

## Chapter 6

### CREATIVITY, SELF-ORGANISATION & THE NON-ALGORITHMIC

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#### INTRODUCTION

The previous chapter [?] has proposed some extensions to the formal logic, topological/geometric architecture and material substratum of mind which would provide it with what it needs enable it to 'deliver the goods'. I am speaking here of the everyday, mundane, conservative things which we all perform within the twinkling of an eye, but which lie beyond the ability of any imaginable computer to emulate. Make no mistake about it; the corpus of the mind *is*, in itself a gorgeous automaton --if one vastly exceeding in subtlety anything to be found or which might be put together in the outside world. However, it is also more than an all-purpose engine, so that even when operating under the most conservative of conditions, its performance is never strictly deterministic -let alone anything approaching literal predictability.

Those of neoCartesian persuasion and others anxious not to see the psyche divested of its authenticity are apt to shy away from any such acknowledgement. They should not; the need for such a substratum of consistent and orderly rationality is an important aspect of what the process of *incarnation* is all about. There need be no fear provided we do not lose sight of the important caveat made clear in the above paragraph. The mind/brain ensemble does more than behave conservatively; it can also upgrade and enhance its own machinery -something which no machine or computer can do; more than this, it is highly questionable that *strictly* conservative behaviour is possible at all. These enhancements do not rest well with the mainstream intellectual of the present age. The secular positivist does indeed take the mind to be behaving strictly deterministically, though conceding that the admission of quantum physics onto the scene may impose some degree of stochastic softening -taking off the rough edges, so to speak. Hence the prima facie manifestations of creativity and free will are in need of being explained *away*.

".....'creation' does not (and metaphysically cannot) mean the power to bring something into existence out of nothing. 'Creation' means the power to bring into existence an arrangement (or combination or integration) of natural elements that had not existed before. (This is true of any human product, scientific or aesthetic). Man's imagination is nothing more than the ability to

rearrange things he has observed in reality."  
it?'

Ayn Rand 'Philosophy-who needs

".....Knowledge acquisition is itself a knowledge-based task -the more you know the easier it is to learn more. With machines, just as with people, learning takes place at the fringes of what we know. It is difficult to learn from nothing; but it is very easy to learn a little more." Feigenbaum Spectrum Nov 1983 [Find his first name]

Dreyfus & Dreyfus seem anxious to dismiss it, while perhaps harbouring a residual uneasiness over the matter:

".....Much of what passes for creativity is actually conventional and unexpected interpretations of past events.....if so-called creative geniuses do more than intuitively see new ways to use past experience, such radical breaks must be extremely rare."

Dreyfus, Hubert & Dreyfus, Stuart Mind over Machine

What in some ways might be called the minimalist intrusion of creative process -the everyday experience of the openness of 'free will' is found to be especially offensive:

".....But if libertarianism, which is the thesis of free will were true it appears we would really have to make some radical changes in our beliefs about the world. In order for us to have radical freedom it looks as if we would have to postulate that inside each of us was a self that was capable of interfacing with the causal order of nature. That is, it looks as if we would have to contain some entity which was capable of making molecules swerve in their paths.....there is not the slightest evidence to suppose that we should abandon physical theory in favour of such a view."

John Searle Minds Brains and science.

This scepticism which so dominates the modern intellectual landscape is far from being a modern phenomenon. It goes back at least as far as the classical Greek times of Lucretius, and re-emerges from time to time during eras of self doubt and spiritual alienation. Searle's 'making molecules swerve in their paths' is precisely what Lucretius had in mind and was anxious to deny.

This chapter seeks to complement the previous one in exploring all of the machine-transcending aspects of human behaviour. To be included here are all forms of creativity, invention, progressive self organization and true learning -not forgetting the enigmatic and very paradoxical acts of *free will*. It opens by surveying the variety of its manifestations together with an overview of how its paradoxes might be been contended with. One might say that its conclusions have been arrived at by informed commonsense backed up by the speculations of poetically-minded philosophers -of whom Plato is the founding example.

But in 1931, events were to take a completely unforeseen turn. In his landmark paper of this year - bearing the enigmatic and unthreatening title "Über Formal Unentscheidbare Sätze der Principia Mathematica und Verwandter System", Gödel was to show that like it or not, the breakout of the mind from the straitjacket of determinism followed as a matter of strict logical necessity. Its many implications will be explored under the heading The Gödelian Coup de Grace. This was bad news indeed for the intellectual who has made heroic but unsuccessful attempts to dismiss.

Following this, I have attempted to bring all aspects of the mind/brain ensembles performance together under the heading Minds, Robots & Zombies -the Larger Formal Context. The chapter ends with a close examination of the intriguing paradox of free will.

## THE ENIGMA OF CREATIVITY

## The Prima Facie Case

Let us start by being clear about what is meant or implied by 'creativity' in all of its many forms.

".....Freedom is self-creation, whatever else it may be." Charles Hartshorne

Here is what Berdyaev takes it to be, a belief shared by 'folk' people such as myself:

".....Creativity is always a growth, an addition, the making of something that has not existed in the world before. The problem of creativeness is the problem of whether something completely new is possible. Creativeness from its very meaning is the bringing forth out of nothing.....creativeness is the greatest mystery of life, the appearance of something new that that had never existed before and is not deduced from, or generated by anything.....The mystery of created ness is the mystery of freedom."

".....Creativeness from its very meaning is bringing forth out of nothing. Nothing becomes something.....Creativeness presupposes non-being, just as Hegel's 'becoming' does. So far from being identical to evolution, creativeness is the very opposite of it. In evolution, nothing new is made, but the old is redistributed. Evolution is necessity, creation is freedom. Creation is the great mystery of life, the mystery of the appearance of something new that had never existed before and is not deduced from, or generated by, anything." N.Berdyaev.

Berdyaev here divides the manifestations of novelty into two classes; those which may be derived unaided from the resources at hand -by some process of *transformation*; and those which call for something more. (Clearly, by 'evolution' he has the former in mind; he is not speaking of the process of organic phylogeny}.

Likewise, creativity is not to be confused with *ontogeny* -in which the oak emerges from the acorn, or You and I from a microscopic germ having as its kernel a few picograms of DNA. These processes seem as magical as the pulling of a rabbit out a hat, but become a little less mysterious when one discovers -more or less-how the trick is done. The process is, in fact, a deterministic (though not fully predictable) one, in which the information of a woven-up blueprint unravels and projects itself into the somatic building which it describes so the rabbit really was there all the time. Regardless, it's quite a trick -and one which remains to a considerable degree mysterious.

Finally, it is not true, as has often been suggested, that the creative innovator is a law *breaker*: quite the reverse:

".....The image created by the beatniks and by most of their predecessors back to the nineteenth century bohemians has led us to suppose that people of high originality are somehow lawless. But the truly creative man is not an outlaw but a law-maker. Every great creative performance since the initial one has been in some measure a bringing of order out of chaos."

John D.Gardner

"..... 'As it must not, so genius cannot be lawless: for it is even this that constitutes its genius -- the power of acting creatively under laws of its own origination' "

Noam Chomsky (quoting Coleridge)

About the nearest that creativity gets to law breaking is in some analogue of organic *ecdysis* in which a former system is shattered by something which is taking shape within it.

There is something deeply counter-intuitive about the notion of 'something from nothing' -seeming to imply a creatio ex nihilo:

".....Parmenides thought that becoming involves the arising of something out of nothing and asked how, under these circumstances, becoming can be possible. Aristotle answered the question by formulating the view that becoming does not involve the passage from nothing to absolute being, but from potential being to absolute being. The terms potential and actual are identical with the terms implicit and explicit respectively" W.T.Stace.

However, this shifts its ground rather than solving the problem, because it still leaves us asking about the location and modal status of the 'potential'. Both the speculations of poetically-minded philosophers and the introspective reportage of genius in-action converge to a like conclusion: The Potential Source is an eternal, infinite realm lying beyond that of existence -which is its product. This is the platonic Realm of 'universals' or perfect archetypes. Few follow Plato's particular lead but his problem of universals survives to this day and is yet to be satisfactorily resolved.

".....Classes and concepts may be conceived as real objects existing independently of our definitions and constructions. It seems to me that assumption of such objects is quite as legitimate as the assumption of physical bodies and there is quite as much reason to believe in their existence."  
Kurt Gödel

None have been more sensitive to this sense of the 'beyondness' of their discoveries have been the mathematicians of almost every stripe, including those who were otherwise staunch secularists (e.g. the Oxford mathematician G.H. Hardy).

".....Mathematical entities appear to have all the variety, the stubbornness, and the frequently unexpected characters which, in the ordinary world, are said to belong to real beings. The mathematicians' realm is in one sense his free creation. In another sense it is a world where what comes to light is that which he, in his private capacity had neither intended nor anticipated."  
Josiah Royce (?)

Creative insights acquired within the fields of science, mathematics and sometimes philosophy, seem, to their authors, to come *through* rather than *from* them. They are discoveries rather than inventions, being inwardly intuited rather outwardly assembled.

".....To him who is a discoverer in this field, the products of his imagination appear so necessary and natural that he regards them, and would like to have them regarded by others not as creations of thought but as given realities."  
Einstein

Much the same appears to hold true for ethical insights:

".....If I examine myself honestly and without any reference to any preconceived body of ideas, I find I do not choose my values at all, but that I recognize them and posit my actions in accordance or in contradiction with these values."  
Gabriel Marcel

To put it differently, the experience is, at times, quite frankly *inspirational*. Stated in the dialect of theism:

".....The genius feels that he acts not of himself, but is possessed by God and is the means by which God works his own ends and design." Berdyaev

".....When God touches the soul with truth, the light floods the souls agents and that man knows more than anyone could ever teach him. Thus the prophet says 'I know more than I was ever taught'.  
Eckhart

This is not to say that creativity is a passive, lay-back process in which the only contribution of the genius is to swing upon the gate upon the realm of Transcendence lying beyond. To the contrary, he must act as his own accoucheur in attendance at a birth process which must proceed without benefit of anaesthetics. To be sure, the final emergence may sometimes be painful, but often enough, this must be preceded by much agonizing preparation. in the absence of anaesthetics.

Poets and mystics have been unsparing in their celebration of the nether world of the a priori:

".....I could never content my contemplation with these general pieces of wonder, the flux and reflux of the sea, the increase of the Nile, the conversion of the needle to the North; and have studied to match and parallel those, in the more obvious and neglected pieces of nature which without further travel I can do in the cosmography of myself. We carry within us the wonders we seek without us; there is all Africa and her prodigies within us; we are that bold and adventurous piece of nature which he that studies wisely learns in a compendium what others labour in a divided piece and endless volume." Thomas Browne

".....Without stepping outside one's door, one can recognise the nature of the world. Without looking out of the window, the Cosmic Order can be seen. The more a man loses himself in the outer world, the more his understanding will perish. The world may be known without leaving the house. The Way may be seen, apart from the windows." Lao Tau

".....To see the world in a grain of sand  
And Heaven in a wild flower  
Hold infinity in the palm of your hand  
And Eternity in an hour"..  
William Blake

In a quotation given further above, Gardner spoke of the genius as the law *maker*. Given an Eternal Realm as source, I think that some generalisations may be made concerning the terms under which these extensions are made. By and large, the process is not one of accretion and accumulation but of a 'top-down' enhancement or supervenience:

".....The pyramid of knowledge no longer rests on foundations but hangs by its vertex; an ideal point never reached and, more curious, constantly rising." Gentzen? quoted by Torrence?

An excellent example is the way in which the system of Euclid was to evoke the more general case of Riemannian geometric. This envisages spaces subject to *curvature* -which may be positive -as in the case of spherical geometry, or negative, in its Lobachevskian counterpart. The space of Euclidean geometry takes its place, within this broadened system, as the singular case of zero curvature; that is to say, it is *flat*.

Another way of putting this is to say that formal structures or systems are closed from below, while open from above:

".....Each formal system is open upwards not downwards, and therefore no level of thought can be accounted for by being reduced downwards." T.F.Torrence

Speaking from his posture of theism, Torrence was to add:

".....Theological statements operate.....with essentially *open concepts* -concepts that are relatively closed on our side of the reference ....but which on God's side are wide open to the infinite objectivity and inexhaustible intelligibility of the divine Being."

Arthur Köstler's concept of 'bisociation' has the appearance of being a special case of this process of 'top-down' enhancement:

".....Bisociation means combining two hitherto unrelated cognitive matrices in such a way that a new level is added to the hierarchy, which contains the previously separate structures as its members."

Henri Bergson appears to provide an excellent example of what Köstler had in mind:

".....Reason, reasoning on its powers will never succeed in extending them, though the extension will not appear at all unreasonable once it were accomplished. Thousands and thousands of variations on the theme of walking will never yield a rule for swimming; come, enter the water, and when you know to swim you will understand how the mechanism is connected with that of walking. "

The eternal Platonic realm is precisely that -one which is eternal and unchanging. It eternally *is what it is*, being *one way rather than another*. Under certain hypothetical circumstances, this may impart to the creative process an element of *predictability* -something which sounds contradictory at first encounter. But just consider for a moment the well-known 'convergent' phenomenon of creative invention in which two or more people independently come up with the same innovative discovery or insight. If, indeed, all must draw inspiration from the same source then it is hardly surprising that creative minds may come to march in 'in step'. One curious consequence of this is to remove any *necessary* conflict between creativity and predictability. As an admittedly very hypothetical example suppose that Albert Einstein had had an identical twin brother Hermann and that both had been reared together but separated around the year 1900 -the start of the great modern era of physics, and that during the two decades immediately following the two remained out of touch with each other while remaining in personal contact with us. One day Albert meets us in a cafe to disclose his theory of relativity to us. At this point we might predict -with a high degree of confidence, that Hermann would soon greet us with news of rather similar if not identical ideas. What makes such a prediction reasonable is the way in which special relativity was clearly an idea whose 'time had come'. What of Albert's second discovery -the General theory- ten years later? Would Hermann show up with this also? That's stretching things, but not at all to the breaking point; this deeper theory is so deeply imprinted with the cast of mind of its author which, of course, would be shared by his twin brother.

#### The Variety of its Manifestations

Creativity manifests in a number of forms, some spectacular while others are of everyday encounter. Most impressive is the performance of genius, whether he be active in mathematics, science, philosophy or apollonian art. Perhaps the genius's opposite numbers -the saint and the mystic- are doing something of the same, drawing upon some exalted region of Reality and speaking in a numinous dialogue -which the plane man finds difficulty in interpreting.

Let us contrast this with a common-place but equally remarkable manifestation. What I have primarily in mind here is the emergence of personhood of each one of us starting from a very humble endowment -in terms of certain biases of temperament and disposition invested in us. This is a long journey of our psychic ontogeny in which we slowly and haltingly emerge into full personhood. Something indeed comes -if not from nothing then from very little.

Consider the phenomenon of phylogeny which resembles it in many ways. It too is a process of self-organization in which the incredible cornucopia of organic evolution emerges from the tabula rasa of solutions mesomolecules which evidently must have been in place at the dawn of life. Somehow or other, somatic blueprints of every kind were to work their way into the light of day, together with the necessary ontogenetic 'pert charts' needed to carry plans into physical actuality. Though the process be largely 'blind' -i.e. must proceed in absence of any empirical guidance to shape its plans; and though the germinal cell is but a single unit in comparison with the  $10^{10}$  -  $10^{12}$  neurones supportive of our own consciousness, there is a strong formal similarity between the two cases. The germinal cell does enjoy a near-compensating advantage on *longevity* Your germ plasm and mine were already taking shape in excess of  $10^9$  years ago -at the levels of biochemistry, cytology and histology. Compare that with our three score years and ten. Questions of germinal consciousness is not one that seems to have

occurred to anybody as something meriting serious speculative analysis. Any reader intrigued by the suggestion may consult my forthcoming volume "The Origin of the Specious: Unnatural Selection."

Some of the most important contributions made 'from outside' are not creative in the accepted sense, but are needed to make running compensation for the very incomplete and inconsistent logic of thought - quintessentially the process of natural language. Consider as a very everyday example, the way in which the minds of two persons engaged in rapid, colloquial conversation 'track' each other, given only a thin trickle of highly elliptical symbolic strings in support of the synchronization, in which sentences are left incomplete, syntax mangled and the connotations of words are given all manner of on-the-spot stretching to suit the situation. The machinery of language on its own would be hopelessly elliptical; the balance must be supplied through a continuing exercise of the imagination -this is achieved through a subliminal consciousness.

Creativity is something to be found within both of the realms of Transcendence and Existence; It's both a means to an end and an end in itself.

".....Of all living creatures in the world, man has his vital and mental energy vastly in excess of his need which urges him to work in various lines of creation for its own sake. Like Brahman himself he takes joy in productions which are unnecessary to him, therefore representing his extravagance and not hand-to-mouth penury."

Tagore

It is essential to life and would be as necessary for a divine eternal being as it is for us. Without it, life would lose its savour and pass into a slow decline, ultimately finding itself trapped within endless repetitions - Nietzsche's 'eternal return'- which serve as well as any as a definition of Hell. At the Transcendental level of the working-out of macro-Reality, it is to be seen in its Hegelian guise in which the ultimate and featureless invariance of pure Being 'unravels' to produce the cosmos, at the moment of the big bang.

With the exception of Hegel and some of those inspired by his teachings (e.g. Whitehead and movement of 'process' theology of which he is the founding father), little has been made of creativity by the great architects and system builders of philosophy:

".....Prior to the 20<sup>th</sup> century, scarcely any philosopher (at least in the West) saw in the idea of creativity a fundamental principle, a category applicable to all reality."

Charles Hartshorne

Hartshorne is speaking here as a 'process' theologian which envisages a larger reality of a progressive evolution in which *Being* has become subservient to *Becoming*. While sympathetic to Hartshorne's initiative, I have followed a course within a more Eastern monistic ambience. These matters lie outside the scope of the present volume: the interested reader may consult my forthcoming The New Monadology. The present chapter is devoted to appearance and importance of creativity within the mind-processes of finite organisms of this world -of whom we are the best known and most advanced instance.

#### A Glimpse of Genius in Operation: Consciousness & Unconsciousness

In normal everyday activity, conscious experience is highly focussed; the mind moves linearly, from this to that in a more or less orderly fashion. One might perhaps conjecture that its intensity and vitality have some direct proportionality to the novelty and the creativity invested in the moment. It falls to a minimum in proportion as we retire into passivity, approaching zero asymptotically as the 'hypnagogic state' is entered.

However, whenever the mind needs to back away from the normal 'stream of consciousness' to address challenging problems calling for novel and creative solutions, consciousness loses its linear, focussed characteristic, becoming more speculative and contemplative. It becomes softer, less articulate; it *tarries*. There tends to be an avoidance of systematic and narrowly deductive thought processes:

" .The themes which reverberate through (creative scientists') intimate writings are: the belittlement of logic and deductive reasoning (except for verification after the act); horror of the one-track mind; distrust of too much consistency .; scepticism regarding all-too-conscious thinking. This sceptical reserve is compensated by trust in intuition and in unconscious guidance by quasi-religious or by aesthetic sensibilities."

Arthur Koestler The Act of Creation

There is typically a back-away from, or perhaps abandonment of linguistic processes:

".....Words are a blessing that can turn into a curse. They crystallize thought; they give articulation and precision to vague images and hazy intuitions. But a crystal is no longer a fluid. -----Roman Jakobson, a contemporary linguist --to quote one among many-voices the same ancient doubt: 'Signs are a necessary support for thought. For socialized thought (stage of communication) and for the thought which is being socialized (stage of formulation), the most usual system of signs is language properly called; but internal thought especially when creative, willingly uses other systems of signs which are more flexible, less standardized than language and leave more liberty, more dynamism to creative thought.' "

Arthur Koestler

And finally, a need to relinquish conscious control, to give mental processes on the fringe of consciousness their own head:

".....The temporary relinquishing of conscious controls liberates the mind from certain constraints which are necessary to maintain the disciplined routines of thought but may become an impediment to the creative leap; at the same time other types of ideation on more primitive levels of mental organization are brought into activity." Arthur Koestler

Berdyayev puts the matter more strongly:

".....Creative inspiration, conception and intuition always have their original basis in the unconscious or the super conscious. The creative process in consciousness is secondary and less intense." Berdyayev

Some deep and subtle intellectual problems may only be solved after a long period of rumination which proceeds subliminally, and therefore privately. Such a self-sufficient module makes heavy demands upon the resources of the psyche, leaving little left over for the minimum of explicit conscious needed to keep the store open. So long as commitment to the problem is maintained, the individual is distracted and absent minded, as if his mind were 'elsewhere' -which indeed in a sense it is. The solution process to the way in which an image slowly comes into focus in the photographic darkroom development bath or when a colloidal sol sets into a gel. Whyte characterises the contrast with ordinary focal conscious thought in this way:

".....Conscious and unconscious aspects (of thought) are now recognized to be not on a par: the first being transitory, discontinuous, and self eliminating; the second continuous and self-developing." L.L.Whyte

Where the mother liquor is 'supersaturated' to speak, this may occur quite suddenly in an 'aha' or eureka! event in which an absent consciousness snaps back into sharp focus. But until such time as this may happen, the burdened individual must endure a period of ennui and dysfunction or quasi-suspended animation.

It is recognised as a commonplace among most creative mathematicians that new and interesting discoveries are not arrived at through processes of deduction but are conceived intuitively as conjectures; only then is the linear machinery of deductive inference brought into play to put pure conjectures to the acid test. As a striking example, Ramanujan surmised that the following expression, scrupulously expanded would boil down to an exact integer -remarkable indeed, bearing in mind that  $e$  and  $\pi$  are transcendentals, and  $\sqrt[3]{163}$  is irrational because 163 is a prime number, so that all three are infinite non-repeating decimals.

In the pre-war days during which this conjecture was made, there was no way of checking its veracity. However, when post war computers got powerful enough to tackle the reduction, what emerged was an 18 digit number followed by 2 million nines!! How can the mind of a limited, self-educated mathematician -a clerk in the Indian civil service- come by such a conjecture?

I think that in coming to terms with all such phenomena, we must be very careful in our choice of words. They are indeed unconscious to the psyche, but that doesn't rule some form of coconsciousness enjoying a closely circumscribed private domain. One may think of this in terms of a heavily banked fire in which consciousness emits no ore than a dull red glow. Such coconscious modules are needed in case where problems can only be solved globally, in parallel, by some process of relaxational closure. Focal consciousness is more adept with problems which can be resolved incrementally through chains of reasoning. Coconscious modules may also appear on-the-run under more mundane circumstances. Consider a secretary who finds no difficulty in typing from a manuscript at full speed while simultaneously carrying on a spirited conversation with a friend or colleague. In this case, the typing is being done by 'channel 2' which is an unconscious automaton. However, its tip bears a subliminal consciousness which catch our attention when something threatens to go wrong.

The recognition and acceptance of subconscious thought as a legitimate and productive mode of mental activity is a comparatively recent event. Whyte has traced its historical origins as follows:

'Unbewusstsein' and 'Bewusstlos' 1776 (E.Plattner) --made popular by Goethe and Schelling (1780-1820).

'Unconscious' 1751 in England. Frequent after 1880, especially by Wordsworth and Coleridge.

'Inconscient' in the 1850s, in France, mostly in translation of German.

However, it seems to be an idea whose time had come judging by the vigour with which all aspects of the notion were subsequently pursued --sometimes to the point of excess.

".....The history of the rise of self-conscious man and the discovery of the unconscious after Descartes shows a dominant German contribution in the realm of systematic ideas, English support on the empirical side and French verbal caution combined with intuitive subtlety. The German language tradition certainly displays most evidence both of an occasional intellectual obsession with the self-awareness of the individual, and later of a need to correct this by substituting, not a more balance personal attitude, but a better theory of mind .In spite of one or two notable names and the great influence of French psychiatry, with its interest in hypnotism and hysteria from Mesmer to Charcot, French minds contributed relatively little to theoretical understanding of the processes involved." L.L.Whyte

".....Hartmann fairly boxes the compass of the universe with the principal of unconscious thought. For him there is no nameable thing that does not exemplify it."  
William James

At the turn of the century, the unconscious was to take off on a tangent spear-headed by Pierre Janet and Sigmund Freud. Though of immense importance to questions of the unity, coherence and authenticity of the psyche, they have little impact upon the matters at hand.

The Gödelian Coup de Grace

Things were to take a most dramatic turn with the publication of Gödel's famous paper in 1931. The nature of his discovery, its possible implications -far beyond the domain of mathematics is presented in an appendix at the end of the present volume; what follows is a brief summary.

What Gödel's paper demonstrated was that any formal system as complicated as arithmetic contains valid propositions and conjectures whose truth cannot be arrived at by any process of Peanoese induction from the axiomatic grounding of the system. Their truth can only be demonstrated by direct insights calling upon lines of argument which lie beyond strict 'mathematical induction'. To put it differently, not all true propositions or statements enjoy the status of *theorems* -although they can become so by fiat, if they be added as extra axioms over and above those upon which the formal system is grounded. More than this, Gödel's proof established that arithmetic was *incorrigibly* incomplete, that is, no finite addition of extra axioms could make it so.

This discovery dealt a mortal blow to the leading school of the foundations of mathematics, that of David Hilbert's 'Formalism' which held that the soundness and consistency of any formal system could be derived within the system, through metamathematical proof-processes. Thus, for example, he was able to make the very shaky foundations of Euclidean geometry complete and consistent, though only at the cost of a greatly expanded axiomatic base. A total of 20 axioms were found to be needed in all if the system was to be protected from false inferences or ambiguities -e.g. the fallacious proof, allowable within the original Euclidean system, that all triangles are isosceles. It was David Hilbert's fond belief that properly grounded and conceived, the whole of mathematics could be shown to be first-order in the sense discussed above. It was not until the advent of Gödel, Church and Turing. that this was shown to be an impossible dream.

However, matters didn't end there. Although directed at the foundations of mathematics, his theorem was soon seen to have broader implications for thought processes in general. in particular, putting paid to *strictly* mechanistic theories of brain's performance. Whatever else, the mind/brain ensemble, in reaching truths by non-algorithmic processes is acting as something more than a machine. Nagel & Newman [ ] are credited with being the first to draw this inference from the theorem, adding:

".....It does not mean, as a recent writer claims, that there are 'ineluctable' limits to human reason'. It does mean that the resources of the human intellect have not been and cannot be fully formalized. and that new principles of demonstration forever await invention and discovery."  
Ernst Nagel and James R. Newman p 99 Gödel's Proof 1958 New York University Press

-though with the further caveat that this, in itself, says nothing, one way or the other, about whether human thought processes may or may not be saddled with their own limitations:

".....The human brain, to be sure, may have built-in limitations of its own and there may be mathematical problems it is incapable of solving" Nagel and Newman

The net effect of Gödel's theorem has been to put a firm plank beneath the advocates of creativity as something which was *provably veridical*. Because this runs so very much against the current of the Positivist times in which we live, vigorous attempts have been made -without much success. These will be examined further below.

This extension to human thought was welcomed by those of Cartesian, or other dualistic persuasion because of the way in which it seemed to be in registration with the nature of the psyche in the way in which its presence is disclosed by introspection and by the given character of the existentialist moment. John Lucas [ ] was to develop this thesis at some length; his ideas are so clear and to the point, and of such direct intuitive appeal that I have not hesitated to quote him at length:

".....At one's first and simplest attempts to philosophise, one becomes entangled in questions of whether when one knows something one knows that one knows it, and what, when one is thinking of oneself, is being thought about, and what is doing the thinking. After one has been puzzled and bruised by this problem for a long time, one learns not to press these questions: the

concept of a conscious being is, implicitly, realized to be different from that of an unconscious object. In saying that a conscious being knows something, we are saying not only that he knows it, but that he knows that he knows it, and that he knows that he knows that he knows it, and so on, as long as we care to pose the question: there is, we recognize, an infinity here, but it is not an infinite regress in the bad sense, for it is the questions that peter out, as being pointless, rather than the answers. The questions are felt to be pointless because the concept contains within itself the idea of being able to go on answering such questions indefinitely. Although conscious beings have the power of going on, we do not wish to exhibit this simply as a succession of tasks they are able to perform, nor do we see the mind as an infinite sequence of selves and super-selves and super-super-selves. Rather, we insist that a conscious being is a unity, and though we talk about parts of the mind, we do so only as a metaphor, and will not allow it to be taken literally.

".....The paradoxes of consciousness arise because a conscious being can be aware of itself, as well as of other things, and yet cannot really be construed as being divisible into parts. It means that a conscious being can deal with Gödelian questions in a way in which a machine cannot, because a conscious being can both consider itself and its performance and yet not be other than that which did the performance. A machine can be made in a manner of speaking to 'consider' its performance, but it cannot take this 'into account' without thereby becoming a different machine, namely the old machine with a new part added. But it is inherent in our idea of a conscious mind that it can reflect upon itself and criticize its own performances and no extra part is required to do this: it is already complete, and has no Achilles' heel."

J.R.Lucas

Stanley Jaki [ ] was to urge the same line of argument:

".....The fact that the mind cannot derive a formal proof of the consistency of a formal system itself is actually the very proof that human reasoning, if it is to exist at all, must resort in the last analysis to informal, self-reflecting, intuitive steps as well. This is precisely what a machine, being a purely formal system, cannot do, and this is why Gödel's theorem distinguishes in effect between self-conscious beings and inanimate objects.....or as Polanyi put it: 'A formalized deductive system is an instrument which requires for its logical completion a mind using the instrument in a manner not fully determined by the instrument; while the mind of the person using the instrument requires no such logical completion. herein lies the difference between mind and machine.'"

S Jaki: "Mind, Brain and Computers"

We find the same sentiments within the Eastern paradigm:

".....Every cognition of an external object is, at the same time a cognition of that cognition. Every feeling and every volition are, on one side, connected with some object, but they are also, on the other side, self-conscious. We are thus possessed of an 'awareness of an awareness'. Knowledge is self-luminous."

Sterbatsky: Buddhist

Logic'

Others, notable Josiah Royce [ ] and Henri Bergson [ ] were to incorporate similar ideas within their philosophical overviews. The 'mentalism' of all of these authors endows the psyche with a deep ontology which stations it at the apex of a 'top-down' logic which operates quite differently from its '-bottom-up' doppelgänger of computer algorithms. It endows the psyche-in-action with sui generis qualities inseparable from 'top down' wholeness stemming from the influx of Eros from the apex of Psi-Logos. This makes of each instantional act a passage from invariance to contingency, from generality to particularity; each such act moves down the formal gradient. In consequence, in initiating the next instantiation, the introspecting Psyche possesses the immediately previous frame from a higher and uncommitted formal ground.

".....The ultimate metaphysical principle is the advance from disjunction to conjunction, creating a novel entity other than the two entities given in the disjunction. The novel entity is at once the togetherness of the entities which it finds, and also it is one among the disjunctive 'many' which it leaves.....the many become one and are increased by one."

Whitehead, quoted by Hartshorne

I would like to add here the special case of the shaft of wit which appears spontaneously, on the spur of the moment, and the ebullience of a free-ranging humour:

"For the first time I understood Goethe's laughter, the laughter of the immortals. It was a laughter without an object." ermann(?) Hesse:  
'Steppenwolf'

Let us pause to consider the magnitude of the sea change which Gödel has brought about. No longer a recondite curiosity, it has entered as a novel and inseparable ingredient of every moment of thought. We all ride upon the crest of a Gödelian wave; its contribution to the thought process may be great, small, or marginal and inapparent, as it is most of the time. The existential moment wouldn't be sensed the way that it is without it. Each moment is inescapably a moment of novelty. Perhaps the well studied phenomenon of the 'oscillation of attention' is its minimalist manifestation. It is simply impossible to maintain a steady perceptual experience for more than a brief moment. As James put it a century ago:

".....There is no such thing as voluntary attention sustained for more than a few seconds at a time. What is called sustained voluntary attention is a repetition of successive efforts which bring back the topic to the mind.....'not to have a succession of different feelings is not to be conscious at all....the chain of consciousness is the sequence of differents'."  
William James

I take it to be the case, of course, the Gödelian presence is universal among monads of every stripe. It is only when we reach the ground floor of the monad manqué of fundamental physical particles that it vanishes -or rather, implodes into the stochastics of improbability; this is the doppelgänger of the openness of freedom within the inorganic realm.

Penrose (and a few others) aside, notions that Gödel's theorem has something vital to say about the activity of the mind/brain ensemble runs directly counter to the zeitgeist; the mainstream intellectual has spared no pains in his attempt to cashier this unwelcome intruder. Both Penrose and Lucas before him have been assailed from every side; it's hard to believe that any unused weapons remain in the armamentarium of the opposition. In a special issue of Behavioural and Brain Sciences (1990) engages each of these assaults and seems, to the present writer to have stood his ground rather well. In an appendix addressing Gödelian initiative, I have grouped the arguments under five headings, which are briefly summarised below.

The first is the 'critical mass' analogy, to the effect that when systems become sufficiently complex, they behave in ways that transcend what their constitutional grounding would seem to permit. This is to say a great deal more than that their formal grounding is incomplete (as is true of arithmetic) or that clearly, complexity must reach a certain limiting richness for certain kinds of events can be made possible. To give Perlis's example (1990), simple molecules cannot individually self-replicate, but suitably complex sets of them can; we now have some idea of what that minimum level of complexity is, to make *transitive* reproduction possible. It has come to be held that some 'chaotic systems' may be displaying 'breakout' characteristics of this sort. This thesis strikes me as far-fetched, consequently resting the onus of proof firmly upon the shoulders of its advocates. However, should it indeed be proved to be the case, then a completely novel principle would thereby have been introduced into mathematics; it would be almost as radical as Gödelian incompleteness for which it would now be surrogate. Wouldn't this make of the victory a pyrrhic one? Perhaps not, in the view of the mainstream intellectual, who might feel that it would provide some protection from unwanted Platonist intrusions.

Second is the postulation of a 'horrendously complex' algorithm at the base of the mind/brain performance. A logical requirement, if it is to pass Gödelian muster is that its formal constitution be *unknowable* to its user. While it is impossible to disprove such a conjecture, it is highly implausible for a number of reasons. First, it is a 'brute-force' solution -an inelegant attribute -something which should immediately put us on our guard. Its proponents would be required to demonstrate that the anatomy and physiology of the brain is capable of supplying the necessary substratum. An added implication is that such an algorithm, as a genetic endowment, must have come into being through Darwinian mechanisms of 'filtered noise'. And secondly, it runs directly counter to the inwardly-given simplicity of the thought process.

Third has been the proposal that the mind operates on hidden heuristics which are general purpose hints and open stratagems rather than hard and fast mechanical rules. However, if the mechanist is to maintain his position, then these heuristics would, themselves, have to be algorithmic, hence would be incapable of delivering a Gödelian performance. Likewise, it has sometimes been urged that the mechanism of mind might support a Gödelian 'front end' loop which could increase the complexity of the system, indefinitely. The problem, once again, is that this 'master routine' would itself be an algorithm which further, would lack the needed intuitions to meaningfully guide the Gödelian process.

Fourthly, is the perennial appeal to the 'monkeys at keyboards' argument. Given time, these industrious creatures would even produce a word-perfect copy of Gödel's paper itself, not to mention (given appropriate keyboard symbols) the score of Bach's great D-minor fugue. Quite apart from overwhelmingly inefficient nature of the process -making it unlikely beyond belief that such products would appear by such means, within the life of the universe, our simian cousins would have, in effect, produced only the symbols and not their meanings -which would only come into existence when contemplated by human or equivalent intelligence. Further, they would not know when they had 'arrived' at something interesting; the clacking of the keys would continue unabated, and these master-pieces would quickly sink from under the piles of trash which followed.

Finally, can we really trust Gödel's theorem, given our uncertainty about the grounding mathematics in general -e.g. as to whether the Zermelo-Fraenkel system provides the needed sufficiency? Penrose, while conceding the point, argues that it applies to all of mathematics, and didn't just emerge under the promptings of the Gödelian discovery. A certain unsupportable faith is needed if mathematics is to proceed *at all*.

#### Minds, Zombies & Robots

".....There was once a monk who invented a machine which could prove the existence of God. This was a very clever thing for a machine to do. The monk, however, was far cleverer than any machine which has been invented up to the present time. No machine has invented a monk who could prove anything at all." C.A.Mace, From Sluckin's 'Minds and Machines'

Minds, zombies and robots form a graded series of performing entities; speculations upon their differences and similarities are usefully entertained in attempts to bring the enigma of human performance into focus. How separable is it from consciousness itself and Gödelian augmentations? The key here is in deciding just what kind of an entity a Zombie is and the terms upon which it might be brought into existence -in principle, if not in fact. It will help clarify the distinction between a mind, as something which a person *has* and that same mind regarded as a formal engine. For the purposes at hand, I'm defining a zombie as a pure automaton which lacks a mind *of its own* because there's no person there to exercise ownership. Any consciousness present is taken to be marginal and epiphenomenal, lacking in all initiative and insight. This may be put another way by saying that the quintessential zombie would be one in which the Gödelian presence had shrunk to zero.

A zombie would need to be a pure automaton, with the immediate implication that everything which it does is strictly *deterministic* -while bearing in mind that no matching degree of *predictability* is thereby implied or to be expected. Yet it would not at all be the same thing as a robot -which may be defined as any dedicated mechanism which may be built and assembled or crafted from classical matter limited to the gamut of natural law as currently accepted. That is to say, we are talking about a 'reductionist' world in which no extensions to the canon of law expressly called upon in support of the architecture of mind are to be contemplated. Pure for purposes of

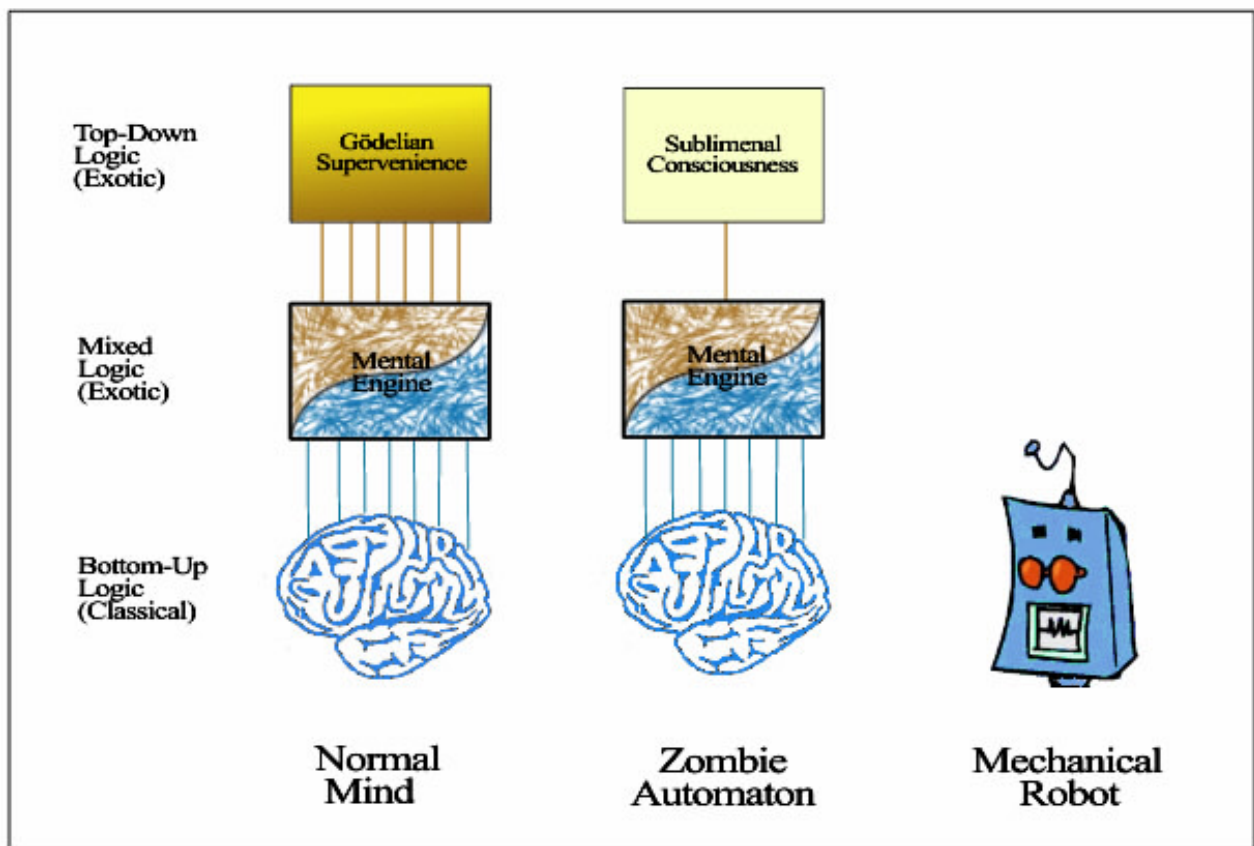
clarity of exposition, I have chosen to designate the zombie's protoplasmic engine an *automaton* to distinguish it from the far more circumscribed *mechanism* which any robot has to make do with. Stated in formal terms, what this means is that the zombie is able to run on 'top-down' logic with all that this implies, whereas mechanisms are limited to its poor cousin, conventional 'bottom up' counterpart. The zombie would be running upon the *characteristica universalis* (or some approximation to it) while all robots must, willy nilly, get by with the *calculus ratiocinator*.

What things really boil down to is this; in attempts to bring the zombie into existence, we have to ask - just how *dispensable* are Gödelian aspects of the existential moment? To what extent may we divest the zombie of its presence without detracting from the kind of stereotyped performances which it is called upon to deliver?

For a start, the initiative and creativity, which can come only from Gödelian supervenience can be dispensed with by definition, since their absence enters into the definition of zombiehood. Likewise, there could be no on-the-run 'truing up' of the algorithms of mind as may be called for by the changing needs of the moment. However, this might do little more than limit the zombie to its traditional single-mindedness. Next, what of the incompleteness and inconsistency of minds viewed as strictly formal engines or instruments? Penrose has insisted that the algorithms of mind cannot be made to run in the absence of a substantial Gödelian make-up. For reasons elaborated elsewhere, I believe that Penrose's essential (if extended) *reductionism* has led him to exaggerate how much of this augmentation may truly be *demanded*. While it is true that his concept of a 'machine within a machine' -which he takes the network of microtubules to supply- provides an extensional to what the conventional network of neurones is able to supply, this is hardly to be compared with what the kinds of exotic high-dimensional domains which I have in mind are able to supply. What I am driven to ask is whether a scaling-down of Gödelian corrective augmentation can go to completion. I suggest that this is possible in terms of a trade-off between subtlety of performance and a barebones functionality. In the course of normal every day activity, I suspect that Gödelian supervenience is called upon in proportion as short-cuts in the exercise of the algorithmic engine are resorted to. This is exactly what happens, in conversational interchanges, for example, in proportion as a measured prose is allowed to decay into an elliptical counterpart. These reduced formal resources are compensated for by a running exercise of the imagination -however inapparent this may be, from the inside view of each participant. This, of course, is not at all the kind of performance which we expect to get from a zombie -who adds *simple*- to his *single*-mindedness. Again, the zombie is traditionally heavy-handed, yet his rich automaton resources enable him to *blunder to success* in a way in which robots cannot.

We come, finally, to a Gödelian contribution which is as essential to a zombie as it is to us. It is the presence of Eros which brings *apical unification* to the unfolded domain of  $\psi$ -engrams dispositional mind; until this is done the top-down logic of mind is latent and non-functional. But once it has entered, an operative *characteristica universalis* is in place and available in support of the Zombie's mission. It necessarily brings with it the presence of the second modality of consciousness, though in the case of the zombie this is required to do no more than provide the regulation 'dream-like' marginality of sentience.

Figure 6.1 strikes the comparisons between normal mind, zombie and robot in diagrammatic form. All three rest upon a basis of classical matter, whether this take the form of the protoplasm of the brain as encountered by the surgeon, or the silicon upon which the hardware of the computer is grounded. The mainstream intellectual would limit humans and zombies alike to the same  $\mu$ -logic resources resorted to by robot artificers, hence for him, only the bottom of the three horizontal layers in the figure should be there at all. As the reader is already aware, I make no attempt to burden the cortex in any such way, seeing it rather as a distributed amplifier and a two-way interface with the neural system which connects to the coma and to the outer world at large. In my mind-brain overview, almost all of the operations underlying manifest (and for that matter, covert) performance of mind are sustained within exotic strata forming a continuum with the classical matter of the cortex. As the figure shows, both of these upper strata are enjoyed by human and zombie alike. The difference between them is in the minimality of the Gödelian presence, in the case of the zombie, where the very active participation, within your mind and mind has been throttled back to an amorphous wash of consciousness.



## Minds Zombies & Robots

Figure 6.1

The colour blue has been used to signify classical matter and the  $\mu$ -logic to which it is unavoidably constrained. The upper two strata in the figure are exotic and supportive of top-down  $\psi$ -logic. Top-most strata is that from which mental automatism enjoys Gödelian complementation and enhancement.

Is the performance of the zombie Turing machine reducible? That is to say, can upper, top-down logic be rendered in bottom-up terms, no matter how ungainly the resulting mechanism might become in consequence? I think that the answer is clearly 'no', just because a functional  $\psi$ -logic can only be brought into existence by the introduction of a second, non-formal category. (Interestingly enough, Penrose would give a different answer, as has been outlined in chapter [ ]. His proposed model of quantum wave function collapse ("correct quantum gravity") side-steps stochastic uncertainties, drawing the platonic realm into a larger determinism; in other words, the platonic realm is, for him, an essential (and larger? part of the *characteristica universalis*).

### The Engine of Mind within its Larger Context

That the mind is a machine can hardly be doubted, given the organised efficiency and the extraordinary scope of its capabilities. Though its performance is not strictly predictable in-the-small, there is every reason to believe that it largely runs within a deterministic regimen, though of a character which is teleological rather than formal. What is predictable is consistent record of success in delivering the goods; what is less predictable is the means by which it reaches its goal. What is remarkable is the way in which it seems able to compensate for unique and unpredictable obstacles which may arise to block its intended path.

But to say that it is a machine is not to say that it is only a machine, nor to imply that its mechanisms or algorithms are organised in ways familiar to us in the construction of our automata and other machines, nor finally that their logic is grounded upon a substratum which is identical with the matter we encounter in the world around us -including the protoplasm of the brain as encountered by the surgeon, neurophysiologist or neuroanatomist.

In point of fact, it *is* more than a machine, with two consequences. Firstly, its performance is no longer strictly deterministic, though it regresses to this when operating within ultra-conservative scenarios. And second, unlike any engine with which we are familiar, the machine is subject to correction, refinement and augmentation which arises, so to speak, from within. Yet this is something which the machine, qua machine, cannot perform on its own. While it is possible to construct machines which embrace an extra layer of mechanism which may perform alignments and confer some degree of adaptability called for by a changing environment, this is not to be confused with a true supervenient augmentation which outstrips what any self-improving 'top layer' is able to provide, because of the way in which the machinery is raised to a higher and novel level of competence. What makes this progressive self-organization so remarkable are the humble beginnings within the infant and the child from which it takes origin.

The engine is able to be more than the machines of which we have any knowledge because of the larger entity within which it is securely and inseparably stationed. According to the nature of the performance which our machines are called upon to fulfil, they may or may not require the services of an operator. Many function as pure automatons, and this would become true of the automobile when suitable enhancements are built into our highway system. But when an operator is necessary and appropriate, he resides separately from the mechanism. We sometimes say, for example, that for an experienced fighter pilot, his plane is an 'extension' of himself, the two merging into a higher unity. But this is to speak in the language of metaphors; the machine remains outside the man rather than being absorbed into his body and his person.

Things are quite otherwise, however, in the relationship between the psyche and his mind regarded as all-purpose instrument and engine. There is both a formal and a material continuity between them which is smooth and seamless to the point where there's no definitive way of saying where one ends and the other begins. The relationship between the two phases is anything but symmetric, however. The Psyche is the seat of consciousness and the author of innovation. The machine took origin from the psyche from whom it continues to be favoured by modifications, alignments, and sometimes formal extensions.

Likewise, the mental engine is not separate from the world upon which it operates, and within which it may be said to reside. Again, we find here an intimacy of continuity which is only possible because its immediate world upon which it directly operates is not 'out there' but an internal construction which is a surrogate image. This inner world is itself an objectified mental entity which is not *of* the cortex but crafted from an exotic substance which resides within, and is an extension from the classical protoplasm of the 'enchanted loom'.

Machine though it be, the mental engine, in the large, is no automaton, requiring a continuing infusion of consciousness to permeate its levers and cams. Nevertheless, the psyche could never perform as it does were it not able to conserve its resources by offloading modules of the machine as pure automatons -though with a latent or subliminal consciousness vague hovering in the neighbourhood available for instant recall if things start to go awry. In G de Reynold's words "the machine is the material expression of the human soul".

Figure 8.2 attempts to summarise much of the above in diagrammatic form, stressing the way in which psyche, mind and environment comprise a single formal and material continuum. It also depicts the nature of the transition between sleeping and waking states. In slumber -as shown in the left off set from the main figure, all consciousness is absent and the dispositional or latent mind which remains is modally singular being nothing more than a weaved up material configuration. However, its upper reaches contrive, will nilly to conserve the disposition and persona of the psyche, ever on the ready to offer this reticulum of engrams to the quickening intrusion of a re-entrant  $\psi$ -emanation. As will be seen by its comparison with a typical conscious instantiation, shown on the right, it lacks both consciousness (colour-coded yellow) and the Gödelian supervenience forming the uppermost stratum of the figure.

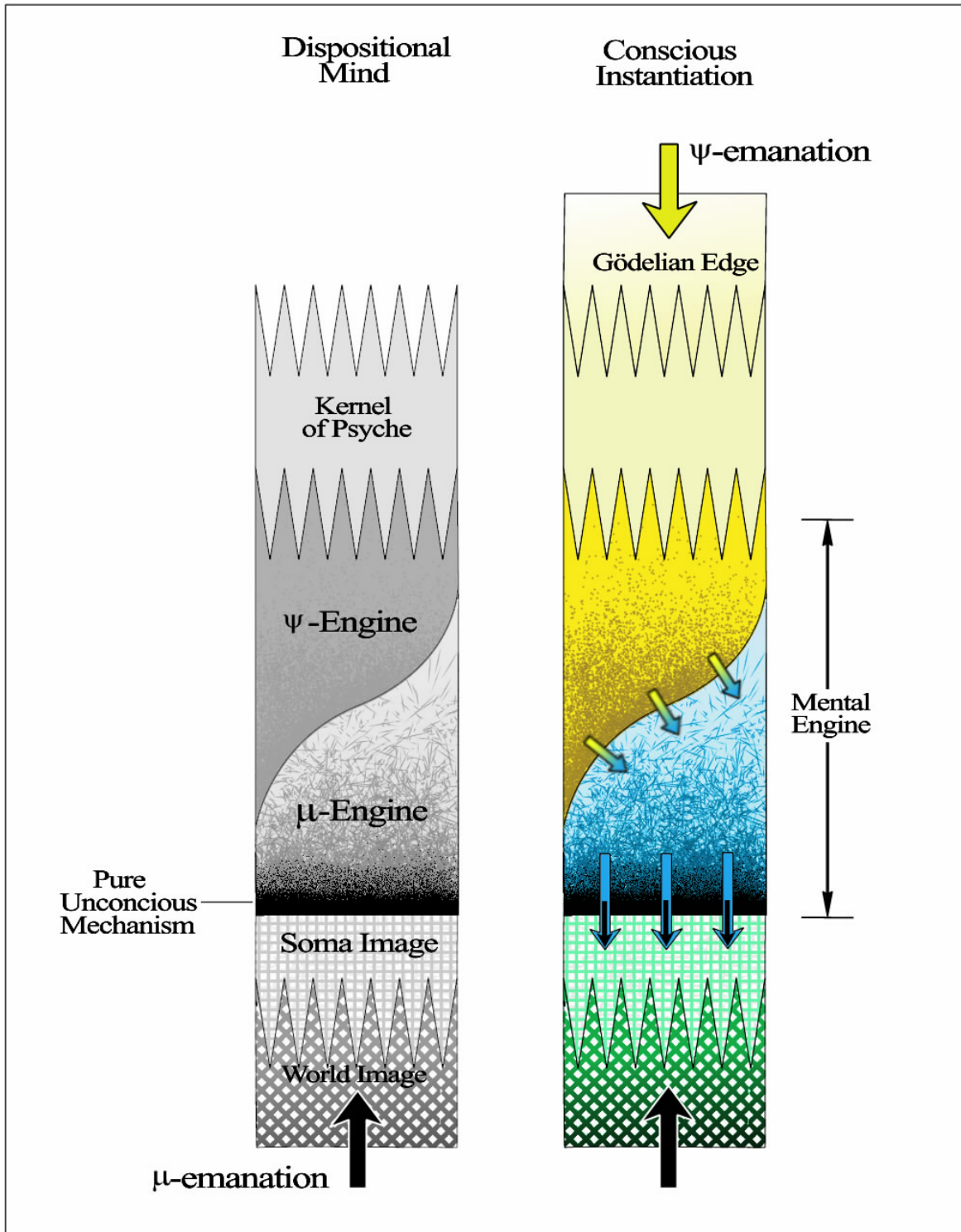
Hubris forever hovers in the wings, threatening to strike those seeking to address and render weighty matters of metaphysics and ontology in terms of simple concrete diagrammatic devices. Regardless, images have their place and sometimes may be less hubris-inviting than their verbal counterparts. The main thing, in this

example as well as others scattered throughout the volume, is to become aware of the ways in which the figure lays itself open to misunderstandings.

For a start this figure overstates the seriality of the staging, in moving down through it from top to bottom. Secondly, it glosses over the profound nature of the passage from the  $\psi$ - to the  $\mu$ -engine. The two are related anamorphically, which means that the passage from one to the other involves a rather literal turning-inside-out; the relationship in question might have been better served, in the figure, by lifting the upper part, out of the plane of the paper, so that it lies above the rest. Third, the lower part of the figure suggest that the mind addresses the internal images of body and world solely through an unconscious fringe of pure mechanism. This is importantly misleading, as introspection directly discloses.

All of this is will be found by both the softheads and hardheads among us to be both distasteful and discordant. The former will deplore what they take to be a debasement of mind by entrapping it within mechanistic entanglements, while the latter fear that reinstalling a ghost within the machine may be the first but fatal step in loosening the cork of the bottle within which the imp of religion has finally been contained. Before we know it, God will be out and civilisation will plunge in a free-fall back into the bad old days of Aquinas and Duns Scotus. I think that this is but one more of the issues which calls for a mediating firm-headedness prepared to contemplate an entirely new order of things which transcends any which have so far made their appearance.

#### Minds Versus Computers



**Embedment of the Mental Engine**  
**Figure 6.2**

Let's open this discussion by delineating the formal constitution of the mental engine; the account which

follows draws heavily upon speculations presented in earlier chapters exploring the need to broaden our concepts concerning the scope of mathematics -at both of the levels of the platonic Logos and the machinery of mind.

First of all, Its engrams propagate throughout both levels or stages of the Binomial Reticulum, hence both above and below the anamorphic interface coupling them together they will be distributed within a densely interconnected and highly redundant topological domain. This is the first consideration to be taken into account in seeking to explain why the modus operandi of minds is seemingly so different from that of computers; these are hemmed in by the limitations of concrete reality under which they must be assembled and operated.

This similarity being set on one side, the formal constitution of the two strata could hardly be more disparate. The upper  $\psi$  stratum has its engrams distributed through a hierarchy of progressively differentiating concentric circles, united at its apex by Eros -the ultimate agent of integration -although its presence comes and goes in the course of the sleep/wake cycle. This means that during its operation within the conscious monad, the upper set of formal engrams differ quite fundamentally from anything with which logic/mathematics is familiar in that their metaphysical constitution is one of *bimodality*. Paradoxically, this places the constituent lamellae *inside* each other. In the more familiar domain below the anamorphic 'singularity', the same constellation of lamellae are outside each other, being mutually *opposed* rather than *contained*. Regardless, the topological denseness of the space within which they reside (or more accurately, constitute) allows each lamella to interface with every other, and with every combination of its neighbours.

These two strata are bound into an indissoluble unit; the wheels of the engine of mind must always turn within both  $\psi$ - and  $\mu$ -levels in synchrony. Yet although consciousness permeates through both strata, the logic within which it is driven is  $\psi$ -like throughout -at least this is its natural inclination. What this means that in its attempts to organise and cope with the phenomena which it encounters, it forever seeks to account for them in terms of *invariances* which strive for maximum formal density and hence power and generality of operation. It is within the lower of the two strata which addresses the concrete objectivity of the real world that the topological density and redundancy of the component lamellae comes into play. It is a domain within which *synthetic invariants* come to be put together. They differ radically from their *analytical* counterparts within conventional mathematics. I have come to name the logic which they support *informal*. Their synthetic character lays them open to the possibility of progressive improvement, though unlike their analytical counterparts they are *essentially fallible*.

It is this architecture of the  $\mu$ -engine of mind which enables it to develop filters of immense power which enables the invariants of figures to be lifted out of a many faceted covariance of background noise. Like wise is our ability to recognise voices and to pay attention to one when others are speaking at the same time.

Just because of its unimodal, pure formal-material constitution, this lower  $\mu$ -engine of mind is intrinsically algorithmic, despite the exotic nature of both its substratum and the organization of the engrams engraved upon it; that is to say that its performance is in principle Turing-machine reducible, and therefore may be rendered in terms with which computer programmers are familiar. There are, however, three reasons why mind's performance can never be computer-implemented, even in the most conservative of situations which are devoid of innovative augmentations. First, we have absolutely no insight into the *logic of informality*; without this we would be lacking in any means of establishing the needed transformation between the two regimens. Secondly, if our knowledge of this new mathematical domain were to advance to the point where the transcription could be accomplished, there would remain the purely practical hurdles of creating a computer which would be one of unimaginable complexity. Long before something of general purpose utility could have been brought into existence, we would be blocked as already suggested in the previous section, by steric hindrance (in creating high-density connectivity) transmission delays in maintaining synchronisation of the plethora of computing modules, and finally by gross matters of structural engineering; eventually, in a hopeless quest of acquiring the size and complexity needed to deliver the goods, it would collapse under its own weight!. But the third reason blocking the simulation goes beyond ignorance and engineering practicality. The  $\mu$ -engine of mind cannot run save in the presence of its  $\psi$ -counterpart; the two are absolutely inseparable, as of the two sides of a coin. But the  $\psi$ -engine is *bimodal* and *therefore* its formalism cannot be rendered in Turing machine terms. It conserves the inner implicitness of *meaning*.

In proportion, however, as problems to be addressed are lacking in any essential invariance or significant form which mind might ferret out and latch onto, mind loses its potency. In proportion as the problems to be addressed are ones of noisy complexity, or alternatively, have their coherence distributed irreducibly within time and space, then the computer comes into its own and can handsomely out-perform mind. Numerical weather forecasting provides the needed example. The operation of mind is essentially serial; we are more or less limited to doing one thing at a time -though sometimes a subliminal 'track 2' can be accommodated. We cannot ape the computer's ability to divide problems into matrices of cells which can be processed simultaneously, and at processing rates exceeding that of our neurones and brains by a great many orders of magnitude. But even where such small and mundane operations of arithmetic -as in long multiplication and division, we are forced to play the computer's game, and come off very badly in consequence -at least, almost all of us do. But there are some interesting exceptions. There are a few extraordinary, mostly institutionalised people around who have somehow managed to establish 'informal' short cuts in arithmetic which enables them to solve problems at speeds which defy all explanation:

".....George can project his calendar calculations over a range of at least six thousand years. For example he can instantly identify February 15th 2002 as a Friday or August 28th 1591 as a Wednesday. When asked in what years April 21st falls on a Sunday both Charles and George will correctly answer '1968', '1957', '1953', '1946', and so on; When encouraged, George can go back as far as 1700. When asked in what month of the year 2002 will the first of the month fall on a Friday, George gave February, March and November, all correct answers. The twins can also specify that the fourth Monday in February 1993 will be the 22nd and that the third Monday in May 1936, was the 18th. "

".The fact that both twins operate in a range of calendar calculation far beyond that of the usual 200-400 year perpetual calendar makes it doubtful that their feats involve only memory. Moreover, they operate so rapidly, that they probably use no formula, even if they were capable of learning one. Investigators write that they have no better explanation of the observed phenomena than the one that is offered by the twins themselves, who answer the question of how they perform by saying, 'I don't know' or 'its in my head' ". Scientific American Aug 1965

Even more remarkable:

".....Two American brothers, for example, can consistently outdo a computer in finding prime numbers" Penrose

What particularly surprises is that those who can perform these feats are mostly handicapped, mentally. What lies at the root of such performances, surely, are not some hidden theorems of analytical mathematics but informal algorithms of a species of which we currently lack any knowledge or insight into.

As if in attempt to even the score, computers have invaded problem areas which call for mental insight for their successful resolution or solution. The most striking example here is the game of chess. Judging by their reported introspections, chess masters operate through their acquisition of deep invariances which enable them to grasp any given board configuration and contemplate its possibilities as a whole, of a piece, as it were, to converge upon that move which offers the greatest promise.

".....The trick is that his mode of perceiving the board is like a filter: he literally does not see bad moves when he looks at a situation -no more than chess amateurs see illegal moves when they look at a chess situation." D. Hofstadter: 'Gödel, Escher & Bach'

".....Highly revealing was the fact that Masters' mistakes involved placing whole groups of pieces in the wrong place, which leaves the game strategically the same, but to a novices eyes, not at all the same." Ibid.

".....Luzhin settled down to play with particular care. At first it went softly, softly, like muted violins. The players occupied their positions cautiously, moving this and that up but doing it politely, without the slightest sign of a threat -and if there was any threat it was entirely conventional-more like a hint to his opponent that over there he would do well to build a cover, and the opponent would smile, as if all this were an insignificant joke. Then, without the least warning a chord sang out tenderly. This was one of Turati's forces occupying a diagonal line. But forthwith a trace of melody very softly manifested itself on Luzhin's side also."

From Nabokov's "The Defense", quoted by William Barrett

When asked how many moves or 'plies' he looked ahead, one chess master replied 'not a single one'.

Computers are unable to compete with humans on their own terms, but must exploit their compensating strengths. While utilising what hints and heuristics which have come to be externalised over the years (e.g. the advantage of controlling the centre of the board, or the relative values of the various pieces -the rook, knight, queen, bishop and pawn- computers compete successfully by their ability to execute a brute-force and systematic follow through of the consequences of each move which offers promise, to a depth of many plies. Owing to the exponential dependence of computing demands upon the number of look-ahead plies which are explored, the computer cannot approach an *exhaustive* working through of proffered moves, but they do well enough to give chess masters a run for their money. But they do so largely by substituting *mimesis* for true *simulation*; as Penrose has insisted, while computers can often defeat grand masters, they have no real insight into the game, and can sometimes commit blunders which amateurs and novices have no difficulty in avoiding.

In their attempts to endow computer programs with human intelligence, artificial intelligence advocates have converged upon that approach which offers the most promise -that which aims at creating a set of powerful nodes (the analogues of our 'ideas' or concepts?) which are densely interconnected. This initiative might be regarded as an effort to ape the kind of informality which I take to underlie much of our competitive advantage. What have so far been brought into existence are narrow, brittle and blunder-prone, because they cannot start to match the complexity and denseness of interconnectivity of mind, and above all because they contain no analogue of *meaning*.

## VOLITION & FREE WILL -LIBERTARIANISM VERSUS COMPATIBILISM

### Opening Comments

".....To take a position on whether we have free will, and what sort of freedom that is, is to take positions on a host of other fundamental and necessarily interlocking issues; what we ultimately consist of as elves, the relation of mind to body, the role of consciousness in behaviour, the proper methods of scientific and phenomenological inquiry, the need for foundations in e, and the possibility of the supernatural, among other questions. To define the will, or volition, and argue that this definition captures the truth of the matter, is to invoke an entire world view, which must stand against its competitors". Thomas W Clark, "The Fear of Mechanism" JCS Free Will Issue

To proclaim a belief in free will is not to deny either the presence or importance of 'inner' determinism in the conductance of our normal everyday affairs, and indeed in nearly everything that we do. Coherence and rationality is what the mind and intellect are all about, at almost every level of human endeavour and action. Without it our actions turn upon the impulse of the moment. The fact that most of human behaviour lacks fine grain predictability is beside the point. No matter what position we may take about the mind-brain relationship and the place of residence and constitution of the algorithms upon which we mostly run, there are few who doubt that most of what we do is 'Turing machine reducible'. At the present time there's no way we can prove this out because we have no idea how the mechanisms of mind are organised. At the macro level, however, much of human behaviour is predictable as well as determined. There is little in life more certain than that a gentleman

will keep his word, although there may be no way of predicting how he may go about fulfilling his obligations. Within the context of the present discussion we may refer to this daunting coherence as an 'inner' determinism. In one very important sense of freedom, one is free in proportion as one's inner determinism -is able to hold out and bring under control the forces of an external determinism impinging upon one.

".....The distinction between hard and soft determinism, already familiar to James does not mitigate the totality of these claims. The soft determinist seems to sugar-coat the bitter pill of fatalism by telling us that our own desires and choices are among the conditions of our act, and that we therefore play a part in shaping our fate. There need not then be a strict antithesis between freedom and determinism. That we be autonomous and free individuals is perfectly consistent with a strict causal determinism."  
William  
E Barrett

James is here anticipating the stating the 'Compatibilist' stand -that what we call free will is actually an exercise of an inner determinism. The libertarian, while accepting the overriding importance of self-determinism insists, along with the man in the street and the folk of antiquity, that something more is involved. Here's how justice Hodgson states the matter:

".....[It is an] ability of conscious subjects to make holistic judgments that (fallibly) resolve non-conclusive reasons. It is an ability which, I say, is not available to zombies or computers as presently understood."

".....In considering the problem of free will, a central question is whether or not there might be such a thing as choice between genuinely open alternatives, made for non-conclusive reasons."

What is being asserted by the libertarian has nothing to do with whim or impulse, however indistinguishable such acts may be from mere chance -as viewed from the exteriority of the 'third world'. What is being claimed is something essentially mysterious unlike anything to be encountered within the world with which science. It may involve a choice between good and evil; between 'I want' and 'I ought'; between initiative and passivity or simply between 'this' or 'that'.

".....Self-determination goes very far to explain what is commonly known as the freedom of the will, but it does not go far enough, for it does not explain the conscious resistance to the determined tendencies of our character." William Lillie

The belief is so strong that even those whose metaphysics militate against it felt themselves unable to resist its persuasions:

".....Pointing out that we *can* give up beliefs in a flat earth and literal sunsets, Searle says that 'we can't similarly give up the conviction of freedom, because that conviction is built into every normal conscious intentional action'. After saying that 'science allows no place for the freedom of the will', he adds that 'we can't act otherwise than in the assumption of freedom, no matter how much we learn about how the world works in a determined physical system.....Nagel's.....position is similar. In spite of seeing no way to give a coherent account of freedom, he says 'I can no more help holding myself and others responsible in ordinary life than I can help feeling that my actions originate within me'." Griffin (1997) (quoting Searle .

Or, as the venerable Samuel Johnson was to put it so much more simply: "...My will is free sir, -and there's and end to it".

It is *almost* impossible to maintain a libertarian posture in the face of a secularist world-view - particularly in the extreme forms of physicalist positivism that dominate the intellectual scene to day. This is the reason why 'compatibilism' -the belief that free will signifies no more than the freedom of a self-determination. We need nothing more and to believe otherwise is to retreat into irrationality and superstition. If there is a break in

causal chains then we are dealing with chance events -of a type, for example, which has become all too familiar to quantum physicists:

".....But now we must ask how it is that I come to make my choice. Either it is an accident that I choose to act as I do or it is not. If it is an accident, then it is merely a matter of chance that I did not choose otherwise; and if it is merely a matter of chance that I did not choose otherwise, it is surely irrational to hold me morally responsible for choosing as I did. But if it is not an accident that I choose to do one thing rather than another, then presumably there is some causal explanation of my choice; and in that case we are led back to determinism." A.J.Ayer 1954 [?]

Thomas Clark makes it very clear just how difficult it is for the libertarian to maintain his posture within a secular ontology -above all, one which has made the deeper retreat into a positivist reductionism:

".....The challenge, which I think is insuperable, is to stay within naturalism (i.e. no ad hoc, mysterious, immeasurable, or theoretically disconnected forces or entities such as your typical incubus or angel) and yet find something causally privileged, something that operates as a first cause, unmoved mover, or a self-construction from the ground up....

".....The final redoubt of free will is therefore nothing publicly recognizable as me, but something very much like a dispassionate 'soul', operating behind the scene of motivational conflict. But what interests, one might ask, does such a soul-chooser have, and would explain why it adjusts probabilities of alternatives (the weights of reasons) in one direction rather than another? Apparently none, since the agent, in its capacity as chooser, has no character and motives, rather it operates *over* such mundanities, in which case the adjustments themselves are inexplicable. Nonetheless, they still get chalked up to the responsible agent. The price of ultimate responsibility, it seems, is the intelligibility and explicability of freely willed choices." [JCS issue]

Of course, on his own terms, he's absolutely right. Secularism outlaw Transcendence which must take an essential hand in the game of making libertarianism supportable and understandable. Here is Clark once more:

".....But libertarian free will is precisely that which, by definition can't have law-like or predictable antecedents, otherwise it wouldn't be free will in the required sense, so to find it within nature is to destroy it. "

There are a few exceptions, of whom philosopher E.J.Lowe appears to be one [JCS article) as also was the 'later' Roger Sperry -and the present Benjamin Libet so far as I am able to judge.

There are also secular existentialists to be found who have come to hold the belief with a fervour which has led them to substitute an eligo ergo sum for Descartes cogito. But for the most part, libertarians take their stand upon a within a non-secular -that is to say a 'religious'- world-view. This best known example is that of the neuroscientist John Eccles -who was both a catholic and a neoCartesian dualist. For him, the mysterious freedom of choice resided in the soul -an entity distinct from the brain within which it takes up temporary residence. Eccles took the soul to exercise its influence through its interference with quantum processes within the brain. Justice Hodgson also looks to quantal interference -though not in any strictly NeoCartesian way.

Penrose stands in a class by himself in that his breakout from secularism into and eternal platonic world leaves a larger, intermodal determinism intact!. He identifies consciousness within the collapsing wave function, an event driven by his postulated 'Exact Quantum Gravity'.

### Compatibilism

Let us be very clear about just what it is that we commit ourselves to, in accepting the Compatibilist thesis:

".....Nagel suggests that the only way to complete an explanation of the way an agent acted for certain reasons, rather than refraining from acting for other reasons is to trace the course of explanation into the formative causes of the agent's character." Hodgson JCS issue

Pursued to its conclusions, this line of thought does much to weaken the Compatibilists' claim that their thesis is adequate to fill the gap left by the despatch of free will.

".....The soft determinist might be more aptly called the lucky determinist. If we are lucky, our desires or choices fit fluently and smoothly into the web of our life, and we act with all the harmonious appurtenances of freedom. We do what we want and we are satisfied with the kinds of things we want. But for the unlucky man cursed with odious and self-destructive desires, there is not the least bit of solace here. Tell him that his own will is part of the conditions of his act and you leave him still groaning in travail. His own desires may be the most monstrous obstacle in his path against which he struggles to no avail. What formed these desires? Previous conditions in the chain of events. We are led backward to the youth that ruined manhood, to the childhood that blighted youth; to the role of parents, society, the historical situation into which he was born. The total claims of determinism begin to reassert themselves. If a man's will has been blighted from the start, and confirmed by circumstances bit by bit into its monstrous obsessions, you have not given him one bit of freedom by naming that will among the conditions that spin out his fate. Unless there is a break somewhere in the deterministic chain you have not made him master of his own destiny but simply labelled him as the helpless instrument of his own doom. From the strictly logical point of view, there is only one determinism, and that is the position of hard determinism.

"....We come back thus to the simple and sweeping thesis that the determinist must strictly insist upon: Given the totality of all conditions that make up the present state of the world, one and only one future can issue there from." William E. Barrett

This is indeed determinism in spades, and it is important to be clear just what the Compatibilist is asking us to believe in embracing his cause. He may, indeed, find himself to be undismayed by the above disclosures, but the fact that these conclusions have to be pointed out to him by outsiders, rather than being offered by himself as an essential plank in his platform does nothing to strengthen his case.

#### Cogent Arguments Against the Compatibilist Thesis

There are, however, much stronger arguments to be brought against their stance. There is something curiously perverse about arguing the case for determinism in human affairs; if true, this very fact would automatically emasculate the processes of persuasion.

".....I state emphatically that to deny free-will is neither a rational nor a logical act. This denial either presupposes free-will for the deliberately chosen response in making that denial, which is a contradiction, or else it is merely the automatic response of a nervous system built by genetic coding and moulded by conditioning." Eccles

".....Determinism.....cannot be true, because if it was, we should not take the Determinists' arguments as being really arguments, but as being only conditioned reflexes. Their statements should not be regarded as really claiming to be true, but only as seeking to cause us to respond in some way desired by them. And equally if I myself came to believe in determinism it would be because I had been subject to certain pressures or counter-pressures, not because the arguments were valid or the conclusion true. And therefore I cannot take determinism seriously; for if it were true, it would destroy the possibility of its being rationally considered and recognized as

such. Only a free agent can be a rational one. Reasoning, and hence truth, presupposes freedom just as much as deliberation and moral choice do.'

J.R.Lucas

I would go so far as to suggest that it is impossible to discuss the question of free will without knowing what it is -i.e. how it differs from the operation of mere chance; and that one cannot know what it is without having it.

Next we come back to the impact of Gödel's theorem. This does nothing in itself to establish the authenticity of the libertarian's cause but it does virtually imply some form of breakout from the claustrophobia of secularism, hence providing the libertarian which just the needed room within which to operate.

I think it is only fair to ask the Compatibilist just why it should be that the belief in free will is so strong and so difficult to deny, even by those who wish no part of it. True to type, the secularist takes refuge within the Neodarwinian machinations of the germ plasm:

".....Rather than asking whether our experience of freedom in choosing different actions is justified, we consider that the important question to be answered is: what advantage does this experience of free choice confer upon us? The evolution of these complex brain systems must have resulted from pressure to develop such an advantage."

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John Searle, possessed by intuitions of a free will he finds impossible to deny, makes an equivalent appeal.

".....For reasons I don't really understand, evolution has given us a form of experience of voluntary action where the experience of freedom, that is to say, the experience of alternative possibilities, is built into the very structure of conscious, voluntary intentional human behaviour. For that reason, I believe, neither this discussion, nor any other will ever convince us that our behaviour is unfree." John Searle Minds Brains and Science

Such a line of attack is but an extreme instance of the *carte blanche* accorded to the 'filtered noise' theory of the extra-ordinary germinal fecundity; there are no limits to what this process is able to come up with. The granting of such powers is a simple dogma. However, this protest is minor, set against the contradiction of a mind-free mechanism inventing something which is so vibrant with existential significance. In the popular parlance of the day, the intuition of free-will is to be regarded as but one more *quale* -to be regarded as no different in principle from the affective concomitants of the many germinal-endowed instinctual ergs. This is but one way of asserting that intuitional promptings, no matter how strong, carry no weight as *evidence*, hence within a world-view dominated by science they may be safely disregarded:

".....Beliefs or intuitions per se never count as proof of anything." Thomas Clark

To say this is to take a metaphysical position, something which Clark does not quite point out; it follows, sotto voce as it were from the scientific world-view which no reasonable man, in this day and age, is about to question.

A Closely connected weakness is the Compatibilist's urging that false though the notion be, we should act *as though* it were true, if human responsibility is not to be undermined:

".....It has now become widely appreciated that assimilation by the general public of this 'scientific' view, according to which each human being is basically a mechanical robot is like to have a significant and corrosive impact on the moral fabric of society....[involving] the growing tendency of people to exonerate themselves by arguing that it is not 'I' who is at fault but some mechanical process within." Thomas Clark

Daniel Dennett has referred to this unfortunate tendency as a 'creeping exculpation', adding that holding people responsible is 'the best game in town'. In other words, we are to accept the belief as true -while believing it to be false- for purely *instrumental* reasons. Perhaps, some have urged, we should adopt a similar stance with respect to 'religious' matters:

".....One post-modern religious view is that while there may well be no god 'out there', human beings (both individually and socially) still have need of the concept of God and find value in the practice of religion. This being the case, it is argued that religion can and should continue, although the jury is still out as to whether it has any ultimate substance.....Perhaps we should take a similar approach to the problem of free will. As Steven Pinker...says...'free will is a fictional construction but it has applications in the real world'." [from JCS lead article? I don't think it's Clark]

Compatilists have always drawn strength from their belief that libertarianism is beset by a number of contradictions and weaknesses which make it untenable. Properly regarded, it is to be seen is a holdover from the days of mythology and religious belief. It is not something which any reasonable intellectual of the present day could entertain for a moment -for reasons of every kind. Compatibilism may make some of us uncomfortable, but there is simply no alternative -it's the only game in town.

They have indeed mounted an assault against the opposition on a number of fronts ranging from the sacred to the profane and from the sublime to the ridiculous. Some of their arguments are valuable for the light which they throw upon the nature of the decision process while failing in their intended purpose. But as I hope to show, all of their sallies conceal fatal weaknesses of one kind or another, making it impossible for them to stand their ground.

Let's start by an examination of their strongest argument -the phenomenon of post-hypnotic suggestion. It is indubitably true that hypnotic suggestion may sometimes cause us to execute acts which we thought we had freely willed. Suppose, for a moment, that I myself had been a victim of this process, in which I seems to myself, at the moment of action, to have freely willed an act, only to discover subsequently that I had been 'taken in'. Would this drive me to the point of bringing my libertarian stand into serious question? The experience would indeed be a sobering one, reminding me to stand on my guard, but it would go no further than this. Let me offer an analogy in support of my obdurence [?] Most of us have had dreams which were so vivid as to seem to have been the very stuff of reality itself, only to wake up and discover that they were but self-generated illusions. Do

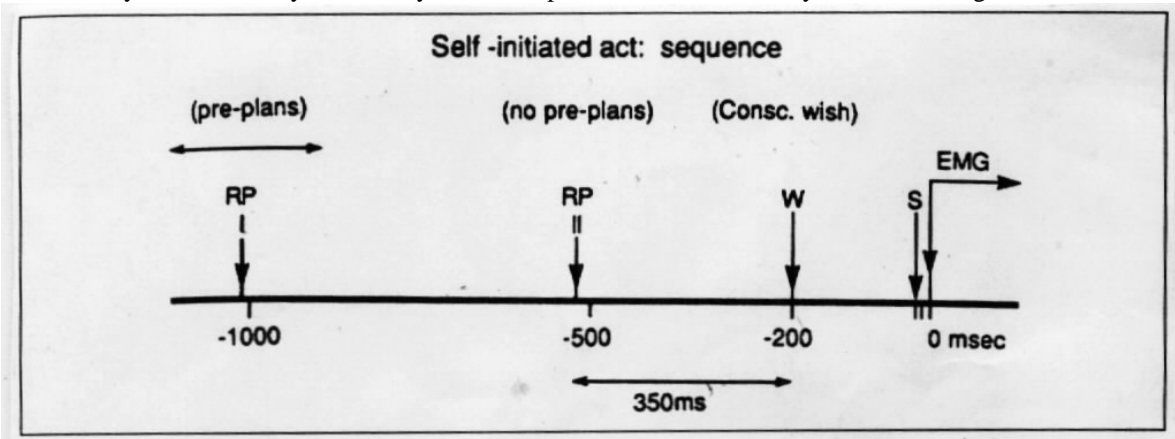


Figure 6.3

such experiences drive me to some form of universal doubt about the existence of an external reality truly 'out there'; or into solipsism or Berkeleian idealism or whatever? Of course not. I have even had the experience (as no doubt have many others) of 'dreaming' that I had awakened from a dream, only to 'really' wake up later. Yet my commitment to realism remains unshaken. Both beliefs -together with that in the presence of my own self as a psyche or authentic agent have nothing to do -in the final analysis- with any process of reasoning or empirical

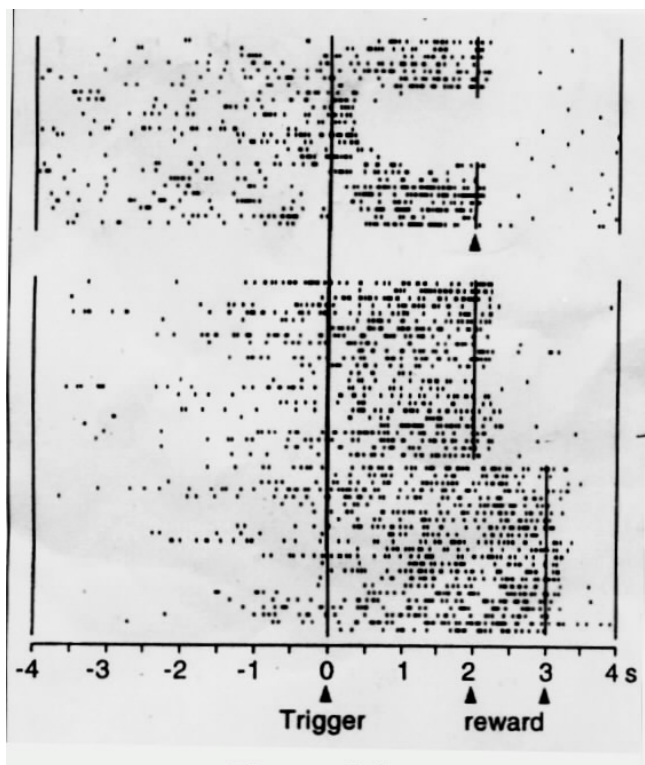
generalisation; rather, they are *directly* known and intuited with a strength and tenacity which makes of any doubting a *folie de doute*. Of course, the phenomenon does cry out for some kind of explanation --for the very way in which it runs directly counter to the 'inviolable' thesis of the free will belief. I do not think one has too far to look. Anyone in act of submission to the depredations of a hypnotist has temporarily abandoned the bridge of his own ship, inviting a stranger to take over its running. During our absence the ship continues in operation; our mind remains awake, not as a person but zombie-wise. In this reduced state, the hypnotist has no difficulty in planting reflexes which, under his express orders shall be invisible to us, upon our return. Along with some of the manifestations of multiple personality, those of post-hypnotic suggestion belong to the pathology of mind. The Compatibilist in pressing his case, demands that the surfacing of exceptions justifies the dismissal of the rule. One might be tempted to say that commonsense arrives at its conclusions through the statistics of observation; that which is true is most likely to be that which usually happens. When things don't go as expected, then explanations are to be sought for which can be maintained in the face of a continuing acceptance of *status quo* beliefs. But this isn't quite how the mind works. Once more. we believe in an external reality and in the freedom of the will because these truths seem to be self-proclaiming, having to do with the weighing of evidence; Logic and empirical observation enter more as after-thoughts.

We have learned a great deal about the cerebral concomitants of the decision process, and likewise of just how the agent -the *prima facie* instigator of such processes is sited upon or within the cortical substratum. Of central importance are the findings of Benjamin Libet. Figure 6.3 says it all. The 'readiness potential -detected concentrated with certain regions of the cortex- appears in an advance of the point at which the subject reported that he had decided to act. This amounted to some 800ms on those occasions at which some experience of pre-planning was reported, but the very considerable gap of 300ms remained for spontaneous acts free of any element of pre-planning.

Libet -no Compatibilist- dismayed by what he has wrought, seeks to execute a rescue on the following terms:

".....The role of conscious free will would be, then, not to initiate a voluntary act, but rather to *control* whether the action takes place. We may view the unconscious initiatives for voluntary actions as 'bubbling up' in the brain. The conscious will then selects which of these initiatives may go forward to an action or which ones to veto and abort, with no act appearing.

".....This kind of free will is actually in accord with religious and ethical strictures. These commonly advocate that you 'control yourself'. Most of the Ten Commandments are 'do not' orders." Benjamin Libet Do We Have Free Will?



(Though not strictly relevant to the matter at hand, this figure also shows the remarkable way in which the machinery of neural physiology compensates for the times of neural transmission. When a stimulus is delivered randomly to the skin, the subject antedates the resulting sensation by 50ms, thus compensating for the time of delivery.

I share his surprise at this findings but not his dismay. My reason is that I believe Libet is attaching too much significance to this rather artificial set-up. How are most decisions in fact made? Normally, surely, by giving the balance of the impinging motivational forces impinging at the moment, their own head. Quite apart from this, under

natural conditions, actual decisions are preceded by a lead time which, so to speak sets the stage (or loads the dice) so that there is really no need for the moment of decision to be invested with consciousness. Just in terms of economy, it may be that consciousness is better employed in running ahead, organizing things in advance. I find Libet's discoveries to fall right into place with my emanational eschatology which lodges consciousness within the Schrödinger wave equation. In this ontology, nascence leads existence, and it's only in progressing from one state to the other that consciousness comes fully into its own.

I need hardly add that these discoveries have been welcomed with undisguised jubilation by the Compatibilists who read into them the defeat of libertarianism.

Libet's findings have been complemented in a number of ways. David H. Ingvar [on Volition], employing a different kind of non-intrusive instrumentation ('2D Regional Cortical Blood Flow' in which the rate of clearance of Xenon 133 is the operative parameter) has reported prefrontal activity some seconds in advance in advance of voluntary movements in cases where some degree of planning and organization was called for. Wolfram Schultz [JCS issue he primate basal ganglia and the voluntary control of movement) found single neurones within the striatum and the closely connected cortical supplementary motor area became active several seconds before self-initiated movements in the absence of external triggering. In commenting on figure 6.4, summarising some of his findings, he notes

".....Neuronal activations in primate striatum related to the expectation of reward. Activations developed between the last external signal predicting the liquid reward (trigger) and terminates shortly after reward is delivered at a spout at the mouth of the animal. The activation continues until reward is delivered, even when the trigger-reward delay is occasionally shortened (top) or increased (bottom) The original sequence of trials is preserved from top to bottom."

To use Spence & Frith's felicitous turn of phrase, such findings draw a nice distinction between 'intentions to act' and 'intensions in action'.

Chris Koch has also been active in the field of identifying single neurones whose action seemingly carries the weight of the decision process -at least in certain situation and in selected cortical areas. The general force of these findings has often been taken to imply a weakening of the notion of the presence of a global self -on the kind normally taken for granted by Cartesians and others of a dualist persuasion. Following this line of logic, equivalent inferences might be drawn from the experimental findings of Spence and Frith, in their studies of the dorso-lateral prefrontal cortex:

".....A number of brain regions contribute to the performance of consciously chosen, or 'willed', actions. Of particular importance is dorso-lateral prefrontal cortex (DLPFC), together with those brain regions with which it is connected, via cortico-subcortical and cortico-cortico circuits. That aspect of free-will which is concerned with the voluntary selection of one action rather than another critically depends upon the normal functioning of the DLPFC and associated brain regions. Disease, or dysfunction of these circuits may be associated with a variety of disorders of volition: Parkinson's disease, 'utilization' behaviour, 'alien' and 'phantom' limbs, the delusions of 'alien control'....."

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(I am reminded here of a Peter Lorre film in which the star was pursued by hallucinations of a severed hand which had a 'will of its own'). Neuroscientists have typically been hostile to the notion of a unitary psyche presiding over the goings-on of the cortex and those regions directly coupled to it. And if the psyche can be despatched, this brings as a bonus the destruction of the libertarians case; if there's no agent then the free will problem simply vanishes as a subsidiary fiction. However, the bizarre consequences of some forms of local cortical injury in which there are displacements or fragmentation of what are perceived as willed events are only damaging to classical Cartesian notions which presuppose a presumably non-dismemberable Soul created of-a-piece by the God of theism. Viewed from other mind-brain perspectives, however, such findings are simply to be viewed as

proving that the psyche itself is prone to malformations and schismatic degenerations -which do nothing to undermine its normal proclivity of hanging together as a unitary presence.

The following is an example of the kind of inferences which mainstream neuroscientists are drawing from their findings:

".....Complex material systems with distributed non-linear feedback such as brains and their neural and behavioural activities cannot be explained by linear causality. They can be said to operate by circular causality without agency.....agency which is removed from the causal hierarchy by the appeal to circularity, reappears as a *metaphor* [stet!] by which events in the world are anthropomorphised, making them appear subject to human control." Walter J Freeman Consciousness, intentionality and Causality(JCS Special Issue) [My emphasis]

Though mainstream neuroscientists and others have wished to view the discoveries of the field as undermining 'folk' beliefs about the probity of the psyche, I would claim, as have some others, that all such evidence is consistent with a variety of metaphysical and ontological presuppositions. Should it prove to be the case that decisions can turn upon the activity of a single cortical or other neurone would only peril folk beliefs about an enduring, powerful psyche if it be true that the neuroscientist has nothing more to work with than the laws of physics as are currently known and recognised.

In emulation of the devil quoting scripture, the Compatibilist has come to make an appeal to the exalted experience of the mystic in support of his thesis:

".....In ordinary life we hold the false notion of a persisting inner self that has consciousness and free will -the audience in Dennett's 'Cartesian Theatre'. In certain circumstances, such as in mystical experiences and near death, this illusion breaks down, giving rise to a new sense of self as one with the universe, or a state of no-self.

".....With this dissolution of self comes a sense of vivid realness, clarity of consciousness, and a loss of the normal sense of volition. Actions happen without the sense of a person doing them, or as the Buddha once put it 'actions do exist, and also their consequences but the person that acts does not'....This state can arise spontaneously or can be developed by training in meditation and or mindfulness. To those who have never experienced this state it seems both paradoxical and a threat to morality, but when it arises, it seems the most natural and easy way to be. And as Claxton ...points out, people seem to become nicer rather than nastier when they live this way." - [Lead Article, special issue JCS]

This dissolution of the self is something characterising 'inward-turning' mysticism, that is to say its classical form (doesn't the word mean, etymologically, a turning of the eyes inwards?). However, sometimes the mystic, from his superior vantage point, can turn his eyes outwards. When he does so, the result may be the exact opposite:

".....On the first day while I was in a state of mere consciousness of the things around me, I had the first most extraordinary experience. There was a man mending the road; that man was myself; the pickaxe he held was myself.; the very stone which he was breaking up was a part of me; the tender blade of grass was my very being, and the tree beside the man was myself. I also could feel and think like the roadmender, and I could feel the wind passing through the tree, and the little ant on the blade of grass I could feel. The birds, the dust and the very noise were a part of me. Just then, there was a car passing by at some distance; I was the driver, the engine, and the tires; as the car went further away from me, I was going away from myself. I was in everything, or rather, everything was within me, inanimate and animate, the mountain the worm and the breathing things. All day long I remained in this happy condition." Lead article (?) JCS Free Will issue.

So, instead of a disappearance of the self, we seem to have a kind of uncontrolled fragmentation or duplication. However, both are seen to be alike in the support of their cause. Who can any longer believe in a psyche or self as authentic agent. If the author be a fiction -no matter how beguiling- then we need fuss no longer over questions of a freedom of action. However, to appeal to mysticism is not without its dangers since the price of drawing the needed damaging inferences demands some degree of prior acceptance of the phenomena at face value. As if to cover their bet, the authors, after offering the quotation immediately above follow it by a second:

".....Last November on a conference in the psychiatric institute of the Universitätsklinik in Frankfurt am Main two patients were described and discussed, who represented every single event in their phenomenal model of the world as caused by their own volitional acts. One of them stood at the window the whole day, looking up and was consciously moving the sun across the sky all day long. The other was observing traffic all day long -driving the cars around each other, walking the pedestrians around, turning the traffic lights from red to yellow to green and back again."

However, as they do frankly point out, it may be unfair to seek to smear the first with the pathological contaminants of the second. The first is an affirmation of monism while the second elevates the author into a universal agent in instrumental possession of all. However, Mysticism is essentially a religious matter which cannot be meaningfully approached within the cramping limitations of secularism. I shall have more to say about this later.

Summarising the Compatibilist's stance. It has intrinsic weaknesses, nor can their counter charges against Libertarianism be successfully sustained. Why, therefore, is it the paradigm of choice among intellectuals who seem to have no difficulty in riding over the counter-arguments? At the very least, one would have thought that libertarianism would be the most reasonable default position to adopt while awaiting further developments:

".....The intuitive feelings about the phenomena of free will form a fundamental basis for views of our human nature, and great care should be taken not to believe allegedly scientific conclusion about them which currently depend upon hidden ad hoc assumptions. A theory that simply interprets the phenomena of free will as illusory and denies the validity of this phenomenal fact is less attractive than a theory that accepts or accommodates the phenomenal fact." Benjamin Libet -lead article

This strikes me as such a reasonable and accommodating position as to leave us asking just what lies behind the Compatibilist' intransigence. To ask this is simply to ask why the positivistic world-view is held with such fervour with mainstream intellectuals everywhere. This zeitgeist disbars the 'interior view' from presiding over its own domain of influence in which reasons for belief need have nothing to do with the kinds of facts with which science deals. To stand their ground, such internal beliefs (of which that of free will is but one of many) are not in need of evidence, which as often as not is simply irrelevant. In insisting that all beliefs must be supported by evidence, science is grossly exceeding its mandate. In taking his stand on the wrong side, Clark makes this alternative very clear.

".....To decide between these two approaches is to decide between intuitionism and empiricism, or between personal modes of knowing versus collective and experimental modes. I suspect there is no final arbitration on this issue, except to point out that one can pitch intuitionist arguments successfully to those like much of the public, that are prepared to buy them, but to convince scientists and most philosophers, you'd better have a theory linked to some institutional, peer-reviewed wisdom. So if libertarians want to get funded for research, they'll have to come up with a plausible naturalistic model for an unmoved mover (not likely) and if Compatibilists like myself want to change the public's conception of free will, we first have to change attitudes of what counts as evidence (not likely). Thomas Clark

There is something about the way that secularism is insisted upon which carries with it more than a suggestion of an odium antitheologicum. This surfaces a number of times within Clark's superb essay.

".....Free will.....in which we are ultimately responsible for ourselves and our acts....makes the self more or less a first cause, an unmoved mover.....the question of whether we really have such free will thus recapitulates in the domain of human metaphysics the question of the existence of God. That many believe that we stand above nature in some essential respect suggests that the enlightenment was more successful in its glorification of the individual in its challenge to the supernatural.

".....The only problem, of course, is that brains, unlike souls, do not go to heaven which is perhaps one reason why we're not so keen to identify with them" Thomas Clark

In short, Compatibilists are but stricken with the sickness of our times. We all find ourselves living within an age of spiritual destitution. There is no firm ground upon to treat, but only a quagmire of alienation within which so many have chosen to wallow. Until the arrival of an overdue New Paradigm, things are unlike to get any better.

### Bringing Together My Own Libertarian Views

My starting position was a simple folk belief that I had freedom of the will, and that this knowledge was one of a few truths of which I could be sure to the point of certainty. It was -and is- known directly; I might say that it is closer to me than I am to myself.

Viewing the matter from the vantage point of all modern knowledge, I was to discover added reasons for belief; I also found that the concept fitted in very well indeed within the framework of my world view of dynamic monism.

An openness of choice is inseparable from the Gödelian character of each passing moment of experience. Between the last instant and that which is in process of coming to be, there is forever a vertical drop between the invariance of the source and the covariance of the previous instantiation. Covariance cannot simply pass to a further such instance. There must be novelty and contingency, though they may be both marginal and inapparent.

This openness may be manifest in a number of ways: active effort versus passive enjoyment, duty versus desire, good versus evil, or simply *this* versus *that*. Such openness of choice is inseparable from any authentic conscious vitality -true alike of eternal and finite beings. Without it, beings would be driven by some mix of deterministic and stochastic functions, and life would be one of kaleidoscopic confusion.

The openness of ethical choice lies within the grey penumbra between the positive and negative faces of Eros. What makes the growth of civilisation in general and human beings in particular so slow, uncertain, halting and bumpy is the slimness of the advantage of light over darkness. The relationship is the same as that between positive and negative Being -of which it is a special case.

Libet's demonstration that the conscious process is launched subconsciously accommodates itself nicely with my belief that the leading edge of the flow of consciousness is the collapse of a complex Schrödinger wave equation, within which act, potentiality passes to full, or quotidian existence through the subliminal modality of *nascence*. It is this which finds its cortical concomitant within the 'readiness potential' centre red within the frontal cortex. Libet's discoveries make it plain that it is the 'inner' determinism of character which drives almost all of our actions. Free will mostly acts unobtrusively, behind the scenes in the growth and maturation of character -a fine-grain process of rumination with only occasional intrusions of 'moments of truth' leading to changes in direction. Something of the kind may be occurring all the time in periods of reflection preceding important decisions. I think Libet is correct however, in saying that that decisions set into motion subconsciously may be overwritten when it is immediately perceived that the wrong decision was made, so that subconscious initiatives are in no way binding.

Justice Hodgson shares my belief that consciousness resides within the wave function, and that the decision process is associated with its collapse. He believes that the effect of consciousness there is the continuing modulation of the probability envelope governing the collapse of a very complex set of super positions. Disregarding Schrödinger's inference that freedom of choice would be inconsistent with hardened stochastic envelopes immutable governing relative collapse probabilities, Hodgson points out that:

".....The Quantum physics super positions of alternatives corresponding to each choice must itself be a single unique highly complicated quantum state, so that there could never be a series of like state reductions in which statistical effects could be disclosed." David Hodgson Private communication

It isn't clear to be that this is an effective rescue unless some rider be added that complexity itself makes a difference. Such a quantum set-up could never be *provably* and demonstrably deterministic, nevertheless, unless extra assumptions be made, the default position would be that determinism still holds. Is Hodgson trying to make bricks without straw? To the contrary, I believe it can be firmly demonstrated that the mind/brain ensemble cannot run upon a substratum of matter and law which is limited to what the present scientific canon is prepared to grant. Extensions in support of life and mind are needed at both of the levels of waves and particles. When these are made, rigid stochastic envelopes become replaced by something softer and more compliant. What quantum physics tells us about the inorganic realm may be viewed as a degenerate case in which individual particles or molecules act single or together as monads manqués. Their interior lives are but isolated points of consciousness which have gone as soon as they have come.

I come, finally, to what the mystical overtones of a truly authentic or regenerate psychic posture disclose. Such a stance is cantered firmly within the begottenness of ones being, A source which stands outside of, and above time. This promotes the paradoxical experience of 'acting without acting'. The leading edge of the decision process is self-determining, to that all that one is articulately conscious of are the details of execution -the 'wherefores' and not the 'whys'.

".....The illumined soul thinks always 'I am doing nothing'."

".....Even when he is engaged in action, he remains poised within the tranquillity of the Atman."

Speaking within its particular dialect of Christian theism, the Theologia Germanica states the matter thus:

".....Now, what is this union? It is said that we should be of a truth simply and wholly at one with the one eternal will of God, or altogether without will so that the created will would flow into the eternal will, and be swallowed up and lost therein, so that the eternal will alone should do and leave undone in us.....for it is perceived of a truth, that the inward man shall stand immovable, and that it is needful for the outward man to be moved. And if the inward man have any wherefore in the actions of the outward man, he says only that such things must be and ought to be, as are ordained by the eternal will."

Given such a stance, one is acting entirely from the positive ground of Eros/Psi-Logos, hence, among other things the flow of conscious experience can proceed in complete absence of any *internal* conflict. But this is not to deny either freedom or any lack of Gödelian openness. To recognise this is to reach the important truth that freedom of action isn't basically about choices between the good and the bad, the morally better and worse or of light over the darkness. Quite to the contrary, freedom is an essential and inseparable component of the 'higher law'. It strikes us as paradoxical because it flies directly in face of 'law' as it is normally understood that dominated by the rigidity of deterministic mathematics; this is composed of restraint unrelieved by any elbow room of options.

This conflation of law and freedom -which latter is not at all to be identified with chance- sounds strange indeed. Here is how Eckhart puts it, speaking as ever from his ambiguous theist-monist ground of Being:

".....Now the authorities say that the will also is free and that only God can constrain it. God, however, does not constrain the will. Rather, He sets it free, so that it may choose Him, that is to say freedom."

".....The spirit of man may not will other than what God wills, but that is no lack of freedom. It is true freedom itself."

The more one stands within one's begottenness, the less one becomes conscious of the self qua self; one moves entirely within the Gödelian moment. But if this high footing is not to be lost, it is essential that the leading edge of one's actions resist capture by the consequences of events set in motion.

".....Perform every act sacramentally, and be free from all attachment to results"  
Bhagavad-Gita

The operative word here is 'attachment' which is the precise opposite of *indifference*. It implies, among other things a deontological as opposed to a teleological ethics. Both carry moral concern equally, The question is not that of whether or not one is to bent every effort to strive for the desired outcome. Rather, it is that of where one is standing while one acts. To allow one's centre of gravity to be dragged into the course of events is to lose clarity, vitality and effectiveness of action.

-----08-04-2000-----maybe belongs somewhere

- Noel Coward gives an interesting example of this process. In writing his 'Conversation Piece' the playwright/composer reports that he had spent ten miserable days at the piano trying to come up with a decent waltz. Then, on the last day, he recalls:

".....The whisky did little to banish my gloom but there was no more work to be done and I didn't care if I became fried as a coot, so I gave myself another drink and decided to go to bed. I switched off the light at the door and noticed that there was one lamp left on by the piano. I walked automatically to turn it off, sat down and played 'I'll follow my secret heart' straight through in G Flat, a key I had never played in before."