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Dynamics and Singularities in the Knowledge Universe

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Annex 2 of *Towards an Astrophysics of the Knowledge Universe: from astronautics to noonautics?*

Dynamics: Periodic processes

The knowledge universe may be experienced as static (unchanging, discussed above) or dynamic (changing, even evolving), or as a mixture of both. From any particular perspective, change may be perceived to occur within the knowledge universe, especially after a more or less extended period of observation. Certain changes may typically only be detectable if the period of observation is a significant proportion of the period over which they occur.

- **Solar orbits**: With respect to a source of excitement, giving rise to heat and light, in my immediate knowledge space, the following orbits may be distinguished:
    - **Binary orbit**: It is possible that the source in question takes a binary form, typical of disciplines or religions with opposing schools of thought that are in constant dynamic relation to each other. This is exemplified by such cases as: intuitive and formalist mathematics, Shia and Shiite branches of Islam, Jungian and Freudian branches of psychoanalysis ***
    - **"Mine"**: Typically an observer in knowledge space occupies a particular position which effectively orbits around the focus of that discipline, exemplified by its elites or its "star" figure. However it is readily assumed that "my" position is static and central, and that any "stellar" concept "rises" and "sets" in relation to "my" position. *** stars / celebrities
    - **Planetary orbits**: In addition to the school of thought with which the observer is associated, other schools of thought may each orbit around the central source of inspiration of that knowledge/belief system. Such orbits are notably distinguished by their distance from the central star, by their mass and by the period of their orbit. Some may be extremely difficult to detect, especially since their visibility is dependent on the light they reflect from their central source of inspiration. Others may be indistinguishable, at first sight, from far more distant stars.
- **Lunar orbits:** Tertiary conceptual objects may also exist in orbital motion and their difference may, at first sight, be difficult to distinguish from entiies that are a direct source of heat and light:
    - **"My" moon(s)**: These are the conceptual objects that orbit around the position of an observer -- and that may well be significantly illuminated by the central "stellar" object. They may appear to be of equal or greater size and may well exert gravitational effects on that position
    - **"My" lunar orbit**: The position of an observer may orbit around a secondary (planetary) source rather than around the central (stellar) source of that system of knowledge. It would then be illuminated by light from both the central source and from the planetary source
    - **Planetary lunar orbits**: Other conceptual objects in "planetary" orbit around "my sun" may also have tertiary objects in orbit around them, although these may be much more difficult to detect from the position of an observer on another planet.
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- Precession
- Galactic orbit
-
- reconfigure
    - terrorism / fear
    - info bomb

Dynamics: "Non-periodic" events

- **Eclipses**: An eclipse event is observed when one conceptual object moves (along its orbit) into the shadow of another. It is exemplified by the common phrase that "A eclipsed B", where A and B are prominent objects. Thus "my" moon may temporarily oscure the significance of "my" sun. More frequently, the orbital movement of "my" position (as a planet) may reduce the significance of "my" moon by preventing light from "my" sun from reaching it. A common expression in this respect, using a

different metaphor, is the term "upstaging".

- **Cometary orbits**: A comet is a relatively small conceoptual object in the local knowledge system that orbits the central stellar focus, typically with a highly eliptical orbit -- namely it alternates between positions extremely close to that focus and quite distant from it. Such orbits are constantly changing, notably through exposure to larger conceptual objects (of planetary size). They may move into orbits that ensure collision with the stellar focus or the dynamics may force them permanently out of the local knowledge system. An observer may well relate to a local knowledge system in this way.
- Aperiodic (non-orbital) phenomena:
- **Meteors**: A meteor is the visible path of a meteoroid that enters the Earth's (or another body's) atmosphere, commonly called a shooting star or falling star. A meteoroid is a relatively small (sand- to boulder-sized) fragment of debris in the Solar System. When entering a planet's atmosphere, the meteoroid is heated up by ram pressure and partially or completely vaporizes. The gas along the path of the meteoroid becomes ionized and glows. The trail of glowing vapor is called a meteor, or a shooting star. If any portion of the meteoroid survives to reach the ground, it is then referred to as a meteorite.
- **Asteroid**: Asteroids, also called minor planets or planetoids, are a class of astronomical object. The term asteroid is generally used to indicate a diverse group of small celestial bodies that drift in the solar system in orbit around the Sun.
    - Conceptual outlaws
    - true religion vs rebels
    - dark matter
    - earth crossing
    - surprise / joke / attractor
- Supernova

Dynamics: Evolution

Stellar evolution: As noted by Tim Thompson: "A star is not a static thing, it changes with time. The process of aging in stars is called stellar evolution. As a star ages, it goes through changes reminiscent of the life cycles of living things, the details of which depend on the star's overall mass. Massive stars live short but exciting lives, whereas small stars live long, quiescent lives." [more] The H-R diagram is considered to be a useful way to follow the changes that take place as a star evolves [more]. Its regularity is an indication that definite laws govern stellar structure and stellar evolution. Building mathematical models of stars, based on straight forward physics, and allowing those models to evolve naturally in time as a star ages, recreates the H-R diagram as it is observed -- with a surprising degree of fidelity of agreement between theory and observation that is of great interest in astrophysics. The ability of the theory of stellar evolution to explain the H-R diagram in its finest details, singles out stellar evolution as one of the most successful and productive of scientific theories. Most stars lie on the main sequence, burning hydrogen to helium through nuclear reactions. As they live out their lives, changes in the structure of the star are reflected in changes in stars' temperatures, sizes and luminosities -- causing them to move in tracks across the diagram.

Is there a case for recognizing that the life of community is determined by the rate at which its initial unifying and energizing inspiration (with a propensity to enter successfully into explanatory bonds) is converted into a polarized and essentially neutral or sterile perspective? Are such possibilities suggested by explorations such as that of Ilanit Tof (Modern Cosmology as Psychological Metaphor, 1996)?

Theories / H-R diag:

- generating new theories
- eve-ill
- collapse of old theories / death of proponenets / conceptual dinoasurs / unprocessed medieval boxes
- black hole
- H-R applied to product lifecycle analysis

inflation

(*Hyperaction through Hypercomprehension and Hyperdrive necessary complement to proliferation of hypermedia in hypersociety*, 2006): ****

The critical element in stellar evolution (as charted by the Hertzsprung-Russell diagram) is the increasing gravitational pressure on the core, perhaps to be paralleled by the increasing "weight" of knowledge on the individual or collective psyche. Two stellar cases suggest distinct psychosocial outcomes:

- An average-size star sheds its outer layers as a planetary nebula -- perhaps corresponding to Hawking's suggestion to seek refuge in space colonies? The core that remains will be a tiny ball of degenerate matter not massive enough for further compression to take place, supported only by degeneracy pressure, called a white dwarf -- an image meaningful to those focused on the "end times" scenarios of the Abrahamic religions and their consequences for Earth?

- In larger stars, fusion continues until an iron core accumulates that is too large to be supported by the electron degeneracy pressure whereby two electrons cannot occupy the same quantum state at the same time. This core will suddenly collapse as its electrons are driven into its protons, forming neutrons and neutrinos causing the star to explode as a supernova (or even a "hypernova"). This suggests a condition in which polarized psychosocial distinctions can no longer be sustained and simply collapse into one another -- again an image meaningful to those focused on religious "end times" scenarios and the dynamic relationship between the fundamental polarities of "good" and "evil"?

(*Dynamically Gated Conceptual Communities: emergent patterns of isolation within knowledge society*, 2004): ****

Astrophysical metaphor for evolution of gated conceptual communities

Hertzsprung-Russell Diagram: A good point of departure is the famed Hertzsprung-Russell Diagram, pioneered independently by Elnar Hertzsprung (1911) and Henry Norris Russell (1913). It is recognized as one of the greatest observational syntheses in astronomy and astrophysics. The diagram plots the luminosity of stars as a function of their temperature. The luminosity, or absolute magnitude, increases upwards on the vertical axis; the temperature (or some temperature-dependent characteristic such as spectral class or color) decreases to the right on the horizontal axis. From this it is readily apparent that stars preferentially fall into certain regions of the diagram along a curving diagonal line called the "main sequence", although there are other regions where other types of stars (red giants, supergiants, white dwarfs, super novae, pulsars, flare stars) also fall [more].

The suggestion is that conceptually gated communities (and various kinds of social group) emerge and live out their lives in a way that could be represented on an analogous diagram. In public relations terms, there is already a familiarity with the visibility of a group (its "luminosity") and a sense of whether it is "hot" or "cool". The analogue to temperature may be more meaningfully understood as degree of communication interactivity amongst members of the community -- especially since temperature is associated with interactivity between atoms. Following from work of B W Tuckman (Developmental Sequence in Small Groups, 1963) the stages of Forming / Storming / Norming / Performing (see also R B Lacoursiere. The Life Cycle of Groups: Group Developmental Stage Theory, 1980; Stan Davis, The Life Cycle of Organizations, 1990). A sense of the knowledge exchange processes is usefully explored by Martha G. Russell and Kaisa Still (Engines Driving Knowledge-based Technology Transfer in Business Incubators and Their Companies, 1999).

In the case of religious groups, the life cycle has for example been characterized by David Moberg (The Church as Social Institution, 1984) in phases:

1. Energy, charisma, community, fluidity, no tradition and few rules;
2. Comes as the pioneers are dying out or moving on, accompanied by appeals from the second generation ("help us preserve the past"; "write things down"; "train us to do what you have done"; "let us build in some structures to make sure nothing changes");
3. Good or bad, with renewal or fossilization. Either the spirit of the original movement wins or the rules and the structure win. Either the life is renewed and flows through the structures, or the structures stifle the life. [more]

Seemingly analogous to the H-R diagram, Lawrence Cada et al. (Shaping the Coming Age of Religious Life, 1979), identified a "vitality curve" in the light of a historical study of the life cycle of religious institutions. As discussed by Mary V. Maher (Between Imagination and Doubt: Religious Life in Postmodern Culture, 2003), Cada distinguishes five separate stages of a religious movement's history:

1. Founding: usually by a strong and visionary leader who has been forced out or has chosen to leave a comfortable mainline institution.
2. Expansion: how far and how fast depends on the culture and the historical situation. This phase usually has two ingredients: a passionate sense of the vision of the founder; and endless energy to communicate that vision.
3. Stabilization or settled-downness: the movement becomes affirmed by society and is legitimatized as mainstream.
4. Breakdown of the structures and systems that the founder had brought forth and that had worked during the expansion phase: This is a time of fervent activity to 'fix' the problem, through new structures, systems, and regulations. It is a time of increased polarization between those who want to return literally to the founder's words and policies and those who want to translate them into new realities. Bureaucratic survival of agencies and their leaders means that more financial demands are placed on individual members and congregations, but standards of belief and behavior are lessened. Hence, a loss of attachment to the institution and loss of a sense of connectedness. Most important of all, there is a loss of identity and loss of a sense of a future. Change becomes unbearable for many.
5. Crisis: this has two possible paths: continued decline, paralysis, and eventual demise; or re-founding through transformation. Change and transformation are not the same. Change is reaction to cultural realities and happens at a point in time. Transformation happens intentionally over time. Change comes from broken functions and structures. Transformation begins at the center of a movement's collective soul. Mere change can be only directionless motion and energy. Transformation re-forms. [more]

**** The metaphor is explored in italicized text in what follows.

Stellar evolution is not studied by observing the life cycle of a single star; rather, by observing numerous stars, each at a different point in its life cycle, and running computer models that simulate stellar structure. Following the Wikipedia description of such evolution, phases to be distinguished are:

- Giant molecular interstellar cloud: This initial stage is distinguished by its very low density and large size. *It might usefully be equated to some movements of opinion in their very first phases.* The cloud is stable, its constituent molecules being too widely spaced for gravity to draw them closer

- Protostar: The next stage results when the cloud is destabilized, such as by a supernova sending out a shockwave of successive compression and rarefaction (analogous to a soundwave travelling through air), knots of matter are formed -- cores of greater density. *Diffuse movements of opinion may similarly be stimulated to coalesce -- such as by shocks like 9/11.* When the density exceeds a certain threshold, gravity takes over, and the region begins to collapse into a protostar (each dense core producing anywhere from 1 protostar to tens of thousands). *As exchanges increase, between those attracted to the particular perspective, the force of attraction increases -- a centre of gravity effectively becomes defined.* The atoms gain speed in their fall toward the center, providing the protostar with heat (heat is defined as particle motion), a weak infrared glow, and rotation. *The movement transforms into a loose organization, exchanges may become heated, the community becomes faintly visible, and its members may be understood as acquiring orientation*. The lowest mass stars are classified as red dwarf stars, but even red dwarfs are massive

enough to trigger hydrogen fusion in their cores to sustain their feeble starlight. If the collapse of the fragmenting interstellar cloud results in an object of less than about 0.08 solar masses, the central temperature and density of the protostar will never get high enough that hydrogen fusion can take place in a sustained, controlled manner. Such an object is a brown dwarf. These can shine only briefly as their central temperatures are too low to utilize hydrogen as nuclear fuel. Contraction remains the only source of energy; they die away slowly, over hundreds of billions of years. As it collapses, the brown dwarf will shine because it converts its gravitational energy through contraction into luminosity -- being heated by gravitational contraction up to 15 million degrees Kelvin, stripping the electrons from their parent atoms, creating a plasma.

- Maturity: A new star emerges at a specific point on the main sequence of the H-R diagram. New stars come in a variety of sizes and colors. Stars range from blue to red, from less than half the size of our Sun to over 20 times its size. The brightness and color of a star depend on its surface temperature, which depends on its mass. *According to its nature and size, a conceptually gated community may also be understood as emerging at a specific point in a "main sequence". The community may even be distinguished by "colour": blue, red, green, brown, black (as explored in the UNU GPID project).* The star will rest there for a period of years: millions (for the biggest and hottest stars); billions (for mid-sized stars like the Sun); tens or hundreds of billions (for red dwarfs). During this time it expends most of the hydrogen in its core. Eventually the supply of hydrogen runs out and the star enters a new phase of its life. *The community may remain in the "main sequence" for an extensive period of time, until its supply of "inspiration" and "vision" runs out and it enters a new phase of existence.* During this period of maturity the star's existence is a tug of war between gravity, which wants to crush the star into a point, and the fusion going on inside, which wants to explode the star and send pieces of it hurtling through the universe. *For the community, this period of existence is a tug of war between the force pulling the community into a one-pointed "integral" or "unified" perspective (most evident in the case of fundamentalism) and the tendency to explode throughout society (again most evident in the missionary impulse of religious and ideological groups).*

- Beginning of the end: Once the supply of hydrogen in the star's core is depleted, nuclear processes there cease. *A conceptually gated community is also faced with the prospect of cessation of the core processes sustained by its inspiration.* Without the outward pressure generated by these reactions to counteract the force of gravity, the outer layers of the star begin to collapse inward, toward the core. *The community then tends to collapse in upon itself -- it becomes increasingly inward looking.* The temperature and pressure increase as during formation, but now to even higher levels, until helium fusion begins. *During the process of collapse of a community the dynamics become increasingly heated -- associated with furious increase in self-righteousness, self-justification and pressures to conform.* The newly generated heat temporarily counteracts the force of gravity, and the outer layers of the star are now pushed outward; the star becomes as much as 100 times larger than it ever was during its maturity. It is now a red giant. The mass has not increased, so its density is much lower (except in the inner core, where the density is higher than during the hydrogen fusion phase). *In the case of a community, this might be understood as a final missionary phase through which adherents are widely dispersed outward from its headquarters.*

- End of stellar lifecycle: The final phases of stellar evolution depend on the star's mass. *Similarly the final phases of evolution of a conceptually gated community depend on the extent to which it is mass movement. Is there a degree of equivalence to be found with the pattern of social collapse identified by Jared Diamond.*(*Collapse: How Societies Choose to Fail or Succeed*, 2004)?

    - Low mass stars:
      Red dwarfs: A star with less than about half a solar mass will never be able to fuse helium, even after the core ceases hydrogen fusion. There simply isn't a stellar envelope massive enough to bear down enough pressure on the core. These red dwarf stars which live for hundreds of billions of years. When nuclear reactions eventually ceases in their cores, they will continue to glow weakly in the infrared and microwave part of the spectrum for many billions of years. The lowest mass stars are classified as red dwarf stars, but even red dwarfs are massive enough to trigger hydrogen fusion in their cores to sustain their feeble starlight.

      Brown dwarfs: Slightly less massive objects, known as brown dwarfs, can shine only briefly as their central temperatures are too low to utilize hydrogen as nuclear fuel. In the case of a brown dwarf, as contraction continues, the speed of the atomic nuclei eventually becomes great enough to overcome the electrical repulsion keeping them apart and nuclear fusion occurs [more]. Eventually, its collapse will be halted by electron degeneracy.

      Black dwarfs: Because it has no additional sources of energy, the brown dwarf will continue to radiate its internal heat until it fades out of view to become a black dwarf. A black dwarf is the remains of a Sun-sized star which has evolved to a white dwarf and subsequently cooled down such that it no longer gives out radiation. White dwarfs are so dim because they are small and not because they are cool. A more appropriate name for white dwarfs is degenerate dwarf. None exist in the universe, as the time taken for a white dwarf to cool to such a degree is longer than the lifespan of the universe to date.

    - Medium mass stars:
      Red giant: Once a medium-size star (0.4 to 3.4 times the mass of our Sun) has reached the red giant phase, its outer layers continue to expand, the core contracts inward, and core-dwelling helium atoms fuse into carbon. The fusion releases energy, granting the star a temporary reprieve. In a Sun-sized star, this process will take approximately one billion years. The atomic structure of carbon is too strong to be further compressed by the mass of the surrounding material. No more fusion can happen. The core is stabilized and the end is near. The star now begins to shed its outer layers as a diffuse cloud called a planetary nebula.

      White dwarf: Eventually, only about 20% of the star's initial mass remains and it spends the rest of its days cooling and

shrinking until it is only a few thousand miles in diameter. The star has become a white dwarf. White dwarfs are stable because the inward pull of gravity is balanced by the degeneracy pressure of the star's electrons. (This should not be confused with the electrical repulsion of electrons, but is a consequence of the Pauli exclusion principle.). No white dwarf more massive than 1.4 solar masses can exist; electron degeneracy pressure isn't strong enough. Consider what we know about novae: Matter is accreted around and onto a white dwarf until it gets hot enough to fuse, and fuses explosively. If the white dwarf's mass is tipped over the Chandrasekhar limit (1.4 solar masses; named for the physicist who discovered it) then electron degeneracy pressure fails and the star collapses. This causes the white dwarf to be blasted clean apart in a supernova event known as a type-I supernova. These supernovae may be many times more powerful than the death of a massive star (a type-II supernova).

Black dwarfs: With no fuel left to burn, the white dwarf radiates its remaining heat into icy space for many millions of years. In the end, there is just a cold dark mass sometimes called a black dwarf. The universe is not old enough for any black dwarf stars to exist.

- Massive stars:
  Red supergiants: Fate has something very different -- and very dramatic -- in store for stars more than 5 times as massive as our Sun. After the outer layers of the star have swollen into a red supergiant (a very big red giant), the core begins to yield to gravity and starts to shrink. As it shrinks, it grows hotter and denser, and a new series of nuclear reactions begins to occur, creating and expending progressively heavier elements, temporarily halting the collapse of the core. Eventually, several more stops down the periodic table, silicon fuses to iron-56. Until now, the star has been maintained by these energy-liberating fusion reactions, but iron cannot fuse.

  Supernova: There is suddenly no energy outflow to counteract the enormous force of gravity, and the star collapses. What happens next is not clearly understood. But whatever it is can cause a supernova explosion in less than a fraction of a second, one of the most spectacular displays of power in the Universe. The accompanying surge of neutrinos starts a shock wave, while the continuing jets of neutrinos blast much of the star's accumulated material -- the so-called seed elements, lighter than and including iron -- into space. As some of the escaping mass is bombarded by the neutrinos, its atoms capture them, creating a spectrum of heavier-than-iron material including the radioactive elements up to uranium. Without supernovae, no elements heavier than iron would exist. The shock wave and jets of neutrinos continue to propel the material away from the dying star, off into interstellar space. Then, streaming through space, the material from the supernova may collide with other cosmic debris, perhaps to form new stars, or planets and moons, or to serve as raw materials for a vast variety of living things. So what, if anything, remains of the core of the original star? Because we do not have a good understanding of the actual explosion mechanism, it's not entirely clear.

  Neutron stars: But it is known that in some supernovae, the intense gravity inside the supergiant forces the electrons into the atomic nuclei, where they combine with the protons to form neutrons. The electromagnetic forces keeping separate nuclei apart are gone (proportionally, if nuclei were the size of dust motes, atoms would be as large as football stadiums), and the entire core of the star becomes nothing but a dense ball of contiguous neutrons, a single atomic nucleus the size of Manhattan. This is a neutron star. It is still an open question whether or not all supernovae do form neutron stars, however. It is believed that if the stellar mass is high enough, the neutrons themselves will be crushed and the star will collapse until its radius is smaller than the Schwarzschild radius and it becomes a black hole. However, our understanding of stellar collapse is not good enough to tell us whether it is possible to collapse directly to a black hole without a supernova, if there are supernovae which then form black holes, or what the exact relationship is between the initial mass of the star and the final object that remains.

The challenge is to explore ways of mapping various organiational types (see below) onto the different stages of stellar evolution and the varieties of stellar objects that can be formed. Of paticular interest is the ways that different groups use the energy resources at their disposal to become "massive", highly "visible", "attractors" (of greater or less attractivity), and "active" (as opposed to being characterized as static).

Scouts	Trade union	Criminal network
Promise Keepers	Professional association	al-Qaida
Franciscans	Youth movement	Rotary
Club of Rome	Fan club	Order of Druids

Singularities

The Black Hole metaphor and the American Way of Life (AWOL)

(*America as Eve-ill Empire: Evocation of Authenticity Elsewhere*, 2003): ********

Characteristics of black holes relevant to their significance as a societal metaphor include (see: Matt McIrvin, FAQs on Black Holes; Ted Bunn, Black Holes FAQ; Cole Miller, Black Holes and Neutron Stars) are noted in the table below. The metaphor was explored by Peter Russell (*The White Hole in Time*, 1992) to reconcile understandings of future human evolution and the "meaning of now" -- although significantly his focus was on the contrasting metaphor of "white" holes. The black hole metaphor is presented here as being more consistent with the dynamics of the USA within the world system -- namely as a semantic black hole.

As explicitly affirmed by George Bush Sr (Earth Summit, 1992): "**The American Way of Life is not negotiable**". This way of life must therefore be sustained by resources continually drawn from the surrounding system -- irrespective of whether this is thereby endangered. The notion within such dynamics of any endangerment elsewhere is in fact then meaningless. The principal resource

acknowledged as vital to sustaining this way of life is oil. However other primary commodities are similarly drawn in from "developing countries". The "black hole" also serves as a prime attractor for individuals -- as associated with the "brain drain" process from other countries.

Some similarities between material and societal black-hole dynamics (tentative)	
Astrophysical black hole	***Societal black hole (AWOL)***
Simplest objects in the universe having only 3 characteristics: mass; spin rate (angular momentum), and electric charge	Simplest form of social organization having only 3 characteristics: "material resources"; "spin" (capacity to "play the angles"); "binary" orientation
a region of space that has so much mass concentrated in it that there is no way for a nearby object to escape its gravitational pull	the pattern of resource concentration in the monopolar system supporting the AWOL and its function as an attractor
dependence on mass concentration pulled in from neighbouring regions of space	dependence on resource concentration as in the monopolar system supporting the AWOL
gravitational attractor	societal attractor
accumulation of matter	accumulation of resources
concentration of mass such that there is no way for a nearby object to acquire the escape velocity to escape its gravitational pull	concentration of society making it impossible for people to escape its attractive power
severe distortion of space and time; strange properties because the the usual rules of geometry no longer apply	severe distortion of conceptual frameworks and normal rules of society (legality, morality, ethics, boundaries) notably regarding property and the role of time
event horizon, namely a spherical boundary that can be crossed to enter but cannot be crossed to exit; known as the Schwarzschild radius; it is the radius below which gravitational attraction between the particles of a body must cause it to undergo irreversible gravitational collapse.	event horizon that makes it impossible to commit to any alternative attractor, once the line has been crossed
invisibility due to the fact that no light can exit across the event horizon	a form of invisibility in that it is impossible to communicate its nature to people before they are already captured by it; information cannot be communicated out of it because things change so rapidly within it; the invisibility may be described in terms of processes of denial (as with the institutionalized inability within the USA to recognize its support of state terroism in Nicaragua)
movement within the black hole inexorably closer to the singularity at its centre which cannot be avoided -- due to reversal of the roles of time and radius	accelerating movement to accumulate, consume and emulate that draws people into a tunnel logic
singularity at the centre having unknown properties	ultimate singular transformation as a process of rapture
stripping inorganic atomic and sub-atomic bonds	stripping organic and psychosocial bonds
usually formed in the final stage of the evolution of an extremely massive star collapsing (via a high density neutron star) in a supernova; density of a neutron star is one hundred trillion times the density of water.	possibly formed by the process of collapse of an extremely massive social system such as a superpower, notably through the collapse of its logical framework and value system
any amount of mass can in principle be made to form a black hole if it can be compressed to a high enough density, as with the Relativistic Heavy Ion Collider (RHIC)	types of "black hole" have been described in relation to extreme negativity; it is also possible that one could be created as a result of the collision of heavy egos -- "Relativistic Heavy Ego Collider"
initial weightlessness in falling in	initial experience of freedom on entering the AWOL
subsequent tidal forces (caused by the difference in gravitational force between two points) pulling differentially to tear any mass apart. This difference may be greatly enhanced over smaller and smaller distances causing the famed spaghettification effect on an object closing in on the black holes event horizon, such that an object approaching a black hole is stretched lengthwise and compressed widthwise.	subsequent psychosocial forces pulling differentially to break any psychosocial bonds
increasing speed of fall	

Ironically one of the prime features of the dynamics associated with a singularity, like a black hole, is the manner in which "mass" is subjected to enormous forces and is effectively distorted and "destroyed" -- through action of compressive forces. The matter that forms a black hole is crushed out of existence; a black hole represents matter that leaves only its gravity behind. A monopole could then indeed be described as a "weapon of mass destruction" -- being dependent on such destruction for its survival.

In general systems terms, there is a case for exploring the isomorphism between the evolution of stars -- as portrayed by the Hertzsprung-Russell diagram in terms of a star's luminosity vs. its temperature [more; more; more] -- and the evolution of civilizations. Ironically the HR diagram has been extensively used as a basis for predicting extraterrestrial life [more; more], but not apparently for exploring how hegemonic civilizations collapse and engender "black holes".

The monopole metaphor also draws attention to the socio-political dynamics of monopoly -- notably of economic form. The monopolar system reinforces the engendering of economic monopolies through the progressive consolidation of independent undertakings. Indeed it might be argued that it is the pressures of the "black hole" dynamics which inexorably "crush" social entities forcing them into consolidated form in a manner echoed by the "crushing" of matter as it enters a black hole.

A major characteristic of a black hole is the degree to which its dynamics distort the movement of light effectively causing the black hole to be invisible except by contrast with its surroundings. Much has been made of the existence of an **event horizon** that constrains vision from within the dynamics of the black hole. Any event inside the event horizon can never be communicated to the universe. This phenomenon might prove to be a useful way of exploring the degree of denial within the AWOL, distorting facts known elsewhere (notably with respect to state-supported terrorism) so as to blame the victim or opponent. From within the AWOL it will never be possible to accept any proof regarding the numbers slaughtered by AWOL initiatives -- notably in the light of the levels of proof required of Iraq in relation to weapons of mass destruction. But, conversely, the AWOL will never be able to prove that it has not covered-up the slaughter of thousands or planted evidence to legitimate its logic.

Another major characteristic of a black hole is the speed of movement associated with its dynamics -- with which the rapid pace of the American Way of Life is consistent. Typically change is perceived as increasingly mechanical or inorganic -- in contrast with the kinds of change characteristic of organic systems, ecosystems and human learning systems which "take time" to grow. In addition to the speed is the acceleration within a black hole. Again the acceleration of the American Way of Life has been the subject of extensive comment (James Gleick, *Faster: the acceleration of just about everything*, 1999; Jeremy Rifkin, *Time Wars: The Primary Conflict in Human History*, 1989).

There is also a recognition, notably tracked by the Singularity Watch of the Institute for Accelerating Change, that the ever-increasing rate of technological change in our local environment will undergo a "singularity," becoming effectively instantaneous from the perspective of current biological humanity. It has been postulated that events after this point must also be "future-incomprehensible" to existing humanity.

Peter Russell (*The Whitehole in Time*, revised as *Waking Up in Time: Finding Inner Peace in Times of Accelerating Change*) has explored the doubling effect of such acceleration in social systems in terms of black hole dynamics and has commented on Terence McKenna's computation of such a point of total collapse at 21 December 2012 [more].

Of special interest is the singularity that is the centre of black hole dynamics. In the psycho-social terms relevant to the Armageddon Lobby mentioned earlier as "trying to hurry up God", notably the Christian right associated with the PNAC initiative, this singularity may be best understood in terms of Armageddon and the biblically prophesied "rapture" on which there are many web resources [more; more; more]. As with a black hole singularity, the evangelical perspective holds that the world is being driven inexorably towards the moment of rapture. The term "rapture" does not appear in the scriptures. There are however references to the manner in which people will be caught up and raised up -- expressions that could well be associated with an analogue to the strange physics at the centre of a black hole -- the enraptured become enwrapped and entrapped. Access to this process is restricted in biblical prophecy to a limited group of people -- namely the evangelical Christians with which George Bush is explicitly associated and by which he is notably supported [more; more].
