What Software Reveals
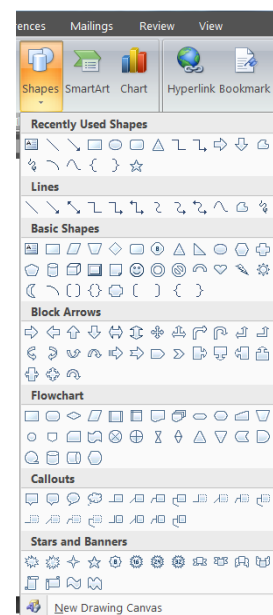## About Thinking, About Being Human

by Andrew Linnell

When I started in the computer field working for IBM in 1973, the only female employees were secretaries. Of the engineers, the vast majority were hardware engineers. My estimate is that about 25% were software engineers. Today, the industry numbers for engineers has more than flipped where software engineers greatly outnumber hardware. And, albeit still small, the percentage of women engineers steadily climbs. In the beginning, software was brute force, masculine. Some brilliant women, for example, Admiral Grace Hopper, brought programming languages with compilers to make this work a lot easier and, more importantly, to allow for software to make software engineering reusable. With COBOL and the many computer languages that followed, one could write a procedure that others could use. The concept of a software stack emerged with software that instructed the hardware at the bottom of the stack and layers upon layers of completed and optimized software up to the layer called the user interface. Standards groups formed so that not only the hardware but also the software of one company could be used by a different company that provided software at a different level of the stack. In addition, "communities" of companies and engineers would get together to develop "open source" software for portions of the stack. This went beyond standards that merely define the interfaces to actual working software contributed by community members for all to share. The operating system Linux is a great example of humans working not for their own financial benefit, but for the betterment of their community or industry, for the human end user.

Since 1973, there have been waves of hardware platforms on which these software stacks were built. Starting about 2010, the third wave began. While the first wave reached thousands of users connected to a mainframe, and the second wave reached millions of users connected to a networked data center, the third wave intends to reach billions of users connected "the cloud". A cloud provider has taken the business risk to build multiple, very large, connected data centers. The hardware within them is constructed to scale out massively to support such large number of users. The software stack is changing to meet this goal. No longer can software assume that the user has a PC or laptop within which there is a hard disk drive. Users of the cloud want to access applications running in the cloud from their mobile devices be it an iPad, an iPhone, an Android, Google Glasses, or even the clothing you are wearing that will have embedded computers. Someday, there will be the urge to implant an internet capable device into a baby soon after birth just as we've circumcised boy babies for centuries.

What is Software?

From a spiritual science perspective, thinking is a spiritual activity. When one attempts to write software, they first think about the flow. In the early days of computing, a flow chart was built before the first line of code was written. One can still find the legacy of flow charts and their symbols in Microsoft Word and

PowerPoint.

Each step in a flow chart comes from a realization of the thought steps one had in designing the intended functionality. Today flow charts have mostly disappeared in favor of Product Requirement Documents and Functional Specifications. But the process from thinking to sequential thoughts to a flow chart or functional spec is a continued process of dying. Analytic thoughts take apart the whole. What if our thinking could go in the "opposite direction;" that is, from death to life? Could this be what is meant in John's Gospel? "Life is the light of men. And the light shines in the darkness (within our soul) and the darkness has not comprehended it."

A thinking process that tries to grasp a greater whole, comes towards the Logos through Life. It is a living thinking. Rudolf Steiner's research showed that we exist before birth and in this state our thinking is alive. When we are born, our thinking, in comparison, dies. The physical body is like a tomb for our thinking. Initiates today are able to raise their consciousness so that they experience their own living thinking. For a healthy humanity, I suppose these two processes of thinking, analytic and holistic, should be in balance. The dying thinking should be balanced by the living thinking. That is, as much as we delve into software development, so should humanity as a whole be rising, in balance, into higher consciousness, into living thinking. Has software emancipated the human from being submerged into an ocean of dead thoughts? It has sped up our emancipation from Nature, overcoming barriers such as distance.

Does a computer think?

There should be no question that a computer, even a cloud of computers, does not think. It can, however, imitate thinking to the point that it could fool a person into believing it was having a conversation with a human. Passing such a test is known as the Turing Test.[i] But the computer is working only with dead artifacts of prior thoughts. What gives the impression of thinking is that the software can be an image of what once was real thinking. In fact, the realm of software can be seen as a mirror image of the so-called Etheric realm, the realm of formative forces, of life. Initiates have often used the term "ocean" to describe this realm.

British scientist and Anthroposophist, Nick Thomas, claims in his booklet *The Battle for the Etheric Realm*[ii] is indeed underway and most of the world is comfortably sleeping through it. As early as 1907, Nick notes, Rudolf Steiner had predicted this battle would come in our time. Nick sees an increasing inflexibility of the Etheric body. He points to the symptoms such as our habit of stereotyping, our lazy thinking where we allow others, especially the media, to think for us, the use of meaningless phrases, and the one-sided approaches taken by politicians, religious fanatics, and even by medical practitioners and scientists. Nick sees the causes in (1) stopping short of truth and being satisfied with a model and (2) aligning our lives with mechanical repetition rather than a living rhythm. Most of science today requires the creation of models to explain the proposed theory. The model should work for all known data and also be able to predict new data. Nick states that the physical plane, such as our environment, is where the problems from (1) and (2) will manifest to awaken us. Thus, he claims, faithfulness to truth is the antidote to materialism's attack on the Etheric.

There are so many untruths that I would like to explore herein but, alas, there is room for only one! Let's examine the belief that one can reverse engineer the brain so that one can build a thinking machine that functions as if it were a human, in fact, a superior human. Equally important, Spiritual Scientists must get over any antipathy or fear of this future direction. In fact, we need to warmly embrace it with interest so that the world will embrace Spiritual Science with interest.

The Man-Machine Future

But how can Spiritual Scientists embrace Ray Kurweil's concepts such as "Most of the intelligence of our civilization will ultimately be nonbiological, which by the end of this century will be trillions of trillions of times more powerful than human intelligence"? Or Francis Crick, a Nobel Prize winner, who writes in his book *The Astonishing Hypothesis: The Scientific Search for the Soul* (1994), "[Our] joys and sorrows, memories, ambitions, sense of personal identity and free will [are] nothing more than the behavior of a vast assembly of nerve cells and their associated molecules"? Or when Marvin Minsky, MIT, scoffs at the spiritual with statements such as "Many thinkers firmly maintain that machines will never have thoughts like ours, because no matter how we build them, they'll always lack some vital ingredient. They call this essence by various names--like sentience, consciousness, spirit, or soul. Philosophers write entire books to prove that, because of this deficiency, machines can never feel or understand the sorts of things that people do. However, every proof in each of those books is flawed by assuming, in one way or another, the thing that it purports to prove--the existence of some magical spark that has no detectable properties. I have no patience with such arguments. We should not be searching for any single missing part."

Spiritual Science traditionally has tried to counter such materialistic concepts with its own concepts of what constitutes the Human, namely not only the Physical but also the Etheric, the Astral, the Ego, and even higher members in the future. So far this has done little to sway Science to expand beyond materialism. More and more Spiritual Scientists must take interest in these fields, enter them as their vocation, and weave into them the graspable knowledge of the Etheric.

Materialism and arrogance leads to such claims of Nanotechnology that it will "rebuild the physical world, our bodies, and our brains, molecular fragment by molecular fragment and potentially atom by atom"[iii] because the existing world is flawed and we can make it more perfect. A future is envisioned by nanotechnology scientists where we will be able to expand our minds through the merger of biological and nonbiological intelligence. Through the use of nanobots, scientists claim we will be able to re-engineer our natural interneuronal links to add connections to computers implanted within our bodies. Several companies[iv] are already claiming to show how paraplegics with simple implants can, using brain waves and eyebrows, control external robots to accomplish basic housework and eating. Once, and if, this has been established, will there be a desire to combine healthy humans with machines?

Eventually, these scientists expect, our brain will be able to directly access the cloud thereby enabling one to solve instantly very complicated calculations. The brain at birth will be outfitted with a bio-compatible chip linking to a world-wide wireless network. This future internet will allow all individuals to become part of one global wireless internet composed of biological and non-biological brains. Compare this thought to St. Paul's expression that we are all part of the spiritual body of Christ[v].

Apocalypse?

Many people on a spiritual path hope that the good gods will swoop down and wipe out all the evil doers so that we can all live peaceful, prosperous, and comfortable lives that will be the same tomorrow as they are today. Such a view differs little from those of Bible fundamentalists who see a time coming when Jesus will swoop down, riding on a cloud [probably not an Ethernet-based cloud], to establish his kingdom here on the earth after smiting all his enemies. Life will be good afterwards; all we need will be provided for us (our sports teams will always win). It is our egoism that envisions that we are good and that the evil is "out there" so that we will be part of the chosen ones for the rewarding good life to follow. It would be a great evil that could make everyone's current life eternally prosperous and easy.

Humanity has a long way to go to become part of the Heavens as its 10th Hierarchy. But already, whether we're ready or not, we have commenced on being co-creators with the rest of the hierarchies. I suspect that we are in "creation kindergarten" and we will be somewhat protected from completely ruining the playroom. Just as higher beings used their living thinking to co-create the world we live in, so shall we humans eventually co-create the next planetary condition that is called the Jupiter Planetary Condition by Spiritual Science. Science and Spiritual Science agree that there were earlier planetary conditions; they even agree that there were likely three prior ones.

Just as the angels, while they were at their Human Stage on the prior Planetary Condition, had to deal with us pestering their lives, so will we have to deal with those who will be Humans on the next Planetary Condition. Normally today, we treat pests with Round-Up. In the near future, we need to find another way – a way filled with the Christ Impulse that will lead us to love them so much that we will want to build a new cosmos for them wherein they will discover our love for them just as today we discover in the cosmos the Wisdom that the Gods wished to share with us. Our human mission on Earth is to develop love, agape love, to the point where we will be able to weave it into the next created planetary condition. The stage for those who will be human on Jupiter will not be our physical world; rather it will be what Spiritual Science calls Sub-Nature, a realm of electricity, magnetism, and nuclear forces that correspond respectively to the formative etheric forces of light, chemical, and life.

Who are these Jupiter-Humans? Where do we find them today, if at all? We find them being thrust up from regions below us into our unconscious will. They say to us "go ahead, watch that mindless TV show – you deserve the time off because you worked so hard today!" Of course the standard for hard work diminishes year by year. Evidence of the influence of these Jupiter-Humans within our will can already be seen in the rise of the new addiction, computer gaming. I've seen several individuals lose their direction in life through this addiction that saps the will resulting in ruined careers, broken marriages, and insurmountable health problems. This addiction is most evident in South Korea where it is estimated 35% of the population are gaming addicts. One couple's addiction led to neglect and death of their three month old daughter.[vi] Gamers camped out at Internet cafes for hours or days or even months typically live on instant cup noodles and cigarettes, barely sleeping and seldom washing.

And of course you deserve a sweet snack while you're watching TV or playing games. Soon this becomes habit. Now the etheric body is imprinted. We could inquire about the etheric quality of the snack food. In most cases we would find that such food is dead food. It will become, in the far, far future a task for humanity to learn how to turn stones into bread; that is, to be able to nourish the body(s) through the mineral kingdom. But in our time, along with dead thinking, dead food weakens the etheric body. Meant to mediate between one's soul-spirit and one's physical body, the etheric body needs to be flexible and full of life.

What should I do?

To balance our analytic thinking, we need this living thinking. We need for our hearts to participate in thinking. Many may feel that in order to develop heart-thinking, they must withdraw from technology and from those who use it. Perhaps some withdrawal is needed to get started, but the challenge of our times is there to build strong living thinking. We must take interest in all human endeavors and to offer one's spiritual treasures towards the fulfillment of human destiny. When love shines into the etheric realm, then its reflection, like the moon's wisdom arising from its reflection of the sun, will reveal wonders of an etheric technology.

Whereas angels once assisted humans, now we turn to machines. Where the divine world once worked creatively, now we feel our budding ability to create new life. Especially within the scientific fields of genetics, nanotechnology, and robotics do we feel that we are becoming gods.

One of the most prolific writers and influential scientist of the Man-Machine relationship is Ray Kurzweil. His books have included *The Age of Spiritual Machines (1999), Fantastic Voyage: Live Long Enough to Live Forever (2004),* and *The Singularity is Near: When Humans Transcend Biology (Viking, 2005).* In pointing to and defining the Singularity, Ray has created a materialistic vision of the future that challenges Anthroposophy to its core. Much of his thoughts are summed up in his article *Reinventing Humanity: The Future of Man-Machine Intelligence*[vii] where he states,

> "The Singularity[viii] is a future period during which the pace of technological change will be so fast and far-reaching that human existence on this planet will be irreversibly altered. We will combine our brain power–the knowledge, skills, and personality quirks that make us human–with our computer power in order to think, reason, communicate, and create in ways we can scarcely even contemplate today. This merger of man and machine, coupled with the sudden explosion in machine intelligence and rapid innovation in gene research and nanotechnology, will result in a world where there is no distinction between the biological and the mechanical, or between physical and virtual reality. These technological revolutions will allow us to transcend our frail bodies with all their limitations. Illness, as we know it, will be eradicated. Through the use of nanotechnology, we will be able to manufacture almost any physical product upon demand, world hunger and poverty will be solved, and pollution will vanish. Human existence will undergo a quantum leap in evolution. We will be able to live as long as we choose. The coming into being of such a world is, in essence, the Singularity."

Throughout the 1980s and 1990s, Marvin Minsky of MIT entertained visitors to the MIT Multi-Media Lab with his claim that one day the Carbon-Humans (us) will succumb to our frail existence but, by then, our

offspring, the Silicon-Humans, will carry on with humanity's highest ideals programmed into them. Minsky epitomizes the prevailing materialistic concept of what comprises the Human with statements such as

> "The more we learn about our brains, the more ways we will find to improve them. Each brain has hundreds of specialized regions. We know only a little about what each one does -- but as soon as we find out how any one part works, researchers will try to devise ways to extend that organ's capacity. They will also conceive of entirely new abilities that biology has never provided. As these inventions accumulate, we'll try to connect them to our brains -- perhaps through millions of microscopic electrodes inserted into the great nerve-bundle called the corpus callosum, the largest data-bus in the brain. With further advances, no part of the brain will be out of bounds for attaching new accessories. In the end, we will find ways to replace every part of the body and brain--and thus repair all the defects and flaws that make our lives so brief. Needless to say, in doing so, we'll be making ourselves into machines."[ix]

While the hardware of computing has physical substance, software, like the etheric, is invisible. Software enables us to imprint thoughts into Sub-Nature just as we imprint the memory of our life into our etheric body. How will this software evolve? More and more, it will work "intuitively" for the human; that is, to operate the software, one will no longer be dragged down into fixed formats. Applications such as Dragon[x] already "grasp" human speech. These applications will be "outfitted" with "personalities" that we will come to sense as more than a machine, perhaps even as a friend or as a split part of our own personality. Will it free us or drag us down?

While the ancient world spoke of the Wisdom of the Gods, today's scientists envision the Power of the Intellect will lead Humanity to an existence no longer dependent upon what Nature and the Earth provide. But Spiritual Science foresees Humanity's future co-creative role as one where we serve the Jupiter-Human similarly to how the angels have served us. Where we discovered wisdom in our world, the Jupiter-Human will discover love in their world. Yes, we are becoming sons of God. We are now babes learning – babes who will one day, in the far future, emerge as "adults" able to co-create a new cosmos for what will be our beloved Jupiter-Humans.

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[i] Alan Turing paper *Computing Machinery and Intelligence*, Mind, 1950

[ii] *The Battle for the Etheric*, Nick Thomas, Temple Lodge Press, 2006

[iii] The Futurist, March-April 2006, www.wfs.org, pg. 42

[iv] http://www.cyberkineticsinc.com/

[v] I Corinthians 12:12-27, a passage ending with "Now ye are the body of Christ" where it states each human is a member of one body just as an ear and an eye though different are members of one body

[vi] http://www.buzzbox.com/news/2010-03-06/South_Korea:Death/

[vii] The Futurist, March-April 2006, www.wfs.org, pg. 39

[viii] Ray Kurzweil, pre-eminent scientist and inventor, is recipient of the 1999 National Medal of Technology and was inducted into the National Inventors Hall of Fame. His name is known to many because of his music and voice synthesizers.

[ix] *Will Robots Inherit the Earth?* Marvin Minsky, Scientific American, October 1994

[x] Dragon Naturally Speaking from www.Nuance.com