An idea for a film script after "Eames's Powers of Ten", October 2007

A kaleidoscope of images from diverse arts, sciences and cultures swarms about and then coalesces to assemble into a composite image of the Earth from near space (as in the opening graphics of The Parkinson Show).

Narrator: A spate of recent publications has heralded the conclusion of our quest to understand the world and our place within it. Most have managed to bring very specialized research within the grasp of laymen. This has given a perspective in which the pieces of the puzzle can be seen all at once and without prejudice. What remains is to put them together.

The image of the Earth then retreats as the camera zooms out though all of space until it reaches the edge of the known universe (as in Silleck's Cosmic Voyage or Eames' Powers of Ten). The camera (impossibly) has instantaneous vision of everything, however distant, and so as the outward zoom continues, we retreat outside of our known universe. Continuing our retreat, we then see our universe both known and unknown as a discrete entity. Next we see any other discrete conglomerations that may exist, until finally all existence retreats to a speck and fades to black.

Narrator: We first travel far outside our own universe, indeed far outside the province of all existing universes, to a place where there is no matter, no space and no time. Yet there is mind, indeed your mind having now taken this journey in your imagination. However, we cannot take our bodies with us to this place, so it is mind without a body.

A human body (like da Vinci's Vitruvian Man) is shown against the black background. The body dissolves away, starting from the extremities and moving in until just the head remains. The exterior parts of the head dissolve away, revealing just the brain, which then becomes enclosed in a vat of transparent liquid with rising bubbles. The brain is pierced all over with electrodes that are attached to coiled wires, and so on. Then the image of a 'brain in a vat' itself dissolves away, leaving behind just some of the bubbles, which rise to become a cartoon chain thought bubble above the place from where the vat has disappeared. (This last sequence is to emphasise that the brain is just as much a part of the mind's embodiment as is the rest of the body).

Narrator: To approach the notion of mind without a body, sit still in a quiet place and close your eyes. Further sensory deprivation can be achieved in an isolation tank. Yet even with the immediate senses numbed, the conscious mind can continue to draw on memories of the world it has perceived in the past. With a bit of practise, it is possible to block these memories as well, so that your mind takes on a similar disposition to a mind without matter.

The thought bubble expands out beyond the field of view, and circular spots of pure white appear against the black background. The white spots expand and contract at different rates, appear and then disappear, at times slewing into each other to resemble the symbols of yin and yang, until the screen becomes evenly divided between black and white. Small '1' characters coloured black begin to fill in the white areas as if being typed in rapid succession, while identical sized '0' characters coloured white begin to fill the black spaces in the same way. The black and white spots then morph to a cycling full colour exploration into many layers of a Mandelbrot set, which fills out the field of view. Euler's identity (e to the power of pi times iota, plus one, equals zero, invariably voted the most beautiful of all formulae, and featuring a prominent '0' and '1') emerges in white from the centre of the screen and zooms into prominence.

Narrator: What can mind think about if it does not have a world, or any memory of a world? If it is possible for it to conceive of something - anything - then it has access to an opposite to nothing, and it can represent a binary. It will then be able to conceive of number, which opens up the world of mathematics, and mind has a bright future ahead of it.

The screen fades to black. Various objects of classic design (such as Arne Jacobsen 'AJ' Cutlery, 1958, the E-Type Jaguar, 1961, Hepburn and Givenchy in Charade, 1963 etc.) appear for a moment and then fade, followed by the next classic design object. One of the first objects to be displayed is then shown once again to correspond with the text from the narration which reads 'thought about'. Then a sequence is shown of a potter's hands at the wheel, forming clay into a vessel. The screen again fades to black.

Narrator: Often the first creative step is to imagine some sort of potential reality. However, the thing being imagined has an existence only when mind is thinking about it. When the mind wanders off elsewhere, the thing once imagined no longer exists until the next time it is thought about. In the material world, we can relieve the mind from having to continually keep things in its imagination, simply by turning those things into objective realities. We take a lump of clay, and fashion it into the object we have in mind. Then we no longer need to describe it to our duly astonished neighbours, for it has taken on an independent existence. Our mind without matter, however, has no such luxury.

A modern laptop computer with a high definition screen is shown resting on an expanse of lawn beneath an apple tree. As the camera approaches the screen, a green apple falls just clear of the laptop, and rolls off to one side. Once the laptop screen has come to fill the shot, it shows that it is running a modern operating system (for example, XP or Ubuntu). The operating system (OS) desktop is displayed and no other applications. A virtual machine (VM) application (for example Virtual PC or VMWare Workstation) then launches, preset to occupy approximately 70% of the screen after initialization. On starting, the virtual machine clearly displays the Power-On Self-Test (POST) sequence which is characteristic of a real computer. It then proceeds to load the same operating system as the host. This OS in turn is set to automatically open to a desktop after loading (no logon required), and then launch yet another imbedded VM which is again preset to occupy about 70% of the screen, and then begin its POST sequence.

Narrator: To understand how mind goes about producing an objective world in which it can live, we need to look at developments in that paragon of technological progress, the computer. When the concept of the computer was first presented, it was recognised that a general purpose computer would in principle be able to replicate the operation of any specific computer, including itself. These virtual computers have now become an everyday reality. A computer is comprised of a physical machine, the hardware, and the programmes which are enacted by that machine, the software. Software is ultimately just an abstract sequence of binary digits, and when computer hardware is itself enacted purely through software, it too becomes a mere abstraction.

This iterative sequence repeats continuously, but the laptop itself (and the parkland) fades, leaving just the laptop screen, without any frame. Within this frame, the entire image is continually zooming in, so that at most only three levels of host and hosted 'machines' are shown at any one time. This single central screen then separates into two smaller but otherwise identical screens shown side by side, with each screen continuing to repeat the zooming iteration of the virtual machine 'frames'. These two new screens have each emerged, the first from one frame of the original screen, the second from the next frame of the original screen. They enlarge to eclipse the original screen, which disappears behind them. Two fluid and broad stemmed arrows are drawn, each emerging from behind each of the screens, and moving out and across to, and then pointing into the front of the other screen. These two screens then fade out, and are replaced by an image that fades in, with the same relative size, of M.C. Escher's woodcut 'Drawing Hands' (which shows a piece of paper from which have emerged two hands, each drawing the other one into apparent reality).

Narrator: Because it is merely a logical construction, software on its own is not subject to friction and heat, and so one virtual machine is quite capable of hosting another identical virtual machine, which can then in turn host the original virtual machine. Together they prop the other one up, holding each other in existence.

The 'drawing hands' begin to rotate in the direction their fingers are pointing, and they morph into two pieces of string, which are seen to be strings of binary digits (the actual digits used are a typical definition for a minimal Universal Turing Machine, each about 20 digits long). Each piece of string follows the other, with a small gap between them, as they move, wave-like, in an inverting figure of eight (Möbius) path. Lines of binary digits then intermittently break out of the gaps between this pair, leaving the original pair intact, but separating completely to become a new pair. These new cycling pairs in turn also reproduce. The reproduction proliferates, and the screen fills with 'particles' (string pairs) made of '0's and '1's. This community then shrinks to a speck, and this speck becomes the starting point for a rapid animation of a biological colony growing to fill a bounded circle of nutrient. This circle then also shrinks to a speck, and this speck becomes the starting point for a familiar, rapid animation of the inflationary birth of the Universe.

Narrator: Of course, complex computers are not at the basis of physical reality, just very simple programmes which are present as one dimensional strings of binary digits. These strings can not only be coded to support the existence of each other, but also to reproduce themselves, building material from an infinite resource of abstract numbers. So when mind first thinks up these machines and sets them in motion, there is an almighty bang, when nothingness becomes suddenly populated with protons.

The universe fades, and is replaced by a large tangled ball of vibrating binary digits that shrinks down to become a solid grey sphere. The sphere is labelled with a 'plus' symbol, and represents a proton, as the presentation now reverts to a model that is more familiar to a general audience. In keeping with this model, the proton is being orbited by a much smaller electron, taking a stereotypical hypotrochoidal trajectory (like a 'spirograph' pattern). The atom is shown proceeding slowly across the screen through emptiness. The path of the atom stops suddenly near the centre of the screen, and remains motionless. At the same instant that the atom stops, the electron disappears. A photon of light, shown as a 'burst' of alternating electric and magnetic fields, each pushing the other along, emerges from the space in between the proton and the place where the electron once was. The photon proceeds away into emptiness. The electron then reappears in an orbit which is now closer to the proton, and at that same instant, the atom recommences its original trajectory. Other hydrogen atoms begin to traverse the image from different directions and at different speeds, each emitting photons in random directions by the same sequence of events. In every case, the atoms stop whenever they eject a photon, and then resume their trajectories at their original pace. In every case, the speed of the ejected photons is always the same (and shown to be the same on screen), despite what may have been the propagation speed of the emitting atom.

Narrator: The physical universe exudes phenomena which make sense. Whenever we measure the speed of light, it is always the same, because every source of light stops moving during the instant when the light departs from it.

The sun is shown with gravity 'particles' (gravitons, the postulated mediators of the gravitational force) departing from it in all directions and out into space. The particles have small arrows coming out from them and pointing in the direction of their movement. The camera zooms up to an area of about 10 degrees of arc near the surface of the sun. From there, the camera zooms into and then fixes upon and follows the path of a selected group of particles coming from this region. As their journey proceeds, the density of this stream of particles gradually decreases, according to an inverse square. However, the lengths of the arrows remain the same. The camera zooms out, and the stream of particles is shown travelling through a sparse 'sea' of background gravity particles (which have come from other objects in other parts of the Universe). The particles which were neighbours to this stream when they left the sun are not shown, for clarity. The background particles are shown with arrows pointing in random directions. The stream then approaches another star. This star is also shown emitting gravity particles as was the sun, decreasing in density with distance from the star, according to an inverse square. The path of the particle stream which is being followed intersects with the particles from the star being encountered, and the two predominant directions for gravity at this location are shown against the faint background 'sea' of omni-directional particles. The camera zooms out to display the entire galaxy, and it too is shown emitting gravity particles in every direction out into space, but in a pattern and intensity commensurate with the shape and density of the galaxy. The camera again zooms out to a view from outside the universe.

Narrator: The universe is held together by gravity. This force of attraction travels in straight lines from one mass to another. However, the attraction is not exchanged instantaneously, because gravity travels at a finite speed, the speed of light. Thus the gravitational influence of one moving mass on another moving mass is in continual flux, for their relative positions will have changed by the time their gravitational influences reach to the places where the other once was. Taken together, these complex and dynamic interactions resemble curvature, and there is a mathematical instrument which elegantly describes them as space-time. However, this phenomenon of gravity should not be confused with space and time, which are fundamental dimensions of reality. The universe is bound by gravity, and so it has a finite volume. However, there is no limit to the extent of the space beyond the universe, because there is nothing there to be measured.

In the view of empty space, a small spherical object is shown moving across the screen. An imaginary graduated measuring tape is superimposed on the object's path, showing the distance travelled by the object relative to its last observed position. The scale on the tape changes randomly from graduations of just one 'unit of length' to ten, a hundred, a thousand 'units of length' and various scales in between. Finally, the object is again shown inflating out to fill space. The object that was moving through nothingness was in fact the nascent universe.

Narrator: If you have an object moving in nothingness, it is meaningless to ask how fast it is moving, because there is nothing against which to measure its speed. Light has a native speed relative to its source, but there is no speed limit in nothingness. Indeed, when the universe was first invented, it burst out into nothingness considerably faster than light, and so the light which was released has remained within it.

We zoom in to a view of the Earth from near space, and we are shown an evolutionary sequence taking in the last five thousand million years. The exposition, which expands to fill the screen, gains speed exponentially as it passes through the emergence of life, mass extinction, the emergence of man, and the 20th century.

Narrator: From the simple distinction between nothing and something, mind has thought up a vast material world in which to dwell, the sheer wonder of which is obvious to everyone. Having begun as an entity which knows everything, but was without form, mind has distributed itself throughout all sentient life, and between us, we have approached knowledge of everything. From the lowliest to the mightiest, we all share the same mind.

An outline map of Europe and the UK without political boundaries is shown obliquely from space, and people are shown walking about on the surface. The size of the people is such that perhaps ten people would fill the area of France. The chains of a cartoon chain thought bubble rise and fall from each of the people to join a single large thought bubble, which is shown above all of them in the space above the earth. One of the people in the UK grows in size and eclipses the other figures on the island. This figure changes from a generic to a specific appearance, and is shown to be Newton. The same thing happens over the continent, centred on Germany, and the emergent figure is shown to be Leibnitz. Only two chains of cartoon chain thought bubbles are now shown, one between Newton and the single large thought bubble, and the other between Leibnitz and the thought bubble. The symbols which make up the Fundamental theorem of calculus fill out the thought bubble. The symbols are then shown simultaneously moving down through the chains and into the heads of Leibniz and Newton. The same symbols are then shown emerging simultaneously from the mouths of Newton and Leibnitz within speech balloons, each directed towards the other.

Narrator: Mind has directed the enlightenment of humanity by selectively imparting knowledge and insight amongst all of its incarnations. Anyone with a mind knows what mind is like, and how personal it is. What makes our mind seem so personal is the free will we exercise over and above our mind's direction. Our mind cannot force, it can only suggest, and it is our will that decides how we then act on its suggestions. It is however very common for individuals to believe that what comes into their heads is from themselves, rather than a source beyond themselves.

The Earth is shown increasing in temperature, changing from blue and green to red and orange and finally becoming engulfed in flames. A fire fighter is shown floating in space with the stream of water from the fire hose trained on the planet.

Narrator: We have come to a fork in the road. We can if we like choose to maintain our conflict with Nature, and melt down the planet. A millennium, one thousand years, is a long time, but at the rate we're going, it could all be over in a lot less time than that. If we chose instead to manage the planet intelligently, we could live here in theory for perhaps another two million millennia. To encourage us to take the long road, mind is offering us an incentive to sue for peace.

The camera zooms in towards the Earth, finally reaching the laptop, shown as it was earlier beneath an apple tree. We pass through the screen of the laptop, and enter into a simulated world (like Job entering into virtual reality in The Lawnmower Man). This virtual world is clearly identifiable as a simulation, and looks similar to 'Second Life'. The visual definition (clarity, sharpness) of this virtual world gradually increases to a degree where it cannot be distinguished from the real world. A naked man and woman are shown side by side, changing through time lapse from the age of about thirty forward into old age and near death, similar to the sequence with Connery and Rampling in the concluding sequence of Zardoz. As they reach near to death, the sequence reverses in direction and the transformation of the couple proceeds backwards through their adulthood to childhood and infancy, whereupon the sequence changes direction, and again proceeds forward. After several cycles, the sequence pauses at about age thirty, and the couple changes from a lifelike appearance, into a stylized and idealized outline like the illustration of the couple engraved on the plaque attached to the Voyager spacecraft.

Narrator: In thinking up the universe, mind has in effect programmed the universe. The universe behaves the way it does not because it has to behave that way, but because that is the way it was programmed to behave. Included within that programming is hidden code, which when the time comes, is set to change the overall behaviour of the universe.

Narrator: Quite anything is possible, but the key incentive on offer is a reconfiguration, leading to the indefinite extension of everyone's lease on life. These modifications to the programme can be made in an instant. Once the changes have been made, we can then all think about living happily ever after, and begin to develop our one hundred, one thousand, and one million year plans. After the first million years, we should then have a clearer picture about what we want to do for the several thousand remaining million years.

Narrator: In the world as we know it, an individual's material wealth is bound by the limits imposed on their lifespan. When those limits are lifted, the limits to the material wealth of the individual are also lifted. The only gain worth seeking will be spiritual.

The rotating Earth, still enflamed and reddened, is shown slowing to a halt from the opposing force of the fire fighter's hose. It then begins to rotate backwards, and to regain its blue and green tinge.

Narrator: In progressing to this point, we have come to understand the practices which are sustainable, and those which are not. In the process of restoring the Earth to a pristine condition, we will be returning to the past, a place from which we will then proceed in a new and sustainable direction. In this sense, the mistakes which have led to the present will be seen as events from the future affecting the past.

The camera shows the Clock of the Long Now (foundation) running at high speed. Then a combination of Google Earth and Sketchup routines runs through a sequence of reality modelling. It is the real world that is being modelled rather than some imaginary world in Second Life.

Narrator: The first step in tidying up our home will be to catalogue the world, and from there to model the world. The first catalogue would be a census of all those people with an interest in remaining. By sequencing each individual's genetic code, we can then construct a precise family tree, so that each one of us can trace at will our exact blood relationship to each and everyone else. We then need to create a three dimensional virtual model of the planet, showing the natural and built environment down to the last integral component, such as a brick in a building, or a tree in a forest. Finally, we catalogue every discrete object of worth contained within that environment.

Narrator: We first hand over title of the entire system to the mind who first thought it up. Each individual incarnation of that mind's will is then given a shareholding in the system. Each human is given one human class share, no more, no less. The other primates are each given a single shareholding of their particular calibre, and so on down through all fauna and flora. The system exists to produce the goods, and deliver the services, that are required by the shareholders in their pursuit of spiritual wealth. It is the shareholders themselves who in turn produce those goods and deliver those services. Any pursuit is valid if it is eternally sustainable, and does not come at the expense of any other shareholder. Lamb remains on the menu so long as sheep can graze happily, and neither they nor their colleagues ever know what is about to hit them.

The planet is shown exploding as if it has been destroyed by Vogons to make way for a hyperspace bypass.