? Will human beings augment their mind/brain, producing radically new kinds of awareness? Will the spirit itself change?

Change is upon us. A new normal is chipping through its egg, and looking around in wonder. How will coming generations integrate this with their understanding of intelligence, consciousness, and the human being? What is needed is a synthesis of neurology, information science, artificial intelligence, and spirituality. I believe it will happen; it must happen. It will be unprecedented, extraordinary, beautiful, and frightening. New entities will walk into our dreams and visions, and our lives.

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