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# A CENTURY OF SURPRISES

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Part 1	New Perspectives	p. 1
Part 2	Being Here	p. 11

When people comment on the advances of the 20th. century, they are inclined to give most of their attention to the outstanding technological innovations: the aeroplane, radio and television, nuclear energy, satellites, computers. This is natural enough. These, and other such inventions, have greatly changed our lives. I would like to take for granted remarkable achievements of this kind and turn instead to an equally transforming set of influences - the new insights that urge upon us the need to think fundamentally differently about the human situation on Planet Earth, and the relationships that bind humankind into the incredible Universe that is our womb and our home.

#### Dynamic Universe

The 19th. century perspective on reality was of the Universe as a giant machine, made up of innumerable discrete parts. The scientists of the time held Newton's laws of motion to be absolute. They also believed that they had penetrated the fundamentals of heat, light, sound, electricity and magnetism and the structure of matter. Together, these packets of knowledge seemed to give the clue to the entire physical universe.

The death knell of this comfortable thinking was sounded early in the present century when Albert Einstein published five papers that 'forever changed man's view of the universe'. For example, before 1905, energy was regarded as a mystical, even spiritual, entity whereas matter was held to be crude, gross and, in some religions, inherently evil. Einstein's famous formula,  $E = mc^2$ , (where E equals energy, m equals matter and c equals

the speed of light) showed that matter and energy are the equivalents of one another. Einstein's formula is as transforming philosophically and ecclesiastically as it is revolutionary in physics. The denigration of matter as debased - and, therefore, the human body also - had clouded the human perspective, and generated guilt, since the beginning of history. Einstein enabled us to escape from this misconception.

Just as Einstein transformed the human outlook by bringing energy and matter into a dynamic unity, so did he overturn age-old perceptions of Time and Space as separate, fundamental aspects of reality. In his paper of 1916, 'The Foundations of the General Theory of Relativity', he elaborated the idea of Space and Time as interrelated in 'a space-time continuum'. Einstein further postulated that gravity was not the result of the pull of matter on matter, as per Isaac Newton, but an effect of the curvature of space-time, brought about by the presence of mass.

Another startling suggestion was that time was not absolute. Anyone travelling anywhere near as fast as light (186,000 miles a second) would grow old more slowly than someone else in a normal life situation. Furthermore, Einstein had the audacity to suggest ways of proving his outrageous hypotheses. The tests that followed fully justified his claims.

Philosophically, the 1916 contribution went with the earlier input to bring out unsuspected interconnections and coherences in the universe, which began to look more like a huge interacting system of energy than a conglomeration of independent parts.

This move towards understanding the fundamental energies of the universe took another giant leap forward with the emergence of quantum mechanics through the work of Bohr, Heisenberg, Schrödinger, Born, Dirac, and Feynman in the 1920's, 1930's and thereafter. Quantum theory transformed our understanding of the infinitesimal dynamic world of subatomic particles.

Quantum physics has also brought us to understand that light and energy are not continuous processes but are composed of tiny units. Just as a jet of water

is made up of masses of water molecules, so is a beam of light composed of hosts of photons, which are the units of light and manifest themselves as both particles and wave packets.

That insight of quantum physics gave a considerable jolt to traditional thinking, but an even bigger jolt came with Heisenberg's 'uncertainty principle' (1927). This stated that in the seething, ceaseless interactions of the subatomic world the *act of observation could affect what was observed*:

'Any attempt to measure precisely the velocity of a subatomic particle, such as an electron, will knock it about in an unpredictable way, so that a simultaneous measurement of its position has no validity.'

Gone for ever was the idea that the observer was totally insulated from his observation: aloof, godlike, impersonal. In the quantum world of very small entities, observer and observation have both to be taken into account. Nor, at this level, can predictions be precisely made. Electrons may be here, or there, or somewhere else. They can absorb or eject photons of energy without any particular cause. The subatomic world is, consequently, a world of pure probability. The solid world we know about us stays more or less put because infinite numbers of chance interactions among atomic and subatomic particles can maintain an appearance of stability. A grain of sand blown up large enough would look more like a swarm of bees than a solid particle. That does not alter the fact that, for everyday purposes, we can treat it as if it is solid.

Even now these ideas are only slowly percolating into general consciousness except in a dawning awareness that we live in a universe of perpetual change. In the opening years of the century, change was regarded as an awkward intruder upon a normally static universe. Most people now realize that change is a natural feature of all existence. At this point, everyday experience has caught up with the physicists' perception of particles and energies perpetually interacting with one

another as the ground state of all that is.

### Universal Patterns

During the years when a startled scientific community was slowly digesting the outcomes of Einstein's genius, and quantum theory, our picture of the universe 'out there' was also being transformed.

At the beginning of the century, knowledge of the universe as a whole was very sparse, and general awareness was even scarcer. Copernicus and Newton, in the previous four hundred years, had eased a reluctant humanity out of the flattering idea that our world was the centre of the universe, yet the solar system itself was still regarded as special.

As the 20th. century advanced, this illusion also had to be given up. The large telescopes that appeared in the 1920's and later, together with information from radio astronomy, opened up an immense and varied universe such as no one had dreamed existed. It was huge beyond all previous imagining: 100 billion stars in 'our galaxy', itself just one among 100 billion other galaxies.

The new exploration of the universe also revealed a great range of astronomical features: giant stars, dwarf stars, exploding stars, quasars, galaxies of different types and at many stages of development, inter-stellar dust clouds and much else besides, including 'black holes'. An additional wonder was added by the work of Edwin Hubble, in the 1920's. He showed that the vast and varied universe was constantly expanding. In the midst of this surge of new knowledge, our Earth was revealed as a middle-sized planet, circling a slightly larger than average star towards the outer edge of a quite normal spiral galaxy.

Astronomical research has also greatly altered our perspective on time. In 1900, many people still believed - following the 17th. century calculations of Archbishop Usher - that the universe was created in 4004 B.C. By the middle of this century, the age of the Earth was put at around 4.5 billion years (4,500,000,000). As for creation itself, the start of it all - the so-called

Big Bang - this cannot be less than 10 billion years ago, and it may be 20. Most astronomers settle for 15 billion.

At first sight, all this immensity may be intimidating. But other aspects of the universe as we now know it are more reassuring. By spectroscopic analysis, chemical elements present in the very distant stars, or other cosmic entities, can be ascertained. What we find everywhere is the same: huge quantities of hydrogen, a lot of helium and a scatter of the larger elements, such as silicon and iron, with which we are familiar on this planet. And, between the entities, vast regions of empty space.

The basic pattern of it all is pleasantly simple: energy takes on the form of photons, electrons, and sub-atomic particles. From these are composed atoms - tiny systems of positively and negatively charged particles - which become elaborated into 90+ different elements. Finally, atoms combine into molecules by sharing the electrons in their outer orbits. From these components the entire universe is built up, governed by four basic forces: gravity, electromagnetism and the strong and weak forces operating upon subatomic particles. So, whereas we may feel dwarfed by the size of the universe, we can also feel comforted by its coherence - *and by the fact that we can understand this coherence*. Our minds are capable of becoming tuned in to it all.

### Insights From The Miniscule

If a human being is tiny in relation to the universe itself, he is gargantuan in relation to the smallest things within the universe. Just as the vast universe was a closed book until we acquired powerful telescopes, so was miniscule reality unknown before the invention and development of the electron microscope from the 1930's. This allowed us to see objects thousands of times smaller than had been visible by the best optical microscopes. We could even see large molecules.

Thus it comes about that, in the past fifty years, we have been able to observe hitherto unseen micro-organisms, small crystals of substances, the fine structure of the tissues of which living bodies are composed, and

other entities to be measured not in hundredths but in thousandths of a millimetre. Such a measure is called a micron. Bacteria are about two microns long. A virus is even smaller.

Perhaps the most fascinating discovery of electron microscopy is the marvellous structure of the living cell, first clearly observed in the 1950's. Formerly a cell was thought to be little more than a blob of living matter; now its intricate structure and busy chemistry have been revealed. Every cell in the body, other than the blood cells, contains a nucleus where the genetic programme for the entire body is stored, together with minute factories for the manufacture of protein, other factories for generating energy, a containing fluid, and a cell membrane which, assisted by special proteins, selects needed chemicals from the blood stream and excretes waste products. Other 'organelles' are also contained in the nucleus. All this within an entity which may be only a fiftieth of a millimetre in diameter, or even smaller. A human body contains something like ten trillion of these minute chemical factories, each one with its own extremely active internal life, while also playing its role in body functioning, as nerve cell, muscle cell, liver cell or whatever.

The sizes of things, both huge and tiny, are among the big surprises of our century. They surprise us because we naturally measure 'large' and 'small' in terms of our own size, and we come somewhere about midway between the bigness and smallness of Nature. We are, accordingly, amazed by extremes in either direction.

There are a thousand billion billion water molecules in a drop of water; there are around the same number of stars in the observable universe. Our century challenges us to adjust to such sizes and numbers.

### The Unity Of Life

The movement towards coherence made another great advance with the discovery of the genetic code (DNA) by Watson and Crick in 1953. At that time, arguments were still going on in some circles about whether man/woman was or was not a special creation, whether

evolution had actually occurred, and whether or not *Homo sapiens* was closely related to the other primates. We now know that DNA exists within the nuclei of the cells of all plants and all animals. The 'code' is different for different species but its chemical make-up follows a single pattern throughout nature. Humanity then, is all of a piece with living things everywhere. We are particularly close to the chimpanzees with whom we share nearly 100% of our DNA programme. The universality of DNA has established man's link with other life beyond a shadow of a doubt.

This DNA code, which ensures the continuation of the characteristics of species from generation to generation, is delightfully simple at root. We are mostly formed from proteins. The proteins that make us are in their turn, made from various combinations of the molecules of twenty amino acids. DNA is primarily made up of arrangements of four large molecules, any three of which can code, by their order or repetition, for any one of the essential amino acids. So a series of code messages can lay down the formula for the manufacture within the cell of the various proteins needed to build and maintain living creatures.

The details of how living matter replicates itself through the famous 'Double Helix' arrangement, need not concern us here. Suffice it to say that what we call life is a system of dynamic chemical processes through which living matter is able to nourish and reproduce itself, and that DNA sets out the programme that steers the elaboration of replicating molecules into complex living creatures. As Francis Crick himself puts it: 'The genetic code is the small dictionary which relates the four-letter language of the nucleic acids to the twenty-letter language of the proteins.'

Just as Einstein gave us the clue to the basic energy of the universe, generated within the sun and other stars, so have Watson and Crick, and those who have built on their discoveries, opened up for us the formative processes of life itself. Both inputs - the physical and the biological - hugely enhance the range of human understanding and power. This underlines one of

the urgent lessons of the present century - that, as knowledge advances, so must humanity and responsibility also if our new powers are not to be corrupted for evil ends.

In terms of philosophical perspective, the newly-found picture of interlocking energy, change and structure has a refreshing wonder all its own. Much of what was mystery to earlier humanity is now factual, but the fundamental mystery of existence still remains and is, indeed, more elusive than ever. But now we no longer see ourselves as looking out at the mystery; we are contained within it, are part of it, in both our subjective and objective aspects.

### Organic Universe

Our century has told us a lot about the universe we live in, and a good deal about ourselves and the living things that share the planet with us. It has also been made clear, as a result of planetary exploration, that Earth is the only planet in our solar system where life as we know it exists, although quite small changes in the situation and size of Venus and Mars could have made them inhabitable worlds also. But how about planets circling other stars in our galaxy? What are the chances that some of them may be inhabited too?

Until the second half of this century most astronomers would have replied with a cautious 'Unlikely'. But, of late, the odds on the possibility of life elsewhere in the universe have been improving.

The probability of life in other solar systems increased dramatically when it was discovered, in the 1960's and thereafter, that organic molecules - the building blocks of life - are not limited to our planet but are widespread throughout the galaxy. There is a big gap between the existence of organic molecules as such and their elaboration into replicating molecules, which are the basis of life. Nevertheless, the knowledge that there is plenty of organic material around in the universe removes one former source of doubt about the possibility of life elsewhere. Given the availability of organic molecules, then the right sort of planetary habitat for the development of life should secure, over time, the emergence of replicating molecules, and evolution. Life

we know, from our experience of it on Earth, is extremely versatile and penetrative.

Another necessity for a fertile planet to exist in a solar system would be that its sun did not burn itself out before an advanced stage of life had had time to evolve. So the crucial question becomes: 'How often can we expect habitable planets to exist in other solar systems, which include suns of an appropriate size to last the four billion years or so necessary for the evolution of life?' Here, too, the odds in favour have greatly improved.

For many years it was argued that our solar system was the freak outcome of a cosmic accident. We now know that solar systems are likely to be normal events. Many stars that we can see in the sky are double or treble stars encircling one another. Such multiple stars are unlikely to have planets associated with them. But solitary stars are also abundant and they are capable of generating solar systems. Have they or haven't they? One clue that some of them have is that they are rotating slowly. This is because, by throwing off planets, they reduce their own rate of spin. We can now calculate the rotation speed of solitary stars. The outcome of the observations is that 15% of the 100 billion stars in our galaxy are spinning slowly enough to suggest that they do have planets around them.

But not all these solar systems will contain habitable planets - mainly depending on the presence of liquid water and an appropriate atmosphere - nor can we be sure that the star will last the 4 or 5 billion years necessary for life to evolve. Let us, then, be cautious and suppose that only one star in a thousand of the 15% of possible stars in our galaxy fulfils the necessary conditions for generating life. That means that there may exist 15 million inhabitable worlds. If we reduce the odds to one solar system in a million as likely to include a fertile planet, that still leaves us with fifteen thousand habitable worlds. It is certainly beginning to look as if we are *not* alone in the universe!

Then why no radio messages? Unfortunately communication within the universe is a very considerable

problem. Supposing the inhabitants of other planets are trying to get in touch with us, what wavelengths would they use, and can we be sure that they would have developed the same radio techniques that we employ? There is also the time problem. We have acquired radio communication only in the present century. Radio communication takes place at the speed of light, so a suitable planet for sending us messages, that was a hundred light years away, would have to have reached, not less than a hundred years ago, the technological stage where we are now. The very nearest star is 4.5 light years away; most are much, much more distant. So intercommunication would be tediously slow. But any signal of obvious technological origin, from outside our planet, would be sufficient to establish life and mind elsewhere in the universe.

A further problem is that, from our end, no large scale, persistent attempt to pick up signals from other solar systems has yet been made. We need a constant scan from satellites above all the radio activity of our world to give us a reasonable chance of making contact, as any incoming signals would be extremely weak.

All the same, if the arguments for life elsewhere are sound - and they seem to be - it can only be a matter of time before contact is made. It may even happen between now and the year 2,000. A clear message from outer space could yet be the surprise of the century.

## PART 2 BEING HERE

We must now switch to a different and rather more sombre vein. Scientific truth has to be struggled for but, once attained, remains in place until modified by further discoveries. Its progress is, in the main, one-directional. Social truth is a very different order of things. It is compounded in confusion and conflict, accompanied by false dawns and back-slidings, so that what is gained in one decade may be lost in the next. The sometimes alarming bond between scientific advance and social change is that the knowledge science brings, converted into new technology, may be directed by social forces, including economic and political forces, towards fearfully destructive ends. We today find ourselves with such tools as nuclear energy and the chain saw, each on its own capable of appalling devastation, and together adding up to the grimmest of menaces, putting nature, beauty, life itself, under ultimate threat.

So, in the social area, the century has produced not so much surprises as shocks: not only power enough in our hands to destroy the world, but an accelerating ecological crisis, including a population explosion that is out of hand and roaring ahead of all predictions; the threat of a global plague, AIDS; and a world-wide interlocking, multi-national system of trade and banking that purports to generate prosperity but, in fact, produces intolerable inequality.

Yet, even as we review the threats around us, profound changes in the social/moral outlook are now gathering ground which promise to generate, over time, antidotes to the mounting sickness of our times. To these we will now turn. We find a mixture of pluses

and minuses.

### One World

A unique event of this century, that still leaves us somewhat floundering, is the rapid shrinking of our planet itself. We have almost achieved Puck's fantasy of putting 'a girdle round about the earth in forty minutes'. (Sputnik I, in 1957, took 96 minutes.) Voice and vision can be transmitted from anywhere on Earth at the speed of light. Satellites bounce the beams round the curvature of the Earth. This makes the whole world into a unified think-tank - the noosphere of Teilhard de Chardin. Our planet is economically one also. The price of oil going up and down sends shivers of excitement or dread around the globe.

This unification of the world calls for a much heightened degree of common purpose globally. Unfortunately, in spite of the existence of the United Nations, our commercial behaviour towards one another is still more medieval than modern. Each nation strives for its own triumphs without regard to the others. The powerful and lucky become excessively rich; the weak and unfortunate, mercilessly poor. Food surpluses rot in one part of the world while starving people rot in another. Japan makes motor-cars and rushes them across the world to sell them in Europe; Europe does the same the other way round. Meanwhile millions of pounds, dollars, yen, etc. are squandered on advertising to try to convince potential buyers that almost identical cars are vastly different from one another.

This widespread economic idiocy is relevant to this paper because it shows that we have not yet adjusted to the shock of being one world but are, at present, short of the will and courage to bring ourselves up to date in our economic/commercial institutions. The sight of brilliant young men screaming at each other across the world, with their computers in front of their noses, doing elaborate deals in raw materials, commodities and money itself - deals that contribute nothing of value to the well-being of humankind - is a monstrosity that cannot be justified. Nor can

the insidious destruction of the substance and beauty of the planet, for private or sectional advantage. A clear task for the last decade of the century is to pave the way for a just, caring cooperative system of production and distribution in place of the system we have inherited from the past which is unjust, selfish and competitive.

One of the big surprises of this century is the realization that plenty for everyone is available as long as greed is controlled, rampant waste eliminated, and population expansion tackled competently. 'Wealth', Buckminster Fuller assured us in *Utopia or Oblivion* 'is now without practical limits.' The hope for the future is that the truth of this statement is beginning to sink in.

### Psychological Revolution

This century has seen a big advance in psychological perspective. Psychology arrived, as an independent science, around 1870. The main endeavour at the start was to explore sensations: measuring our discriminatory responses to temperature, light, weight and so forth. Students were encouraged to treat one another as laboratory animals, even though, around the same time, William James was already studying more profound dimensions of human personality.

From about 1900 to about 1940, a psychological revolution occurred. While some psychologists continued to investigate men and women as though they were only response mechanisms, others - notably Freud, Adler and Jung - began examining the deep well-springs of the human psyche. From these initiators grew up a much expanded recognition of unconscious influences on overt behaviour, with Freud concentrating on the sexual impulse; Adler on the individual's quest for significance, over against his/her inherent sense of inferiority; and Jung on the creative roots of our humanity - individual's yearning to achieve integration of personality and 'unconditional, binding and indissoluble community' with the surrounding world.

These insights have led to an increasing awareness of what actually accounts for human attitudes and behav-

jour. From which came, in due course, the growth movements characteristic of western civilization today. Over the years, men and women have become more aware of themselves and more eager to achieve actualization in terms of what they are, and what they may become.

The psychological revolution has also led to a reconsideration of values and motives which, *in the long term*, must be good. The new psychological insights have knocked many of the old pretences out of the ring. They have also emphasized the supreme worth of good relationships between person and person.

Personal psychology, group psychology, industrial psychology, transpersonal psychology, and the rest, have all come to a focus in these truths: that a person is diminished in a state of isolation whatever wealth or glory he/she may snatch on his/her own. Fulfilment comes through others and with others. It is cooperation that makes humanity invincible. A mature individuality is the reward for growing beyond individualism.

These new approaches have pointed up the fact that moral principles are really about human relationships. They are the essential conditions for living together: respect for truth, honesty, concern for others, sensitivity about people, a sense of responsibility. Unless such values are honoured, there can be no trust between people, and social order becomes impossible. Basically, moral principles are as pragmatic as the principles of nutrition. In the long run it is fatal to ignore them. The age-old reverence for moral values is rooted in social reality.

### The Changing Face Of Authority

Most nations, most of the time throughout history, have been run on raw authoritarian lines. There were the rulers, designated by inherited right or established might, and there were the ruled who were expected to do as they were told. Cadres, councils and bureaucracies were there too, to advise those in power, to carry out their wishes, and to suppress opposition. Lower down the social hierarchy, the boss was the boss and

the workers did what they were told. Authority, it was assumed, had a divine right to rule - a supremacy taken over from earlier ideas of kingship. Revolutions came and went, but the old style of dominant authority was soon back in the saddle. Its face might have changed but the focus of closely-guarded power remained. Democracy emerged here and there but it was partial and inadequate, often a façade rather than a reality. A firm directive downwards was considered to be the essence of good government whether in factories, schools, the services, or the nation itself. That was how things were for centuries and, for the most part, still are.

But now fundamental change is on its way. A remarkable new insight of this century is the realization that stark authority is not only brutal *but also inefficient*. If the creative energies of human beings are to be released for effective action, then participation, not authoritarianism, has to be the operant system. This social truth has been demonstrated in many situations, including the rehabilitation of criminals, but it has, perhaps, been most spectacularly vindicated in what was formerly a hotbed of authoritarian direction - industrial management.

The change of approach to workers from 'telling them' as employees to collaborating with them as valued colleagues gained a main impetus during the 20th. century from - appropriately - the work of a woman: Mary Parker Follett. In a series of papers, read between 1924 and 1928 to the American Bureau of Personnel Administration, she made the case for leaders as people capable of building 'harmonious and effective unity' by mobilizing the individual capacities of their fellow workers in a climate of agreed aims and mutual respect.

These insights - which went beyond industrial paternalism - were carried forward, so far as Britain was concerned, by such imaginative managers as Wilfred Brown (later Lord Brown) at Glacier Metal in Alperston during, and after, the '39-'45 war. Counterparts of such revolutionary changes of attitude and action were found, about the same time, in the United States, Scandinavia and elsewhere. The ideas of participant authority grad-

ually spread because they worked spectacularly wherever they were honestly tried, even though bitterly opposed by oldstyle autocratic management. In the new climate, initiative and discussion were encouraged; bureaucracy and domination eschewed. Ernest Bader went even further and established the Scott-Bader Commonwealth, run as a workers' cooperative.

The new managerial approach is specifically directed to getting people working with people in the pursuit of common aims. At every point the autonomy of the individual is recognized, relevant information is made available, and purposes are constantly clarified. The workplace becomes a dynamic community of involved people instead of a scramble of egocentric competitors seeking personal advantage and bearing down on their 'inferiors'.

Under the new system, authority is still recognized and valued, not as a claimed personal status but as a condition of fulfilling responsibilities - the authority of function that is - and as the consequence of exceptional knowledge, skill and achievement.

This new style of productive relationship has still a long way to go. Dominating arrogance dies hard. But the validity of the new style is now securely established. It will, in due course, be recognized as one of the major discoveries of the 20th. century - the method of fully mobilizing human creativity in organized situations.

One of the important outcomes of this is that society is now in a position to differentiate true leaders - the initiators and facilitators - from the power-hungry dominators who have, in the past, often usurped leadership, with dreadfully destructive social consequences. Mistakes in selecting leaders are still being made but, hopefully, mistakes will occur less frequently as the psycho/social factors of leadership become more widely understood. As dominant leadership dies out, replaced by democratic management through participant involvement, the social/moral health of the community must rise.

### The Female Dynamic

The 20th. century will also, in due course, come to be recorded as the time when the age-old usurpation by males of the major operational roles in society was effectively challenged. In the early years of the century votes for women were regarded as a joke except by a few reformers. It took a war, in which women proved they had capabilities formerly considered essentially male, to loosen the masculine grip on politics. In 1928, at long last, women were given the vote on the same basis as men. This political victory was, however, only the beginning. The idea lived on that women were best suited to maintaining homes, and working in subordinate roles in society, while men should continue to shoulder the main brunt of managing the nation's and the world's affairs.

Meanwhile a subtle, and profound, change was taking place. Those very qualities of perception, gentleness and skill with relationships which had been regarded as the justification for limiting women's roles to 'the caring professions' began to take on an enhanced value throughout society. Men were faced with the need to develop greater sensitivity if they were to function efficiently in all those roles that they had formerly managed by toughness. As a sign of the times, in the 1950's, foremen in the building industry were sent on courses planned to help them sharpen their human perceptions. In the 1930's, to threaten the sack was enough to maintain discipline on a building site; twenty years later, human obtuseness on the part of a foreman could precipitate an expensive strike. The so-called 'female qualities' were no longer regarded as merely a pleasant embellishment to life; they had taken on an economic as well as a human value.

This recognition of the universal importance of the female qualities, together with women's proved capacity in roles formerly regarded as essentially male, has greatly accelerated the advance of women. One result of this has been the arrival on the world scene of a new style of woman leader. Joan of Arc won recognition by playing the man; other women have

also gained high positions by doing likewise. Such women may out-male males. New style women leaders - such as Mrs. Bruntland, the Norwegian Prime Minister, or Mrs. Aquino of the Philippines - are particularly valued because they have mobilized their caring and perceptive qualities in the service of the cause they represent.

As war ceases to be 'the pursuit of politics by other means', and as sensitivity and cooperation gain recognition as crucial elements in all human affairs, so will the arrogant, aggressive type of male come to be regarded as dangerously out-of-date, and women will move into equal partnership with men in running the world. The genetic/cultural situation seems to be that, whereas both men and women share the whole range of human potentialities, overt aggression is nearer the surface in men and caring nearer the surface in women. Today, drive and caring are needed *together*, to sustain, and enhance, life on Earth. It is this fact of the contemporary situation, not theories of sexual differences by themselves, which will bring women more and more into the centre of things in the final years of this century.

It is vital that this should happen because most of the large-scale evil in the world comes from comparatively small groups of males who are more concerned with domination, power, status and wealth than with the public good. A better male/female balance in running the world is on its way.

### Universal Values

Another hopeful change is the growing understanding that the fundamental values, which govern right and wrong behaviour, are not the particular property of any culture, ideology, or religion, but are universal. This is not a new idea, but it has taken a long time to reach the level of general consciousness because people are so prone to bolster their insecurity by claiming that their ideas and cultures are unique, even a particular gift to them from a divine source. So religions, which should unite people, have often led to conflict as each sect made its claim to absolute rightness.

Sectarianism is by no means dead today but it becomes less and less convincing as the years pass. Rigid fundamentalism cannot have much of a future. It no longer fits the known facts of our existence.

However, the alternative is not mechanistic materialism. As J.B.S. Haldane said many years ago: 'Though the religions are all untrue they are concerned with something very important.' The clue to this conundrum is, perhaps, that we should dissociate the religious impulse from what religions have made of it. The religious impulse itself is free-flowing: a longing to be in unity with the whole; a passion to understand the mystery of existence; to find the ultimate simplicity behind the overt complexity. This impulse may become diminished and confused when it is packaged up in parcels of rituals and beliefs.

The ecumenical movement is a struggle to break free of the hunger to be special at a time when shared values offer the only way forward. Incidentally, the religious impulse, as described above, embraces the scientific outlook because science, too, is a passion to understand, a search for ultimate simplicity.

In moral terms, the ultimate simplicity is love, as Jesus (minus the hell-fired interpolations), and the other great moral teachers, have all stressed. Love, exercised and justified in the way we treat each other, is the solvent that can melt away the arrogant posturings and claims that have limited and distorted humankind's social/moral perceptions and attitudes in the past.

Today, the world is caught up in a struggle between love and ruthlessness; it is crucial to the human future, life's future, and the future of the planet itself, that love shall establish ascendancy. That is the universal need.

In spite of the rampant greed we see around us, the acceptance of that essential truth is slowly gaining ground within the world community. Ordinary human decency is, in the long run, a more powerful factor than the pessimists suppose. But that still leaves us with some searching questions; one in particular: Do we really matter?

## Human Significance

The changes of scientific and social perspective that the 20th. century has brought have not necessarily enhanced our sense of value as human beings, even though our power - for good or evil - has enormously increased.

At the beginning of the century, traditional beliefs about God and Creation were still firmly in place. People saw themselves as chosen by God to inhabit a world especially made for them and with the assurance of eternal bliss in heaven after death if they accepted the faith and lived by its rules.

This is a far cry from things as we now know them to be. Our Earth is in no way special in the universe. We ourselves are not spirits transferred to Earth to learn how to obey God's will, but are of solid terrestrial stock, at one with the animal kingdom and only special by virtue of being more conscious than other animals. We have a short life span without any guarantee that heaven awaits us thereafter. Even the Earth itself turns out to be a temporary affair, due, after a few billion years, to be engulfed in the heat, gases, and radiation of an expanding Sun. This is one inescapable outcome of our century of surprises. What are we to make of that?

Some writers retreat into doom and gloom. Jaques Monod, the brilliant French biologist, for example, described our species in *Chance and Necessity* as no more than an accidental spin-off from a vast, alien, physical universe. He wrote:

'The ancient covenant is in pieces; man at last knows that he is alone in the unfeeling immensity of the universe, out of which he emerged only by chance.'

Is there, we may ask, some other position with which we can start the 21st. century which is neither 'the old covenant' nor a despairing sense of isolation. We have two good reasons to suppose that there is. One derives from the universe as we now apprehend it; the other from the perception of ourselves which quantum theory and the very structure of our minds urge upon us.

As we saw earlier, the picture of things now opening up is not of a sad little *Homo sapiens* clinging to a temporary foothold on Earth, within a dauntingly vast and indifferent universe. Instead, we find ourselves involved in a cosmic drama in which the spread and advancement of life appears to be the major theme. Our obvious responsibility, and capability, is to enrich the quality of life on our planet. We know ourselves to be the product of 3.5 billion years of evolution. We now have the task of carrying that evolution forward, aware that, in doing so, we are acting in partnership with other intelligent life if it exists.

No longer are we earthbound in mind and spirit, nor should we regard ourselves as irrevocably earthbound physically. Already we see the first signs of global cooperation in the exploration of space. Once the waste of war has given way to more positive uses for brains and money, there will be a rapid acceleration in solving the problems of space travel. A thousand years from now - provided that we do not destroy ourselves - although the Earth will still be our home, it will no longer be our prison. The vista ahead of us is, accordingly, infinite.

But why, some may ask, should we be concerned anyway about what will happen only in the very distant future. For the same reason that we are concerned about what happened in the distant past. We are, through our personal and collective consciousness, woven into the very fabric of life itself. This brings us to a central issue for modern man - the nature of mind.

## The Organ Of Knowing

At the beginning of the century, man was painfully relinquishing the illusion that his world and himself were central in the universe. Two-thirds through the century, some writers had gone to the other extreme and were declaring man to be of no significance whatever. Now, in the last decades of this century, man is regaining a central importance as manifesting overt intelligence within the universe.

In this whole area, discussion is in full flood.

Detailed study of brain physiology reveals a complex of intricate neural and hormonal mechanisms. Excited by such discoveries, some analysts think it is only a matter of time until the mind is totally explicable in terms of brain physiology, and expect that we shall soon have computers capable of Artificial Intelligence. Others hold that mind operates to different principles from those governing neural and hormonal events.

This matter will not be settled for some time yet. But it is certainly true that the ways of the mind are more than neural/chemical mechanisms. When the world impinges on our brains through our senses we are, all the time, interpreting what we see - giving it form, value and relationship. Light patterns impinge on our eyes; electro/chemical impulses travel along the nerves; various neural processes take place in the occipital and related areas of the brain, and we 'see'.

If there is a brass band in the street, sound waves actuate our ear drums and precisely similar electro/chemical impulses to those of our seeing nerves travel to auditory centres and we 'hear'. So it is for other senses. We are not making direct contact with what is 'out there'; we are interpreting what is out there in the language of our sense organs. We then weave our perceptions together into elaborate patterns. That is what observed 'reality' is for us.

Sir Alan Cottrell summed up the situation in a recent lecture: 'We can no longer assume a universe "existing out there" independently of us as observers. What we see is never an absolute, independent universe but a universe whose features are always modified by our own acts of observation.' Thus, our apprehension of the world 'is partly objective and partly subjective'. This gives a new aspect to human subjectivity. The human mind itself becomes the sounding-board for truth.

The reverse of this process is also true: the mind echoes what is 'out there'. Mathematicians play around with symbols and sometimes come up with equations that exactly fit what is going on in the universe. A half-way position between subjective and objective arises, as we have seen, within the quantum world of dynamic

miniscule systems when the act of observation influences what is observed. Our minds and the universe are inextricably bound up with one another. Human consciousness is not a spin-off; it is of central significance.

For most of the century, within the scientific community, the subjective has been regarded with suspicion. Now subjectivity is again accepted and scrutinized. We are in the universe and of the universe, and our inner perceptions are, in ways not yet understood, a part of the whole. You might say that the role of mind in our understanding has moved on, in this century, from that of an abstracted observer of the universe to being its involved interpreter.

### The Threshold Of Tomorrow

This section must be something of a summary. We have noted a huge expansion of human perspective during the century. It follows that we cannot expect all the beliefs that carried conviction at its start to have retained their former credibility intact. Re-thinking our situation as *Homo sapiens* - alive in a vast, dynamic universe - is, therefore, very much on the agenda today. One inevitable casualty is the idea of an almighty, all-loving, potentially intervening God as the designer and guide of everything. What we now observe is a universe that is self-contained, however vast. There is no imaginable beyond. But what is around is amazing enough. The universe is fizzing with energy, ceaselessly active, exploring every possibility offered by ever-changing circumstances, creating from within itself, generating beauty, a source of wonder and wonders. It is, moreover, in a state of perpetual Becoming. The involvement of our species, and our lives, is to share in that becoming.

The bodies and minds we inherited from our parents were the result of aeons of natural selection, but what we do with what we have takes us into an altogether different realm of being. This is the personal realm, the creative realm, the spiritual realm and, also, the moral realm. We can squander our powers, or seek to use them constructively. We can take account of others or concentrate only on ourselves. We can

create beauty or condone ugliness; aim to be kind, or tolerate cruelty. The choice of the quality of life we seek to represent is ours. Our choice is not absolute, but it is sufficient to make the difference.

Ultimately our choice is about the future of life on Planet Earth. We now have such knowledge and power that the future is at our mercy. It follows that we need to match the new knowledge and know-how of this century with heightened humanity, concern and vision. What we are noticing today is the gap between the morality that we have and the morality that we need to match our immense new powers and responsibilities. If we are to transform the world we shall also have to transform ourselves. And, for that, we need all the good models we can find, in the present and in the past.

Yet the nagging query remains: Why bother? As individuals we are mayflies in a cosmic eternity:

One moment in annihilation's waste,  
One moment, of the well of life to taste -  
The stars are setting and the caravan  
Starts for the dawn of Nothing - Oh, make haste!

(The Rubaiyat of Omar Khayyam, Stanza XXXVIII)

And then there is Macbeth's dreadful comment on the human situation:

It is a tale  
Told by an idiot, full of sound and fury,  
Signifying nothing.

(Macbeth, V.V.)

Over against such despondent views, we have Spinoza's encouraging message that we should live as though we are eternal - *sub specie aeternitatis*. Or Robert Browning's robust 'Yes' to life:

How good is man's life, the mere living!  
How fit to employ  
All the heart and the soul and the senses for ever in joy!

(Saul, Stanza IX)

In the end, as we swing through space on our small planet, we are left with a subjective conviction that what we are and what we do is significant. It feels as if it is, and the consensus of mystics, artists,

writers and composers throughout history is that it is. We are, indeed, involved in something tremendous, living in the midst of life and responsible for its future on this planet, perhaps participating in a community of high consciousness that is spread throughout the entire universe.

The old man who plants an orchard so that his grandchildren may enjoy the fruit sees meaning enough in what he does. We are the planters of the future. Certainty is not on offer but vision, hope, imagination and purpose are. We live immersed in mystery, wonder and beauty and we have things to do because they need doing, and because they are worth doing. The basic personal and moral truths are that we have the capacity to know, and the ability to act with creativity and love. That is the substance of contemporary faith: we matter because we share in a creative process of which we are a part. The rest lies in the bosom of time.

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## THE QUAKER UNIVERSALIST GROUP

The Quaker Universalist Group believes that spiritual awareness is accessible to men and women of any religion or none, and that no one Faith can claim to be a final revelation or to have a monopoly of truth. The group is open to both Quakers and non-Quakers.