

**Committee I**  
The Evolution of Man



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**A MODEL OF MAN**

by

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## A M O D E L O F M A N

A Contribution to the Seventeenth International Conference of the Unity of the Sciences.

This contribution aims to give a more concrete and reliable understanding of what we humans are and of how we have become as we are now, what is imperative in front of the severe world crisis which we traverse now. A science of man is not possible at present because of the heavy constraints on our minds which prevents them to be objective when it comes to consider what we are, but this is a first step towards that objectivity.

Our basic assumptions are that there is a unity in nature and within it a unity of man, that there has been an evolution of all living organisms, that the variations which we observe in living organisms are due to the concurrent variations in the cosmic and terrestrial influences upon an original living substance. We will consider first the physical model of the Universe, given today to us by physics, astrophysics and astronomy.

### 1. The Physical Model of the Universe.

Our general actual understanding is that the Universe is a system of relations between natural events in continuous and perpetual changes, whose origin we do not know.

That it is a relational system, extremely complex, made of sets of other bound systems of natural events. These systems of natural events have selective and particular relations with each other, making wholes which function. There are continuous exchanges of primeval materials. Some of the resultant transformations are reversible, others are not, all are temporal.

That understanding is given to us by our sensorial and mental

endowment and is dependent upon it, to what extent it conforms to all that is, is impossible to know.

We have now a very concrete representation of the Universe, at least of that part at present accessible to astronomical observation. There are maps of that part, which may enlarge by the use of new radiotelescopes mounted on satellites, as a system of clusters of galaxies, of galaxies and stars, black holes and other celestial objects and situations. The interstellar space is filled with gases and stardust. The distances between the celestial objects and our earth are known.

A calendar is now available of some of the successive physical changes through which that part of the Universe has undergone and there are at least three theories about the beginning of the whole. They are not verifiable.

A constant flow of energy under the form of cosmic forces and with the interaction of thirty seven elementary particles and as many antiparticles is thought to be the fundamental feature in the relations between natural events, with an underlying unified matrix.

We will assume on the bases of our experience and perception that the Universe is natural events which repeat themselves or not in a continuous becoming.

1. Some of them repeat themselves in a regular manner, they are constant in orderly sequences, at least temporarily, they give what we perceive as the "order of nature", one of the first discoveries of our forebears, emerging from their animal condition, and clearly recognized thousands of years ago in the Chinese, Hindu and Greek philosophies, in the first

documents of a rational understanding of all that exists.

2. Other natural events are intermittent or discontinuous and may repeat themselves in a regular manner during certain periods.

3. There are also natural events which are occasional, accidental, completely irregular, repeating themselves in that manner or never repeating themselves or in very distant occasions.

We do not seize what determines natural events to be and to be as they are to our perception but progress is being made thanks to scientific research. Our general purpose is to seize what are the relations between natural events in our perception in order to understand their relation in the Universe and what is our relation to the Universe, the purpose of all the sciences.

We also pursue practical purposes, to follow up chains of natural events to a certain point with the possibility to predict or to prevent their consequences.

Our model of the Universe is that of an immense maze of physical events in perpetual and continuous becoming, at least to our dimensions.

"Physical" here does not mean what it designates in quantum mechanics, it is not sure that all biological events may be reduced to an interplay of subatomic particles. That interplay could exist but it ought to be shown to exist and how it results in living matter.

The main feature of the modern physical model of the Universe is its inherent instability. And its variability.

Subatomic particles are instable, the four cosmic forces, perhaps reducible to one or two, stand upon the conception that all "matter" is engaged in a struggle between gravity and the opposing forces

of dispersal. It is assumed that there is a continuous imbalance between "matter" and "antimatter", our world results of the casual predominance of "matter" over "antimatter".

However the conception of "matter" in the shapes of the Universe has lost much of its significance, solid "matter" as dissolved itself in several levels of different structures, the last one being one of spontaneous, inherent, energetic impulses seen as determinants of the movement of subatomic particles. Our concrete Universe becomes a field of exchanges between subatomic particles. What exists behind we do not know.

It has undergone a progressive succession of epochs of changes, in which certain elementary particles have predominated in each epoch: the GUT era, the hadron, the lepton, the plasma eras after an original explosion, followed by the era of ionized gases, that of the galaxies and finally that of the solar systems forms, which leads into our era, each with a determined duration.

The concrete Universe in our maps has become suddenly a complex tangle of intertwined protons, neutrons and electrons, resolving themselves in quarks of different spins and "colours" in perpetual rotations along predetermined and accidental tracks. An atomic Universe.

The instability and variability of the known Universe, as observed in astronomy is a field of immense explosions and thermonuclear catastrophes which happened long time ago and that we cannot perceive directly.

Thanks to scientific research an Universe has emerged that was of an inconceivable size and unimaginable beauty, beauty that is perhaps still there, of terrible violence in which billions

and billions of stars burned continuously like thermonuclear furnaces of gigantic proportions, of changing colours against the darkness of the interstellar space.

Our minds are incapable to count the almost infinite number of galaxies, each with billions and billions of stars, most likely still rushing from us at an incredible speed.

An Universe which we cannot observe as it is now, but only as it was billions and billions of years ago, that for ever will remain to us a riddle, a puzzle, an unfathomable mystery, because it is an image of a past for ever disappeared.

An Universe that was like a pulsating monster, animated by unknown forces, monstrous to our limited capacity of perception, monstrous yet at the same time to a certain extent ordered.

Limited or unlimited, eternal or temporal, bounded or illimited, expanding or contracting, finite or infinite, perhaps with a beginning and perhaps with an end, we do not know. But to us certainly a whole.

An Universe in which the immense galaxies are just precisely to the astronomer as the subatomic particles are to the physicist. Measures, distances, speeds, times, all conventional, in what is to us a relational system, in which we perceive and recognize order, because of our sensorial and mental endowment. Perhaps a symbol of something else, which we cannot grasp or imagine or determine yet.

A symbol at a certain stage of our evolution. All the previous record is in favour of that assumption.

We have acquired now a certain understanding of the successive

Transformations that our planet has undergone from the earliest times of its condensation from the physical components of a passing nebula, but much remains still to be determined before we can understand what made possible the emergence upon the surface of the earth and most likely only here in our solar system of living organisms and of ourselves.

Last year an explosion of a supernove was observed in the Magellanic Clouds, one of the galaxies nearest to our own. The distances between us and the other natural objects of our Universe outside our solar system is one of the most important of our limits: we are immensely isolated.

That explosion, the first observed with accurate instruments, was an evidence of the restlessness of our Universe, of its turbulence and of its continuous mighty transformations.

One such might explosion, spewing into the space its materials, may have been the click that gave rise to life here on the surface of our planet.

It is not clear yet if living organisms here have a terrestrial or extraterrestrial origin, a question to be settled by research, but it is evident that all life has a cosmic origin. The theory of "Panspermia" has gained now new attention. (Hoyle, 1983).

We have now full evidence that the same basic primordial elements which constitute all known "matter", at a higher level than the atomic, are the constituents of our tissues. Living organisms are an universal physical necessity, once certain conditions meet. We begin to discover the earliest organisms upon the surface of our planet and the dates of their emergence.

It is beginning to be understood that in the plastic original natural substance from which all species emerged a particular form of "homeobox" contained the cluster of specific genes which made life and heredity possible.

Given the evidence of an evolution, in ordered sequences in which variability and heredity ruled, as Charles Darwin understood it, the relation of man to the Universe is still a complete riddle but increasingly a matter for research, a change in perspective of the greatest significance.

We may make the assumption that there are two important physical systems, changing and transforming themselves at different rates: one the universal, which is determinant, the other the living, which is determined.

The rate of changes and transformations in the system of living organisms is linked to the existence of particular forms of structures, of that primeval plastic natural substance.

Another step towards reaching an understanding of what is our relation to the external reality that is the Universe is the conviction that in us humans all that there is is our biological endowment: there is nothing between us and natural events around us.

A third step is to understand that we have natural limits, because we are biological structures with functions and a form. Is the Universe limited? Is all that has a form limited?

We must avoid the bias of considering ourselves distinct from all living organisms and in the last instance from the Universe, we are parts of them. Our unique mental endowment ought not to mislead us. If it does a science of man becomes impossible.



## 2. Our Evolution as Primates.

The understanding that there has been an evolution of living organisms was already reached by the Ionians, Anaximander of the Milesian school (ca. 610-ca. 547 B.C.) thought that man, like every other animal was descended from fishes, what modern science has confirmed. Empedocles of Agrigento or Acragas (5th century B.C) created a fantastic history of human evolution. In modern times I. Kant (1724-1804) in his "Natural History and Theory of the Heavens" from 1755 and Pierre Simon de Laplace (1749-1827) in his "Système du Monde" (1796) and in his "Mécanique Céleste" (1799), renewed the interest for a continuously changing Universe.

J.B. de Monnet de Lamarck (1744-1829) in his "Histoire Naturelle des Animaux Sans Vertèbres" (1815-1822) expressed the two axioms that are fundamental in the theory of evolution: that the world is not static but continuously evolving, that the evolution of living species is continuous and gradual. Today we could say: partly. Charles Darwin (1809-1882) assembled the views of his predecessors, contributed with his own, resulting from his patient observation of animal species in South America and in England, and introduced the first coherent theory of evolution, together with Alfred Russel Wallace (1823-1915), in 1859.

He wrote: "I infer that probably all the organic beings which have ever lived upon this earth, have descended from some primordial form, in which life was first breathed". It was an old tenet, already expressed by his grand father, Erasmus Darwin (1731-1802). But he added some genial insights: "The evolution of living organisms results of variability and inheritance in large

"populations"(Darwin,1859).That conception of the linking of variability to the existence of large populations is absolutely remarkable."The Natural system,he wrote,is a genealogical arrangement"(Darwin,1859).Before him Geoffroy Saint Hilaire(1722-1844),K.E.von Baer(1792-1876),Richard Owen(1804-1892)and others had already said much of importance for our understanding of evolution(Løvtrup,1987).

After Darwin,an Austrian,Gregor Mendel(1822-1884),a German,Ernst Haeckel(1834-1919)and North Americans,like Thomas Hunt Morgan (1866-1945)and Calvin B.Bridges,would bring a great deal of precision in the intuitions of Charles Darwin.

He added a clear confirmation of his views:"Each large group of living organisms tends to become larger and at the same time to diverge in character"(Darwin,1859).

In 1871 he published "The Descent of Man"not much read today but again a genial confirmation of his creativity and of the perfect freedom of his mind.

We have now,thanks to research,a rather clear picture of how we, humans have become to be as we are now,through a series of transformations of a small group of primates.There have been gradual and rapid evolutionary changes.

A.The earliest primates,at present known,lived in North America as "Purgatorius",allied to the Plesiadapis and linked to the Insectivores,but of an unknown direct origin,about 65 million years ago.They migrated to Europe as "Cantius" which we find 13 million years later,in the Eocene.That does not mean that all primates have a North American origin,it may be asian.

B.Still,at the end of the Eocene,40 million years ago,some of the

prosimians have evolved into anthropoids. "Amphipithecus" and "Podaungia", monkeys of the size of a gibbon, with some mandibular peculiarities which we also have, determined by their diet, lived in the Northern Hills of Burma.

C. In the next stage, in the Oligocene, about 28 million years ago, important transformations have occurred in anthropoids: there is now a clear divergence between monkeys and apes. In the Fayum depression, at that time a luxuriant forest, have been found the fossils of our first direct ancestors, "Aegyptopithecus", with a brain "distinctly anthropoid".

D. The Miocene, 23 to 6 million years ago, was the period of the reign of apes and monkeys, now asiatic and african species. They had a great diversity of structures and forms, as "Dryopithecines", "Ramapithecines", "Proconsul", "Rudapithecus", "Sivapithecus", "Gigantopithecus", but few of these types survive.

Darwin notes: "A broken or interrupted strain may often be accounted by the extinction of the species in the intermediate regions". "An interminable number of intermediate species must have existed, linking together all species in each group by variations as fine as our present varieties". "The mind cannot grasp the full meaning of a term of hundred millions of years, it cannot add and perceive the full effect of slight variations, accumulated during an almost infinite number of generations".

E. Some of the apes of the Miocene were most likely the forebears of the Australopithecines, which we find in South and East Africa 5 million years ago, still in the Pliocene.

We do not know when our direct ancestors separated themselves from a common stock with the chimpanzees, most likely that did

occur more than four million years before our era, since we have now evidence that the brain of our direct ancestors did begin to increase in volume after their forebears began to walk, what does not seem to have been possible before 3.7 million years ago. That separation may have been due to genetic or geographic isolation. Were the Ramapithecines, most successful apes of the Miocene, our direct ancestors? They spread over large regions of Europe, Asia and Africa, in very different niches, what shows remarkable physiological possibilities.

"A. Afar~~ensis~~" may have been our ancestor and perhaps "A. Boisei" but "H. Habilis" certainly was.

As very large populations of monkeys lived in Africa before and during the Oligocene, it is possible that some of them migrated to South America, still united to Africa around forty million years ago and slowly separating itself. Because at that time monkeys had not yet evolved into apes, no apes are found in South America. In "The Descent of Man" Darwin wrote: "Man appears to have diverged from the Catarrhines or Old World division of the Simiidae, after these diverged from the New World Division". That sentence could be changed into: "Man diverged from the Catarrhine or Old World division of the Simiidae after the New World Division had diverged from a common stock with the Old World monkeys". But we do not know, it is possible that all primates, including the South American stem from a common stock existing already in Pangea or in Gondwana,

If we consider with an inquisitive mind into the circumstances which may allow to understand such mighty rapid transformations in a group of primates, we are allowed to make some hypotheses.

1. A great fertility, with direct and rapid ways of reproduction in the original groups of primates, could have led to large populations, with progressive greater possibilities of divergence and more complete transformations.
2. It is certain that if these populations existed they had a great mobility, being arboreal mammals, with free members and a good vision.
3. Thanks to that mobility they could migrate over large regions of the habitable world and very early we find them in Europe, Asia, Africa and South America with a possible origin in North America. The displacements of the continental plates must be taken into account in recognizing faunal regions in the planet.
4. As arboreal mammals these groups of primates were rather well protected against predators.
5. Because of their mobility they had experience of quite different ecological niches, lived under quite different climatic conditions to which they adapted because of good physiological possibilities.
6. Predatory animals, always in search of an exploitation of the natural resources, they were led to consume varying diets, very favourable to body growth.
7. When some groups of apes of the Miocene left temporarily the trees and became terrestrial, perhaps about 15 million years ago, all the above situations became enhanced. The groups that remain permanently arboreal evolved more slowly.
8. The fact that our forebears were permanent pedestrians did play an extremely important part in their transformations.
9. We know that their brains began to increase of volume after

they became pedestrians and not before. It is likely that it was the change of diet which made possible the body growth and the brain growth, man became what he is because of what he ate.

10. However other species of mammals and certainly other groups of primates could have had the same opportunities of evolution but did not have them. We are bound to suppose that the evolution of monkeys, apes, hominids and humans rested upon genetic changes which opened possibilities of evolution in a sense which ended in humans.

We are driven to conclude that the acquisition of the "human condition" by our forebears was the cumulative effect of genetic dispositions which drove them into progressive changes in structure, functions, form and action. But is that not a tautology? We are driven into the symbolic conception of a leading thread in the labyrinth of Ariadne, in our case the genetic endowment.

Each stage reached led into the next, each stage made the next possible to a happy ending, an extremely naive conclusion. How many exterminations of populations supposes our emergence?

We will take that the rapid growth of the brain of our forebears, which started around 3 million years ago and not before was of a decisive importance for the transformations observed afterwards.

"Lucy's" brain was of a volume of 350 to 500 cc, Homo Erectus, one million years afterwards, had a brain of 1050 cc, the Neandertaler's brain was two million years afterwards of 1600 cc.

It is certain that many other species have larger brains than humans, even in relation to body size than humans and they may have increased of size more rapidly. Why the differences in performance? Perhaps the answer may be found in the future in the specific and

unique qualities of certain genetic changes, acquired at random.

The thread in the albyrinth becomes a set of favourable revolutions in a vital roulette.

Would it not be better to avow our ignorance, waiting for more facts, thanks to scientific research?

But the acquisition of our "human condition" did not end in Homo Erectus.

1. The acquisition of an unique endowment is to us obvious in the extraordinary results of the manipulation of natural objects, since then manipulation has always been the greatest and more reliable sources of "knowledge" of humans.
2. More complex systems of social relations emerged before or after manipulation began, already some millions of years ago, but based upon the same conditions prevailing among monkeys, apes and many other species of mammals.
3. The new systems of social relations, united to an increasing possibilities of genetic exchanges, determined the development of increased mental capacities or resulted of them.
4. The first ethical problems may have been linked to hunt in groups, with a needed choice between egoism and collective rights.
5. Cultures resulted of an accumulation of innovations, that is of special forms of creativity, in relation to the mental stage reached.
6. Our direct ancestors, coming most likely from Northern Africa, had a different genetic endowment, most likely due to isolation.
7. They introduced many more innovations than the previous stems, first under the form of objects of "art" and then in a mighty

innovation, the creation of agriculture, what led to permanent stable communities and to a better exploitation of the natural resources as food, which has always been the source of energy in human evolution.

We have not contested here the pertinence of the facts actually known thanks to palaeontological research, but it is obvious that they are so few that new ones may lead to quite different views. We assume that Africa is the cradle of humanity as Charles Darwin assumed, more on the bases of intuition than of known facts, that two important migrations from Africa have taken place: one about three millions of years ago when the Australopithecines, perhaps after five million years of aquatic life, as sir Alistair Hardy imagined, in the warm waters of the Indian Ocean, spread through the world, following the narrow passages uniting Africa to Asia, and the other when our direct ancestors, Homo Sapiens Sapiens, emerged about 50,000 years ago in the Middle East, migrating to Asia, Europe, Oceania, Australia and America, and coming most likely from North Africa. The possibility remains that humans emerged from groups of apes of the Miocene, existing in Asia and spreading to Africa, whose fossils have not been found yet.

### 3. The Biological Historical Evolution of the Human mind.

"Intelligence" being a quickness in perception and understanding and "mind" being the capacity to think, will and perceive, to reason, we will assume that all living organisms are intelligent but that only we, humans, have a mind. This may be contested, it is not only an epistemological question, it is also an ontological one.

If we consider the 65 million years of the evolution of primates, it is obvious that in the groups which evolved more rapidly it is only



in a very small group that a mind emerged in the last three or four last million years. The acquisition of a mind by humans seems to be a result of the cumulative effect of a progressive higher degree of intelligence, through sixty one million years. A kind of acceleration of mental powers is observed.

1. In the Prosimians and monkeys of the Eocene and Oligocene there certainly was intelligence but not a mind.

2. A higher degree of intelligence is observed in the apes of the Miocene, in particular in the Ramapithecines, whose fossils have been found in India, Kenya, Hungary, Pakistan and Turkey, with a capacity to live in quite different ecological niches and who existed for about fifteen million years or more.

3. It is in the Pliocene between 6 and 1.8 million years ago that a mind emerged in our forebears.

4. Once it emerged it evolved in close relation to organic changes.

a. An important stage was when it became possible to create and use symbols, what we observe about 100,000 years ago.

b. A full acquisition of a mind was reached by our direct ancestors, Homo Sapiens Sapiens, emerged 50 or 40,000 years ago. They spread through the whole world.

c. The acquisition of a cultural diversity is not older than 4,000 years before our era, if we judge by historical documents.

It is obvious that there have been stages in the historical evolution of the human mind, linked to organic transformations.

(They resulted of progressive gradual changes or of mutations.

1. We admit at present that when our ancestors began to create artificial tools, in order to better exploit the natural

resources as food, they had already acquired a mind.

There were pragmatic acts, purposeful, with an understanding of the quality of the materials used, of the need of certain shapes in order to obtain certain results. There must have been an excellent "memory", whatever that term designates, collective possibilities of learning and imitation, the systems of social relations were by then more complex than just sex and sharing food. Most likely by then a biological mechanism had been set up of mental endowment and pragmatic prestation, as a feed back system, a relational cerebral system. The Olduwan and Olduvai cultures emerge.

2. The emergence of Homo Sapiens opens a new era about 800.000 years ago, given the utensils found at Soleilhac in France.

One of the first evidences of an important change, the purposeful use of fire, is found in Terra Amata, near Nice, about 400.000 years ago. Now collective hunting is possible in a larger scale, the use of fire makes it easier, it is a defence against night predators, it gives warm and makes more digestible some foods, it gives light, and it promotes social gatherings around a hearth. Food is brought back to women and children.

3. We do not know when the ability was reached to use spontaneous vocal sounds to express, not feelings or moods or wants, but to designate events or things, with a collective understanding. When that ability was reached the door was open for the creation of symbols, the greatest human ability through all historical times. In the Shanidar cave in the Zagros Mountains of Iraq we have a clear evidence of great mental progress, reached by the Neanderthals about 80.000 years ago.

Lovely and fragrant flowers are used to express respect, love, grief,

and respect. The belief has emerged that when the body is dead not all is ended, a first evidence of a past reflection on the nature and quality of man.

Thanks to an accumulation of innovations a culture is created, a meaningful whole in thought, purpose and action. They spread over regions of France, Germany, Italy, Spain, Yugoslavia, Iraq, China, Java, Zambia and Israel. The glaciation times are hard and they disappear, as the Dinosaurs and many other species disappeared before. As we may disappear one day.

4. In the Cro-Magnon we find a very fine evidence of the increasing ability to use the capacities in the cerebral tissues. The Blanchard plaque, discovered by Edouard Lartet in the eighteen sixties, in Les Enzies, in Dordogne, and recently studied by Alexander Marschak, gives evidence of a new ability to use symbols. About 30.000 years ago they had acquired an associable mental function involving careful observation of celestial and climatic changes, with tool making using a very fine touch and manipulation, united to certain capacity of abstraction in following a sequence of events, linked to each other, they could understand them as symbols with a meaning, perhaps for collecting and hunting.

5. The emergence of our direct ancestors, Homo Sapiens Sapiens, coming most likely from Northern Africa opens a new era in the growth of the powers of the human mind.

About 30.000 years ago, human features and their changes begin to be carefully observed, in the Venus of Willendorf and in that of Lespuge, feminine fertility is detected and given meanings, perhaps fantastic and absurd in terms of beliefs. The cave paintings of Altamira and Lescaux give evidence of great abilities.

Communication between living organisms and species does not need to be verbal. It seems to have been always easy and direct between primates, if we judge by what we see in monkeys and apes.

But when communication began between humans by words, most likely a ultimate result of the use of sounds and of the creation of symbols, it acquired new immense possibilities, which were enriched by the creation of writing and then of an alphabet.

It should not be taken that communication by words is a direct process, in spite of the fact that we have apparently a ready use of it.

The word is never the object or thing, the natural event that it merely designates or represents. A book is a collection of symbols as well as a discourse.

In the use of a word, what means a choice, at least four different moments must be recognized, if very short: the sensorial perception, the mental representation that is a recognition in a classification, the choice of the word to represent it or to designate it, the act of belief, doubt, followed by an assertion.

C.G. Jung asserted that when we find ourselves in front of paradoxes, situations which are common and place us in front of insoluble opposition between two different conceptions, what may be due to wrong premises, we always resort to the creation of symbols which are meaningless.

When the ability to use words was acquired we do not know but most likely is not a very old acquisition. The creation of languages or idioms is much later.

the newcomers have spread themselves over the whole world, for the first time in the history of man, with the same mental endowment.

6. The creation of agriculture opens a new era. It happens in the same period in the Middle East and in Mexico and Peru, In Ain Mallaha in the Jourdain valley about 7.000 years before our era, in the valley of Hierakonpolis in the Nile valley about 5.000 years B.C., at El Riego in Mexico, 7 to 5.000 years ago and in the Pikki complex in Peru about 5.000 years ago.

These coincidences have not yet been understood: they mean that there was in all humans a common spontaneous creative ability, based upon the organic biological endowment at the contact of the terrestrial environment, with its urges, needs and wants, without the need of any communication between populations, living in nations separated by oceans, deserts and mountain ranges.

The creation and practice of agriculture created immense changes in human existence, they stimulated the creative powers of the human mind. As a delicate flower yet powerful grew in the human mind the sense of beauty, already observed in the Cro-Magnon. It was shown in the decoration of pottery, begun at Jarmo, in Kurdistan, 4.750 years before our era, in Hierakonpolis in the Nile valley, in the Badarian era, about 4.000 years ago, among the Olmecs in Mexico, 1.200 years B.C., at Puerto Hormiga in Venezuela and in the Valdivia culture, on the West coast of South America, 3.100 and 2.400 years ago. Temples began to be erected.

7. The creation of writing in Egypt, Sumer, later in India, China and in Guatemala opened another era in the history of the human mind.

It was largely overdue and necessary, at last it was possible to record in documents the workings of the human mind. In Babylon we find in the monolith of black basalt of Hammurabi (1792-1750 B.C.) a fine example of the use of writing for practical purposes and of the great progress made in the use of the mental capacities.

8. Still remained a last evidence of the unity of man and of the unity of the human mind, on the bases of its organic endowment. In the VIth and Vth centuries before our era an explosion of the capacities of the human mind took place in India, in China, in Ionia, in Babylon, in Guatemala, as philosophical systems, different in their forms but with the same principles and ideas. We find them in the hymns of the Rg-Veda and Upanisads, later in the teachings of the Buddha, in the systems of Confucius and in the Tao Te Ching, in the reforms of Zarathustra and above all in the theories of the Greek Ionians, which have changed the world.

Table I. gives a distribution of the main principles in nature, as expressed in Chinese, Indian and Ionian philosophical systems in the VIth and Vth centuries before our era.

In the towns of Miletus, Ephesus, Clazomenae, Samos, in the islands of the Aegean Sea, where lived the Ionians chased from continental Greece by the Dorians, and in Abdera and Stagira in Thrace, emerged the irresistible urge to understand the relations between natural events with the full conviction that the human mind was capable to penetrate all the mysteries of the Universe. The possibility of science was created, an endeavour taken upon their shoulders by Western Europeans, nineteen centuries later.

#### 4. The Modern World Crisis.

After that explosion a great diversity appeared in the expressions

of the capacities of the human mind: a multiplicity of cultures appeared throughout the world. It must be seen as one of the determinants of the world crisis which shakes our modern world. To the impartial observer it is obvious that the great cultures of our modern world have beliefs that are sound, practices that are appropriate, habits that are beneficial, norms and rules that are just and adequate but also much that is damaging, false, absurd, unjust, noxious. Cultural differences also create the great menaces to the survival of humanity, the great drama of our age.

We are now in a situation which has progressively aggravated itself in the last 200 years, with two main determinants, the too rapid and excessive growth of the human population and the nefarious use of the technology which results of scientific progress. That world crisis may be temporal and perhaps reversible, it is not beyond our powers to restrain it.

For that we need new Cultural Values and a new Cultural Revolution.

- a. In 1864, in his book "Man and Nature" George Perkins Marshall (1801-1862), from New England, clearly showed that as an irrational predatory force man was blindly altering the face of the globe. He had seen the damage done in the Mediterranean. (Thomas, 1956)
- b. In 1901, Alexander Ivanovitch Woiekof (1842-1914), in an article, "L'Influence de l'Homme sur la Terre", clearly stressed his concern over the damage done to nature in Russia. He was appalled at the rapid expansion of the Russian urban centres at the expenses of the rural areas. (Thomas, 1956)
- c. In 1905, another New Englander, Nathaniel Southgate Shaler, professor of geology at Harvard, in his book "Man and the Earth", stated that the more advanced the world economy becomes, the more

destructive it is of animals, plants and minerals, a severe warning in a young nation that was just beginning its industrial development and still believes in it today. (Thomas, 1956)

d. In her book "Man and the Conquest of Nature", from 1912, Marion Isabel Newbigin, from England, emphasized that man can only live by destroying the balance of nature, by favouring certain species, at the expenses of others, forcing them to give way to those that are favourable to him. (Thomas, 1956)

e. In 1955 at a Symposium "Man's Role in Changing the Face of the Earth" at the University of Chicago, there was a cautious hope that scientific progress could alleviate the damage done to the natural environment. (Thomas, 1956)

That hope has now disappeared. The situation of the ecological systems in today's world is appalling.

The populations of the poorest nations of the world are increasing at a too rapid rate. Millions die of hunger every day.

In all nations but particularly in the richest technology is widely used and it is impossible to recognize in time its safe and dangerous consequences, if these are absolutely obvious.

The natural resources are under a blind spoliation, many are not renewable, other are renewable but are not being renewed.

Our survival depends on our respect of the ecological system in which we live, yet we know nothing about how to preserve it. Great numbers of animal and plant species become extinct every year, it means changes in our ecological system with irreparable results.

We know that industrial development is now destroying the natural conditions which make life in this planet possible.

The social relations between and within the nations of the world



are today disastrous,with resort to violence,wars,terrorism,all disputes between nations are settled in terms of military power and economical pressures.

In certain parts of the world the climate is changing what menaces the extinction of their populations or their emigration,with still greater extensions of deserts.

The international institutions for preservation of peace have now failed,the international conventions,like that of Geneva,are not respected by the nations which signed them.Mortal gases are now used against defenceless rural civil populations.

Cultural differences make impossible the use of methods of prevention of menaces to population,the adoption of successful strategies for resource management.

Enormous centres of population are growing,in them misery,despair,hunger,depravation,vice,predominate without any possible remedy.

In the year 2000 Mexico city will have a population of 39 million.

The forests of Western and Eastern Europe are dying at a rapid pace,for unknown reasons but most likely atmospheric.

One shudders at the thought of a world population of 16 billions,pitted against each other by fanaticism and hatred.That,in 12 years.

In the year 2050 of 10 billions.

We assume here that the only possible adequate response to that immense world crisis is to know more about what we humans are and how we have become as we are now in order to create new Absolute Values and a New Cultural Revolution,a naive but reasonable and reliable assumption.

In this dramatic crisis,there is an actor of immense importance and that is man.What is man,then?

### 5. A Synthetic View of Man: a Model of Man.

About 4,000 years ago, the vedic poet exclaims: "I do not know what kind of a thing I am: mysterious, bound, my mind wanders". We are still there. (Raddakrishnan, 1923).

In our civilization there has been much wondering, of Michel de Montaigne, Rene Descartes, Blaise Pascal, de la Rochefoucauld, John Locke, Baruch Spinoza, G.W. Leibniz, Immanuel Kant, G.W.F. Hegel, Karl Marx, Frierich Nietzsche, Sigmund Freud, Carl Gustav Jung and many others. There have also been the describers of human actions. And we have exposed the results of modern scientific research.

The study of what man is could be done at different levels, one of them what we have in common with all living organisms, with all primates, with our direct ancestors in the emergence of our structures, functions and forms, of our intelligences and minds.

Another level is that of the human collectivities or communities as social groups in which all men live.

The third level is that of the individuals, who are the only creative. As an individual man has the capacity to be self critical, self corrective and self creative, much of human history was created by individuals.

We will assume that human fate is not written beforehand, an idea that stems from ignorance and prejudice, but that it does realize itself at every moment of new action, new thinking, new feeling, with a choice between alternatives, that man's free mind may conceive.

All the facts and situations in human evolution that we have discussed in this essay have led us to construct a Model of Man.

A model is a mental construct, an imagined structure, used to make understandable ensembles of facts, taken to be a whole, with certain

A MODEL OF MAN

A. THE UNIVERSE A SYSTEM

B. THE EARTH

C. EVOLUTION , Geologic ages, epochs, periods  
Changes in living organisms

1. THE INPUT.

Cosmic solar irradiation  
Earth temperature  
water cycle  
atmosphere  
minerals  
Biological: food  
Human : a feed back. of output.

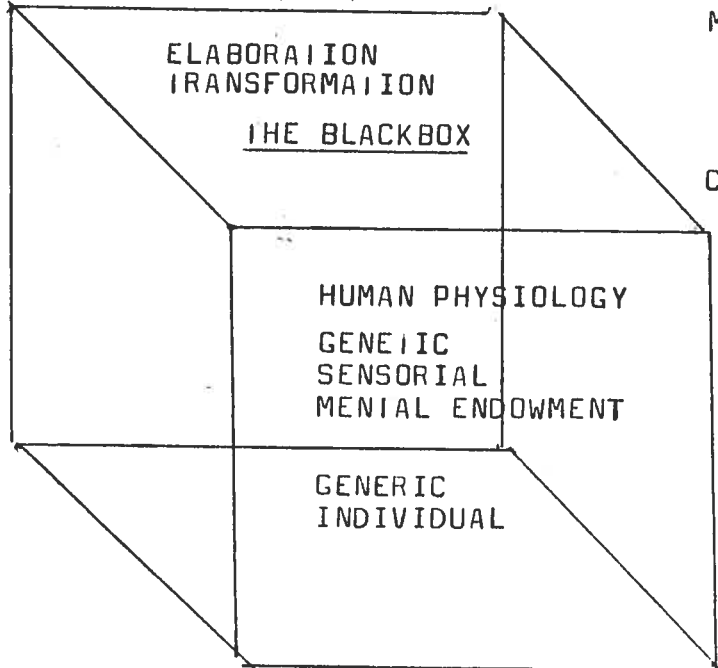
2. THE INNER ELABORATION AFTER INCORPORATION

The Human organism  
structures  
functions  
form

The incorporation is  
selective  
specific  
individual sensibility!

MAN AS A MACHINE,  
Taoism, Lieh Tzu after Har  
Descartes, XVIIIth century  
Jacques Monod, 1971.

Conditions of freedom  
Creativity



3. THE OUTPUT.

Action  
a. upon the environment  
b. upon other humans  
c. upon oneself  
Shed  
1, secretions  
2. excretions

Changes of Environment  
Degradation, Destruction

A FEED BACK AS INPUT OF HUMAN ORIGIN  
Creation of conditions of life  
Social norms, institutions  
Education, training  
Economic conditions  
Exploitation

COMPARISON OF HUMAN THINKING WITH ELECTRONIC MACHINES.

- A. In certain mental activities the electronic machine does function exactly as a human brain, more rapidly with greater possibilities of solving complex problems
- B. But do electronic machines have freedom creativity ?
- C. They certainly do not have feeling, an important element in human decisions, which can decide between alternatives which are created and imagined.

relations between them, as a whole or a system. It may be used to guide research.

We may assume that all living organisms upon the surface of this planet are receptors, transformers of energy in a relational system of communication with an inner elaboration and transformation and with an output, in their active forms of action upon the environment.

We will consider man as an object, a natural product of the cosmic and terrestrial environment.

As an object man has always received and receives an input as selective form of energy as communication.

As a living organism with a structure he elaborates upon the input incorporated and transforms it in his organism.

There is an output of the energy incorporated as the result of the forms of thinking and feeling as action upon the environment.

That output also functions as a feed back upon the input.

#### A. Study of the Input.

The only form of cosmic input upon man that has been so far considered is that from the sun. There may be other forms exerted in very low doses, which escape at present measurement.

The terrestrial input has been named but not studied and it must be important since we see the transformations of structures and forms in amphibians and cetaceans which have become aquatic and in fishes which have become reptiles and terrestrial. Reptiles evolved in birds, cetaceans and mammals.

The human input is important as feed back of the output, it creates very important ethical questions.

#### B. Study of the inner elaboration.

The inner elaboration of the communication received has been much studied lately, the bodily structures have been considered with their functions but with scant progress, yet we take that it is most of what we know about ourselves.

C. Study of the Out put.

It is only recently that the study of the human action upon the physical, biological and human environment has begun to be studied. Before it was believed that man could do as we wanted and imagined without any need of critical consideration.

D. Study of the Feedback.

Human forms of thinking, feeling and acting result in an input of information upon the human organism.

We will not discuss here for lack of space which are the different approaches with which these field of research ought to be studied. Some of them are in the field of physics and cosmology, others in the fields of chemistry, biology, medicine, zoology, and others in the social "sciences", study of populations, ethology, environmental research. As we have debated above the results of the human output upon the physical, biological and human environment have now become disastrous. It is therefore important to discuss how the quality of that output with its feedback may be ameliorated, since it seems that our well being, prosperity and perhaps survival depend upon it. We could as agnostics, sceptics, and cynics do nothing, and as magnificent "voyeurs" observe with placidity what happens, believe in a preordained human "fate" and limit our care to our own affairs and exclaim with Louis the XVth: "Après moi le déluge". This is a quite common attitude among the "intelligent people" or the "elite" of the "jet set". But we could also take that we have an ethical responsibility, as full humans, which draws us to imagine how the actual noxious

situation could be changed for the better.

Obviously by our own ways of action, by our output: the individual has within himself the possibility of a creativity which may result in new absolute values and a new cultural revolution.

It is important to preserve that freedom, which in our world must be above all an inner mental freedom. We must respect the need of freedom of the others. We must grant him the right to a perfect inner freedom, so that he may be able to transform himself and his manners of action upon the physical, biological and human environment.

We may also help those around us to reach a perfect inner freedom. Particularly as teachers: the ultimate objective and purpose of all teaching and educating must be to let the individual to reach full maturity by being able to judge with a free mind, with a sense of his responsibility.

But experience in world affairs, what we may get without leaving our little community, shows us the importance of concerted collective action, with a unity of purposes, a unity of decisions, a unity of executions, being able to reach a consensus.

It is obvious that in our world, profoundly divided by creeds, by divergent interests, by different situations, a consensus is not always possible. But a free debate is always possible and resort to violence always a severe mistake.

We must change our self image. The modern world crisis is the consequence of the abusive use of our mental powers. Have resulted the excessive exploitation of the natural resources, far above our necessities, the progressive contamination and destruction of the natural environment, a permanent state of

suspicion and hatred, a passion for conversion of the whole humanity to certain doubtful ideologies and above all a mad and delirious will to power.

We must understand that we are a part of nature, that by destroying it we drain the sources from which spring the forces upon which depends our existence, our possibility to survive. We must put an end to our immaturity which leads us to believe that we have at our disposal unending riches in the natural terrestrial resources. We don't. They will come to an end. By changing an erroneous, false and misleading self image we may be able to transform ourselves.

Chuang Chou, understood it very clearly 2,400 years ago. He wrote: "All creations arise out of transformations". "All creations are issued from perfect freedom".

There has been much talk lately about the creation of "a new man", but it was never understood that it was impossible without reaching first a state of mental freedom, absolutely incompatible with a doubtful aggressive ideology.

Let us unite in our common faith, based upon facts, of the need of a perfect <sup>mental</sup> freedom in order to attain full creativity, absolutely confident in the unity of man create new absolute values and start a new cultural revolution. A new era must begin for humanity.

## 6. An Epilogue.

1. Our ignorance of ourselves, of what we are and how we have become as we are now, creates the greatest obstacles to our adequate and necessary transformations which will put an end to our obvious immaturity.

2. It is quite obvious that there have been great advances in the

evolution of the human mind and we still have unsuspected possibilities. But at present we use badly our unique mental endowment.

3. Modern scientific research has completely changed the relations between science and philosophy. Most of the modern scientific theories and discoveries must be discussed by the philosopher, they are of an immense importance for us, men, and directly affect our existence and the conceptions of what we are.

The idea, very popular 50 years ago, the science has to do with things and not with people, is now obsolete. The scientist himself is a man, with all of its limits, an observer who limits what he observes. And he has ethical responsibilities.

4. All our science is temporary in a certain stage of human evolution. What we may do is to be able to describe natural events, as accurately and as completely as possible, but on the basis of the information available we may not seize the ultimate natural resorts of what we observe. We do not know if that may be possible in the future.

5. The prognosis for the ailing primate, that is man, is not favourable at present.

A severe world crisis has been created, it will be very difficult, but not impossible to get out of it.

We have to be selfcritical, self corrective and above all self creative. For that we need, as individuals, a perfect inner freedom. But if all men do not understand and accept that they are parts of nature, there is certainly no possibility of a change in the now disastrous trend. The mass media of communication ought to be used.



A LIST OF REFERENCES.

1

- Coon S.C.1963,The Origin of Races,original edition,Knopf,New York.
- Darwin Ch.,1859,The Origin of Species,fourteen reprints,Penguin Classics,Hammondsworth,Middlesex,England.
- Darwin Ch.,1871,The Descent of Man,original edition,London,J.Murray.
- Davies P.C.W.1982,The Accidental Universe,original edition,Cambridge, England,Cambridge University Press.
- Davies P.C.W.1983,The Inflationary Universe,Was the Cosmos born in a Fleck of Foam,The Sciences,New York Academy of Sciences,1983,2,32-37
- Eddington A,1935,The Nature of the Physical World,several reprints, the last in 1955,Everyman's Library No 922,J.M.Dent and Sons.
- Foucault M.1966,Les Mots et Les Choses,original edition,Paris,Gallimard.
- Freeman W.H.ed.,Evolution,A Scientific American Book,San Francisco.
- Freeman W.H.1956,Cosmology,A Scientific American Book,eight previous editions,last in 1978.
- Fung Yu Lan,1952,A History of Chinese Philosophy,2nd edition in English,London,George Allen and Unwin Ltd.
- Gorenstein S.ed,1974,Prehispanic America,original edition,London,Thames and Huston Limited.
- Granet Marcel.,1948,La Civilisation Chinoise,original edition,Paris,Albin Michel.
- Granet Marcel,1950,La Pensée Chinoise,original edition,Paris,Albin Michel.
- Honour H and Fleming J.1984,A World History of Art,original edition London,John Calman and Cooper Limited.
- Hoyle Fred,1982,The World According to Hoyle,Musings of a Maverick Cosmologist,The Sciences,New York Academy of Sciences,november,22,8, 9- 13.
- Hoyle Fred,1983,The Intelligent Universe,original edition,London,

Michael Joseph.

Jung C.G. 1933, Psychological Types, new impression in English, no previous dates, London, Kegan, Paul, Trench and Trubner and Co. Ltd.

Leakey Richard E. and Lewin R, 1977, Origins, The Evolution of our Species and its Possible Future, first Futura Edition, London, Macdonald and Co., 1982.

Marschack A. 1985, The Hierarchical Evolution of the Human Capacity, original edition, New York, American Museum of Natural History.

Montaigne Michel de, 1580, Essais, many editions since, Paris, La Nouvelle Revue Francaise, Bibliotheque de la Pleiade, 1937.

Monod Jacques, 1970, Le Hasard et la Necessité, Many editions, Paris Editions du Seuil, Collection Points.

Morin E et Piatelli Palmerini E, eds. 1974, L'Unité de l'Homme, original edition, Paris, Editions Du Seuil, vol. 91-93. Collection Points.

Needhan Joseph, 1961, Science and Civilization in China, original edition, Cambridge England, Cambridge U. Press, 7 volumes.

Repetto Robert, ed, 1986, The Global Possible, original edition, London, A World Resources Institute Book, Yale University Press.

Repetto Robert, 1987, World Enough and Time, original edition, A World Resources Institute Book, London, Yale University Press.

Radhakrishnan S. 1923, Indian Philosophy, 7th edition, London, George Allen and Unwin, 1954.

Russell Bertrand, 1946, History of Western Philosophy, 6th edition, London, George Allen and Unwin, 1954.

Spengler Oswald, 1912. Der Untergang des Abendlandes, Beck, Munchen two editions translated as The Decline of the West, New York, A. Knopf, 1939.

Thomas W.L.jr.ed.,1956.Man's Role in Changing the Face of the Earth,original edition,Chicago,Chicago U.Press.

Whitten P,and Nickels M.K.1983,Our Forebear's Forebears,The Sciences,New York Academy of Sciences,january-february,20 - 27.

Wilson O.Edward,1976,Sociobiology,Original edition,Cambridge , Mass,Harvard University Press.

Wilson O.Edward,1978,On Human Nature,original edition,Cambridge, Mass,Harvard University Press.

Wittgenstein Ludwig,1921.Logish-Philosophische Abhandlung, an edition with English text,London,Routledge and Kegan Paul,1961

Vijil y Tardon Camilo,1987.An Essay Concerning the Natural History of Man,Predetermined and Predestined,Alingsås,Sweden, Hammar.

Løvtrup Esøren,1987,Darwinism:the Refutation of a Myth,London, Croom Helm,original edition.

TABLE I. THE MAIN PRINCIPLES IN NATURE AS EXPRESSED IN CHINESE;  
HINDU AND IONIAN PHILOSOPHIES ABOUT 500 TO 400 B.C.

THE PRINCIPLE IN NATURE	CHINESE PHILOSOPHY	HINDU PHILOSOPHY	IONIAN PHILOSOPHY
1. The Order in Nature	"Tao", the Supreme order in Nature	"Rta", the Course of Things, Karman	"Logos", "Nous" or "Mind in Nature
2. The Unity in Nature	"The Oneness of the Universe"	"Brahman" Rg-Veda, Upanisads	The Primeval Substance in the Universe, Thales
3. Perpetual Change	Transformations Chuang Chou	Perpetual flux of Buddhism	Perpetual flux of Heraclitus
4. The Elements in Nature	The five elements of I sou Yen	The four elements Upanisads	The four elements of Empedocles
5. The two Opposites Duality in Nature	Yin Yang theory HsOn Ching	Brahman and Atman Upanisads	Love and Hate, Necessity and Chance, Empedocles
6. Transformation in Nature	"Existence is transformations" Chuang Chou	Perceptual transformations of Buddhism	Theory of Evolution of Empedocles
7. Relativity in Nature	A famous passage in the Chuang Tzu, the observer	Relativity: The six blind men of Jainism	Theory of Motion of Leucippus
8. The Atomic Theory	Theory of "germs" or "chi"	"Paramanus" of Vardhamana in Jainianism	Atomic Theory of Democritus and Leucippus
"Tao Te Ching" fourth century B.C. Chuang Chou (368-286 B.C.) Tsou Yen (350-270 B.C.) HsOn Chin (288-238 B.C.)	Hymns of the Rg-Veda, 1500 B.C. The Upanisads, 1200 B.C. Vardhamana (599-487 B.C.) The Buddha (567-487 B.C.)	Thales, sixth cent. B.C. Anaximander (610-546 B.C.) Heraclitus (540-480 B.C.) Democritus (460-370 B.C.) Empedocles, Leucippus sixth century B.C.	