



**Rosanne DeBats**, is a registered psychologist in Adelaide, and has spent many years in public policy research. She was active in the Women's Electoral Lobby in its early days, and has built an energy-efficient house at the Aldinga Arts Eco-Village.

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There will be two or three other speakers from Australia and NZ, from different faculties and backgrounds to give everyone a taste of the science and spirituality paradigm.

**Cost:** NZ\$325. Early bird special, NZ\$275 if paid in full by September 5th - lunches and dinners included.

**Registration:** For a full programme and registration form please view on our web page <<http://www.theosophy.org.nz>> after 1 June, Email <[hq@theosophy.org.nz](mailto:hq@theosophy.org.nz)> or phone NZ(09) 523 1797.

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## WHAT IS LIFE?

**A precis of lecture by Sir Paul Nurse, and commentary by Edi Bilimoria, England**

Edi Bilimoria <[edibil@btinternet.com](mailto:edibil@btinternet.com)>

The full talk is available on: <http://www3.imperial.ac.uk/events/theschrodingerlecture>

Edi writes: "I recently attended (on 22 November 2011) this prestigious public lecture at Imperial College:

***What is life?** The 2011 Schrödinger lecture given by the President of The Royal Society and Nobel-prize winning geneticist, Sir Paul Nurse.*

The following is a factual précis of this talk delivered, unsurprisingly, with pristine clarity and focus. My own comments are stated indented in square brackets [...].

### **OBJECTIVE OF THE LECTURE**

To respond to Schrödinger's question ***What is life?*** immortalized as the title of his book.

### **THE APPROACH TAKEN**

To expound those characteristics of life as distinct from non-life: to discern the living from the non-living.

[It soon became apparent that the approach would be entirely materialistic: the hylozoism principle enshrined in the esoteric doctrines would mean nothing to Sir Paul. This principle affirms that there is no such thing as dead (or non-living) matter and everything, from the smallest subatomic particle to the minutest infusoria is conscious at its own level: that what varies in the 'upward' ascent is not the fact of consciousnesses but the degree of awakened consciousness.

Also, none of Schrödinger's profoundly metaphysical questions were touched upon. A key passage from Schrodinger's great book, also commented upon by Ken Wilber is given at the end.]

## KEY CHARACTERISTICS OF LIFE

- Heredity (Schrodinger referred to the 'code script' on p. 20 and p. 60 in his book.)  
Information is implicit in the organization of the genes. Solidity and stability are vital for life.
- The gift of self-organization – self order (p. 77 in Schrodinger's book.)

## ATTRIBUTES OF LIFE

### 1. Life Is Chemistry

Life is made of chemistry: life is built on chemistry.

[This is more in the nature of a belief system than a considered position taking cognizance of all evidence; all very much in line with the pronouncements of Sir John Maddox, the former editor of *Nature* who used his position and influence to denounce Rupert Sheldrake's first book and denigrate the work of Jacques Benveniste on the memory of water.]

The vital processes of life are chemical processes – the notion pioneered by Lavoisier. The basic building block of life, the chemistry of life and the natural world is carbon – the residue from decaying star systems.

The ability of carbon to form long chains of polymers is crucial for encoding information. Silicon might be another possible contender for the building block.

Biology has expelled both Aristotle's ideas of teleology (explanation of phenomena by purposive design in the material world, rather than postulated causes ) along with all concept of vitalism.

[So the sterling work of such as Rupert Sheldrake on morphogenetic fields and Bruce Lipton's *Biology of Belief* can conveniently be ignored.]

### 2. Metabolism and Self-Organization

Enzymes are critical for metabolism incorporating the many 100's of chemical reactions occurring all at the same time in the space of even one single cell. This implies that the Second Law of Thermodynamics is reversed *locally*.

Viruses do not constitute life per se, but are "a subset of life" because their parasitic function survives by drawing upon the parent body in which they are embedded.

Turing's equation  $dtq = \underline{D} \Delta q + R(q)$  is the governing principle whereby structures built up by spatial organization spread over distance and also in time.

Homoeostatic mechanisms serve to keep cells stable by way of regulation by negative feedback loops.

### 3. Heredity

Gregor Mendel was the founding father. It is the method of science to discard the insoluble and deal only with the solvable, with what we can understand. Therefore Mendel focused on pea crossing (experiments from which he deduced two generalizations which later became known as *Mendel's Principles of Heredity*).

[This is a very convenient use of Occam's razor. Intended to pare away the superfluous, the razor is conveniently used nowadays (but not by Mendel) to slice off inconvenient evidence that stands in the way of dogma.]

Therefore a particulate theory of heredity is unchanging. Particles, i.e. genes determine the characteristics of life because particles encode information.

This point was reinforced with a diagram upholding Francis Crick's *Central Dogma of Molecular Biology* showing how information flows only one way from micro to macro: from the cell to the soma.

[Amit Goswami in *Creative Evolution* shows very convincingly how information can also flow in the reverse direction; also how the whole organism works as a whole towards orchestrating its intended purpose and function. And in fact this central dogma is in flagrant breach of a central tenet of esoteric science affirmed by centuries of sages, ancient and modern: that downward causation (quantum consciousness in popular terms) is the primary mechanism; upward causation is also necessary but not the principle driving force.]

#### **4. Heredity**

Heredity underpins the evolution of life by natural selection. Evolution means life evolves: the mechanism is natural selection (not only Charles Darwin's idea – tribute was paid to Darwin's grandfather Erasmus Darwin). So if you have a system with heredity then evolution by natural selection is a foregone conclusion.

#### **5. Systems and Information Management**

Networks hold the key to how complex systems manage information. The double helix is a digital biological information storage device. Networks are not just linear pathways but their complexity exists in other dimensions and, like transport hubs, also display a hub characteristic. On these grounds life is not so much hardware but 'wetware' because the system can be rewired.

Living things have the remnants of everything that went before them [arguable the only comment with faint esoteric echoes. Recall the title of Sheldrake's second book *The Presence of the Past*].

### **NEW LIFE FORMS**

The discovery of new life forms could change our perception. New forms could emerge from: 1. outer space; 2. deep inside the oceans; 3. different life principle: such as one based on silicon.

Neurobiology would be very different. It will be 100's of years before we sort out what consciousness is.

[One recalls Krishnamurti's story that a man trying to make a polished mirror surface by rubbing together two stones may carry on for 100's of years without success. If it takes 100's of years to sort out consciousness, perhaps science should consider a new approach.]

#### Key extract from Erwin Schrödinger, *What Is Life?* Cambridge University Press

*The scientific picture of the world around me is very deficient. It gives a lot of factual information, puts all our experience in a magnificently consistent order, but it is ghastly silent about all and sundry that is really near to our heart, that really matters to us. Science cannot tell us a word about red and blue, bitter and sweet, physical pain and physical delight; it knows nothing of beautiful and ugly, good or bad, God and eternity. Science sometimes pretends to answer questions in these domains, but the answers are very often so silly that we are not inclined to take them seriously. So, in brief, we do not belong to this material world that science constructs for us. Science cannot tell us a word about why music delights us, of why and how an old song can move us to tears? Science can, in principle, describe in full detail all that happens in our sensorium and motorium from the moment the waves of compression and dilation reach our ear to the moment when certain glands secrete a salty fluid that emerges from our eyes. But the feelings of delight and sorrow that accompany the process science is completely ignorant—and therefore reticent. And science is reticent too when it is a question of the great Unity the most popular name for which is God.*

*The scientific worldview contains of itself no ethical values, no aesthetical values, not a word about our ultimate scope or destination, and no God, if you please. Whence came I, whither go I? That is the great unfathomable question, the same for every one of us. Science has no answer to it.*

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## **EVOLUTION OF SELFLESS BEHAVIOUR**

Victor Gostin, Adelaide

"The human transition was a rare and momentous event."  
Thus concludes a recent summary of the evolution of selfless behavior by David Sloan Wilson, Professor of Biology and Anthropology at Binghamton University in N.Y. State. (New Scientist 6.8.2011).

If evolution was said to be the survival of the strong and demise of the weak, or the promotion of the "Selfish Gene", then how did altruism evolve? In Charles Darwin's words (ibid, pii) "... an advancement in the standard of morality will certainly give an immense advantage to one tribe over another. A tribe including many members who, from possessing in a high degree the spirit of patriotism, fidelity, obedience, courage, and sympathy, were always ready to aid one another, and to sacrifice themselves for the common good, would be victorious over most other tribes; and this would be natural selection."

In modern terms, according to Wilson, biological systems are a nested hierarchy of units, from genes within individuals, individuals within groups, through to groups within a population. When individuals within a group compete, selfish individuals will produce most offsprings and these will dominate the group. However when groups compete, those with more selfless individuals [ie. with strong team spirit] will beat groups of selfish individuals. Hence the proportion of selfless individuals will increase in the total population.

This idea of group selection went out of favor in the 1960s for several decades, but by 2008, most evolutionary scientists agreed that group selection does occur. In the long course of evolution, it has been clear that selection occurred at the level of groups rather than individuals. Simple cells like bacteria (procaryotes) combined (by endosymbiosis) forming nucleus-bearing complex cells (eucaryotes). Later these complex cells evolved by cooperating into multicellular organisms from sponges to corals, molluscs, arthropods, and vertebrates. Groups of some animals like ants and bees evolved into super-organisms. As Wilson states "prosocial adaptations usually put individuals at a disadvantage relative to other members of their group. The only way for them to evolve is if there is another layer to the process of natural selection. That layer is group selection."

These transitions are never complete as selection within groups is only suppressed not eliminated. Some genes do manage to bend the rules of cooperation in their favor. "Increasingly cancer is seen as an evolutionary process taking place within individual cells causing some genes to succeed at the expense of others, with tragic results for the whole organism" writes Wilson. Cancer can result when cells cease cooperating.

The momentous event that saw the emergence of humans from our primate relatives is now seen as the action of group selection of egalitarian traits, and the suppression of

individuals who try to benefit themselves at the expense of others. Wilson considers that with humans, cultural evolution has occurred in parallel to genetic evolution since socially transmitted traits spread because they may benefit whole groups, or give individuals an advantage within groups. Human intelligence is based on trust and coordination of activities that have enabled the growth of great civilizations. This dynamic of cooperative cultures and those plagued by divisions may explain the rise and fall of empires as explained in the book "War and Peace and War" by Peter Turchin (2005). Wilson concludes that group selection has been an exceptionally strong force in human genetic and cultural evolution. Humans are indeed the only primate super-organism.

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## Great research news!

Peter Fokker, President of the TS in Canberra Group writes in their Newsletter No. 62 (October — December 2011): [www.austheos.org.au/Canberra/](http://www.austheos.org.au/Canberra/)

"Through the T.S. Australian Section's website you now have access to the Online Public Access Catalogue (OPAC). This powerful search tool will inform you if a particular publication is available and in which of the theosophical libraries it can be found. As an example, I searched 'Gomes' and found that Michael Gomes' 1987 book *The dawning of the theosophical movement* is available in Brisbane and Melbourne TS Libraries and that there is a copy in the Campbell Library, but that one is not for loan."

The log-on steps are:  <http://www.austheos.org.au/>

- **Resources** tab
  - **Library catalogue** (first on the pulldown menu)
  - Click on **Search and Browse** the Online Public Access Catalogue (OPAC)
  - Enter your general search term in the box on the left and run the green search button.
- Once you are on the webpage of your choice of publication, you will see that there is a button to reserve or request the book or article.

**Try it out. You will be captivated by the results. A great deal of work must have been put into this project and all involved are to be congratulated.**

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## Social and economic aspects of the debate about climate change

Olga Gostin,  
Adelaide

In the preceding newsletter I touched very briefly on why the science of climate change is so passionately denied. In this longer contribution I should like to pick up the same theme and summarise the discussion expounded by Naomi Klein in an article entitled "Capitalism against the Climate", published in *The Nation* of 9 November 2011.

[<http://www.thenation.com/article/164497/capitalism-vs-climate>]

Klein was an observer/reporter at the *Heartland Institute's Sixth International Conference on Climate Change* held in Washington D.C. in June 2011. For those of us not versed in the U.S. politics of climate change, the Institute is apparently America's premier gathering

for deniers of climate change. Klein was rather taken aback at the passionate and sometime vitriolic references to advocates of anthropogenic (human-driven) climate change. These included reference to them as a “Green Trojan Horse whose belly is full with red Marxist social-economic doctrine”; plotters to “undermine American freedom” and stalking horses for National Socialism. Environmentalists were described as akin to “Aztec priests, sacrificing countless people to appease the gods and change the weather”.

The underlying fear of deniers, as Klein saw it, was that they viewed proponents of climate change as not so much concerned with the environment, as keen to shackle capitalism and transform the American way of life in the interest of global wealth redistribution. From such a right-wing perspective, opposition to climate change has become as central to their world-view as “low taxes, gun ownership and opposition to abortion” (2011:4).

Klein further suggests that the emotional intensity of deniers is driven by the realisation that the changes needed to address climate change would amount to a *transformative movement* with serious real-life implications. The transformative impetus would require profound changes not only to our energy consumption but to the underlying logic of our economic system, currently premised on the central fiction that nature will provide us with a limitless source of water, clean air and oceans, arable top soil, minerals and biodiversity. At its very heart, climate change ideology challenges this expansionist and extractive mindset. We are called upon to go beyond recycling, green products and market-based solutions. The new civilizational paradigm is grounded not in dominance over nature but in respect for natural cycles of renewal, and acute sensitivity to natural limits, “*including limits to human intelligence*” (2011:8). The warning here is against hubris, the presumption that a techno-fix will inevitably emerge to redress problems, and that it is OK to carry on as usual, despite evidence to the contrary.

Klein then tabulates six spheres of transformation which must apply to an effective engagement with the realities of climate change:

(1) **Reviewing and reinventing public infrastructure.** Given the world-wide trend towards urbanisation and the conglomeration of millions of people in cities, public infrastructure must be improved including big ticket spending on subways, light-rail and busses: in short, cheap affordable and effective public transport. A necessary corollary of urbanisation is the need to provide affordable, energy-efficient housing. Both of these initiatives must rely on energy grids carrying renewable energy.

Klein states that these are public interest issues and therefore should be funded by the public sector. She warns: “Government budget deficits are not nearly as dangerous as the deficits we have created in vital and complex natural systems” (2011:10). We have to move beyond recycling, bulb changing and carbon offsetting to embrace the realities of large-scale concentrated urban living.

(2) **Economic planning.** The shift to weaning ourselves from fossil-fuelled industries will result in job loss and the need to create new ‘green’ jobs. These new initiatives must reflect collective priorities rather than corporate profitability. Changes in agriculture are also envisaged in a shift from soil-depleting annual cereal-based monocultures to perennial polycultures. Such agricultural practices would be less prone to attacks by pests and extreme weather, and would be more labour intensive, thereby generating new employment opportunities. A weakness in Klein’s expose, however, is that she does not

address the socio-economic implications of our exploding world population and the impact that this might have on the implementation or otherwise of her transformative movement.

(3) **Corporate regulation.** The logic of the two points above is that government must take an active role in regulating corporations by for example, imposing caps on carbon emissions, banning coal-fired power plants and opposing industrial feed-lots, while at the same time promoting green and renewable energies, and responsible land stewardship. While recording Klein's wish list, I regret that it did not include a corporate ban on the armament industry.

(4) **International trade.** Klein challenges the current article of faith that the role of government is to keep right out of the corporate sector, and specifically international trade. Free trade, as the current mantra goes, has devastated local manufacturing, local businesses and local farming practices, as well as self-sufficiency. Klein points out that cheap goods come at a price to the environment and pollution. Indeed, "the rise in emissions from goods produced in developing countries but consumed in industrialised ones was six times greater than the emissions savings of industrialised countries" (2011:13). Klein identifies a momentous task ahead: to reverse the 30-year old trend of removing every possible limit on corporate power.

(5) **Consumption.** There is an inherent conflict between economic growth and sound climate policy. Klein points to the paradox that greater efficiencies and access to renewable energy invariably lead to increased consumption. People do not adhere to the principle that sufficient is enough; instead the attitude is that bargains are there to indulge a bottomless hankering for stuff. The bottom line, says Klein, is that we have to reduce the amount of stuff we produce and consume. The options are stark: trash the system or crash the planet" (2011:15). In his *Revenge of Gaia*, James Lovelock has expressed dire warnings along the same lines, reflecting on the fact that we would require the equivalent of five Earths to indulge all humans with access to goods and services on a basis equitable with current western consumption. Clive Hamilton has tackled the same theme in his *Affluenza*, exposing the sheer addiction of western society to conspicuous and superfluous consumption. And let us remember that western standards of economic wellbeing are pushed as the ultimate good for all peoples.

Klein urges us to embrace a managed transition to an alternative economic paradigm where the public sector, cooperatives, local business and non-profit organisations are encouraged, while the corporate sector with its inordinate profits in the hands of a few, is reined in. In short we have to move away from a frame of thought where huge profits and growth are the necessary criteria of wellbeing and success. Klein reflects that climate change deniers understand the implications of change all too well. That is why they are so strident. It is not that they are paranoid; rather, it is because they have been paying attention and understand the implications of transformative action only too well (2011:15).

(6) **Taxation.** The question may now well be put: how will all these changes be brought about? Klein is unequivocal: go where the money is. She itemises carbon tax, financial speculation, corporate profits and the wealthy as sources of cash, while cuts to bloated military budgets and subsidies to ineffective and polluting industries be introduced too. In short, says Klein, polluters should pay, and certain taboo topics such as nationalisation and challenging free trade must be brought to the table.

Klein is well aware that points 1 to 6 break every rule of the 'free-market playbook'. She goes even further: none of the proposals for transformative action can be realised unless "accompanied by a massive, broad-based effort to radically reduce the influence that

corporations have over the political process” (2011:18). At a very minimum she proposes that we hold publicly funded elections and thereby reduce corporate capacity to pay off lobbyists promoting their own interests in the political sphere. While Klein’s comments may apply more to the USA political scene, there is no doubt that corporate influence also applies to Australian politics.

Above all Klein challenges the centrality of profit in our economy and she is well aware that this is what rattles climate deniers most. “It is not opposition to the scientific facts that drives denialists but rather opposition to the real-world implications of those facts (2011:19). This prompts her to return to the dichotomy (spelt out in my earlier contribution to TS-Science Newsletter No.70:17, 2011) between ‘egalitarian- communitarian’ [EC] world-drivers and those who adhere to a ‘hierarchical-individualistic’ [HI] world view; where the former espouse a willingness to undertake collective action for the common good while the latter would rather sustain the current status quo favouring those with the means to generate profits and personal advantage. Klein suggests that when powerful ideologies are challenged by scientific facts or hard evidence from the real world, the challenged ideologies rarely die out completely. Instead they tend to become increasingly cult-like and marginal - hence the strident vilification of climate change supporters and general fear-mongering among a public easily swayed by the loudest voice in the media.

Klein warns us: “The same economic model that is blasting the bedrock of the earth to keep the gas flowing is blasting the social bedrock to keep profits flowing” (2011:28). Yet all is not lost. Klein looks at social initiatives like the Occupy Wall Street movement as a sure sign that current values and practices are open to challenge and revision. Rampant greed and individual profit-making are not necessarily the only criteria of successful and happy lives. Cultures are fluid and can, and do, change. In the current ideological crisis where we are confronted by stark evidence that western world-views are not necessarily the best blueprint for the planet as a whole, it behoves each and every one of us to address our individual and collective commitment to the transformative challenges of our times.

In the next TS-Science newsletter I should like to take this imperative further and share a fascinating and positive take on the role of cooperation in general life forms, and human societies in particular. I refer to *Super Cooperators: Altruism, evolution and why we need each other to succeed* by Martin Nowak and Roger Highfield (2011).

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## **Yes, humans did visit the Moon.**

Victor Gostin, Adelaide.

Many people prefer conspiracy theories for major historical events in preference to scientifically and forensically derived information and data. And so, one still hears of those who prefer to believe that all the film and written evidence of humans arriving on our Moon in 1969 was US propaganda essentially created in Hollywood.

While I sit here preparing this article, I have alongside me a thick volume of 736 pages entitled the "LUNAR SOURCEBOOK: A User's Guide to the Moon". Published by Cambridge University Press in 1991, it is dedicated "*To those who have been there - And*

*those who will return*". It has contributions from 25 prominent scientists and contains eleven chapters involving everything from the astronaut experience, lunar surface processes, minerals, rocks, chemistry, physics and the global geophysics of the Moon. It is thus impossible for me to believe that humans have never been there and have not returned 382kg from six Apollo manned lunar landings, and 0.3kg returned by the three Soviet Luna robots. Perhaps the Earth IS FLAT, but perhaps it's easier to understand that it is round!

Perhaps the easiest to explain is the unusual nature of the rock samples returned to Earth and studied in detail. Moon rocks have been found to show many features that do not exist on Earth. Most samples come from the intensely fractured surface material called the regolith. This contains abundant glasses as spherical particles, many that are truly tiny (nanometre-sized), containing a surprising content of metallic iron. Lacking the waters and humid atmosphere of Earth, that rapidly destroy (oxidize and hydrate) such materials, all meteorite impacts on the Moon create and maintain an abundance of impact-melted glass spheres. Due to such extreme dryness, and their ultra-fine size (with large specific surface area), the dusty lunar surface is electrostatically charged, forming an atmosphere up to 30cm above the surface. Sometimes this charged dusty atmosphere reaches up to 100 km. Also, due to their high metallic iron content, many particles are attracted by magnets, and astronauts have continually complained of the fine lunar dust getting into all equipment and being very abrasive and sticky.

The lunar regolith contains an abundance of helium derived from the solar wind. This is largely He<sub>3</sub> formed by thermonuclear reactions in our Sun, whereas on Earth our He<sub>4</sub> is derived from nuclear decay of radioactive potassium in Earth's crust and mantle.

The dark basaltic lunar rocks have a high content of ilmenite, a titanium-iron mineral, and all lunar minerals are anhydrous (lacking any water). Unlike on our planet, there is no quartz in any moon rocks.

Concerning the age of the Moon, all geologists were surprised that all radiometric ages indicate that it is much older than any Earth rocks, and must have cooled very early in our common history.

As Dr S. Ross Taylor, ANU, Canberra, commented: "The handful of Apollo data from sample return in July, 1969 swept away centuries of speculations: a striking demonstration of the power of scientific investigation. The maria were basaltic lavas, not dust. The lunar highlands were anorthosite, not granite, the highland plains were ejecta sheets from large basin impacts, not volcanics, ..." etc. (Abstract 5020, 68th Meeting of the Meteoritical Society, Sept. 2005).

### **The Moon is indeed a very different place.**

For those with further interest in our Moon landings, a new article published by the Royal Geographical Society of South Australia, is entitled "The Apollo Expeditions and Dust on the Moon" by Dr Brian O'Brien, Fellow of the Australian Academy of Technological Sciences & Engineering, which was edited from notes of an invited presentation on 18 October 2010.

Also: Zbik et al. 2012: ISRN Astronomy and Astrophysics, Volume 2012, Article ID 506187, 3 pages, doi:10.5402/2012/506187

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