



## STAGE 4

# That is That

What is that, knowing which,  
everything is known?

Swami Vivekananda



Understand?

**T**HE PROBLEM IS ENTIRELY GENERAL. No particular problem need be cited. We are told that there *must* be a problem, for why then did no man cast the first stone? If one asks a question then a problem has

been raised. Now, according to the scientists, questions can be asked to which no man has the answer. Does everyone therefore not then have at least these problems?

Every real problem must have an intelligible solution. This is scientific faith. Since every problem presses for solution, is one only content when there is no problem at all, since only then do we not need to seek anything? Unless we are to be trapped forever by theoretical difficulties, there must be a sure way out of this apparently imperforate web.

The world of your experience reveals the only world which you know about. This world encompasses everything which exists, as far as you know. This direct experience, whatever it ultimately is, is the source of all problems and the source of all solutions. Therefore it actually transcends problems and solutions, questions and answers. This 'it' can never be other than itself whatever the current opinion, and that is that.

There is a problem. Have faith that there is a solution, and by so doing acknowledge the transcendental source of both. This is it. There can be no question about this, because it transcends questions. Therefore that is that. Scientific method itself has been transcended since this source of all questions is not itself amenable to questioning.

Even given that there seems scope for unending confusion and difficulties, the faithful recognition that quantum explanation is possible leads to the realisation that clarity of mind is the essential weapon. Doubts about this conclusion can only arise if the transcendental argument is not understood.

If we are not enlightened, but believe that enlightenment is possible, then we can take heart because consciousness is all we need and that's that. A conscious individual can never suffer instantaneous lack of wholeness. Physical or mental disability can never be an impediment to the ultimate wisdom.

Whatever that noumenon is, it is definitely itself. That is tautologically true by definition of the semantic significance of the reflexive pronoun, self. Therefore 'that is that' is necessarily true. No problem. That's that.

There is a way out of the question-answer loop. Recognise this presence in the eternal now as the source of both question and answer and by identifying with it transcend the loop. When the transcendental argument is obvious then there can be no doubt about this transcendental itness, and that's that.

## ① Causal Reason: free control of future and past

WHAT COUNTS AS AN EXPLANATION depends on the familiar paradigm. In the quantum paradigm the concept of explanation is so different from that in the classical paradigm that even the solid ground of elementary logic needs some tilling if not completely digging up. Tycho Brahe did something similar for astronomy. By discovering a supernova in 1572 and a comet in 1577 he took astronomy from the perfect unchanging cosmos of Aristotle towards the scientific subject of today. Likewise Einstein, by his general theory of relativity took Euclidean geometry 'off the shelf of untouchables' and made it a subject of empirical enquiry.

### Quantum Logic

The same sort of adjustment now has to be made to logic. What is the meaning of *or* in quantum logic? If when talking about the future we say that this *or* that will happen then, as with the application of statistics, we have to be careful to determine whether these alternatives are the result of quantum or classical type ignorance. If quantum then the *or* is like that in the statement: 'an electron goes round one side of a barrier *or* the other'. In this case, mathematically speaking, the *boolean lattice of classical phase space* must be replaced by the *projection lattice of quantum Hilbert space*. One consequence is that in quantum logic there is a new restriction on the application of the distributive law of classical logic. Thus, for example, (A) and (B or C) does not *quantum logically* imply that therefore (A and B) or (A and C), where A, B and C are simple propositions.

This modification of dear logical intuition can offer an alternative approach to confronting, unravelling and understanding the paradoxes of quantum philosophy. Wheeler has recently suggested that all experiments in the quantum realm ought to be formulated as questions which have the answer *yes* or *no*. Quantum theory should then be reformulated as a quantum logical theory based on a binary quantum logical foundation. This has not yet been achieved.

Attempts to return to classical understanding by inventing 'hidden variable theories' to restore determinism or locality, or to remove complementary ontology or inescapable ignorance, have been shown to be far more elusive enterprises than Einstein for one supposed. The same is true of a return to classical logic. In 1967 Simon Kochen and E.P. Specker

showed that, while it is possible to embed a classical logic inside a quantum logic, it is NOT possible to embed a quantum logic in a classical one. This seems to necessarily imply that no hidden variable theory underneath a quantum theory could ever allow a return to classical logical foundations. This necessity completes the overthrow by quantum metaphysics of classical metaphysics; of classical *ontology*, of classical *epistemology* and of classical *logic*.

Newtonian physics did not have a threatening influence on discussions of Aristotle's logic because classical physics is a strictly deterministic theory. Questions about the truth value of future events are not considered to be problematic in the way that they are in an indeterministic quantum universe. Strict determinism gives a theory a rigid static deductive feel which is consistent with the essence of Aristotle's syllogistic logic.

Schrödinger's equation, on the other hand, expresses the evolution of rooted probabilities. While the evolution is still strictly causal, the evolving wave function is not a phenomenal known being but a noumenal potentiality; unknowable and insubstantial. Production of the future from the past is not one to one but many to many. The Schrödinger equation encapsulates a *dynamical reason*. Explanation has a dynamic rather than simply static component to it. In an indeterministic fundamental theory there is sometimes no traditional-type explanation of why one thing happened rather than another. Why was Schrödinger's cat not killed? Because the photon did not go through the mirror. This is traditionally acceptable as an explanation. Why did the photon not go through the mirror? NO ANSWER! This is not a sensible question. It is *nonsense* because if you tried to *sense* which way the photon had gone you would destroy the essential quality of the mirror to reflect and transmit the photon with equal likelihood.

Quantum philosophy deems a wave function to be a rooted probabilistic *supertruth* about a system because the wave is a complete, that is a perfect, representation of the state of the system. A quantum logical argument is *supervalid* if the supertrue conclusion follows by dynamical reason, that is by the quantum equation of motion, from the supertrue premises. Given this sort of causal indeterministic scenario, it is not surprising that quantum philosophy hails a new concept of rationality, a new paradigm of explanation, a new meaning of meaning, a new understanding of understanding, a new wisdom.

The new rôle of classical logic might be expressed like this.



Heisenberg's uncertainty principle applies to complementary quantities. The relativistic complement of continuous space-time is the four dimensional dynamical concept of momentum-energy. The uncertainty relation between these two becomes an expression of the phenomenally mutually exclusive alternatives of exact specification of continuous curves and exact specification of deterministic influences. In other words, either the geometry of the situation can be apprehended precisely or the logic of the situation can be exemplified but not both together. So classical geometry and classical logic become, in some sense, complementary domains.

Physics gives a description of possible experience. It does this by way of a quantum theory of noumena, or interphenomena via the wave function. Description of noumena is not possible in ordinary classical language. Even the logic is different. Everything that is classically possible in some classical picture combines to make the quantum conclusion. Mutually exclusive possibilities, like a single electron going one way OR the other round an impenetrable obstacle, *interfere* to give the visible outcome. In particular, the notion of a *tautology* is given content. That which is necessarily true is not as immediately obvious for noumena as it is for phenomena. An electron is still necessarily an electron, but given half a chance it will be an electron plus a photon or a million other things, *all at the same time* when not directly observed.

The originator of quantum tautologies is the quantum theory itself. The theory determines how things can possibly behave, what constitutes information and also what is necessarily true. There is no alternative reservoir of more fundamental coherent truths about reality. In terms of experimental pressure, there is no impetus to improve on quantum theory. Therefore let us simply try to understand what it says; not try to improve it because we prefer the old comfortable foundations, or find fault with it because we don't think we like what we think it might be implying. Let us just try to face it and ask what it means. It can't be nonsense because it's all about sense and it works.

Physicists are finding that they have such profound requirements of a theory of everything that these requirements already almost uniquely determine THE theory of all physics. Since Einstein began to seek a unified field theory, more and more pilgrims have followed the quest. Today theoretical physicists are a long way down the road. Many believe that properties like general relativistic invariance and quantizability *will uniquely determine the* theory of everything. From around 1970 when the

bootstrap theory of scattering matrix elements was in vogue, some physicists have been aware of the possibility of a unique quantum theory of everything. Such a theory would demonstrate that *nature is as it is because it is the only nature quantum logically consistent with itself*. In a sense every statement in such a theory would be a quantum rational tautology by self-consistency. Even the account of what can *exist* would follow, introducing a new kind of determinism, *ontological determinism* as opposed to *dynamical determinism*.

The theory of everything is a representation of the consciousness of the perfect observer. The theory accounts quantum logically for all conscious experience. But it is not a deterministic theory so future experience is not locked into the past or present. There is room for manoeuvre. This accords with our experience. From Newtonian physics we might have expected to feel like a robot; uninspired and obedient. Convinced determinists argue that we *are* robots but by clever tricks our brain makes us feel free. We can do what we want but we can't want what we want. Even if we could want what we want, we can't necessarily want what we want to want. The argument is recursive and inconclusive.

### Freewill

You lift your hand. WHY did you lift your hand? Because the muscle contracted. This is acceptable as an explanation. Why did the muscle contract? Because a nerve cell fired. Why did the nerve fire? Because a 'quantum' of neurotransmitter molecules was released by a neighbouring neuron which increased the nerve sodium pump potential sufficiently. Thousands of these cells may be connected to the original nerve cell so the difference between firing and not firing is not simply determined. At best there could only be chaotic determinism. Ultimately there is only quantum probability to account for it. Unlike digital computation and nerve axon transmission, which are designed to be strictly on/off states, the transmission across a synaptic cleft relies on the release of 'quanta' of neurotransmitters. Each quantum contains about fifty thousand molecules so we are getting quite close to the manifestly quantum mechanical probabilistic realm.

Nevertheless we feel in control. The hand did not just rise. A conscious decision was involved. We feel responsible. We see the choice and *choose* without feeling forced into it. Doubtless there are programmed responses brought to bear. We are not necessarily conscious of their



influence. However, through it all we feel free and now quantum philosophy tells us we could in theory be free. Physics predicts a set of possible outcomes. Incorporating all the environmental factors makes it hard to be sure what is quantum and what is classical uncertainty. One would expect, from the Schrödinger wave point of view, that waves from the environment would usually tend to flatten waves of the object and so increase rather than decrease the scope of quantum uncertainty. The actual outcomes resulting from quantum uncertainty are not predictable by any theoretical means. Whatever the outcome, that outcome will be in harmony with the theory. Yet right up to our finger tips we feel in control of many muscles in the body.

One cold day in 1970 Helmut Schmidt put a *real* poor cat in a shed with only a small electric heater for comfort. The heater was turned on and off randomly according to the random emissions from a radioactive strontium source. If the cold cat could freely choose which undetermined outcome to 'actualise' then the heater would presumably go on more than off. Schmidt claimed that the cat was successful at turning the heater on with ninety to one odds against chance. At the Cambridge University Society for Psychical Research Bernard Carr and I tried in 1973 to reproduce these spectacular results in similar experiments with people *willing* lights to turn on in a quantum random circuit built by Tony Hooley. We didn't get any obviously significant results. King Canute couldn't stop the tide either. Nevertheless we all know that as regards our little finger we are able to will it to do many things with one hundred percent success. Why is our will power apparently restricted to our bodies? How is our consciousness associated with our brain? Is it attached to the world outside at all?

Even the perfect observer looks *out*, not down. The quantum theory of everything is a quantum logical account of the flow of his consciousness. There can only be one perfect observer, the one who is looking out, not the ones who are looking in; they are observed. The theory therefore is centred on the perfect observer. There is no consciousness to explain other than his. The others are ultimately identical. So there is no physical connection of consciousness to brains.

We can lift a hand by free choice. We can, at least for a short time, control our lungs by conscious effort. We can also control sufficiently well the final stages of the digestive system - unless we get a big fright! These are all muscular. Not all muscles can immediately be reined into conscious control though. The heart is a muscle which we have little

direct control over, luckily for those of us who cannot concentrate long and hard. Some yogis, however, have claimed to achieve complete mastery over their heartbeat. Each hair follicle has a muscle attached called the erector pili muscle. This is how your hair can stand on end when you think you see a ghost. Could a yogi achieve conscious control over each and every one of these?

Imagine a new microelectronic gadget called a *macromirror*. It is primarily a flat TV screen which hangs on your wall like a mirror. In the centre is a tiny TV camera looking out. When you approach the screen a picture of you is presented on the screen, just like a mirror. But with this mirror you can zoom in or out with the turn of a little knobble. Now focus into a hair on your cheek. Try to gain control of the erector pili muscle using this biofeedback to learn how to move it. Maybe you will do it eventually. The question is, what is happening here? What is connecting to what? What are the limits of conscious control? Can we gain willful control of our genes? Can we directly influence our environment? Mind over matter is undeniable in hand control but where does it end?

Unless, like digital computers, brain function is of an entirely deterministic design, which it does not appear to be, then there will be scope for quantum random influences. These random influences could account for our freedom. How? Well, what is the definition of random? In classical physics there is absolutely no such thing. There is any amount of chaos but only in quantum physics are there events which do not have a rigorously deterministic explanation, such as the precise decay time of a strontium atom. Classical logic says everything has a deterministic cause, quantum logic does not. So there are original motivating events in the brain which have no mechanical *prior necessity* type of explanation. Once these events have been actualised then other events will follow by instrument design with very high probability. I might have considered whether or not to raise my hand, in depth, for three days, but in the event of deciding I am almost certain my hand would respect my decision. The actual determining event is itself not necessarily determined. My free conscious *mind* seems to have made the choice. The free soul is a prime mover.

There does seem to be some evidence that mind can influence chance away from average odds. Experiments on psychokinesis are often frowned on by the academic establishment because they think they know the answer already. Nevertheless, a few careful experiments have been done. Working under pseudonyms, P.Duval and E.Montredon found that a



mouse in a cage could either *determine by psychokinesis* which side of the cage to electrify or else *know by clairvoyance* which side was to be electrified next, depending on your interpretation of the fact that their mouse could avoid the side being randomly electrified with odds against pure chance of a thousand to one. Other experiments have been done with cockroaches, mice, gerbils, cats and humans which obtain good odds against chance. If we had just the very slightest control over the quantum wave function of our brain we would be able to effect *large* muscular changes. If we were able to control *even just slightly* some near fifty-fifty synaptic transmissions in our brain then we could thus achieve at least the degree of control over our bodies which we normally exhibit.

Can we achieve total freedom over the superstate? This is quantum logically allowed simply because it could happen. Of course one can only *decide* something if no one can contradict, or counter-decide, it. Two observers can make different decisions about the state of something only if it is impossible for them ever to disagree over facts. Such control would spread over a very wide non-local range. Objects which had previously interacted with something else would afford greater power for influence than others because all objects with which they had already interacted noumenally, that is without phenomenal manifestation, would also be under some entangled control. This is the scope of quantum omnipotence.

The perfect observer, who understands by reduction all science, will recognise the scope for control that he has and thereby learn its mastery. Goodness of spirit, or intention, is a mark of intelligence while evil is a mark of stupidity. Therefore the perfect observer as a free soul will be good. He will use his perfect freedom to the good. His spirit will be magnanimous, his attitude will be holy. He will embody the holy spirit. His will will be the divine will. He will agree with the disposition of another perfect observer. The holy spirit, or a selfless disposition, reflects the harmony of thoughts and actions of the perfect observer.

If there is conscious free control in the world then and only then can there be deep responsibility, deep justice and deep ethics. Otherwise they are the superficial social constraints as viewed by materialism. Politics, from the point of view of n<sup>th</sup> cousin identity, flows from the recognition that scrupulous fairness to others is actually scrupulous fairness to oneself. Egotistic selfishness results from misunderstanding and confusion.

The word 'conscious' derives from Latin *con* meaning WITH, *scio* meaning I KNOW. Animals have knowledge. Are they conscious? Do books and computers have knowledge? Take a human apart to the point

where everything is removed which is not essential to some basic communication with the outside world plus consciousness. What remains? Ordinary self-consciousness would not be conceivable without some kind of neuron loop in the brain because it requires recourse to some sort of prior knowledge to effect the reflective nature of self-consciousness. Nevertheless a kind of *loopless itness* consciousness is conceivable for this dismembered monad even without neuron loops, although communication responses by this stage would probably appear uninteresting from a normal psychological point of view. Now put the human back together again. If you can do that then you can probably create totally artificial humanoids, identical in every respect to a real person but made in the medical laboratory. There can be no reason to suppose that these artificial humans are not conscious while we natural ones are. Consciousness did not need to be put in explicitly, so where did it come from? Then again there is no way that you can be sure that any other person is conscious. Intelligent behaviour is not enough. It can be artificially mimicked. Neither does senseless behaviour prove lack of consciousness.

Brains organise memories by various means; short term, long term and associative storage. Brains govern processing of information by various systems and chemical actions; visual, auditory, sensory-motor, cognition and language. But they do not, as physical lumps of meat, have any more to say about consciousness itself than does a T-bone steak. Mental function, yes; mind structure, yes; consciousness, no. The world-wide telephone network may be a good physical analogue to the neural network but as a classical physical system it cannot sustain consciousness itself.

In quantum philosophy there is only *one* consciousness. How could there be a consciousness of which you are not aware? It would not be consciousness. Consciousness has to be experienced directly to be deemed conscious. Although Copernicus took away the central rôle of the Earth in astronomical terms, quantum philosophy puts you, the observer, at the centre of the stage, at the heart of the story, at the ever present origin of the ever present universe. The theory of everything is a representation of the consciousness of the perfect observer. In this theory, everything is noumenal potentiality unless it is phenomenal which means conscious which means actually experienced, felt, known, perceived, observed, made aware or otherwise directly seen by the one and only consciousness. This is it and that's that.

## ② Conscious Evolution: programming of instinct

RATHER THAN BLIND EVOLUTION, consider that each step in the evolution of life was made consciously and then programmed into automatic response, layer by layer. *Life was designed and built by understanding.*

Imagine learning how to drive a car. The steering wheel, gears, clutch, accelerator and breaks all have to be manipulated in coherent wholeness. They have to be worked in conjunction with one another, in a particular order, at a particular time. It takes a lot of practice, like swimming, or walking, until you can do it without thinking about the controls. Once you can do it automatically then you can drive forever more. In the same way, all instincts might have been learnt by conscious effort rather than by blind classical randomness. Artificial intelligence *models* that programming: it does not reproduce the conscious intelligence. You could teach a robot how to drive a car but it wouldn't get very far without considerable logical improvement to car function or the highway code because interaction with other cars is basically intelligent conscious mental communication between drivers. The robot could approach human dexterity of purpose only with *open programming*, or with an aware mind in control to understand the multitude of unknowns, rather than the *closed programming* of a loop in which the unimaginative, thoughtless, mindless, unconscious robot always eventually resides.

As conscious life extended its senses, it flexed its forms of perception and categories of understanding. First reacting physically and then chemically and then biologically to a ray of light - even an individual photon - intelligence extended the optic nerve from the central nervous system and programmed the constructive steps genetically thus passing the advance on to the next generation, or 'refreshment'. Understanding formed a bulb on the end of the nerve making it more and more sensitive to light. Hundreds of thousands of generations later, bit by bit, understanding built a lens onto the retina and gave it focusing controls. All this was done by consciously *understanding* the natural situation through a deep primitive developing conscious mind. Rather than nothing being learnt through inheritance of acquired characteristics, practically everything except the odd lucky accident was ultimately learnt by consciously acquiring new intelligent - since originally consciously understood - characteristics.

Once upon a time the black man was hardly accorded even consciousness by the arrogant white man. Then monkeys and now dogs and cats are hardly credited with conscious awareness. But there is only one consciousness and even humble bumble-bees exhibit that resulting appearance of very *intelligent behaviour*. Therefore they should be seen as reflecting awareness of a sort. They won't win Master Mind because their forms of perception and categories of understanding are very different to ours. Their understanding is so very different from ours that they are hardly going to have a comprehensible 'specialist subject' either, and their general knowledge will be of a different sphere altogether. But they still have a mind.

### Life-Forms

Hypothesize that life forms choose *balanced* senses. As they built their 'telescopes' and 'mass spectrometers', so to speak, they chose a fairly balanced mix of complementary physical extensions. If they developed a *position* sensor then they would be likely at the same time to develop an *impulse* sensor because developing one without the other would produce an unbalanced integrated view. For example, the eye can use the lens controls to accurately pinpoint *position* but without eyeball movement muscles and head rotation, *velocity* is very difficult to judge. Both together they constitute a well balanced useful *complementary* pair of instruments.

That both realms of complementary concepts are thoroughly mixed up in ordinary language reflects this precise sensual balance through which we experience nature. Unnatural, or contraptional extension of the senses, which has really accelerated since 1500, can cause manifest imbalance and has thus revealed quantum language which respects complementarity.

Make another hypothesis. Considered as an integrated collection of measuring devices, life forms *maximise certainty*. In other words life forms try to develop a whole set of complementary pairs of apparati. Hearing, sight, taste, touch, smell: what is missing? Eyes to see radio waves might require an arm span of five hundred yards for the complement to be meaningful, therefore other considerations leave one generally satisfied with visible light. The hexagonal structure of bees' eyes quite probably invokes grid refraction giving quantum coherent effects which allow them to see a whole lot better than one would expect from a classical analysis.

Possible extensions into nuclear realms are entirely ignored in chemical or biological discussions which consider only the gravitational (bone and muscle) and electromagnetic (nerve and chemical) forces. From a long, conscious evolution, one has perfectly integrated *sense*, both in terms of the ‘five senses’ making a whole set for normal potential experiences, and in terms of giving complete ‘meaning’ from an understanding, or basic theory, which has developed alongside, and in close association with, development of the internalised, on-board, extended senses. The hypothesis of conscious evolution suggests mind over body can extend to heartbeat, digestion, even genetics if the layers of programming are unfolded and the original conscious control is resumed.

### **Layer upon Layer of Programming**

Where did we all come from? Monkeys ‘made’ man, fish ‘made’ monkeys, amoebae ‘made’ fish and a molecular soup ‘made’ amoebae. To be slightly more precise, life has been evolving ever more rapidly for the last three or four billion years. From a molecular soup, containing at least hydrogen, carbon, nitrogen, oxygen, sodium, phosphorus, sulphur, chlorine, potassium, calcium and iron compounds, developed, probably after many unsuccessful and many continuing attempts, the first self-reproducing carbon based life form, the *universal ancestor* of life on Earth. A billion years later this intelligent manifestation had developed into algae and then into slimy photosynthesising organisms. After another two billion years, or about one billion years ago, multi-cellular life was being built, making jellyfish, worms and molluscs. By five hundred million years ago fish had formed. Everything was painstakingly constructed on the sound foundation of previous generations and immediate *experience*. As time went on, life gradually diversified and development accelerated. By four hundred million years ago land plants had begun to take hold. Within sixty million years the Earth was well covered with dense vegetation. Amphibians left the water and took to the land. By two hundred million years ago, reptiles and the first mammals had taken shape. In the last sixty million years there has been explosive evolution of mammals.

The first hominoids probably existed five million years ago. Having vocal chords, they surely had some sort of linguistic communication, as do many other lower species from whales to birds. One million years ago the Stone Age began. *Homo erectus* learnt to make simple stone tools and use

fire. By the beginning of the Bronze Age, thirty thousand years ago, agriculture had begun and the first towns had been built by *homo sapiens*. Twelve thousand years ago the Iron Age began. All the Indo-European languages can be traced back to a common primitive language that flourished six thousand years ago. In the last ten thousand years there has been exponential growth of 'culture', manifestly built by conscious choice and determination using advanced mental powers. A relatively short time ago man's intense creativity and incessant activity seems to have abandoned to oblivion the deep memory of his modest origins from muddy soup.

### **Formation of Deterministic Structure from Naught**

Where did the molecular soup come from? Where did the *Earth* come from?

In the beginning, says this quantum fable, there was just the origin of octonionic space. All eight axes were wrapped tightly into a jelly-ball point. Without classical explanation, by quantum tunnelling to another topological configuration, the jelly-ball assumed the form of a quaternionic knot, or *quot*; a sort of doubly-knotted four dimensional torus in eight dimensions. Although topologically stable, the *quot* began dynamically to compactify, or infurl, two of the four quaternionic dimensions while four of the eight octonionic dimensions began to dynamically unfurl. Within a finite instant, the *quot* had assumed the form of a knotted rigid relativistic string in an expanding four dimensional space-time.

As space expanded, the string stretched and the tangled knots tightened. The tension and bending soon became unsustainable so the string shattered into a host of little stringy loops congregating around the site of the old cosmic string. In a trillionth of a second some loops took on the quantum state of a quark, others of a lepton and yet others of other fields. Within a few minutes of its beginning, the expanding universe was filled mainly with photons, electrons, neutrinos, hydrogen nuclei and helium nuclei.

Eventually electrons combined with nuclei to form atoms. The photons no longer interacted much with the electrically neutral atoms and therefore decoupled. These photons remain to this day as a low energy microwave background filling all space. The distribution of atoms would be more concentrated in regions where the cosmic string had been. Therefore the distribution of microwave radiation should reflect this



original non-uniform distribution. In 1992, data from a radio telescope on a NASA satellite first detected deviation of the microwave background from absolute uniformity.

Not only the atomic distribution, but also the galactic distribution should reflect the position of the original cosmic ball of knotted string. Places where large tangled knots began to tighten should locate the seed for superclusters of galaxies. Smaller internal links forming parts of knots could likewise seed clusters of galaxies. The Milky Way has been found to reside in a knot-like distribution of two dozen galaxies.

An individual galaxy starts, according to this parable, as a broken length of string. The ends of an open relativistic string must travel at the speed of light and quickly wrap round the centre of mass before completely disintegrating, leaving a spiral galaxy. When the string disintegrates into atoms, gravitation draws the atoms into large spherical pockets of gas. If the ball is large enough gravitational pressure heats up the centre and initiates nucleosynthesis. Energy is released as light making this new *star* shine.

If the star is sufficiently large, once enough of the hydrogen has synthesised into helium, then hydrogen and helium will synthesise into lithium and then into beryllium. This process of nuclear fusion continues to form shells of heavier and heavier atomic nuclei within the star. At transition stages in this process massive turbulence can take place inside the star. This turbulence may cause an eruptive prominence from the core bringing with it material from surrounding shells. If ejected faster than the escape velocity, once free of the strong influence of stellar gravitation, the material will condense into roughly spherical drops containing a mix of materials from the stellar shells. Our Sun is made of debris from past supernova in which very heavy elements were manufactured. These elements would have collected in the Sun's core.

Into the centre of this 'drop' tends the most dense material, like liquid nickel and iron, further out are layers of silicon and aluminium, while on the surface floats the chemical 'scum'. The compounds forming the outer layer are composed of molecules such as lithium fluoride, sodium chloride, calcium oxide and silicon dioxide. These compounds formed when chaotic turbulence caused the harmonic shell layers to mix when they were forcefully ejected from the star. There would also be streaks of inert elements such as gold. Such a crust cooled and the compounds crystallised to form the rocky surface of our Earth. Water vapour and other trace gasses condensed into seas. Internal turbulence caused

continental drifting, folding and cracking. Earthquakes and volcanoes were very common occurrences.

Water (H<sub>2</sub>O), possibly produced when the oxygen layers passed through the outer stellar hydrogen gas, dissolved some mineral salts and chemical reactions formed carbon dioxide, ammonia, methane, ethane, propane, ethylene, propylene, methanol, ethanol, propanol and many more complicated carbon based molecules. In some such way appeared the original molecular soup from which we eventually developed. Some say we got here as soon as we could!

The Earth came from a star and we came from the Earth. Therefore which is deeper, the star or the Earth or us? The Earth will spiral into the Sun one day. If the Sun is more essential, more fundamental, more basic, more *it* than the Earth then is this a catastrophic or a glorious moment? A rock is dead and yet we who are essentially rock are alive. What is the vital difference? Complex organic chemical structure. Organisation. We are organised rocks. This would be an insult to one who takes a dim view of rocks. But if you can see in a rock the essence of the universe then matter comes alive and it is a blessing to be identified with the very truly real.

Today we claim to understand, to know and to feel. Yesterday we understood, knew and felt too. Why say *our* actions are intelligent while those of ancient generations were unconscious? Why credit random mutation with the advance when it was intelligent experiment and intentional determined design. One day soon the discoveries of today will be clearly written into our genes. Will future generations give us no credit for *being* either? A pattern is laid for conscious recall to the beginning, the task is to appreciate and act from that depth of being.

### ③ World History: the strong influences

IN THE LAST TEN THOUSAND YEARS, since farming began, much of the change on the surface of the Earth has been effected by man. Five thousand years ago the first *civilizations* began. Civilisation was initiated several times. Some faded, and some flourished. For the most part these civilisations developed independently and were indifferent to external influences, except for the occasional invasion by a neighbour. From this new *social* foundation the pace of change accelerated further.

By the year 1000 four major civilisations had emerged; Western European, Islamic, Indian and Chinese. All were based on a subsistence agriculture and derived power from wind and water, and from animal and human muscles. Each society was based on traditional patterns and seemingly unquestioned routines.

By 1500 a new age of human *world* history had begun. Europe already had long established land trade links with China but had only just discovered the Americas by ship. In 1522 the globe was circumnavigated. Struggles in one civilisation became entangled with struggles in another and wars took place on a larger scale. The main instigator of this new pitch of turmoil was Europe. The world began to be Europeanised. People became more alike. Their dress, mode of government, assumptions and ideas began to converge on the European standard.

Up until 1750 most people still thought the world would go on as it had. But it was on a new wave of relentless and accelerating transformation, invigorated by theoretical and applied science. European power through scientific know-how, with resulting wealth and influence, dominated. In 1800 most communities throughout the world were still self-governing. By 1900 the *British* Empire alone had consolidated its hegemony in about one quarter of the globe through decisive advantage in military technology. Russia and China remained the most unaffected. North, Central and South America, Australia, Africa, the Far East and India had all suffered European colonization.

### The 20<sup>th</sup> Century

In 1911 there was a revolution in China which overthrew the last emperor after four thousand years of imperial dynasties. Russia, from its Slav origins over one thousand years before, was still a feudal state in 1900, but its frontiers had been extending. Predictable collision between

Europe's Austro-Hungarian Empire and Russia sparked off the First World War in 1914 as a result of a complex European alliance system. To fuel the four year Great War, national economies shifted industrial production to armaments. This induced a depression in Europe and North America between 1929 and 1935. Reeling from the conflict, Russia suffered civil war after the communists seized power in 1917. In Europe fascist military dictators gained power in several countries as a result of the economic hardship and political uncertainty. The democracies tried in vain to resist this ominous development.

The undefeated German army rose again with ambitions to occupy Western Russia. Japan sided with Germany against Russia. In 1937 Germany occupied Austria and Japan attacked China. German fascist expansion continued while the British and French democracies and Russian communists strenuously endeavoured to maintain peace. When Germany invaded Poland in 1939, Britain and France reluctantly declared war on Germany. Thus started the Second World War. After six years of fighting, the democratic powers to the West and the communist power to the East eventually managed to defeat the Germans in May 1945.

Meanwhile a surprise attack by Japan on Hawaii in 1941 brought America into the war. Eventually Japan was forced to surrender when America dropped two *atomic bombs* in August 1945, the very first atomic bomb having been tested just one month before. Fighting had spread to almost every continent and ocean. Over fifty million people died in the Second World War, half of them Russians.

### Interfering Civilisations

We are experiencing a GIGANTIC COLLISION as powerful civilisations meet the industrialised, modernised West. Less powerful civilisations are also experiencing the turbulence as they get caught in the wake of the storm of the last two hundred years. Apart from a few weeks, since 1930 there has been major fighting somewhere in the world. Since 1945, terrorism apart, there have been over three hundred significant military engagements in Central and South America, the Middle East, Africa, China and the Far East, in the disintegrating Soviet Union and now in Europe itself. Currently there are about twenty four wars being waged on Earth. Awe-struck by *'the bomb'* and *'the money'*, undeveloped countries are torn apart in the race to *'Westernize'*. The interference



phenomenon from the interaction between Europe and China is yet to begin in earnest.

The world has never been so fragmented. Two thousand years ago there were a number of quite distinct and separate civilisations, each homogeneous in itself. These are all now steeped in ideas and techniques from the West. Those attempting to cling onto their traditional ways are progressively finding it more difficult to survive. Non-western societies like Iran are appearing in the Western mould although they are often burdened with internal conflict, large debts, rising populations, inaccessible or dwindling natural resources, natural disasters, unstable food supplies and poor basic education. While the 'by-definition' attractive *ideas* of wealth and luxury have been avidly consumed and digested through television, advertisements, tourism and general hearsay, it has been too hard to find the courage to explain to former colonies that the new Americans took all the resources they wanted from the Red Indian who had come from Siberia ten thousand years earlier, and Europe extracted much wealth from her Empires.

On the other complementary hand, a single unified world civilisation has never been so real. There is a forum, the United Nations, where the one hundred and seventy or so world states can exchange ideas with minimal language barrier. Unfriendly invasions have given way to friendly holiday visits. English is spoken somewhere in every city in the world. Westernization is a manifestly happening reality everywhere. Many Indians in India still imagine that Britain is something like Brahmhaloka, the highest heavenly planet, and many Jamaicans in Jamaica believe the United States is practically Paradise. In a sense they are right.

Because even the major civilisations are in the melting pot and because many countries have *chemical, biological and nuclear weapons*, the world is now a very dangerous place for *everyone*. The Cuban crisis in 1962 almost led to nuclear exchange between America and Russia. Any serious threat to the integrity of a nuclear power is, if history is anything to go by, likely to lead to nuclear retaliation. The financial markets reflect all this uncertainty. The fortunes of whole countries, such as Mexico, can bob up and down at the hands of the big computerised money dealers. Mercy is deemed light when weighed with profit. Balance sheets replace humane considerations. Economics is regarded as the scientific barometer of *value* and vast personal riches pretend to be fair game for all.

## The Psychic Atmosphere

When one looks closely at a bee hive, or steps back to see some ants at work, or looks upwards to see a flock of birds, there one sees harmonious societies where all appear to understand their rôle and fulfil it in co-operation with the others. Co-operation is every bit as essential as Darwinian or Thatcherite competition. Picking up a gregarious ant one sees a tiny, almost extraterrestrial creature with eyes to see and limbs to grapple and climb. Within his brain is associative memory storage and optical image processing. He has a mind. Each cell of his body displays remarkable intelligence. For example, it has been discovered recently that cells do not die, they self-destruct when it is to the advantage of the whole organism. This utilitarian behaviour of cells displays a marked similarity to behaviour associated with conscious understanding. Cells seem to truly understand their rôles.

Under the microscope we see the mark of *consciousness* in a single cell. With the naked eye we see the mark of *mind* in the entire ant. Standing back we witness the mark of a *psychic atmosphere* of integrated minds at work in the ant society. To acknowledge and appreciate this psychic atmosphere, and the complementarity between hierarchy (competition) and democracy (co-operation), and the nature of n<sup>th</sup> cousin politics, whereby chimpanzees' DNA program is 99% identical to ours, is the immediate OBLIGATION of leaders and followers everywhere.

