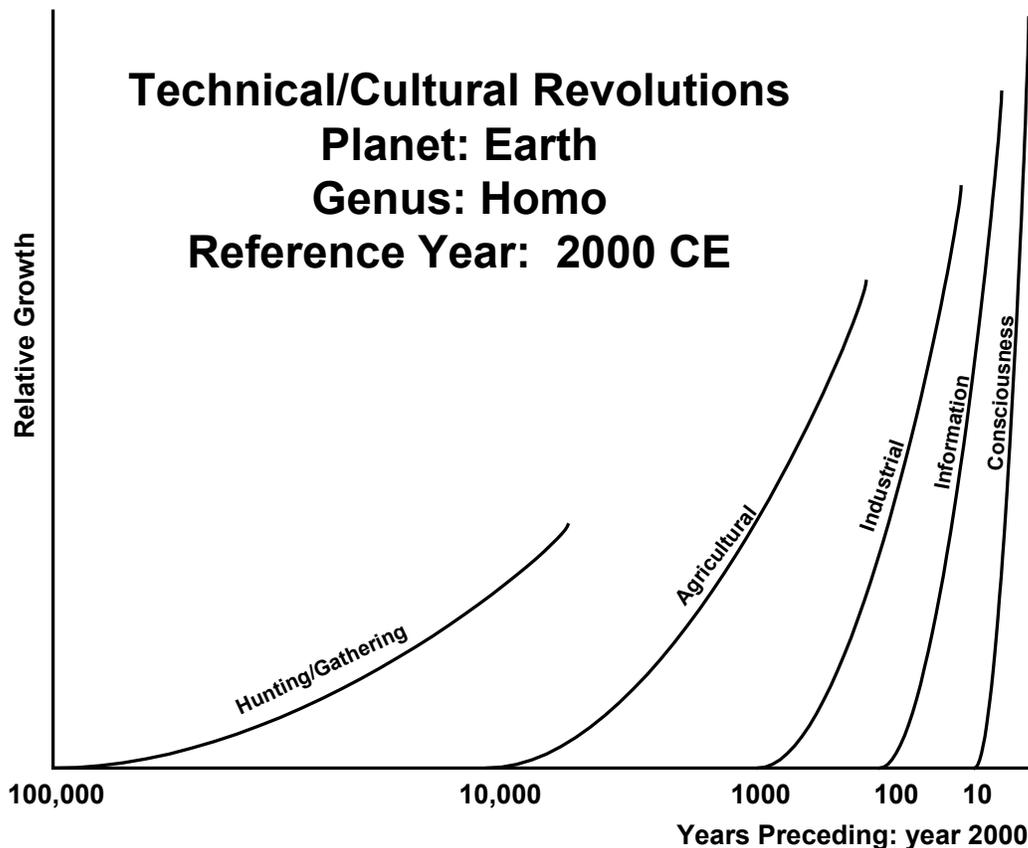


## Brain, Mind, and Neurofeedback: The next 100 years

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Where are we headed? What is the future of the human experience? How do the previous 10, 100, 1000, or 100,000 years relate to our ongoing journey? In particular, where do consciousness, the brain, the mind, and neurofeedback fit into the big picture?

In order to look forward, it is instructive to look back, and to view our work in the context of our historical and anthropological development. Suppose an anthropologist visits earth from another planet, and is assigned the task of making a brief summary of human technical and cultural development, up to the current time. Something like the following graph might result.



This graph roughly summarizes the major revolutions that define the human experience over the last 100,000 years, using “order of magnitude” estimates of times and growth. It shows the appearance and rising of successive revolutions and reveals a broad view of the past, as a guide to extrapolating into the future. Note that in successive revolutions, the “doubling time” has become shorter and shorter. Whereas the hunter/gatherer phase lasted on the order of 100,000 years, agriculture grew significantly in just a few thousand years. Industry grows on the order of 100’s of years, and information revolution is

characterized by growth in periods of only 10's of years. The consciousness revolution is changing every year, and is accelerating daily.

Approximately 100,000 years ago, humans were hunters and gatherers. Skills involved traveling, searching, trapping, killing, transporting, using simple weapons and tools, and so on. Basic teamwork became essential to survival. Successful hunters were hypervigilant, being occupied with both finding dinner, and making sure they did not become someone else's dinner. It was essential to constantly be on the lookout, finding game, chasing it down, and catching it. Those who survived in this environment had many of the qualities we now associate with "attention deficit disorder" and "hyperactivity." But these are useful skills, in the right context.

About 10,000 years ago, agriculture was discovered. People learned to stay in one place, watching the stars, clouds, moon, and weather. It was necessary to carefully study plants and their environment, recognize good things to eat, and recognize things that were not good to eat. It was necessary to cultivate, remove weeds, and know when planted foods were ready. Preparation of food by grinding, cooking, and preserving became important. The mind set associated with these activities were in strong contrast to the previous 90,000 years. This mind set now predominates in education. We are expected to sit still, study, concentrate, and be quite happy without stimulation, excitement, or adventure. If we are not happy with this, there are drugs we can take to stifle our need for novelty and exploration. We classify our more restless individuals as sick, disabled, and suffering from a disease.

So we are all hunter/farmers, making our way in a new world that we have created, and are continuously recreating. We have within us all of these qualities, and any given individual may adopt a hunter mentality, or a farmer mentality, at any given time. Our very genes contain the seeds of both of these modes, and we can express either of them whether we know it or not. We are flexible in this regard, though we may lack certain task-switching skills. It is an insult to ourselves to take those with a strong hunter inclination, and marginalize and medicate them. We are drugging our Alexanders, our Henry Fords, and our Thomas Edisons, into submission. Rather than "solving" this "problem," we should be teaching the flexibility and appropriateness needed for specific tasks, and inculcating an adaptive style that serves a broad base of needs, not just the classroom setting.

We see further that there was an industrial revolution characterized by wheels, machines, factories, and cities. Following that, an information revolution was brought about through communications, computers, and automation. Many of us have seen the information revolution firsthand. From room-sized computers that could barely handle a few thousand calculations per second, we now have powerful processors in our handheld personal computers, wireless telephones, televisions, and music players. Within 5 years, these appliances will merge into one. After that, something wearable or even implantable will appear, that plays directly into the ears and eyes of the user. We will be able to communicate, do business, be entertained, and study using an implanted device, that can respond to subtle muscle activity, subliminal vocalizations, brainwaves, or other signals.

So these hunter/farmers, who learned to make machines and then built themselves an information-based world, are now engaged in a self-created consciousness revolution. In the 1960's and 1970's it became common to question and look into the mental realm using a variety of techniques and agents; it became acceptable to look into new religions, belief systems, and other mentally focused pursuits. The U.S. Congress declared the 1990's the "Decade of the Brain", awakening interest in the brain. We have seen increased interest in meditation, spirituality, mental development, and similarly empowering pursuits. We see the widespread practice of reading, going to counselors or workshops, training classes and seminars, group processes, personal experiences (Outward Bound, survival experiences, religious retreats). An increasing number of people are aware of and accept the importance of "the inner", as being as important, or more important, than "the outer". We are seeing record amounts of psychoactive medications being used, as the chemical treatment of depression, anxiety, and attention problems alone represent a multi-billion dollar industry, motivated by some of the strongest advertising and lobbying forces in history.

So where are we headed? Where will today's brain science, individual and collective consciousness, and the roots of neurofeedback, lead us during this century? What is neurofeedback? In the broadest sense, it is a means to precisely navigate inner space. What the compass, sextant, and gyroscope did for navigation and exploration of the outer world, neurofeedback can do for the inner world. Imagine systematically exploring and discovering inner lands, worlds, and dimensions, that are now only fleetingly glimpsed, by a select few. That flash of insight that today characterizes the occasional mental breakthrough, can become something that is reached over and over, transforming individual and collective consciousness.

Let us look at some of the things we now take for granted, that would have been unthinkable only 100 years ago. Men have walked on the moon. It is routine to travel across the country, even around the world, in a single day. We have decoded the entire human genome. We know the mass of the electron to 13 decimal places. We can see and interpret events that happened 13 billion years ago. We can replace an entire human heart with a manmade device.

With this point of view, we can look forward 100 years, and envision things that are today unthinkable. Imagine that the study of consciousness enters the world of physics, and we have a true science built around the phenomena of mind. Imagine equations similar to Einstein's field equations, but which include consciousness as a physical field. It is likely that these fields will involve other dimensions, giving rise to a sound physical basis for "other-worldly" phenomena. We may come to look upon intention as a force, similar to physical forces. We may come to understand the physical phenomena that give rise to consciousness, and may even learn to create artificial consciousness. We will understand the physical underpinnings of subjective experience, an area that is entirely mysterious to us now. 100 years ago, no one had even heard of a radio or a computer. Today, even schoolchildren can be "computer wizards" who can run circles around their

parents in installing, using, even writing software. So what will the “brain wizards” of the future look like?

Imagine a scientific basis for direct mind-to-mind communication. Imagine that it is possible to systematically teach clairvoyance. Imagine that we learn how to train psychokinetic ability. Imagine that we learn to develop the mind with the same zeal and specificity with which we currently develop the body. Look at a professional body builder, and ask yourself what might happen if an individual could apply the same level of determination and knowledge to the development of the brain and mind. What would a 21<sup>st</sup> century brain-builder be like? Might psychokinesis someday become as systematic and well-understood as physical exercise is today?

Imagine a world in which the cellphone is an artifact of the past. Direct mental communication is possible, for those who want to develop this skill. Instead of going to the store to pick up a cellphone, you go to a neurofeedback trainer who specializes in providing this ability. There may be some physical aspects such as implants, chemical treatments, special dietary supplements, and so on. But the individual is trained to develop and employ an abilities that today lie latent in all of us.

Imagine a system in which you put on an EEG hat (or not), and the system immediately takes over from there. It scans your brainwaves, makes analyses and comparisons, figures out what you “need”, and proceeds to configure and control the training. The feedback is based upon a complex, adaptive analysis of your brain, and does whatever is needed to move you wherever you want to go. Training involves the entire head, with global or localized training being done automatically. No more separate QEEG’s, no waiting, no using separate protocols, no setting up the system, choosing settings, making changes. The system sees your response to the feedback, and adapts instantly. In a single short session you might experience 2, 3, or 100 different training protocols, depending on how you respond. The displays include virtual reality, whole head maps, tomographic analyses, and statistical results, all in a comprehensive and easy to understand format.

Imagine a world in which eating medicine for psychological problems is considered obsolete. Our great grandchildren will laugh when they say “Grandma told me people used to eat serotonin inhibitors to feel better”. In the future, people will be empowered to have mental health and stability, and it will no longer be necessary to tolerate side effects in order to deal with depression, anxiety, attention disorders, or other mental challenges.

Imagine a world in which a significant journey can be taken without physical transport, but by working with neurofeedback-guided transformation. You go into a full sensory immersion world, in which your internal state is reflected in your external world. You are free to explore, work, create, and relax in your personal reality. Feedback includes sound, sights, tactile sensations, even smells. The feedback can give rise to genuine out-of-body experiences, remote viewing, and direct mind-to-mind communication, that spring from the neurofeedback world as new dimensions in consciousness and

experience. Shared experiences are even possible, giving rise to entirely new ways of being with others, transforming relationships and entire social structures.

We can envision a future in which a brainwave elite emerges. These are the individuals who have the aptitude and interest to develop mental powers well beyond those we know today. They may be called “heads,” “brainmasters,” “electric gurus,” or “cybernauts,” in reference to the emphasis they put on the use and development of the brain and mind.

Not everyone will have the time, ability, or inclination to develop these skills.

Developing mental skills in this way is sure to become controversial. New political, social, legal, and medical issues will arise. Perhaps those who are not part of this elite will continue to be relegated to eating medications, experiencing mental strife, and pursuing “old fashioned” therapies to address their mental woes.

Imagine a world in which millions, perhaps billions, of brains, are in a state of continual connectedness. A new form of consciousness emerges, in which individual brains take on the role of individual neurons, in a global brain. The next major revolution may indeed be one of “hyperconsciousness” brought on by these changes. We may find ourselves exploring other dimensions through the power of the mind, thus circumventing the anticipated challenges of space travel, supplanting it with direct travel at the level of consciousness, not merely at the level of space, time, and matter.

Scientists believe that the sun will explode billions of years in the future, and that our entire solar system will be vaporized. How will humanity persist after this cataclysm? What will happen even further into the future, when the universe meets its fate, be it eventual expansion into a black void, or compression into a “big crunch”? Will consciousness itself have the ability to persist beyond the physical reality we cling to? It is possible that, through advanced development of the mind, we will find ourselves living in an entirely different realm, one that looks back on our entire 3-dimensional universe as a distant relic of the past, much as we now look back at the Olduvai Gorge and the Mesopotamian watershed as birthplaces of our earthbound experience.

We can now see that to consider neurofeedback solely as a means to relieve specific maladies, or to do a brain tune-up, is to ignore its true power and potential. In that view, the best that can be hoped is that some people suffer less from specific distresses, but that humanity becomes no different in the whole than it is today. To view neurofeedback strictly as a “fixer” is to say that our consciousness status quo is just fine, and all that we need to do is stamp out the aberrations. That would be like seeing the value of the automobile in running local errands, and saving a few minutes here and there. But in much the way the automobile gave rise to roads, suburbs, shipping and industry, thus transforming our world, neurofeedback will be no less a transforming agent. When neurofeedback reaches its full potential, the meaning of the human mind will have changed, and the most significant phase in human evolution will have taken place.

Hopefully, “The Decade of the Brain” will be looked upon in future years as a seed from which emerged brain mastery, consciousness exploration, and precise mental navigation. We will have learned to use that “90%” of the brain we are supposed to be ignoring, and

we will use it well. These developments will have lead to a global hyperconsciousness that will be a first step toward a true supercivilization. We will reach beyond the stars into other dimensions, and beyond. We are truly poised to change the universe – one brain at a time.