

## THE SCHUMACHER MEMORIAL LECTURE

Of course, we need economic prosperity and of course economic development must be extremely sensitive to its environmental consequences. But we must ask some fundamental questions about our achievements so far. How is it possible that nearly two hundred years after the birth of the Industrial Revolution, the number of people living in both material and social misery in the first and third worlds, has grown exponentially? In 1800 the urban slum population of the world probably consisted of about 7 million people. Today it has swollen to nearly 575 million. And do not think that that is just a reflection of the growth in world population. The slums have developed about sixteen times faster than has the overall population. During humanity's greatest period of economic expansion, despite incredible technological innovations, misery has increased dramatically and continues to do so worldwide.

How is it that the world now faces man made threats of a quite different dimension to the wars, famines, epidemics and other disorders of previous dark ages? Climate change threatens the stability of life; progressive destruction of the ozone layer could convert everyday sunlight into a mortal danger; both fresh and sea water are being poisoned; land and soil are being debased; the air in many areas is becoming dangerous to breathe; and as United Nations Environmental Minister, Maurice Strong, said, we are living with the threat of "forty Chernobyls waiting to happen" and that in Eastern Europe and Russia alone.

It seems an extraordinary enigma that humanity's greatest production of material prosperity has created extreme social breakdown and that the greatest period of technological and scientific achievement has created the risk of destabilising the conditions which allow life on earth.

To understand the behaviour of modern Western man we must start by studying his culture. His religion, principally, is based on the premise that there is one God, the Creator, and that man is made in his image; that man and man alone is the personification of God on earth: that man is set apart from other forms of life and that nature has been placed at his disposal.

This is quite different to the religious outlook of primal peoples. They cannot conceive of man set apart and unrelated to the animate and inanimate forces surrounding him. Men and women in primal societies approach the natural world with care and reverence. In the primal world, man's position vis-a-vis nature is not one of exploitation but of relationship. In the modern tradition, however, the natural world is something to be investigated, explained and ultimately used.

Buddhists and traditional Hindus, for their part, believe that the origin of the problems of our society lies in the dichotomy that we perceive between man and nature. They consider that the radical separation of man from nature follows from the fundamental premises of the Judeo-Christian tradition and that within such a context, nature is there to be subjected to the will and aggressive instincts of man.

The most modern of the great religions, Marxist-Leninism, rejected spiritual beliefs and placed its trust in science and technology. Marxism feels absolutely free to exploit nature solely in the service of man.

Modern philosophers drawing on the Platonic tradition, reinforced the belief that humans were separate from nature and that somehow their intelligences were divorced from both their own bodies and from nature. Thus, Rene Descartes and Francis Bacon affirmed the division of science from the spiritual.

The inevitable conclusion was that nature was to be used by man and that science was to be his tool. And as science was divided from morality, it could progress on its own without

constraints. Bacon considered that facts derived through the scientific method have no moral significance in and of themselves.

So science travelled independently in the confirmed belief that it had the right, and the duty, to investigate, discover and innovate. Successive generations of students were brought up unconditionally to believe that science could solve all problems.

But as some were solved, new and unexpected problems were created. A deepening crisis has emerged.

*What can be done?*

Obviously there are a number of important technical measures which must be implemented to limit and in some cases reverse part of the physical damage. These include finding ways to reduce CO<sub>2</sub> emissions; eliminating the use of ozone-destroying chemicals; controlling the dumping of toxic waste; encouraging the use of extensive methods in agriculture and much else.

But we must be clear in our priorities. For better or for worse we have established a global industrial society. It can be radically improved, it can evolve, but it cannot be suddenly broken. If it were, the result would be immediate social chaos and the creation of such poverty that concern for the medium or long term would be replaced by the anguish of short term survival. Those who by necessity must concentrate on next week's food for their children cannot be expected to worry about environmental threats which might occur a few years later. We must aim at bringing about necessary change in a way which, as far as possible, maintains social stability.

We must be unrelenting in curtailing those activities that constitute an immediate and fundamental threat. But we must be ever mindful, when confronting lesser issues, of the need to avoid unnerving the economy and creating a dramatic backlash against environmentalism by a multitude of people whose livelihood will have been damaged and whose horizons of concern thereby will have been reduced. A global industrial system which has spawned an industrial society dependent from it, cannot abruptly be dismantled. So it must secrete material prosperity with limited environmental and social damage and that prosperity must help us evolve towards the post industrial age.

Mechanistic measures, albeit very important, deal with symptoms not causes. Modern man prefers them because he believes in reasoning from the particular to the general and as Descartes ordained, from the simple to the complex.<sup>1</sup>

Modern man likes to compartmentalise and to measure rather than to understand. Here are some examples of the sort of mistakes that can result.

1) A community's prosperity is measured by counting its gross national product (G.N.P.). What is more, its rank and influence is, to a large extent, similarly determined. If a country has a successful G.N.P., it will tend to be a model, both economic and cultural, for other nations and it will also feel that it has a moral duty to teach other nations how to "succeed" and to convert them to their culture.

Unfortunately G.N.P. is only a measurement of activity. It is quantitative, not qualitative. If a calamity strikes, the immediate impact could be a rise in G.N.P. as the damage is repaired. If there is social breakdown leading to an epidemic of crime, the G.N.P. will rise to reflect the building of prisons and the expansion of law enforcement personnel. If a farmer grows a diversity of foods for his family, his production is not included in the G.N.P. as he does not sell it. If he switches to producing a monoculture, then both the sale of his cash crop and his purchases of other foods will become part of the G.N.P. If the mothers of two neighbouring families care for their own children, then neither will contribute directly to the G.N.P. However if one mother decides to go out to work and to

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<sup>1</sup> Regulae ad Directionem Ingenii, R. Descartes

employ her neighbour to look after her children, then the activities of both women will be included in the G.N.P.

Recently I visited Bhutan and discovered a wise and beautiful nation. 90% of Bhutan's population live on small family farms principally producing, by organic means, a diversity of crops for family use; over 60% of Bhutan's land mass is covered by natural forests (this compares with about 1.5% in England); about one fifth of this consists of protected reserves for flora and fauna; its architecture is of unusual beauty; its environmental pollution and indigenous crime rate are among the lowest in the world and its society respects its religious and social traditions. According to the measurement of G.N.P., including welfare payments an inhabitant of Washington D.C. is ninety four times richer than an inhabitant of Bhutan. In Washington there is an epidemic of crime, drug taking, alcoholism, suicide and family breakdown. Yet the West feels it has a duty to "enrich" Bhutan by "educating" it in modern ways. Fortunately the King of Bhutan has said that he is more interested in gross national contentment than in gross national product.

2) A second example concerns agriculture. It is generally accepted by economists that large mechanised farms using modern scientific methods produce more food, more cheaply, for the benefit of the economy and of people throughout the world. What is more, it is thought that such farming will liberate men and women from the land and will allow them to participate in the more dynamic sectors of contemporary industry and therefore to contribute to the growth of G.N.P. and to public prosperity.

But this does not take into account the fact that when people leave the land, they gravitate to the cities. If there are insufficient jobs and infrastructure, such as schools and hospitals, there will be increased unemployment with the consequent costs as well as substantial expenditure on infrastructure. These costs also must be taken into account.

But there is a deeper price. When, as a result of change, jobs are lost in industry, the fundamental balance of society is not altered. Some declining companies suffer while others emerge. Loss of rural employment and migration from the countryside to the towns, causes a fundamental and irreversible shift. Throughout the world, it has contributed to the destabilisation of rural society and to the growth of vast urban concentrations. These regroup deracinated individuals whose families have been atomized, whose cultural traditions have been extinguished and who have been reduced to dependency on welfare from the State. From the first world to the third, urban groupings have become tragic, morbid intumescences. The cost of contributing to such social breakdown can never be measured accurately. The hurt is too deep. Jose Lutzenberger, that far sighted former Minister of the Environment of Brazil, reminds us<sup>2</sup> that the favelas or Brazilian slums, were the direct result of the green revolution of the 1950's which, through intensive farming, was supposed to end for all time famine throughout the world. He added: "In the South of Brazil, in my home state, Rio Grande do Sul, in Santa Catarina and Parana, when our Ministry of Agriculture, adjusting to the demands of intensive cattle raising in the Common Market, promoted big plantations of soya beans to feed not hungry Brazilians but cows in Europe, hundreds of thousands of our peasants and farm workers migrated north. Most of them ended up in Amazonia, some in Paraguay. You certainly know what devastation this caused in the rain forest, the Cerrado and the other biomes."

We must also consider the physical effects of intensive farming such as the degradation and erosion of the soil, the chemical pollution of ground water, water depletion, the destruction of genetic diversity, the debasing of the quality of food resulting from unnatural methods of production. Modern society's judgment on intensive farming is based on measuring superficial results rather than understanding overall consequences.

The GATT negotiations, as they affect agriculture, provide a further demonstration. Inter alia, they propose that nations would be prohibited from limiting the volume of imported agricultural products. The result would be that the directly and indirectly subsidised products of intensive agriculture would flow unrestrained into nations which have

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<sup>2</sup> Letter from Jose Lutzenberger, September 1992

maintained their traditional methods. In such circumstances, rural communities, in which small or medium sized farms still predominate, would be washed away as if by a catastrophic flood; whole populations would be uprooted and swept into urban slums. Not only would rural life be deracinated, but towns would become uncontrollable.

Vietnam is an example. It is one of the many countries taking the first steps away from Marxist-Leninism. It has a population of 67 million of which 78% live on farms. Driving them from fields into urban slums would create deeper and longer lasting devastation than the horrors of communism or the war.

Or consider Mexico. If the agricultural products of the U.S. are allowed to flood the Mexican market forcing Mexico to adopt U.S. intensive methods, then Mexico's agricultural population would be brutally reduced. Millions more would join the deracinated and could move to towns. But bear in mind that Mexico City already has a population of twenty one million people. So many would migrate to the U.S.A. It is an irony, is it not, that the U.S.A. is seeking to create the North American Free Trade Area partly so as to stabilise employment south of the Rio Grande and thereby reduce immigration. Yet, so as to obtain short term economic benefits they would uproot the rural population of Mexico and unleash a transnational flood of migration.

In Europe not only would the GATT proposals further destabilise our rural population and swell our towns, but if we extend the European Community to Eastern Europe it would devastate their rural and urban societies.

In the world as a whole, the rural population currently consists of 3.1 billion people. Let us suppose that as a percentage of total population, it were to be reduced to the levels that exist in the "new" countries like Canada or Australia. The result would be migration from the land to the towns of about 2.1 billion people and that figure is based on today's population. These GATT refugees would have been sacrificed to the illusion of efficiency and free markets.

The "new" countries have failed to understand that their social structures are quite different from those of traditional nations whose populations were not assembled rapidly by immigration. When immigrants reached North Dakota, for example, they did not find a society with a large population based on village life and deep rooted traditions. They found a wide open space, sparsely inhabited by a primal people. They did not worry about social changes which would follow the creation of vast farming areas. It would be mistaken for the remainder of the world to follow their example.

3) My third example of counting and not understanding is the belief that a geographic space, once populated, becomes a nation. Of course, they can both contain the same number of inhabitants but a populated space consists of heterogenous clusters of individuals drawn from different cultural and ethnic groups. In a nation it is the common culture, identity and traditions which create its heritage and constitute a vital pillar of social stability.

Although long unfashionable, real nations have proven, once again, that they exist. They can survive generations of totalitarian imperialism and long periods of grouping in artificial structures. We can see them in the ex-Soviet Union, Yugoslavia, Czechoslovakia, Ireland, South Africa and throughout the world.

In our society mobility has been thought to be a good thing. People, it was believed, should move to jobs rather than the reverse. But this failed to take into account the social consequences. In a stable society, each member of a family has a role. The grandmother and the maiden aunt both influence the upbringing of the children. The family and its friends constitute the public opinion with which children must cope. But if to find work the mother, father and children move to a distant town, leaving relatives and friends behind, the influences that help educate the children are changed and the function of relatives is diminished. Society begins to disaggregate. The older generations regroup in special retirement cities, the children become more anonymous within an impersonal

community. In particularly severe cases, the families break down and children seek a surrogate family within urban gangs.

Of course there will always be the need for reasonable geographic mobility and certain benefits can result. But a policy of promoting migration is unwise.

4) A final example of modern man's confusion, is that we have allowed ourselves to classify many man-made disasters as natural disasters, also known as Acts of God.

Regularly we read of droughts, floods and their tragic consequences such as famine. Very often, we have contributed to these disasters. Consider the effects of deforestation. Forests create atmospheric humidity through a process of evaporation and transpiration. That is how they produce rainfall. Cut the forests down and rainfall is correspondingly reduced. What is more the roots of the trees form a sponge-like network which

helps trap the rainwater at the appropriate level. Destroy the forests and you also destroy this natural system. The water runs off, streams and springs dry up and during the monsoon season, the rain rushes unrestrained into the rivers which become torrents carrying with them the soil from the denuded slopes.

And all this is amplified by over exploiting agricultural land. The soil is degraded to the point that it loses its capacity to retain water.

This man made deterioration directly contributes to droughts, floods and famine.

The infamous Dust Bowl years in America are another example.

U.S. agronomists believed that intensive ploughing of land made it more suited to hold rainwater. The new tools of mechanised farming made this possible. The result, contrary to expectation, was wind erosion. The big dust storms started in 1933 and continued for four years creating devastation of crops and farming communities.

When we read of tragedies in Africa and elsewhere, we should perhaps not only react with financial generosity to try to soothe the immediate pain, we should also attempt to understand their true causes and whether we have contributed to them.

And this goes not only for physical disasters but also for social breakdown. Zaire is a dramatic example. 80% of its urban population is unemployed; inflation is running at 5000% per annum; there has been massive migration from rural to urban areas; most of the urban population lives in slums; food is scarce; water is unsafe; the infrastructure has collapsed; corruption is endemic; prostitution is generalised; and population growth is exploding.

This has been brought about by applying traditional "modern" methods.

The West backed a "modern" tyrant, Mobutu, who decided to destroy tradition; replace tribal chiefs by centrally appointed collective chiefs; stifle the tribes, in other words the true nations, so as to create a unitary state with a one party political system; massively invest in "modern" education in the cities so as to attempt to eradicate traditional knowledge (the number of teachers increased from 37,000 to 230,000 in eighteen years); and embarked on a program of rapid economic development consisting of centrally planned grandiose industrial and infrastructural projects.

The West loved it and financed it. Zaire was being developed in a modern way. No doubt we will continue to help other African nations to modernise in a like way. An illustration of the method of thinking of Western international institutions is provided by a memo written by the World Bank's Chief economist, Mr. Lawrence Summers, formerly a Harvard Professor. After suggesting that global warming was not of significant importance because,

over the next fifty years, it would only cause damage equal to half of a single year's growth in G.N.P., he said<sup>3</sup>:

"I have always thought under-populated countries in Africa are vastly under-polluted, their air quality is probably vastly inefficient compared to Los Angeles or Mexico City".

It is not only the way we measure that is wrong, it is also the premises on which we have based our modern society. I will describe some of the more significant examples.

1) Science, like any other tool, should not travel independently from the spiritual and social traditions and needs of a community.

Science does not have great wisdom, rather it accumulates and analyses particular information which supplies it with cleverness and ability. Science is massively powerful, potentially useful and of course can be very beneficial. But contrary to the views of Descartes, science cannot be separate from the spiritual and contrary to the view of Bacon, scientific facts do have a moral significance. Science must always be a part of society not separate from it.

Nehru provides a striking example of a convert to Western modernism who adopted an absolute belief in science, in and of itself. He is quoted as having said<sup>4</sup>: "It is science alone that can solve the problems of hunger and poverty ....".

2) The most extraordinary example of the domination of nature by man, is genetic engineering also known as recombinant DNA technology. This allows man to create new forms of life. Skills are now available to manipulate and transfer genes from one species to another. This is not an evolutionary process like choosing and mixing strains within a species so as to try and achieve a particular purpose. It is an abrupt manmade break with evolution. For example, researchers at the University of Kentucky have transferred genes from a fish to a soya bean plant. Other researchers have introduced human genes into a pig.

Humans even feel that they have a right to own new life forms. The biotechnology industry is lobbying for a legal system which would allow all living organisms altered by genetic engineering to be patented. A draft European Community directive is currently under discussion in the European Parliament.

All of this should raise many practical questions: can we understand the longer term effects, direct and indirect, of the wholly new and partially known forms of life? How can we be confident that new forms of life, such as genetically engineered microbes despite their potential benefits, will not cause unlimited damage? Their very "newness" means that existing life on earth including animal and vegetable life, has never been exposed to them and therefore has no immunity to protect against them. Do we understand that by creating and imposing on the biosphere instantaneous, unexplored new forms of life we throwaway the vital protection of being able to learn from our own mistakes?

But there are deeper questions. Has man the moral right to create new microbes, new animals, new life forms? Are we wise to transform artificially the course of evolution and to do so at unimaginable speed? Do we understand that much of the change is irreversible? Should we convert animals and fields and forests and all things living into unnatural high performing machines whose only purpose is to serve human beings? Is changing fundamental genetic information in living things, which will remain part of their inherited characteristics, the ultimate form of pollution? Should we not remember that as James Lovelock has said<sup>5</sup>: "The entire range of living matter on earth, from whales to viruses, and

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<sup>3</sup> Memo from Lawrence Summers. Chief Economist of the World Bank, to his staff. 12 December. 1991

<sup>4</sup> Quoted in "Understanding the Present" (1992), Bryan Appleyard

<sup>5</sup> Quoted in "The Way" (1992), Edward Goldsmith

from oaks to algae, can be regarded as constituting a single living entity"? Should not man consider that by creating entirely new life forms he will be affecting that single living entity?

Has man assumed the role of God or, in the eyes of the less formally religious, is he attempting to usurp the role of nature?

3) The purpose of industry and commerce is to create prosperity. Like science it must be part of society and not separate from it. Economic growth is of value for so long as it contributes to the stability of society. It is of no value if it sows the seeds of destruction.

All my life I have been a conservative or, in the old European sense of the word, a liberal in the tradition of Tocqueville and Hayek. I have lived during a period in which the two dominant political and economic systems in the West have been liberalism and Marxist centralism.

Liberalism was the antidote to centralism. It is not just a more efficient economic method. It has deeper significance. Its beliefs, of course, are based on limiting the power of the State by separating the executive, legislative and judicial branches of government; granting the State great strength to exercise those powers that need to be centralised; decentralising others; and maintaining a free enterprise economy. Instead of encouraging dependency from the State, liberalism transfers responsibility to citizens and to their families. Instead of centralising absolute power at the top, it limits power through checks and balances, decentralisation, public opinion and ensuring that the State like everybody else is subject to the law of the nation. That is the moral justification for liberalism.

But the world has changed. Marxist centralism has been discredited. Human societies are lifting their attention from the Cold War and are being forced to face different and grave threats. Vaclav Havel wrote<sup>6</sup>:

"The fall of communism can be regarded as a sign that modern thought ... has come to a final crisis. This era has created the first global, or planetary technical civilisation but it has reached the limit of its potential, the point beyond which the abyss begins.... Man's attitude to the world must be radically changed. We have to abandon the arrogant belief that the world is merely a puzzle to be solved, a machine with instructions waiting to be discovered, a body of information to be fed into a computer in the hope that sooner or later it will spit out a universal solution .... "

Liberals must understand that although in many nations and in many ways, their beliefs remain eminently valid, on their own they are not sufficient. They must be integrated into the overriding imperatives of the biosphere as well as of human societies. Otherwise liberals, like Marxists will be rejected as mechanistic relics of the past.

4) Nations with a high G.N .P. must cease to believe that because they are technologically competent, they have greater wisdom or are spiritually superior. Advanced western industrial nations seem to believe that there is only one way, only one culture and one set of social rules which should be applied universally no matter the traditions of others. This is to be rejected unconditionally. Cultural diversity allows each society according to its requirements to develop its own evolving model from which others can learn voluntarily.

Cultural imperialism is more deeply harmful than territorial expansion. The Conquistadors plundered, raped and returned to their homelands. They caused pain and injury. But the long-term consequences of their actions cannot be compared to the damage caused by their successors - the proselytizers. Often with the best of intentions, they robbed whole nations of their language, religion and identity.

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<sup>6</sup> New York Times. March 1,1992

Let the "new world order", about which we hear so much, have as an objective a world in which nations are allowed to live according to their religions, their traditions, and other needs, without either cultural or territorial imperialism, well meaning or otherwise, established by military means or through financial inducements. The new world order should not be a system which allows one nation to impose her political, social and general ideas on others. Let the industrial nations look at their own social wounds before affirming their moral superiority.

Only when there exists a real threat to the world community should these fundamental principles be violated.

5) David Attenborough in his work "Life on Earth" plots the history of life on the timescale of one year. Based on that scale, if evolution started on January 1st, humans did not appear until December 31st<sup>7</sup>. For almost all its life, the earth lived without humanity. As we all know, in the eighteen hundred years from Annus Domini one to the birth of the Industrial Revolution, human population grew from 250 million to 900 million. Then from 1800 to 1992 it grew to 5.5 billion. And in the next fifty years we are told that, on present trends, it will grow to 10 billion<sup>8</sup>. Significantly the elimination of other living species follows a roughly similar pattern.

What is more, instead of a human population rooted in its own communities which were based on family units, bound together by their own cultures, confident in their traditions and therefore stable, the bulk of the population has been uprooted and isolated. This breakdown has been a direct contributor to the population explosion.

Thus has the population grown to an enormous size and become tragically desocialised. Humans face two tasks which are twinned: to at least stabilise the population and, to allow societies to return to social health. Both are vital and interdependent.

6) And lastly, we all know the story of Genesis. Let me read one extract:

"So God created man in His own image .... and God said .... be fruitful and multiply and replenish the earth and subdue it; and have dominion over the fish of the sea, and over the fowl of the air, and over every living thing that moveth upon the earth."<sup>9</sup>

Some concerned Christian theologians are reassessing their religious roots within the Hebraic tradition. They consider that "dominion" does not equate "domination" and that as the bible also requires man to "tend and to keep"<sup>10</sup> the earth, man has in fact been entrusted with the duty of stewardship of nature. This school of Christian thought is further comforted by the story of Noah's Ark in which Noah is ordered by God to save two of every living species. This is interpreted as God's wish to protect diversity. And God's covenant was made with "all living creatures"<sup>11</sup> confirming the sacredness of life. In the Book of Genesis it is said that God, after creating the earth, declared it "very good".<sup>12</sup>

There is also a Christian school of thought which considers that man is indeed part of nature because, like the animals, he is created out of the dust of the earth.<sup>13</sup> When God

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<sup>7</sup> "Life on Earth" (1979), David Attenborough

<sup>8</sup> United Nations Estimate

<sup>9</sup> Genesis 2 : 27 and 28

<sup>10</sup> Genesis 2 : 15

<sup>11</sup> Genesis 9: 10

<sup>12</sup> Genesis 2 : 31

<sup>13</sup> Genesis 2.7 and 19

breathed into man the breath of life, it is said that he also breathed it into birds and animals.

These interpretations recreate a unity between science and the sacred. The earth is "very good" so how can a Christian allow it to be ravaged? Man is the steward and as such, has a responsibility for nature. Instead of traveling unrestrained, science would have to be sensitive to moral, ethical and societal standards.

The Christian philosopher, Dr. Rene Dubos, said: "We must take to heart the Biblical teaching: the Lord God took man and put him in the Garden of Eden to dress and tend it. This means not only that the earth has been given to us for our enjoyment, but also that it has been entrusted to our care. Technicized societies thus far have exploited the earth: we must reverse this trend and learn to take care of it with love."<sup>14</sup>

Welcome as this is, some believe that there is further to go. In these more recent interpretations, man, the steward, remains apart from nature and transcends all other living things. He and he alone is created in the "image of God".

Perhaps the most promising strand of Judeo-Christian thought was that of Saint Francis of Assisi. He considered all nature as the mirror of God and called all creatures his "brothers" and "sisters". In the "Canticle of the Creatures" he also speaks of "Brother" sun, wind and fire, "sister" moon and water; and "mother" earth. But his views were quickly forgotten, even by the Franciscan movement, because, at the time, the Church was struggling to suppress the indigenous European religions which believed in nature and that man should have reverence for it.

All this is in contrast to the ancient Chinese idea in which man is regarded as having been created out of the fleas on the body of P'an-Ku, the primal being by whose death and dismemberment the world was made. As Arthur Cotterell comments: "What stands out most for a westerner is the lowly position the Chinese have ascribed to man; not the center of creation, nor the colossus in the landscape, but rather a small figure in the great sweep of natural things."<sup>15</sup>

All human societies need spiritual commitment. Otherwise they become counting machines and believe that every aspect of nature is no more than an instrument that can be operated, mended or replaced. That is why the seminal requirement for progress, is that religions understand the relationship of man to nature and teach, not so much humility towards other men, but humility towards other life, not least, the life of the biosphere itself.

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<sup>14</sup> Quoted in "The Delicate Creation", Christopher Derrick

<sup>15</sup> "Early Civilisation of China" (1975), Arthur Cotterell