

## Acknowledgement

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# Proem

## *Fides praecedit rationem*

Faith precedes reason

St. Augustine

This book, a collocation of independently edited treatises, pursues a twofold objective: on the one hand it is a tractate concerned with the meaning, ramification and scope of the *philosophy of biology*; while on the other, it is an attempt to define a potential *system of philosophy-science* that will be based upon biology and its philosophy, and aimed at coming to grips with the various scientific, techno-logical as well as moral and spiritual questions of our problem-torn age. The treatises, published at separate times, in different journals<sup>1</sup>, make up the chapters of this book. In each of them specific items and aspects of the principal problem-trends are dealt with. The chapters, to use a musicological simile, are variations of the main theme. Although they are linked to one another in a logical sequence, each of them displays an integral form and can also therefore be studied independently of the rest. This, I suppose, is in conformity with philosophy's logical schematization. Resorting to a political imagery, we may claim that a philosophico-scientific tractate resembles a federation of autonomous states while maintaining a relative interdependency. The relationship between the principal contracting parties of the philosophy-science system, namely, metaphysics and science, has especially always been utterly critical and precarious. If one of these parties limps behind the other, the entire structure begins to crumble. The emphasis has to fail evenly on both sides. If you were to overemphasize the metaphysical part and neglect the scientific one, then, your system would lose touch with the factual world, and become morosely speculative. On the contrary when you unduly emphasize science and neglect metaphysics, the structure at hand will be unable to come up to the logical texture necessary for constituting a system; and accordingly, seen from the epistemological standpoint, it will remain inadequate and superficial; and this, after all, is the current state of affairs within which we are now living. Hence we understand that in a well-built, well-balanced *system of philosophy-science* the crucial constituting elements, *physics* (the research of basic, concrete facts) and *metaphysics* (the study of all mentally induced values and transcending features), ought to receive their due share. Yet, however well balanced the constituting parts might be the intellectual glimmer of any philosophy-science system inevitably wanes with time. It goes without saying that the science section due to changing condition becomes sooner or later to a great extent out-dated and unoriginal and often ends up falling into oblivion ignored except by academics. What remains worth mentioning is only the system's metaphysical heart. Thus we can see that in a well-thought-up and long-standing system of philosophy-science the metaphysical centre (mainly the corpus of the principal leading problems) survives the science (the systematic attempt to solve problems) perimeter.

The far-reaching and winding roots of the philosophico-scientific custom stretch down in time following mankind's epoch-making passage from the *unformalised logical mode of thinking* to the *formalised mode of thinking*. Subsequently philosophy-science's first and foremost source of inspiration was the grandiose historical phase of the *tradition of wisdom*.

I use the expression *unformalised logical mode of thinking* instead of "prelogical outlook", so called by Lucien LEVY-BRUHL<sup>2</sup>.

Logic is indeed inherent to the human nature. This means: logic is not introduced into human nature once man has already become an accomplished fact; man did not acquire it after the hominization process terminated and he attained his fully fledged human phase. Logic is a disciplined, orderly mental operation, and is a unique characteristic of man, resulting from cerebration. Man's thinking, in contradistinction to that of other living things, is logical and this manner of thinking is the prime source of cognition. Other highly organised living things, such as dogs, cats, dolphins, and chimpanzees, can also think, but certainly not conceptually. Accordingly, even though they are capable of gathering ample information and transmitting it to their peers and youngsters, they are unable to form cognition. Why? Because, as Kant has indicated, *cognition* is the end product of *conceptual thinking*<sup>3</sup>.

Thinking starts with the simple recognition of things and processes - representations and images. Thereupon, this information by producing the elementary thinking procedure brings about the foundation upon which the subsequent cognition engendering procedures are erected - imagination and conceptualization. Finally, certain pre-eminent minds have stepped beyond these two preliminary phases in order to build up coherent entities out of the already acquired wealth of information and cognition. This last mentioned mode of thinking is known as *reflective* and can develop into *meditative*. Herefrom *theorization* and then *systematization* have emerged. The agent reflecting over his faculty and appropriated depository of knowledge is the *homo sapiens sapiens*<sup>4</sup>, the being trying

to know his knowledge, which expression is especially suitable for qualifying the *philosopher* whose specific object of research is primarily *knowledge* by itself. He is, so to speak, *homo sapiens sapiens inter homines sapientes*. This shows us sufficiently that contrary to all other professions which aim before and above all at extracting knowledge out of objects, *philosophising* is the relentless effort to know within the context of strictly formalised logic what knowledge is and what its various aspects look like. Thus we are entitled to assert that philosophy's basic research object is knowledge itself.

## EDNOTES

1. The following are the treatises (and the journals wherein these have been printed) which have given rise to the constituent chapters of this book:

1. *Preliminary Remarks on the Philosophy of Biology*, pp. 3-46 in "Hamdard Quarterly Journal of Science and Medicine", v: XVII, no: 3, Karachi, 1984.
2. "Aristotle's Thoughts concerning the Problem of the Living Beings and their Evolution", pp. 5-30 in "Comptes rendus de la Conférence sur l'Influence d'Aristote dans le Monde Méditerranéenne..."; Editions ISIS, Istanbul - Paris - Rome, 1988.
3. "An Introductory Essay on the Biological Foundations of A Priori Cognitive Faculties", pp. 455-469 in "Sixth International Kant Congress"; University Press of America, Washington, D.C., 1989.
4. "*Philosophy-Science from the Biotic Standpoint*", pp. 91-115 in "Uroboros - International Journal of the Philosophy of Biology", v: 1, no: 2, Mexico-City, 1991.

2. See: Lucien Lévy-Bruhl: "Les Fonctions Mentales dans les Sociétés Inférieures", pp. 78 & 79.

3. Refer: Immanuel Kant: "Logic", p. 96, #1.

Furthermore, Immanuel Kant distinguished three/

1. *Sensibility* is that mechanism which intervenes in the interaction with the outside world and so engenders percepts;
2. *understanding* produces from the percepts upwards the concepts and evaluates them;
3. finally reason is the component that contains the principles through which man knows the things and organizes the concepts in time and space –see: Jean-Pierre Changeux: "Les Neurones de la Raison", p. 706. It is striking how much these principal levels theoretically formulated by Kant in the second half of the Twentieth century. This, in turn, demonstrates to us two stunning aspects. One is the salient characteristic of geniality whereas the other is the interwovenness of philosophy and science.
4. "it seems, thus, legitimate to assert that the frontal cortex architectures of the reason that characterizes the *homo* Changeux: *Les Neurones de la Raison*, p. 707.

## Part One

# Aristotle's Thoughts Concerning the Problem of the Living Beings and their Evolution

"God and nature create nothing that has not its use."

Aristotle

"The human being ... **is the only living thing that stands upright, and this is because his nature and essence is divine.**"<sup>2</sup>

Aristotle

"From quotations which I had seen, I had a high notion of Aristotle's merits, but I had not the most remote notion what a wonderful man he was. Linnaeus and Cuvier have been my two gods, though in very different ways, but they were merely schoolboys to old Aristotle."<sup>3</sup>

Charles Darwin on Aristotle

## 1 - Intellectual Circumstances wherein the Aristotelian Thought unfolded

### A - The Becoming - Being Discrepancy

Nowadays we are more or less inclined to suppose that any current of thought which has become fashionable is a product of our epoch. It is, however, a long-known fact that there is nothing beneath the sun which might be qualified as brand-new or completely original. On the other hand material and mental entities are subject to a constant process of alteration. In the long run the changing feature of an item is, in a certain sense, its evolution. So, it is not difficult to grasp that the conception of evolution itself has also undergone an evolution within the framework of inquiries concerning the living things. We take it for granted that research on evolution started in the late Eighteenth century and gained momentum

Throughout the history of philosophy-science eminent minds have pondered on alterations at the level of individuals, and transformations at that of species.

ANAXIMANDER of Milet, later XENOPHANES of Colophon, ANAXAGORAS of Clazomenae and EMPEDOCLES of Acragas were the first thinkers to speak about the origin of life and the probable causes of its various forms in a more or less un-mystified manner. The suggestion that man somehow arose from the earth or evolved from other animals is often encountered. Anaximander seems to have held that the first manifestations of animal life was in the sea, that changes of structure occurred as the animals moved to dryland, and that man thus evolved from the fish.<sup>4</sup>

Xenophanes argues that the dryland is recurrently mingled with the sea and then with the passage of time,

separated from moisture. He puts forth such proofs as these: shells are found far inland and even in mountains; in the quarries of Syracuse imprints of a fish and of seaweed have been found, and in Paros is the imprint of a small fry deep in the stone, and in Malta the slabs bear the impressions of all sorts of fish. He says that the imprint was made ages ago when everything had been covered with mud, which then dried in it.

In this world of the *Antique Aegean Civilization* - especially at the *Classical period* of it - we are confronted with a handful of remarkable personalities displaying an amazing degree of sense of wonder. They tried to sound out their cultural as well as natural surroundings, above all expecting straightforward answers to their questions usually in terms of physical reality. Their eager inquiry into the mysteries of nature and the universe was peculiar to the master minds of the Aegean world in Antiquity.

About the fifth century BC the influence of the Aegean Civilization could be felt almost all over the Mediterranean region. At this time, Athens began to rise to prominence in all matters of culture within the Mediterranean world. Artists, rhetoricians, men of learning; in short, everybody who held a high esteem of his personal capacities, flocked into Athens. With its manner of conducting affairs, way of living, style of treating its native citizens and aliens, and finally with its particular outlook, the then Athens could be compared to a certain degree to North-West Europe and its transatlantic continuation in North America of the Modern Age.

Athens was, of course, not the only and isolated case of intellectual enlightenment in the middle of a crude and desolate environment. There were, indeed, some other notable centres like Miletus, Ephesus, Smyrna, Sardis in Western Anatolia; Mytilene in Lesbos and the Cos island in the Aegean Sea; Byzantium in Thrace; Stagira in Macedonia; Corinth in Arcadia; Thebes in Boeotia; Sparta in Laconia, and Syracuse in Sicily. The city-state Syracuse was no doubt a genuine rival to Athens in economy, cultural wealth and military power. Like Miletus of Ionia, Syracuse could also be qualified as a brooding-place of some of the outstanding minds Antiquity bestowed on mankind.

Kenneth Dover tells us that a visitor to the Syracusan quarries, not beset, as the Athenian prisoners were, by sickness, pain and starvation, had enough spare time to notice that the limestone was full of fossils. "*in the days before the timescale of the history of living beings on Earth was understood*" Dover goes on saying, "*there were three ways in which people could react to the sight of - for example - a fossil fish. They could say, 'Isn't it funny, that bit of rock looks just like a fish!'*, and turn their thoughts back to the day's concerns. Or, '*A miracle! God has put a fish in the rock!*' Or they could say, '*Well, now, I wonder ...*' A certain Xenophanes, some time in the late 500s BC, said to himself, '*I wonder ...*', and drew the conclusion that the distribution of land and water had not always been what it was in his time; every so often, he suggested, they had combined to form a world of mud, then separated out again, and fossils were the imprints retained by mud which had become solid ... Xenophanes continued the old tradition of speculation about the universe, but he also anticipated the moral preoccupation of SOCRATES and PLATO. What binds these two lines of thought together is inquiry into the nature of God..."<sup>6</sup>

Remarkably enough, Xenophanes, as far as we know at present, was the first thinker in recorded history to conceive the idea of a *single God*, and to offer strong reasons to support his position. His reasoning provides a considerable degree of tenacity and therefore cannot easily be refuted. It runs as follows: "*Ethiopians have gods with snub noses and black hair, Thracians have gods with gray eyes and red hair.*"<sup>7</sup> Then, he continues his assertion: "*But if oxen - and horses - and lions had hands or could draw with hands and create works of art like those made by men, horses would draw pictures of gods like horses, and oxen of gods like oxen, and they would make the bodies - of their gods - in accordance with the form that each species itself possesses.*"<sup>8</sup>

## **B - The Fact - Faith Discrepancy**

Since human beings, unlike other living things, lack to a great extent inborn automatic mechanisms which serve as driving forces, they are left with no option but to find out their way with the help of self-designed guide-tackles, generally known as 'beliefs'.<sup>9</sup> Human beings perceive, but do not respond automatically to the effects they receive. Every human perception has two sources: the world of experience, and the mind which arranges, and thence, shapes what is encountered. Our mind shapes every perceived item according to the previously encountered perceptions, and the thereupon formed impressions, images and notions. The perceived item is, thus, worked up into impressions, images, notions and finally into concepts in conformity with the previous experiences already elaborated by mental schemes. Consequently impressions, images, notions and concepts are not the mere results of a mere biotic machinery; on the contrary, they are the products of man's mental efforts. Each of these products is a *bellet*", which when transposed to the factual world, takes on the form of an action. So, it is evident that actions are movements expressing our beliefs. Furthermore, the broad network woven out of interconnected beliefs is man's other environment, Culture which runs parallel to the biotic one. This network, which encompasses all sides and aspects

of human life, depends on a number of basic beliefs. These are generally known as *faiths*. They are, so to speak, unreasoned and unalterable values which one can either wholeheartedly accept or reject. In case a set of faiths is rejected, then, the entire order of beliefs, attached to that set, collapses. This is the reason why no single, one-dimensional and homogeneous culture embraces the whole humanity. The common feature of all cultures, however, is that each of them possesses a set of faiths or a credo of principles as foundation. In due course, firmer and ever more enticing sets of faith have evolved. So are to be considered Xenophanes' assertions concerning God. He tried hard to dissociate God from all sorts of possible associates, and to tie all principles, by which we can explain everything, material as well as spiritual, taking part in the universe, to the creed in the Supreme Being. Each being and process whether actual or potential will henceforth be measured against and judged by this Omnipotent-Omnipresent-Omniscient-Supreme Being which transcends every perceivable and imaginable feature, being, event or process. He is unique, unequal, unprecedented, dissimilar and inimitable. Hence, even though, He is, of course, rejectable, refusable, He cannot be refuted.

## C - The All-embracing Principle

The shift from idolatry to the faith in a transcendent Supreme Being paved the way for a tight and consistent system of beliefs, and raised abstract and rational thinking considerably.

Idolatry, consisting of the most colourful folk tales and myths, reflected people's fancy beliefs of gods permanently in all sorts of activities. Thus we are told by Xenophanes that both HOMER and HESIOD have attributed to the gods all the things which are shameful and a reproach among mankind: theft, adultery, and mutual deception.<sup>10</sup>

The popular mind believes, or better, again in Xenophanes' own words "... *mortals believe the gods to be created by birth, and to have their own - mortals' -raiment, voice and body.*"<sup>11</sup>

"Truly" says Xenophanes, "*gods have not revealed to mortals all things from the beginning; but mortals by long seeking discover what is better.*"<sup>12</sup> Thus the *seeking* and *reasoning* mind may find out step by step the hidden aspects of the universe. But for setting out on such a long and arduous journey we need a strong, reliable and an overlooking springboard. Xenophanes indicates this 'springboard' in an unwavering voice to be the "... *one God, among gods and men the greatest, not at all like mortals in body or in mind.*"<sup>13</sup>

"He sees as a whole, thinks as a whole and hears as a whole."<sup>14</sup>

"But without toil He sets everything in motion, by the thought of His mind."<sup>15</sup>

"And He always remains in the same place, not moving at all, nor is it fitting for Him to change His position at different times."<sup>16</sup>

Hereafter a solid foundation, on which a consistent structure could be built, had been obtained. Since there was the necessary steadfast basis, irreducible to any further one, and the resolute will to learn, the desire for knowledge, so the unique, unprecedented event could take its start from now on: to inquire into and thereby to uncover methodically and coherently the unknown. Notice, how clearly HERACLITUS of Ephesus expresses us this fact: "*Men who love wisdom must be inquirers into very many things indeed.*"<sup>17</sup> Inquiry, however, does not proceed on its own. It needs, first of all a firm basis and a methodology consisting of testable and verifiable components. That is to say, we are not entitled to use any verbal or material element we find on our way toward the end of our inquiry. It must fit into the logical framework of our inquiry and it ought to be testable and verifiable by others. This, of course, is not a condition which binds us in the course of our daily lives. Therefore the person who lives from day to day and has nothing to do with inquiry "... *is apt*", in Heraclitus' words "*to be in a flütter at every word (logos).*"<sup>18</sup> In the tide of inquiry we strive towards a consciously composed coherent order within which there is no room for unwarrantable and randomly gathered elements. Only acquired results within such an order are transmittable, and thus verifiable by other researchers. Consequently, again this kind of an order is the necessary condition for communication. Heraclitus tells us this in his own phraseology; "*To those who are awake, there is one ordered universe common - to all - whereas in sleep each man turns away - from this world - to one of his own.*"<sup>19</sup> Furthermore the building blocks of - i.e. the 'beliefs'<sup>1</sup> that make up - an Order are the necessary valuations, the 'measures' in reference to which we carry out all our mental and material activities. Without these 'measures' not only philosophical-scientific investigations were to become impossible, but our whole culture and therewith our humanness would collapse. This is the very reason why Heraclitus reveres *Measure*: "*The sun will not transgress his measures; other-wise the Furies, ministers of Justice, will find him out.*"<sup>20</sup> Here we can see that the sun, as a life bestowing might, symbolizes for Heraclitus an important guide mark in charting the physical features of the universe. It is, however, subjected to something far more substantial, far more decisive: Justice. Even as the source of light and heat and as a heavenly body the sun is not exempt of alteration. Like everything else it underlies the guidance and control of Justice which has no counterpart in the world of matters.

To recognize the fact or existence of change in the physical world does still not mean to adhere to relativism, so long as the *reason* and the *sense* of material things and processes are sought in an immaterial sphere. Ontological *relativity* is the relation of each event or process to another or others in terms of space and time. *Relativism*, on the other hand, is a doctrine promulgating that, whatever its power of comprisal, embodiment and abstraction might be, no notion, no concept is in a state to assume the role of a principle or an axiom of absolute validity, with which every event and process in the material realm can be explained and evaluated. In case, however, we deny the mutability of the components of which the material universe is composed, we, then, refuse to acknowledge the processive quality of things and events. This may eventually push us towards a *dogmatism*.

It is difficult to blend a conception of a world, submitted to a ceaseless process, and full of haphazard events and things, with a rigidly built-up, motionless, static view about the cosmos. In the Antique Aegean world, which is generally accepted as the cradle of the Occidental philosophico-scientific civilizations, two outstanding thinkers have tried hard to overcome this obstacle. One of them was Heraclitus. Beside PARMENIDES, he was the first to ask genuine metaphysical questions. Such questions indeed led to philosophy-science's problem-treasury in subsequent ages.

As stated above, Heraclitus admits the fact of ongoing change, and this we can clearly see in his famous passage: "*in the river, we both step and do not step, we are and we are not.*"<sup>21</sup> Being an integral part of nature, our corporeal side is also submitted to continuous alteration. But there is still something which transcends this corporeality, and thereby our ever altering features: the affirmation, "I am". This affirmation of 'my' 'being'<sup>22</sup> stands in contraposition to 'my' own incessant 'becoming' as well as that which surrounds 'me'. The whole physical reality 'flows'. But if we cling to this 'steady flow' and take it as the sole Reality, we shall never be entitled to make any statement concerning our own selves and the phenomena around us. Even in order to grasp the 'flow' of 'becoming' in and around us, we need something that does not change. 'Being' is that something. The extreme multiformity we see in nature, reflects to us a glimpse of the enormous wealth of shape and colour Reality has in store. The one who holds on to the essential principle, will be saved of getting drowned in the 'torrent' of the changing features of nature. Heraclitus expresses this point in the following way: "*When you have listened not to me but to the Law (Logos), it is wise to agree that all things are one.*"<sup>23</sup>

Heraclitus, like Xenophanes, takes it for granted that both the unswerving order of the outside world - which runs according to the material principle, "fire" - and the rules of the concatenation of thoughts - which obey the *Logos* - depend on the Harmony established by God. Since mind works alongside the physical world order, he who has grasped the right manner of thinking will also be able to understand what he comes to see and eventually to observe. In other words, if we can link up our thoughts with each other in the manner *Logos* expects us to do, then, we shall be capable of discovering the hidden connections between events occurring out in the physical realm. Hence when we start to look at the multiplicity of things and happenings from *Logos*' unitary point of view, we will come to see that there is homogeneity underlying all the steadily mutating heterogeneity. "*If we speak with intelligence*" says Heraclitus, "*we must base our strength on that which is common to all, as the city on the Law (Nomos), and even more strongly. For all human laws are nourished by One? which is divine. For it governs as far as it will, and is sufficient for all, and more than enough.*"<sup>24</sup>

"*Heraclitus' God*", we are told by Daniel Babut, "*is the 'ever-living fire' on which the eternal and immutable world order depends. In other words, it is an immanent principle, found in all things, whose aspects and appellations vary as much as the manifestations in the world.*"<sup>25</sup> So let us look at Heraclitus' own statement about the subject-matter: "*God is day - night, winter - summer, war - peace, satiety - famine. But changes like fire - which when it mingles with the smoke of incense, is named according to each man's pleasure.*"<sup>26</sup> The above-mentioned unitary unique Principle, however, according to Daniel Babut, is a transcendent Being; "*because the world-forming fire is merely a minimal part of the universal heavenly fire.*"<sup>27</sup>

Moreover in Heraclitus' vocabulary, "*the heavenly One*" connotes "God", the formative and regulative power, from whom all the multiformity of the phenomenal world springs and to whom it eventually returns resolving the strife, friction and dissonance between its components. Heraclitus conveys this state of strife between the phenomena in a rather figurative manner: "*War is both king of all and father of all, and it has revealed some as gods, others as men; some it has made slaves, others free.*"<sup>28</sup>

Just as EMPEDOCLES will tell us at a later date, Heraclitus speaks about a constant merciless struggle that lashes out in the universe, and finally rages itself to a standstill at the Divine (theion) level. "*One should know*" says Heraclitus, "*that war is general - universal - and jurisdiction is strife, and everything comes about by way of strife and necessity.*"<sup>29</sup> But at last the relentless, furious storm will die down in the heavenly Haven which combines all the contrary forces - supra: fragment: LXXVII. This 'Haven', more overtly expressed, God represents, accordingly, Being in its totality. As humans, nonetheless, we perceive this Being just from a certain point in time and space coordinates. Consequently we conceive and determine this unitary and total Being partially. Every time we change

our position, we come across a new aspect in regard of Being. The more we experience and try harder physically as well as mentally the more we are apt to find out about those innumerable parts of Being which remain still uncovered. In connection with this subject-matter Heraclitus tells us *"that which is wise is one: to understand the purpose which steers all things through all things."* Then, he leads us to the conclusion that *"men who love wisdom must be inquirers into very many things indeed."*<sup>34</sup>

So we see that in order to comprehend what is going on, we must get to terms with the Law (*Nomos*) of the outside world, through the Law (*Logos*) on which each of us depends. But since we are only partly able to comprehend the Law of the outside world via our own Law, so, we ought to learn about ourselves and the Law which reigns over us and forms us. This is the reason why wise men in olden days preached incessantly the motto which later came to be formulated in the phrase: *"Know thyself!"* It is first of all through my own reason that I become aware of the perennial order which I recognize to be universal after having come into contact with other rational beings, with human beings, and observed physical events happening in sequences. In this way I conceive that my inner order has its counterpart in the outside world. Therefore if I acquire a more profound understanding of the underlying Law (*Logos*) of my mind, I shall be able rationally to interpret the ongoing events outside myself. This was the manner eventually adopted by ARISTOTLE when he tried to unriddle nature. In doing so, he was principally following the line drawn by a certain tradition of thought: namely, the Xenophanean-Heraclitean-Parmenidean-Socratic-Platonic tradition. He, of course, was more than a dull, devoted follower, an adept of this line. He can solely be regarded as the culmination of the Classical Period of the Antique Aegean thought. With him, philosophy, of which Heraclitus and Parmenides might be considered as the forerunners, assumed an altogether new outlook.

## II - The Emergence of Philosophy-Science

### From Speculative to Non-speculative Metaphysics

Accordingly philosophy sorts from the speculative era and begins to investigate nature closely. What particularly distinguishes the trend, extending from Xenophanes and Heraclitus to the Sophists and Socrates, deriving then its classical form from Aristotle, and carried on further by THEOPHRASTUS and GALEN, is the state of complete fusion of philosophy and science - thence the great tradition of *philosophy-science* in the *Occidental civilization*.<sup>^</sup>

At the earliest stages of this trend there is still no distinction between speculation and empirical research. *"Astronomy and mathematics as well as all branches of natural knowledge, and in the beginning even medicine, were all included in the scope of philosophy, the last named science being the first to detach itself as a practical techne. Only history the combination of history and geography, as practised by the Ionic logographers and Herodotus, stands apart, and even here the dividing line is not always sharply drawn. Ionic philosophy in its first representative, considered from a methodological point of view, is pure dogmatism."*<sup>38</sup>

With Aristotle *philosophy* attains the particular stage where it starts to develop the *sciences*, its so-called 'feelers'.<sup>1</sup> Through the sciences, indeed, philosophy reaches out to the phenomenal realm. Thus Aristotle can be regarded as the founding father of philosophy-science, and the first known thinker to define the confines of the philosophico-scientific conception. His way of thinking and re-searching was not solely determined by the aforesaid line. He, no doubt, was also to some extent influenced by the other two thought currents, which differed in almost all respects from the one that came down from Xenophanes, through Heraclitus and Socrates to Plato. Although the other mentioned currents stood rather for dissimilar world views, they at least shared the conception of a nature and world devoid of sanctity and of any form of determinateness. They categorically refused all kinds of mystification of man

and the whole nature, which in fact appealed to the popular mind.

Aristotle took over from the *Sophists* the liability towards doubt and questioning; from the *Atomists* the keenness to look with closer attention at nature and to describe natural events with a sober language - one that is dispassionate and free from subjective elements. Aristotle set up the science of logic, leaning on the art of arguing known as *dialectics*. The dialectical manner of thinking makes its first appearance in Heraclitus' conception about the universe, which posits that every-thing results from the interactions of opposites. Afterwards, in the *Sophists*, and under their influences in Socrates' cases we see dialectics as a method of argumentation. Beside the *Sophists*, Aristotle was substantially influenced by the *Atomists* whom some of our modern tendentious historians of philosophy-science like so much to brand as the precursors of Materialism. On the basis of this heritage, Aristotle set out to devise the methodology, purpose and conception of the philosophical-scientific endeavour. In his ingeniously contrived enormous philosophical-scientific system, sciences, each of them dealing with a definite section of reality, are supposed to gather the so-called 'raw material' from the physical and social environments. This 'raw material' is worked up into knowledge through theoretical operations in the non-speculative metaphysical kernel of a philosophical-scientific system. In this way we obtain general pictures about the various parts of the physical realm. "in every kind of theoretical investigation and every way of teaching" says Aristotle, "whether the more noble or the more ignoble, there appears to be two notions of proficiency: the one is called science while the other is a sort of skill, or education."<sup>39</sup>

Furthermore, in establishing coherent connections between theories, corresponding to related domains, we acquire an all-comprising structure called *system*. And to underpin a *system* is indeed the task of *metaphysics*\*<sup>®</sup>. This, however, is not a unitary, not a compact fabric. *Metaphysics* comprises, in fact, two opposite structures: the *speculative* and *non-speculative metaphysics*. This distinction I have designed following suit to Immanuel KANT'S outstanding finding according to which questions expecting logically as well as empirically warrantable answers give rise to *transcendental structures*, whereas those not entitled to await justifiable replies bring about *transcendent constructions*. The latter ones are the causes of *antinomies*.<sup>^</sup> Antinomic answers are, in turn, the sources of both various sorts of *dogmatisms*, and *relativisms* which eventually may end up in  *nihilisms*.

### III - The Bounds of Change

#### A - in Search of Changelessness

From all that I have told until now, it will be understood that Aristotle, in his time, was confronted chiefly with three lines of thought currents:

- the one accepting a supernatural source for all events, material as well as spiritual, accordingly a necessary universal order wherein everything moves from a certain starting point towards a definite end;
- the other that refuses any source, to say nothing of a supernatural one; processes mechanically concatenated incessantly go on; 'becoming' is a beginningless as well as an endless 'flux';
- lastly that particular thought current which rejects, not only any notion of source and purpose, but also the order considered to prevail throughout the universe.

The thinkers of the first main current can be further classified as being the adherents of one or the other of the two 'sub-currents':

- the Parmenidean - Platonic line where the phenomenal world is either not considered at all or is only accepted as an epiphenomenon of the ideal-spiritual realm;
- the Heraclitean tradition within which the phenomenal world enjoys full consideration, in spite of the fact that through Logos the Heavenly Almightiness exerts the basic formative and purpose-indicating power.

Aristotle sided with the Heraclitean trend in the study of nature. He was aspiring to learn why and how this ceaseless alteration, this relentless coming-to-be and passing-away happened. Moreover, he wanted to reach beyond change. Indeed our study of the physical environment and culture should involve some constant factors. Constancy, according to Aristotle, first and foremost characterizes the pure forms of our thought that underlie any investigation. Furthermore, our capacity of investigation, intuition and finally reasoning enables us to comprehend our 'Self and everything Around us. It is this capacity to reason that Aristotle regarded as the sole instrument with which we can set out for investigations.

First of all the Universe has to be an ordered unity. This is partly the basic faith upon which Aristotle's system of philosophy-science reposes and partly the out-come of his thorough-going observations.

The order of every class of being, reflects in its final analysis the world's perpetual harmony which in turn is based on the infinite oneness of the shaper and prime mover of the Universe.<sup>44</sup> Change, alteration and even transformation are not excluded from Aristotle's world picture, contrary to what generally his modern-day commentators believed and made us believe. These changes, however, do by no means occur haphazardly and mechanically. This is in fact the crucial point, which is almost always overlooked and missed. There is no logical condition that compels us to place the notion of *change* on the same footing as randomness. Moreover, if *necessity* is scientifically indemonstrable, so must be the case with *randomness*. Indeed, in both cases we are confronted with a question of faith.

## **B - From Becoming (Coming-To-Be) towards Evolution**

Aristotle's system is the turning point in the passage from speculative to non-speculative metaphysics, the basis of scientific endeavour. Besides, we witness in his investigations on the living things the advent of the problem of evolution in its proper sense, that is, the process wherein interspecific transformations take place. In his studies on the living things, *evolution* develops into a distinctive feature of the problem of *becoming*. Here we already come across the impacts, yet hardly noticeable, exerted by the Sophists and the Atomists alike, according to whom matter possesses weight, density and hardness, but is primordially inanimated. Aristotle does not take any more for granted that the universe, at least in its appearance, is filled only with enlivened things. He, indeed, finds himself in a more or less dubious situation. Even if in his time the opinion was getting ever more widespread that something of a hiatus between the spiritual (ψυχική: spiritual being) and the material (σωματική: material being) existed, which effectively separated the animated (ἐνψυχόν) from the inanimated (ἄψυχον), and ultimately the 'understanding living being' (νοεῖν ζῶν) from the 'perceiving living thing' (αἰσθάνεσθαι ζῶν), the assumption of a connection between these two principal spheres of being had not been given up altogether. Basically the universe itself was still accepted as an animated being by the majority. Accordingly everything is imbued with soul. More explicitly expressed, every actualising thing assumes a certain shape, and this is a *spiritual* (*pneuma*: spirit) activity. Before and above all comes the distinction between *form* and *matter*, which is present throughout the world: where something stands to something else as being more perfect, the defining and effecting, the former is called the *formed* or the *real*, and the latter the *potential* or the *unformed*. Hence when matter assumes its own form, we speak, according to Aristotle, of becoming (coming-to-be). So each *potential* (δύναμις) *becomes* ("γίγνεται) a *real* thing (ἐπέγγεται).

The relation of form to matter yields the concept of *motion* (κίνησις) or, what is nearly the same, *change* (μεταβολή) to which everything in the world that contains matter is subject.<sup>43</sup> *Motion*, in Aristotle's view, is therefore, "the fulfillment of what exists potentially, in so far as it exists potentially ... ; of what can be increased and its opposite what can be decreased ... ; of what can come to be and can pass away ... ; of what can be carried along, locomotion. " \*\* Taking, at least, merely our Earth into account, and leaving his controversial speculations about the celestial bodies aside, for Aristotle there is an incessant passage from the formless matter, the potential towards the formed matter, the real. Further-more *the formed matter* makes up the *sensible substance*, the *singular being*, the *individual* which basically is apt, nay, bound to change. Because each power that has reached the perfect formal stage it expects to attain, will thence eventually assume the role of being a power, a potential to be actualised, to become reality. Thus each being possesses a polarity in itself: its reality (ἐνέργεια) as well as its potentiality (δύναμις). No being on Earth is either pure potentiality or absolute reality. In other words, each real thing bears within itself the seeds for a certain forthcoming new real thing. Expressed in a different manner, each real thing is in fact the potential of the real thing to which it is to give birth. Therefore each forthcoming actualization is determined by its forthbringing reality.<sup>45</sup> While we onlookers cannot discern the determinations - *gnosiological indeterminableness* - of the forthcoming real thing in its potential stage, it, in fact, is determined - for it is factually there - by its forthbringing reality, that is, in its potential stage *on-tological determinedness*. ^ Since we onlookers are

outsiders and therefore un-able to pin down the determinations of a forthcoming real thing right in the bosom of its forthbringing real thing, how can we say that the forthcoming real thing is already determined by its forthbringing real thing? Indeed by contemplating the particular events we arrive at something of a universal order from where, then, we can draw analogies for the comprehension of sensible substances which are the only real things. As a matter of fact, "of all things" say s Aristotle, "there is order, and every time and life are measured by a period; except that all are not measured by the same period, but some things by a less and others by a greater."<sup>47</sup>

The *living* in distinction to the *non-living* thing is the being endowed with an 'awoken soul'<sup>1</sup>, the life-principle' which forms its relevant tool, the body. Since *soul* is the first *entelechy*, *body* is the *tool (organon)* by which the *formative-principle* (the soul) gets *actualised*. Therefore the living thing is - with a present-day term - an 'organism' - soul's organised body-; again in other words: the body organised by the soul.<sup>48</sup> Such a body, for fulfilling its various specific life-functions possesses 'secondary tools', the organs. Since the soul is found in every-thing,<sup>49</sup> thence it remains only a question of whether it is asleep or awake: "in the life of the soul there are sleep and awakening." As a result of the foregoing assertion it becomes clear that the living and the non-living things share a *substantum*. To think the other way round would, as a matter of fact, contradict the Aristotelian logic according to which the emergence of a thing from something totally dissimilar is impossible. "Necessarily, the soul"<sup>99</sup> say s Aristotle, "cannot be substance, except as form of a natural body that has life potentially."<sup>5</sup> \* Thus any natural body, whose soul awakes, is turned from an *inanimate* - in modern terms, from an 'inorganic' - thing into an *animated* - 'organic' - being. Once a group of beings are *vitalised* - have their souls 'awoken' -, they will go uninter-ruptedly on producing beings of their kind. Even if crossing from one group with a certain outlook - shape - way of feeding, of reproduction and locomotion over to another one is ever possible, it is still out of question that a whole group of living beings may fall back to its primordial state of inanimateness. The single being, the individual on the other hand, wanes away, thus disintegrates<sup>52</sup> when its *life-principle*, the soul snuffs out.

Consequently, the genesis, and then the succeeding life history of a particular living group depends upon the development of the souls of its constituting individuals. So we see according to Aristotle that a living group comes to be, then proceeds through an interplay of innumerable factors related in varying degrees to each of the living things forming that particular group or assembly. Each being encloses its own formative power. The same is true for the living group. Because like individuals, groups made up of these bear their purposes within themselves. It is in the course of their life history that the individual's as well as the species' innate purposes sprout: this process is known as DEVELOPMENT. Before turning our attention upon its connotations, let us first take up the etymological basis of it briefly. The word 'development' derives from two Latin components: namely, 'dis-' and 'Volopar'. When these are put together they form the infinitive 'disvolopar' (or, 'disvolopar') which means to 'unwrap', 'disentangle', 'rid free'. Hence *de-velopment* has the subsequent connotations which are relevant to the present study:

" 1 - A gradual unfolding, a bringing into fuller view; a fuller disclosure or working out of the details of anything, as a plan, a scheme ...

That in which the fuller unfolding is embodied or realised;

2 - ... bringing out from a latent or elementary condition; the production of a natural force, energy, or new form of matter;

3 - the growth and unfolding of what is in the germ ... ;

4 - gradual advancement through progressive stages, growth from within."<sup>^</sup>

Thus it is clear that in the Aristotelian sense, both the *alterations* of individual living beings and *transformations* occurring between groups of living things are *developmental processes*. Consequently, seen from the phenomenal angle Aristotle's world of living things is not static; it is mobile. This conception of mobility, nonetheless, does not imply inconstancy, and is not void of meaning, causal necessity, and purposive directiveness. Here resides in fact the chief unconformity between the views of the *developmentarian manner*<sup>^\*</sup> of alteration and transformation, put forward by ARISTOTLE, thenceforth followed and supported by almost all the ancient students of the living things, and the *evolutionary method* of investigating the biotic sphere, applied by most of the contemporary biologists from especially Charles DARWIN'S epoch-making formulation of the principle of '*natural selection*?\$ onwards.

Now, let us have a look at the passage in *History of Animals* where Aristotle tries to explain the genesis and the further development of the living things:

"Nature proceeds little by little from things lifeless to animal life in such a way that it is impossible to determine the exact line of demarcation, nor on which side thereof an intermediate form should lie. Thus, next after lifeless things in the upward scale comes the plant, and of plants one will differ from another as to its amount of apparent vitality; and, in a word, the whole genus of plants, whilst it is devoid of life as compared with an animal, is endowed with life as compared with other corporeal entities. Indeed, as we just remarked, there is observed in plants a continuous scale of ascent towards the animal. So, in the sea, there are certain objects concerning which one would be at a loss to determine whether they be animal or vegetable. For instance, certain of these objects are fairly rooted, and in several cases perish if detached; thus the pinna is rooted to a particular spot, and the *scaphopoda* (or razorshell) cannot

survive withdrawal from its burrow. Indeed, broadly speaking, the entire genus of testaceans have a resemblance to vegetables, if they be contrasted with such animals as are capable of progression. In regard to sensibility, some animals give no indication whatsoever of it, whilst others indicate it but indistinctly. Further, the substance of some of these intermediate creatures is fleshlike, as is the case with the so-called tethya (or ascidians) and the acalephae (or sea-anemone); but the sponge is in every respect like a vegetable. And so throughout the entire animal scale there is a graduated differentiation in amount of vitality and in capacity for motion.

A similar statement holds good with regard to habits of life. Thus of plants that spring from seed the one function seems to be the reproduction of their own particular species, and the species of action with certain animals is similarly limited. The faculty of reproduction, then, is common to all alike. If sensibility be superadded, then their lives will differ from one another in respect to sexual intercourse through the varying amount of pleasure derived therefrom, and also in regard to modes of parturition and ways of rearing their young. Some animals, like plants, simply procreate their own species at definite seasons; other animals busy themselves also in procuring food for their young, and after they are reared quit them and have no further dealings with them; other animals are more intelligent and endowed with memory, and they live with their offspring for a longer period and on a more social footing.

The life of animals, then, may be divided into two acts procreation and feeding; for on these two acts all their interests and life concentrate. Their food depends chiefly on the substance of which they are severally constituted; for the source of their growth in all cases will be this substance. And whatsoever is in conformity with nature is pleasant, and all animals pursue pleasure in keeping with their nature."<sup>56</sup>

## About the same subject Aristotle speaks anew in his *Parts of Animals*

"The Ascidians differ very little in their nature from plants, but they are akin to animals than the Sponges are, which are completely plants. Nature passes in a continuous gradation to animals, and on the way there are living things which are not the result that one class is so close to the next that the difference with a sponge, as I said just now, is in all respects like a plant: it lives long on to something, and when it is pulled off it dies. What are called sponges and other similar sea-animals differ only slightly from the sponges they have no power of sensation, but they live just as if they were the soil. Even among land-plants such instances exist: living and free plants or quite unattached: for example, the plant found on Parnassus - the Epipetron (Rockplant). If you hang this up on the pegs it will last a considerable time. Sometimes it is doubtful whether these Ascidians and other creatures ought to be classed as plants or as animals: in so far as they are long on to some other object they approach the status of a plant; but they are of a soft substance and therefore probably are capable of sensation of a kind." <sup>56</sup>

So Aristotle has, without leaving any trace of doubt, mentioned the crossing from the still-not-living thing, and the various passages from one to another. Thus we are presented with ample evidence in favour of *'biological transformation'* which could be seen as leading to the conception of *evolution*. Nevertheless we have to say it has already been indicated for so many times that it is found Aristotle's not yet well established and sufficiently concerning 'biological transformation' with the limply asserted thesis of 'evolution' which emerged as a result of thoroughgoing researches, and though, even quite often rough debates towards the second half of the Nineteenth century.

According to Aristotle, even at the level of the individual, change never happens haphazardly or just for the sake of change. Every alteration is a means leading towards a definite end. Furthermore, unexpected abrupt changes almost never happen in nature - except the *spontaneous generation*, a rare case by means of that the primeval living things emerged from non-living ones (q.v.: 'Soul's awakening'), and for which Aristotle could not find any tenable explanation. In Aristotle's foregoing passage we notice his effort to explain that the individual living thing possesses, so to speak, two faces, or rather two aspects: on the one side, as a form-receiver from its group, its species, it covers on its own a certain stretch of time from *birth to death* - the living thing's individual life-span -; on the other, it is the formative agent of its offspring - the living thing's species-life. Thus the living thing, while in its individual status, is bound to die; in its species-status, it transcends mortality. That the individual, with its species-status, be, so to speak, immortal, is rather far from providing a sufficient logical proof for the fixity of species. It is a fact that Aristotle, seen from the angle of the present-day philosophy-science, treated most details and technicalities of the objects he studied mis-takenly, we might even say, blindly.<sup>59</sup> Nonetheless it seems quite improbable that Aristotle, an illustrious mind in philosophy-science as he was, could have drawn such a resolute conclusion out of such a flimsy set of premises. There must have been something beyond mere philosophico-scientific considerations which had thenceforth urged him to subscribe to the doctrine of the fixity of species, and to deny any possibility of transformations and alterations above individual level although he had pinpointed the fact of biological transformation, and expressed it clearly, as we have just seen, in his works concerning inquiries on living things.

## IV - Conclusion

### Bioscience - Bioethics Discrepancy

We can surely talk in greater length and breath as to why Aristotle resolutely declined to continue to take into account, and then eventually put special emphasis on the idea of interspecific transformation. However a sufficiently demonstrable, and thus verifiable conclusion seems almost out of reach for us.

Now, I think there are considerations other than certain purely theoretical ones, which might have prevented Aristotle of elaborating further what he had already established in regard to interspecific transformations, and so anticipating something of a hypothesis about evolution. In spite of his insistence that science should not look for anything but knowledge, Aristotle could not after all wipe off his deep-rooted piety which certainly was keeping on nourishing the substratum of his philosophy-science-system. And this piety, I am convinced, could not have allowed Aristotle to believe that the universe, and everything in it, we human beings included, was a notorious 'Dicer's casual play'.

## Endnotes

1. Aristotle: *On the Heavens*, I, 5, 271a (33).
2. Aristotle: *Parts of Animals*, IV, 10, 486a (25).
3. Charles Darwin to William Ögle, on the publication of his translation of the *Parts of Animals* in 1882 - q.v.: Frontispiece of the *Parts of Animals*, Peck's translation.
4. Q.v.: Morris R. Cohen and I.E. Drabkin: Source Book in Greek Science", p. 395.
5. The Classical period of the Antique Aegean Civilization the focus of which is Periclean Athens (479-323 BC) - extends approximately from 500 to 200 BC Instead of 'Ancient' I prefer the qualifier 'Antique\*' for distinguishing the Aegean Civilization from other ones contemporaneous to it. The *Aegean Civilization*, comprising mainly the Minoan, Mycenaean, Lydian, Phrygian, Ionian, Laconian, Attic, Macedonian, Thracian and Sicilian cultures, differed from all other *Ancient civilizations* - the Mediterranean, Egyptian, Mesopotamian, Anatolian, Iranian, Central Asian, Indian, Chinese and the rest - due to the fact that it was the birthplace of *philosophy-science* and, as a consequence of this, of *technology*. In the other mentioned Ancient civilizations we come across important *traditions of wisdom*, but not *systems of philosophy-science* proper.
6. Kenneth Dover: *The Greeks*, pp. 46 and 47.
7. Xenophanes (XVI), q.v.: Kathleen Freeman: *Ancilla to the Pre-Socratic Philosophers*, p. 22.
8. Xenophanes (XV), q.v.: idem.
9. The opinion that the human being, as a member both of the *biosphere* and the *Culture*, occupies a position unique among living things is far from being free of controversies. An example of the opposite view can be seen in the statement of Wim van der Steen and Bart Voorzanger: "*Human beings, besides being human, are obviously animals. So biology rightfully belongs to the sciences that cover the study of man ...*" - Wim J. van der Steen and Bart Voorzanger: *Sociobiology in Perspective*, p. 25.
10. Q.v.: Xenophanes (XI), öp çit., p. 22.
11. Xenophanes (XIV), q.v.: idem.

12. Xenophanes (XVIII), q.v.: idem.
13. Xenophanes (XXIII), q.v.: p. 23.
14. Xenophanes (XXIV), q.v.: Öp çit., p. 23.
15. Xenophanes (XXV), q.v.: idem.
16. Xenophanes (XXVI), q.v.: idem.
17. Heraclitus (XXXV), q.v.: Kathleen Freeman: *Ancilla to the Pre-Socratic Philosophers*, p.27.
18. Heraclitus (LXXXVII), q.v.: Öp çit., p. 30.
19. Heraclitus (LXXXIX), q.v.: idem.
20. Heraclitus (LCIV), q.v.: Öp çit., p. 31.
21. Heraclitus (XIXL a), q.v.: Öp çit., p. 28.
22. I have always wondered if Parmenides and Heraclitus had not written in an Indo-European language, like Ancient Greek, how they could possibly have managed to lay the foundation stone of ontology that was to become the groundwork of latter - day Occidental philosophy-science. For instance, in Turkish, which is not an Indo-European language, you will hardly find a linguistic form corresponding to the infinitive 'to be', and its eventually sub-stantivised derivative 'being'. This incidental remark of mine still does not indicate that the philosophy-science tradition necessarily depends upon the existence of an Indo-European Language.
23. Heraclitus (L), q.v.: Öp çit., p. 28.
24. Due to their distinctive meanings I have capitalised some of the words appearing in the translations.
25. Heraclitus (CXIV), q.v.: Öp çit., p. 32.
26. Daniel Babut: *La Religion des Philosophes Grecs*, pp. 29 and 30 - translated from French by me (T. Durah).
27. Heraclitus (LXXVII), q.v.: Öp çit., p. 29.
28. Daniel Babut: Öp çit., p. 30 - my translation (T. Durah).
29. Heraclitus probably intends to say 'extraordinary heroes', and
30. 'ordinary men' - T. Durah.
31. Heraclitus (LIII), q.v.: Öp çit., p. 28.
32. Heraclitus (LXXX), q.v.: Öp çit., p. 30.
33. Heraclitus (XLI), q.v.: Öp çit., p. 27.
34. Heraclitus (XXXV), q.v.: idem - N.B. Heraclitus is, as far as we know at present, the first to determine and to use the term "love of wisdom", that is to say, "φιλοσοφία" "philosophy" proper - q.v.: Eduard Zeller: *Outlines of the History of Greek Philosophy*, p. 23. For further discussions over the same problem, see: pp. 112, 113, 114.
35. Q.v.: Eduard Zeller: Öp çit., pp. 18 and 19.
36. The period from THALES up to Heraclitus and Parmenides could be regarded as transition from *constructions of wisdom* to *philosophy*. And philosophy, in turn, was for the first time systematised by PLATO.
37. The Set of Occidental Civilizations comprise mainly the *Antique Aegean*, the *Medieval Judeo-Christian* as well as *Islamic*, and finally the *Modern secular European civilizations*. This Community has sprouted out of a common 'seed', the *Mesopotamian* primordial civilization. Then it has been enriched and built out by the *Monotheistic - Revelational Religions* originating from West Asia - or, the East Mediterranean - and with the emergence of *philosophy-science* at the Classical period of the Antique Aegean civilization, later bearing its fruit, the *technology*.
38. Eduard Zeller: Öp çit., p. 24.
39. Aristotle: *Parts of Animals*, I, 1, 639a (1-4); q.v.: Thomas Kiernan: *Aristotle Dictionary*, p. 438.
40. Strawson: "... *Metaphysics ... the most general and fundamental of studies ... its method will be non-empirical, or a priori, not because, like transcendent metaphysics it claims to be concerned with a realm of objects inaccessible to experience, but because it is concerned with the conceptual structure which is presupposed in all empirical inquiries. This kind of investigation Kant sometimes calls 'transcendental', as distinct from 'transcendent' ...*" - P.F. Strawson: *The Bounds Sense*, p. 18.
41. Kant: "*The transcendental antithetic is in fact an investigation of the antinomy of pure reason, its cause and its result. If we apply our reason, not only to objects of experience, in order to make use of the principles of the understanding, but venture to extend beyond the limit of experience, there arise rationalising or sophistical propositions, which can neither hope for confirmation nor need fear refutation from experience. Every one of them is not only in itself free from contradiction, but can point to conditions of its necessity in the nature of reason itself, only that, unfortunately, its opposite can produce equally valid and necessary grounds for its support*" - Immanuel Kant: *Critique of Pure Reason*, B 449, p. 340.
42. In Aristotle's view the logical and ontological structures run exactly parallel. Both are submitted to the same *universal order*. Therefore any knowledge that we work out within

our logical 'machinery'<sup>1</sup>, and the source of which is the empirical data we receive, must reflect us that particular fact or phenomena to which it corresponds. A specific logical construct, that is, a theory, if founded on a certain fact, will yield the sort of knowledge about whose truth we need not to question any more. Thus Aristotle tells us in the *Generation of Animals*: "... This, then, appears to be the state of affairs with regard to the generation of bees, so far as theory can take us. supplemented by what are thought to be the facts about their behaviour. But the facts have not been sufficiently ascertained; and if at any future time they are ascertained, then credence must be given to the direct evidence of the senses more than to theories, and to theories too provided that the results which they show agree with what is observed" - Aristotle: *Generation of Animals*, III, 10, 760 b (30).

Now, what concerns the universe's shaper and prime mover Himself, here elliptically rendered, Aristotle reveals the following points:

<sup>M</sup> ... God is always in that good state in which we sometimes are, and this compels our wonder; and if in a better state this compels it yet more. And God is in a better state. And life also belongs to God; for the actuality of thought is life, and God is that actuality; and God's self-dependent actuality is life most good and eternal. We say therefore that God is a living being, eternal, most good, so that life and duration continuous and eternal belong to God; for this is God.

It is clear ... that there is a substance which is eternal and unmovable and separate from sensible things. It has been shown also that this substance cannot have any magnitude, but is without parts and indivisible - for it produces movement through infinite time, but nothing finite has infinite power ... But it has also been shown that it is impassive and unalterable; for all the other changes are posterior to change of place. ... The first principle or primary being is not movable either in itself or accidentally, but produces the primary eternal and single movement. But since that which is moved must be moved by something, and the first mover must be in itself unmovable, and eternal movement must be produced by something eternal and a single movement by a single thing, and since we see that besides the simple spatial movement of the universe, which we say the first and unmovable substance produces, there are other spatial movements those of the planets - which are eternal - for a body which moves in a circle is eternal and unceasing; we have proved these points in the physical treatises (et : *Physics*, viii, 8, 9; *De Caelo*, i, 2, ü, 3-8) - each of these movements also must be caused by a substance both unmovable in itself and eternal Aristotle: *Metaphysics*, 11,8, 1072 b (25, 30, 35); 1073 a (5, 10, 15, 20, 25, 30, 35).

43. Cf.: Eduard Zeller: *Öp cit.*, p. 176.

44. Aristotle: *Physics*, III, 201 a (10).

45. Cf.: Aristotle: "*Those elements which are changed from one into one, are generated from one thing being corrupted; but those which are changed from more than one thing being corrupted*" - Aristotle: *On Generation and Corruption*, II, 4, 331 b (35-36).

46. Cf.: Aristotle: "... it is manifest that the circumstances are not influenced by the fact of an affirmation or denial on the part of any one. For events will not take place or fail to take place because it was stated that they would or would not take place. nor is this any more the case if the prediction dates back ten thousand years or any other space of time wherefore, if through all time the nature of things was so constituted that a prediction about an event was true, then through all time it was necessary that that prediction should find fulfillment; and with regard to all events, circumstances have always been such that they occur hence is a matter of necessity. For that which someone has said truly that it will be, cannot fail to take place; and of that which takes place, it was always true to say that it would be" - Aristotle: *On Interpretation*, IX, 18 b (35); 19 a (5).

47. Aristotle: *On Generation and Corruption*, II, 11, 336 b (12-14).

48. Cf.: Aristotle: *Parts of the Animals*, I, 27, 43 a (25-35).

49. Cf.: Aristotle: *On the Soul*, III, 8, 431 b (20).

50. Aristotle: *On the Soul*, II, 1, 412 a (25).

51. Aristotle: *On the Soul*, II, 1, 412 a (20) - q.v.: Thomas Kiernan: *Aristotle Dictionary*, p. 460.

52. Cf.: Ludwig von Bertalanffy: *Problems of Life*, p. 125 (footnote); also for the definition of the 'individual', ref.: F.J.J. Buytendijk: *Mens en Dier*, p. 49.

53. "Develop" and "development" in *Oxford English Dictionary*, column: 280, p. 707, vol. I.

54. According to the developmentarian view "there are always horses because horses tend to beget horses. This happens so regularly because in these cases the efficient, formal and final causes are one. The efficient cause of a horse is the essence of its male parent; its formal cause is this same essence embodied in itself; and its final cause is again its essence, since the individuals of species naturally strive to realize as perfectly as they can the essence of their species.

It was this combination of factors which led Aristotle to argue against organic evolution. It should have led him to argue against spontaneous generation as well ..." - David L. Hull: *The Metaphysics of Evolution*, p. 317.

Contrary to 'development', 'evolution' in our time rejects any conception of 'directionism' or 'entelechy' it is not a drive towards definite morphological ends by immaterial 'life-principles'. Furthermore, seen from a universal standpoint, it is not a wholesale progressive change towards sublime goals.

"Evolution" says Theodosius Dobzhansky, "involves alterations of the genotype. The hereditary endowment of evolving species. Modifications of the phenotype. owing to environmentally induced changes in the manifestation of the genotype, are obviously important in evolution. Indeed, what survives or dies, reproduces or remains childless is only indirectly conditioned by the genotype - through its interactions with the environment molding the

phenotype. Nevertheless, without genotype change the subsequent generations start from the same old base, and phenotypic changes can be reversed by return to the old environments. Fúcity of the changes requires a genetic foundation. Any theory of evolution must, therefore, provide an account of the origin of genetic changes. At present we know two types of genetic changes mutation and recombination of genetic materials" - Theodosius Dobzhansky: *Chance and Creativity in Evolution*, pp. 312 and 313. 55. Since Aristotle refused categorically any suggestion of fortuitousness, he, of course, is not expected to tolerate an idea which would even hint at 'natural selection'. According to this principle, in nature - ör more generally, in the universe - there is nothing but Tight', 'strug-gle', 'strife', and 'competition' - refer in this context to Heraclitus' passage about the univer-sal struggle at page 14. Where 'struggle' ör 'strife' reigns, there is no order, no necessity: *Chaos*. in Aristotle's view, however, the universe is an ordered whole - *Cosmos* -, sub-jected to and administered by the eternal Law of Reason (*Logos*). This is why Aristotle at-tacks vehemently Empedocles' consideration about the coming-to-be, and the development of the living things: "Where, then, everything turned out as it would have if it were happen-ing for a purpose, there the creatures survived, being accidentally compounded in a süit-able way; but where this did not happen, the creatures perished and are perishing stili, as Empedocles says of his 'man-faced ox-progeny'" - Aristotle: *Physics*, II, 8, 198 b (30); also q.v.: G.S. Kirk and J.E. Raven: *The Presocratic Philosophers*, paragraph: 447, p. 337. in connection with Aristotle's rejection of any sort of idea concerning 'natural selection', Tight for existence', 'survival of the fittest' and the like, Majorie Grene makes the following statement: "Aristotle presents his concept of 'that for the sake of which, as a guide to the study of nature in opposition to the thinking of Empedocles, who would elicit the phenomena of the living world, without ordered ends, out of a combination of chance and necessity. At öne stage in cosmic history, Empedocles imagines, there were heads and trunks >(&4 l^ JMVfartPI&töj ^/^\Ö^Jlftc,^ biologist objected: ox-headed man progeny and vine-bearing olives, such as Empedocles envisages in his transitory world, are an absurdity. What we always have in nature is the ordered passage to a definite endpoint: man to man, cattle to cattle, grape to grape, olive to olive. Only where there are such functioning ordered series does the study of life begin" - Majorie Grene: *Aristotle and Modern Biology*, p. 82.

56. Aristotle: *History of Animals*, VIII, 1, 588 b (5, 10, 15, 20, 25, 30); 589 a (5).

57. Aristotle: *Parts of Animals*, IV, 5, 681 a (10, 15, 20, 25).

58. Every process, in Aristotle's view, is predetermined and strives towards an end which is the completion of the being in process. The individual being's change from *potentiality* to *actuality* is, so to speak, its career from budding up to flourishing. Here the first stage stili waits to be completed, while the latter is already accomplished. But every accomplishment is again a step in the direction of a new completion. While the completion of individuals is the *best* stage of their unfolding existence - that is, when they are ripe enough to reproduce -, there is no completion ör best stage to be said about a natural species, a natural group. Because every natural species is good in its own right so long as it brings lort h individuals capable of reproducing.

A 'natural group' is a class of individual beings which are able to interbreed successfully, but not able to crossbreed with organisms of other groups: "... while that which is not eternal admits of being and not-being" says Aristotle, "and of acquiring a share both in the beller and in the worse; also, Soul is betler ihan body, and a thing which has Soul in it is betler than öne which has not, in virtue of that Soul; and being is beller ihan not-being, and living than not-living. These are the causes on account of which generation of ani-mals takes place, because since the nature of a class of this sort is unable to be eternal,

that which comes into being is eternal in the manner that is öpen to it. Now it is impossible for it to be so numerically, since the 'being' of things is to be found in the particular, and if it really were so, then it would be eternal; it is, öpen to it to be so specifically. That is why there is always a class of men, of animals, of plants; and since the principle of these is 'the male' and 'the female', it mil surely be for the sake of generation that 'the male' and 'the female' are preseni in the individuals which are male and female. And as the proximate motive cause, to which belong ihe logos and the Form, is better and more divine in its nature ihan the Maïter ... The male ... comes ögeiher with ihe female and mingles with it for the business of generation, because this is something that concerns both of them" - Aristotle: *Generation of Animals*, II, 1, 731 b (25, 30, 35); 732 a (5). For Aristotle species does not represent a concrete sensible entity; on the contrary it is a supersensible substance, solely conceivable by our understanding. Hence there is no trans-substantiation at this non-material abstract level of being - here, beings in process, that is, beings from their potential state towards actualization, are not found. Evidently, then, only this level of being can be treated philosophico-scientifically. in Aristotle's view the *non-speculative meïaphysical domain* of *philosophy-science* takes the permanent necessary universal, and not the 'flowing-away' particular sensible substance into account, "for there could be no knowledge of things" he asserts, "which were in a state of flux" - Aristotle: *Metaphysics*, XII, 4, 1078 b (16).

59. Even though Aristotle had undeniably inherited a great wealth of materials and infor-mation from his contemporaries as well as from past scholars, he possessed no ready-at-hand model, and no precursory on which he could lean while building up his far-reaching, prolific system. So he can, in accordance with what has already been hinted at, rightly be accepted as the founding father of philosophy-science. Interestingly enough, Aristotle was well aware of the exceptional position with ali its virtues and vices, he had assumed in his-tory. The subsequent passage excerpted from his *On Sophistical Refutations* demonstrates this awareness quite vividly: "... in the case of ali discoveries the results of previous la-bour that have been handed down from öthers have been advanced bit by bit by those who have taken them on, whereas the original discoveries generally make an advance that is small at first though much more useful ihan ihe development which later springs out of them. For it may be that in everything, as the saying is, 'the first start is the main part': and for this reason also it is the mosi difficult; for in proportion as it is most poleni in its influence, so it is smallest in its compass and therefore mosi difficult to see: whereas when this is önce discovered, it is easier to add and develop ihe remainder in connection with it. This is in fact what has happened in regard to rhetorical speeches and to practically ali the other arts: for those who discovered the beginnings of them in ali only a little way, whereas the celebrities of today are ihe heirs - so to speak - of a long succession of men who have advanced them bit by bit, and so have developed them to their preseni form. Moreover on the subject of Rhetoric there exists much that has been said long ago, whereas on the subject of reasoning we had nothing else of an earlier date to speak of ali, but were kepi al workfor a long time in experimental researches. If, then, it seems to you after inspection that, such being the situation as it existed at the start, our investiga-tion is in a satisfactory condition compared with ihe other inquiries that have been developed by iradiiön, there must

remain for all of you, or for our students, the task of extending us your pardon for the shortcomings of the inquiry, and for the discoveries thereof your warm thanks" - Aristotle: *On Sophistical Refutations*, XXXIV, 183 b (20, 25, 30, 35); 184 a (5); 184 b (5).

## Part Two

### The Philosophy of Biology

#### 1 - Attempts at Defining the Philosophy of Biology

As may be readily understood, the designation Philosophy of Biology covers, broadly stated, a melting pot where primary and secondary results of biosciences are evaluated with the help of philosophical methods. Philosophy of biology is in general a highly abstract 'language' and some of its 'dialects', which I shall deal with shortly under the subheading "parabiology", even tend to be speculative.

The data of experimental biology are expressed in what I call the 'basic language' (or a first order). They are appraised in a 'higher level' (or a second order). Then, their account of an 'uppermost level' is the 'uppermost language'. The basic language describes straightforward facts observed by the experimentalist in the laboratory or by the researcher in the field. The second tries to explain (either with the help of a formal notational system or by means of an ordinary daily language) the experimental or 'purely' observational data. Already the second step furnishes some of the life sciences with certain explanations, which can be accepted as laws, even highly fluctuating theories, but surely not principles, since biology, in general, still lacks a rather well-established axiomatic system. The third one is a sort of replication over those statements expressed in the second order. This, however, does not yet mean that the uppermost language represents an altogether speculative domain. As already Immanuel Kant specifies in his *First Critique*, not every theoretical statement is necessarily speculative. To be speculative it must be entirely deprived of any kind of factual basis. 1

Working within the frame of the higher and uppermost levels, the philosopher of biology is usually exempted from experimental occupations. Unlike the experimental scientist, he is not in a position to affirm his arguments *demonstratively*; they need to be *befounded*. It is this very point which identifies him as a philosopher of biology. Simply because, contrary to experimental methods, philosophical method consists of founding that which is asserted. Moreover, "*to philosophise means to ground concepts and their association on the basis of the very question: 'What is ...?' The philosophical foundation of a question yields an answer which furthers other answers.*"<sup>^</sup> Thereby it gets clear how philosophical investigation differs from the experimental enterprise: almost no philosophical answer can ever be considered final, whereas basic scientific answers, satisfying the necessary experimental conditions, do usually not require to be tackled on any longer.

So, philosophy of biology designates:

1. the attempt to satisfy the most urgent need of biology in general, to construct an adequate axiomatic system, enabling similar experimental data to harmonise with one another. Consequently systematised knowledge, like laws, theories and finally principles. Concerning biotic phenomena will be produced;
2. clarification of the meaning of terms and uncovering sets of terms, used in various descriptive or explanatory statements, belonging to different biological sciences (biosciences) and disciplines;
3. the appraisal of doctrines - usually cited under the label 'natural philosophies',

which try to grasp the living being and its diverse qualities either previous to or beyond life sciences, without losing contact with factual data;

4. to glance at the outgrowths of some of the natural philosophies, which transcend the phenomenal world altogether and sometimes appear as ideologies to be called 'parabiology';
5. working out purely experimental data and theoretical results yielded by life sciences for moral purposes.

Consequently it may be possible to name every particular branch, brought under the general title of 'philosophy of biology' as follows:

1. Theoretical Biology, which in turn can be functionally divided into two main sections:
  - a. Epistemology of Biology;
  - b. Biomathematics.
2. History of Biology in General:
  - a. History of Biosciences;
  - b. History of Biophilosophy:
    - i. History of Metabiology,
    - ii. History of Parabiology.
3. Bioethics:
  - a. Impact of biosciences upon living things in general and human life in particular.
  - b. Deontology-ethics of medicine.

The denotation and detailed classification of the herein treated field are certainly not accepted all over. At first glance this field seems rather heterogeneous. This however, is not the case. Among the seemingly unrelated parts or domains there exist intrinsic ties. As long as firmly set-up theoretical biology is existent it will hardly be possible to cover experimental data by unambiguous conceptual frameworks and to establish well-founded laws and theories. This state of affairs means that no effect can be expected from bioethics. Since ethics itself has an extremely slippery basis, we need clearly defined concepts for bio-ethics to arrive at something meaningful. This indeed is exceedingly important, not only for biology, but for our morally tormented world as well.

Metabiology still has a significant function: it is a reliable source from where, whenever necessary, relevant concepts may be extracted for facts newly discovered by experimentation. Important hints can also be obtained from history for coining fresh assumptions, even hypothesis, which in turn may result in new experiments.

The only use of parabiology within the whole field of what we here call philosophy of biology, may be qualified as 'negative'. It may indicate the limits of meaningful and sound reasoning. Just at this point, no doubt, we owe a lot to Kant's ingenious distinction between the *transcendental* and *transcendent* spheres of intellectual activity.<sup>3</sup>

Inspired by this distinction I venture to draw a demarcation line between *theoretization* - extending from theoretical biology up to metabiology - and pure *speculation* - like parabiology. Indeed metaphysics and pure speculation are no longer considered as synonymous terms, as it used to be during the Scholastic period. While the first is seen today, more or less, as an inquiry concerning the coming into being and passing away of situations, positions, relations of real beings, the latter is regarded rather as doing the same within the context of fictitious entities. The principle subject-matter of parabiology consists, thus, of entities produced solely by the thinking self.

Now let us have a close look at those specific domains, which make up the whole philosophy of biology. The arrangement of the specific domains will take place in the above-mentioned order of Theoretical Biology, Biophilosophy and Bioethics - see also Table I in the Appendix, p. 71.

## II - Theoretical Biology

As mentioned, the aim of this one is to show how biosciences can *theoretically* handle questions concerning organisms, and also those questions escaping the scope of biological research. Therefore it should not cause any astonishment, in case no firsthand information about organisms and problems related to them will be presented. The present account is about statements concerning descriptions of experimental data.

## A - Epistemology of Biology

The first branch of theoretical biology has to do with biological mechanisms and methodology of biosciences. *"it establishes the foundations of biological knowledge and thus forms a branch of general logic and epistemology, whilst it may also be important for biological investigation, for example, that of teleology, or relation between fact and theory, of the significance of experiment in biology ... it may be of the greatest importance for the whole direction in biology. Critical methodological clarification may constitute protection against the fallacies of hurried hypotheses."*<sup>\*</sup>

The epistemologist of biology starts his enterprise by analysing statements formulated mainly by the biomathematician. This means that he undertakes a logical investigation. Thus an epistemological account is a twofold theoretization: between experimental biology and epistemology of biology, there lies an intermediary step with which we shall deal hereafter. Accordingly, the epistemologist of biology is unable to ascertain by himself whether a given experimental datum *really* corresponds to its factual basis. To find out such *material fallacies*, he has to cooperate with the biomathematician and especially with the experimental biologist. The main duty of the epistemologist of biology, therefore, is to search whether a given theoretical argumentation contains certain paradoxes, contradictions, contrarities between premises and conclusion, in short, *my formal fallacy*.

Starting from conceptual analysis, the epistemologist of biology, together with the biomathematician, tries to match certain concepts with the aim to designate similar phenomena or processes. In this way he makes a statement trying to explain a definite process or fact, which, when sufficiently confirmed, may be transformed into a scientific law and eventually into a theory.

I shall now give a suitable example, which displays the chief characteristics of a description of experimental data.

"Avena seedlings were imbibed and germinated in the presence of inhibitors of carotenoid biosynthesis. After excision and defoliation, the coleoptiles were cultured in the presence of these basally supplied inhibitors and their growth, phototropic behaviour and pigment content were subsequently measured. Total carotenoids could be reduced to ca. 20 per cent of the control value without marked influence on the dose-response curve for the first positive curvature. Chromatographic analysis of extracted carotenoids on alumina columns revealed that the inhibitors produced both qualitative and quantitative changes, reducing one fraction and virtually eliminating two others ..."<sup>^</sup>

If a report such as this one, enumerating and describing isolated processes, is not connected or compared to similar reports, no generalization can ever be achieved. *Generalization*, however, is the *indispensable condition for establishing law and thenceforward theory*. Furthermore, *unless there are laws and theories, we can-not assume to possess a reliable and systematic knowledge about a special field of facts*. Thus experimental data do not yield us knowledge in general, but furnish us with the necessary means of either building up a fresh system of knowledge or of testing whether existing knowledge is trustworthy enough.

When we turn our attention from descriptions to explanations, which could be considered also as stepping stones for devising laws and then theories, things get more complicated.

Moreover, information obtained in the course of ordinary experience about the material realm is frequently accurate, but it seldom provides any explanation why the facts are as alleged. It is one of the distinctive attributes of theoretical science, namely, philosophy in its non-speculative sense, that it strives to provide explanations of why the observed events do in fact occur. Theoretical science attempts to discover and to formulate the conditions under which the observed facts and their mutual relationships exist.<sup>6</sup> Now let us recapitulate this exceedingly important point: unlike *experimental science* which enumerates and then *describes certain facts*, *theoretical science* seeks to construct conceptual *definitions* within whose limits it can render explicit the already described facts.

Thus furthermore, for explaining a certain case (or fact) we need two conditions: *facts* and *scientific laws*. Facts can be represented by basic propositions. Laws are expressed either by universal conditional propositions - in this case it is a question of *universal* as well as *deterministic* laws - or general expressions which render us probabilistic relations - and in such cases we speak about *probabilistic* as well as *indeterministic* laws. An explanation can be considered as an argumentation. Its conclusion is a statement which describes the fact to be explained. The premises are statements describing us laws and (other) related facts. Whenever the argument is deductive, we speak of a *deductive-nomological* explanation.<sup>7</sup>

"A deductive-nomological explanation" says Hempel, "is based on laws which express uniformities;

such laws are strictly universal form, of which the following is a simple example: 'in every case x, without exception, when the - more or less complex -conditions A are satisfied, an event or state of affairs of kind B comes about', or, symbolically, '(x)(Ax  $\supset$  Bx)'. Generally, the deductive-nomological model construes an explanation by means of strictly universal laws as a deductive argument of the form:

$$\begin{array}{l} L_1, L_2, \dots, L_m \\ \hline C_1, C_2, \dots, C_n \\ \hline E \end{array}$$

"The premises are said to form the explanans: the conclusion, in other words, the statement E describing the phenomenon to be explained, is called the explanandum-statement or briefly the explanandum ... especially in the case of causal explanation, which is one variety of deductive-nomological explanation, the particular circumstances specified in the sentences  $C_1, C_2, \dots, C_n$  will be such that their occurrence is prior to, or at most simultaneous with, that of the event to be explained."<sup>8</sup>

The classical explanations of physico-chemical sciences commonly fit the above-stated pattern. They are couched in terms of universal law, as is clearly seen in Sir Isaac Newton's famous formula,  $F = g \cdot m_1 \cdot m_2 / r^2$ , which represents the law of gravitation.

On the contrary, explanations pertaining to biosciences usually display *inductive-probabilistic* properties. Again according to Hempel's statement, in an inductive-nomological explanation, at least some of the relevant laws are not of strictly universal, but of *statistical* character.

"The simplest statements of this kind have the form: 'the statistical probability - that is, roughly, the long-run relative frequency - for the occurrence of an event of kind B under conditions of kind 'A' is r' or in symbols, ' $P^{(B.A)} = r$ '. If the probability r is close to 1 then a law of this type may serve to explain the occurrence of B in a particular case i by reference to the information, together with the statistical law invoked, does not, of course, deductively imply the explanandum-statement 'B<sub>i</sub>', which asserts the occurrence of B in the individual case i; rather, it lends to this statement strong inductive support; or, to use Carnap's terminology, it confers upon the explanandum-statement a high logical, or inductive, probability. The simplest kind of inductive-probabilistic explanation, then, may be schema-tised as follows:

|                                    |                              |
|------------------------------------|------------------------------|
| A <sub>i</sub>                     | confers                      |
| Ps (B, A) 1 - ε (where ε is small) | high inductive               |
| B <sub>i</sub>                     | probability on" <sup>9</sup> |

At present, even those assumptions, considered as the most basic ones in biology can at best be rendered by inductive-probabilistic (or better said, inductive-statistical) laws. In connection with this fact the subsequent passage may serve as a striking example:

"Virus diseases can be transmitted by the crystalline virus material as well as by infected sap, and again the amount of recoverable virus increases as the disease develops. Here, therefore, we have something that has some of the properties of living material; like many bacteria, the viruses can transmit disease from one organism to another and again like bacteria, they can multiply in tissues of their hosts. Yet, at the same time and unlike bacteria, they seem to have no metabolism of their own and unlike any other kind of living stuff whatsoever, they are crystallizable ... These substances thus bridge the gap between the living and non-living worlds, a discovery that has had profound effects upon biological thought. It has been necessary, for example, to revise our ideas about nature and the origin of life; indeed it seems that we can no longer use the word Life as a precise term, because we know less than ever exactly what we mean by it."<sup>10\*</sup>

'What is life?' is indeed one of the oldest unsolved riddles, keeping busy the most illustrious minds from Aristotle up to Erwin Schrödinger. Herewith, of course, we suddenly pass from theoretical biology to metabiology in particular or to biophilosophy in general. Here again we can apprehend how the various branches of the philosophy of biology are intermingled.

There is no doubt that the definition of 'life' or 'living being' poses itself as the main problem of general biology and especially of the philosophy of biology. Being directly or indirectly the basis for every biological explanation, 'life' must be clearly and unambiguously defined. Otherwise we cannot expect that *deductive-nomological explanations* and *universal-deterministic laws* will ever be produced by biological researches. Moreover, as long as biology remains inapt to define its *basic concept*, the strong appeal for reduction of biological facts through physico-chemical explanations by Mechanicists, will remain convincing. Consequently, the time-old quarrel between *Animists* (or *Vitalists* or *Organicists*\* or *Panpsychists*) and *Mechanicists* (or *Physicalists* or *Reductionists*) is bound to go on.

Those supporting the Mechanistic (or Physicalist or Reductionist) point of view assert that biotic phenomena are an amalgamation of inorganic matter, different only in apparition from the inanimate ones or that the living being is

nothing but a well running engine. They accordingly claim that *every* life process can be explained in terms of physical sciences.

Against those former *Physicalists* or *Mechanicists* and the present-day *Reductionists*, other thinkers hold that the origin and prevalent unfolding of life are due to or brought about by a vital principle, apart from a purely physico-chemical force. Thus they affirm that life processes can solely be explained contradistinctively to organic ones. It gets clear that while **Mechanicism** may be considered as another version of *Materialism*, its adversary, *Vitalism*, can be regarded as a scion of *idealism*.

Actually, those following the first trend can be recognised by their thesis that any strict natural science only works with the Causal explanation characteristic of the physico-chemical sciences. On the other hand the adherents of the second trend assert that although biology is a natural science, it is *irreducible* to physico-chemical principles. According to them biotic phenomena are the effect of a non-material principle, which is variously called vital force, entelechy, vital impetus, radial energy, or the like. Hence biology is, they maintain, obliged to use a distinct category of explanation, that is, Teleology.

Although the term *teleology* was coined by Christian Wolff in the Eighteenth century, we inherit the conception from Aristotle, who distinguished four causes, the foremost of which was the *purposive*:

<sup>11</sup> ... we see that there are more causes than one concerned in the formation (genesis) of natural things (*i**n* *physik*&1): there is the *cause* (*aitia*) or *the sake of which* (*heneka*) the thing is formed (*gignesthai*), and the *cause* to which *the beginning of the motion* (*hō archē tes kinēseōs*) is due. Therefore another point for us to decide is which of these two *causes* stands first and which comes second. Clearly the first is that which we call the *final cause* that for the sake of which the thing is formed - since that is the *logos* of the thing -, its rational ground, and the *logos* is always the beginning for products of *nature* as well as for those of art. The physician or the builder sets before himself something quite definite - the one, health, apprehensible by the mind, the other, a house, apprehensible by the senses; and once he has got this, each of them can tell you the causes and the rational grounds for everything he does, and why it must be done as he does it. Yet the *Final Cause* (*heneka: pur-*pose**) and the Good (*to kalon: the Beautiful*) is more fully present in the works of Nature than in the works of Arts. Moreover the factor of *Necessity* (*hē anagkē*) is not present in all the works of Nature in a similar sense. Almost all philosophers endeavour to carry back their explanations to Necessity; but they omit to distinguish the various meanings of Necessity. There is absolute (*haplous*) Necessity, which belongs to the eternal things; and there is *conditional* (*hypotheseōs*) Necessity, which has to do with everything that is formed by the processes of Nature, as well as with the products of Arts, such as houses and so forth. If a house, or any other End, is to be realised, it is necessary that such and such material shall be available; one thing must first be formed, and set in motion, and then another thing; and so on continually in the same manner up to the End, which is the Final Cause, for the sake of which every one of those things is formed and for which it exists. The things which are formed in Nature are in like case. However, the method of reasoning in *Natural Sciences* (*physik*<sup>^</sup>*s*) and also the mode of Necessity itself is not the same as in the *Theoretical Sciences* (*theōrētikōn epistēmōn*) ... They differ in the following way: in the *Theoretical Sciences*, we begin with what already is; but in *Natural Sciences* with what *IsGoingToBe*.<sup>11</sup>

Herewith a grave misconception usually attributed to Aristotle must be corrected: As the preceding passage excerpted from Aristotle's *Parts of Animals* clearly shows, Purposiveness in the study of nature does generally mean an over-all 'heavenly end or plan', in spite of his unshakeable belief in the *stability of the uni-verse* and the *orderly processes of its components*, worded in his passages about the 'teleological causality of the *unmoved mover*, he does pay attention to ends in the sense of determinate end-points, of particular processes in the natural world. Consequently, for Aristotle 'telos' is especially significant in explaining '*ontogeny*' and not '*phylogeny*'. To suppose otherwise is, as Marjorie Grene very rightly suggests, to introduce a Medieval theological confusion not due to Aristotle<sup>12</sup>

As a matter of fact, from the beginning of the Middle Ages until recent times, teleological explanations in biophilosophy used to be supplanted with theological considerations. Especially for explaining organic evolution, usually recourse was taken to a creator or planning agent external to the organisms themselves, as we can see in Teilhard de Chardin's works, to name one of the more recent thinkers following this trend. Such attempts to explain and define life processes in terms of teleology, imbued with theological thoughts, were not infrequently confronted with severe criticism. Even that kind of teleological conception which refrains from theological reflections is generally in disrepute in modern science. "*More frequently than not it is considered to be a mark of superstition, or at least a vestige of the non-empirical, a prioristic approach to natural phenomena characteristic of the pre-scientific era*" says Carl G. Hempel. "*Biology*", he carries on, "*has been said to require teleological concepts and hypotheses in order to be able to account for regeneration, reproduction, homeostasis, and various other phenomena typically found in living organisms; and the resulting explanations have been held to be fundamentally different from the kinds of explanation offered by physics and chemistry ... Now indeed, some kinds of teleological explanation which have been suggested for biological phenomena fit neither of the covering-law models. This is true, for example, of vitalistic and neo-vitalistic accounts couched in terms of vital forces, entelechies, or similar agents, which are assumed to safeguard or restore the normal functioning of a biological system as far as this is possible without violation of physical or chemical laws. The trouble with explanations of this type - in sharp*

contrast, for example, to explanations invoking gravitational or electromagnetic forces - is that they include no general statements under what conditions, and in what specific manner, an entelechy will go into action, and within what range of possible interference with a biological system it will succeed in safeguarding or restoring the system's normal way of functioning. Consequently, these explanations do not tell us - not even in terms of probabilistic laws - what to expect in any given case. and thus they give us no insight into biological phenomena, no understanding of them -even though they may have a certain intuitive appeal-; and precisely for this reason, they are worthless for scientific reason for their failure does not lie, of course, in the assumption that entelechies are invisible and indeed non-corporeal entities; for neither are gravitational or electromagnetic fields of classical theory visible or corporeal, and yet they provide the basis for important scientific explanations ...it is precisely the lack of corresponding laws or theoretical principles for entelechies which deprives the latter concept of all explanatory force "^^•\*

Beside such total renunciations of teleology with the contention that any biological statement must be formulated right from the start in physico-chemical terms, it has been maintained that propositions containing teleological concepts can be converted to ones constituted by causal concepts. Hence it has been tried to demonstrate that positions based on teleological concepts do not have any non-Causal substance. One of the most outstanding supporters of this position is Ernest Nagel, who claim that teleological - in the sense of functional - explanations are equivalent to non-teleological ones, so that the former can be replaced by the latter without loss in asserted content. To document this, Ernest Nagel presents the following example: " *The function of chlorophyll in plants is to enable plants to perform photosynthesis.* " This statement, according to Nagel, appears to assert nothing which is not said by " *plants perform photosynthesis only if they contain chlorophyll* ", or alternatively by " *a necessary condition for the occurrence of photosynthesis in plants is the presence of chlorophyll.* " These latter statements, however, do not explicitly ascribe a function to chlorophyll and in that sense are therefore not teleological formulations ... On this assumption, therefore, a teleological explanation states consequences for a given biological system ... the equivalent non-teleological explanation states some of the conditions - though not necessarily in physico-chemical terms - under which the system persists in its characteristic organization and activities. The difference between teleological and non-teleological explanations is thus comparable to the difference between saying that B is an effect of A, and saying that A is a cause or condition of B<sup>14</sup>

Nevertheless, no one can assert that the stage is only open to those who wage a fierce war against teleological explanations. In this connection we may lend an ear, among others, to Francisco J. Ayala, who maintains that " *generally, the experimental laws formulated in a certain branch of science will contain terms which are specific to that area of inquiry. If the laws of the secondary science contain some terms that do not occur in the primary science, logical derivation of its laws from the primary science will not be prima facie possible. No term can appear in the conclusion of a formal demonstration unless the term appears also in the premises. To make reduction possible it is then necessary to establish suitable connections between the terms of the secondary science and those used in the primary science. This may be called the condition of connectability.* " <sup>15</sup> // can be satisfied by redefinition of the term of the secondary science using terms of the primary science. For example, to effect the reduction of gene to physical science such concepts as gene, chromosome, and so forth, must be redefined in physico-chemical terms such as atom, molecule, electrical charge, hydrogen bond, deoxyribonucleic acid, length, and so on... Scientific laws and theories consist of propositions about the material world, and the question of reduction can only be settled by the concrete investigation of the logical consequences of such propositions, and not by discussion of the properties or the natures of things. " <sup>16</sup>

in case we once conceive wholeheartedly the fact that science, on its unswerving itinerary heading towards an ever increasing acquisition of cognitive wealth about the world, gets changed not only in its general outlook, but eventually in its very structure and constitution too, then, we must give up at last that habit of observing phenomena and processes from behind spectacles of classical mechanics, which was considered for such a long while as the ultimate step of scientific advancement. As a matter of fact, " *in the biological, behavioural and sociological fields, there exist predominant problems which were neglected in classical science or rather which did not enter its considerations. If we look at a living organism, we observe an amazing order, organization, maintenance in continuous change, regulation and apparent teleology. Similarly, in human behaviour goal-seeking and purposive directiveness cannot be overlooked, even if we accept a strictly behaviouristic standpoint. However, concepts like organization, directiveness, teleology, and so on, just do not appear in the classic system of science. As a matter of fact, in the so-called mechanist world view based upon classical physics, they were considered as illusory or metaphysical ... The appearance of models - conceptual and in some cases even material - representing such aspects of multivariable interaction, organization, self-maintenance, directiveness, and so on, implies introduction of new categories in scientific thought and research.* " <sup>17</sup>

No doubt, a teleological explanation, as it has already been revealed thanks to Ernest Nagel, can be reformulated in

a non-teleological one; yet, the above arguments unmistakably indicate that teleological explanation connotes something more than the equivalent non-teleological one: the former includes all the basic assumptions of the latter, but says more than that.

This state of affairs reveals another point very crucial for comprehending theoretical investigations on living nature: Although we do not venture to erect a barrier between inorganic and organic matter which would obviously be inappropriate in view of intermediates such as viruses, nucleoproteins and self-duplicating units, we do not thereby maintain that the difference between the organic and the inorganic is simply a matter of mathematically measurable degree. Consequently, to deny that biology is partially explained by physics would be out of place in view of the tremendous advances of physico-chemical explanations of life processes; but it would appear equally nonsensical to assert that biology does not need any explanatory form surpassing those used by physico-chemical sciences.

For distinguishing *scientific teleology* - which has been shown as indispensable for biology - from the *speculative* one, Jacques Monod preferred to employ a newly coined term, *Teleonomy*. This, he defined as follows: "*The concept of teleonomy implies the idea of an oriented, coherent and constructive activity. By means of these criteria, we can maintain that proteins must be considered as the essential molecular agents for the teleonomical performances of living beings ... The organism is an engine which builds up itself. Its macroscopic structure is not imposed upon it by the intervention of exterior forces. Thanks to its inner constructive interactions, it makes up itself autonomously ... Even though our understanding concerning the Mechanism of development might be more lacking, we can nevertheless affirm henceforth that the constructive interactions are microscopic, molecular and furthermore the molecules are essentially, if not uniquely, proteins ... Consequently proteins build up, assure the coherence and canalize the chemical machinery. All these teleonomic performances of proteins rest, in the final analysis, upon properties called as 'stereospecific'; in other words, proteins possess capacities of 'recognising' other molecules - among which are proteins too - according to their shape, which in turn is determined by the structure of those to be recognised*".<sup>18</sup>

Hence we can gather together all that has been indicated in respect to biological explanatory forms in the following manner:

1. On the basic levels of biology, like biochemistry, biophysics ... a *causal* explanatory form is commonly used.
2. But when already cells and then especially organisms and their various parts are taken into consideration as open systems,<sup>19</sup> as in embryology, genetics, paleontology, evolution, physiology of particular organs or organelles, ethology and sociobiology, we come across '*functional-purposive*' explanations - in the sense depicted hitherto.
3. Another form, found either implicitly or explicitly in almost all biological - especially evolutionary and paleontological - statements, is the *chronological* explanation. In fact every teleological statement bears certain chronological elements. *Teleology* is a way relates, according to Nicholas Rescher "*solely to the role played by the time factor in explanation, as evidenced in the temporal scope of the data requisite for explanatory purposes*"<sup>20</sup>
4. Besides causal, teleonomic ('functional-purposive') and chronological explanatory forms there is a fourth one called *structural* (or, *morphological*), encountered in anatomy, morphology, and comparative physiology.
5. One of the most common explanatory forms in biosciences is the *statistical* one.
6. Among biosciences particularly taxonomy, systematics, comparative physiology and morphology take frequently recourse to *comparative* explanations - see Table 2 in the Appendix, p. 72.

This amazing wealth of explanatory categories in biology springs from its place at an intersection of natural and non-natural sciences. While for instance its bio-chemical and biophysical regions border on physico-chemical sciences, paleontology and biogeography possess a common frontier with earth sciences and geography in general. Evolution is closely connected with historical sciences. Systematics and taxonomy extensively use categories and concepts of the science of logic.<sup>21</sup> Ecology has got some ties with economics, climatology, oceanography and with all other biosciences; sociobiology, as its name indicates, is intermingled with sociology; whereas ethology can hardly be separated from psychology - see Table 3 in the Appendix, p. 73.

The tremendous variety which we encounter in the research field of experimental biology, we also encounter in the theoretical biology. Therefore, most of the methodological aspects of adjacent biosciences and those of domains beyond the realm of biology must be considered in theoretical biology. Consequently, statements appearing in theoretical biology are usually neither totally causal nor purely teleonomic in form. They contain both of the explanatory ingredients. To pass, accordingly, from one of these explanatory forms to another with an almost automatic ease is not the unusual practice in biological arguments. Here we see that premises of an explanatory argument can, either totally or partially, be explained by another argument, which in turn might also be explained by a subsequent one; and the new one may give a fresh impulse for further explanations. Hence a 'chain'<sup>1</sup> of arguments comes into being, which is called *genetical*<sup>22</sup> explanation.

Under appropriate epistemological conditions from such 'ultrasynthetic' arguments as 'genetical' explanations are, it is possible to arrive at 'ultra-synthetic' theories -like the modern theory of evolution. No doubt that the evolutionary and synthetic - better said, 'systematic' - trends, proper to contemporaneous biology, owe a lot to Charles Darwin's integrating influence upon all kinds of biosciences.<sup>23</sup>

Today having won a much deeper insight into biology's own subject matter than Darwin could ever dream of, we perceive more clearly that all biological events, like all inorganic processes, are based ultimately on a relatively small number of irreducible components, the alterations of which are determined by a limited sum of basic laws.<sup>24</sup> Bernhard Rensch denominates these complicated biological laws, embracing a vast variety of such causally determined 'basic laws', as well as of probability and logic as *polynomistic*<sup>25</sup>

Like explanations and laws - other than biochemical and biophysical all biological definitions are also built from extremely heterogeneous elements. The fact that biology proceeds with explanations whose constituting parts are not, so to speak, tightly packed together and that definitions become devoid of evidence, deprive most of the biological laws and the theories of their power for liable prediction. In this case we can speak in biology only about potential predictions.

Besides this heterogeneity of the constituting elements of biological explanations, caused by the fact that biology mainly treats *open systems* that are exposed to an extraordinary amount of external influences, there is another factor playing a decisive role in weakening the predictive value of biological statements: the ambiguity of terms used in them. This is the reason, why it is so urgent to develop a *formalised language*.

## B - Biomathematics

Theoretical biology in the second sense should be related to descriptive and experimental biology in just the same way theoretical physics is related to experimental physics. *"That is the task of a theory of the various single branches of the vital phenomena, of development, metabolism, behaviour, reproduction, inheritance ... and in the last resort, of a 'theory of life', in just the same sense in which there is a 'theory of heat', a 'theory of light', and so forth."*<sup>26</sup>

Theoretical biology in its second sense is precisely as much a branch of natural science as theoretical physics: it deals exclusively with the exact theoretical systematization of facts; in other words, it is a systematised evaluation of facts expressed through a formalised language. So it has no room for speculations. This point, as Ludwig von Bertalanffy puts forth so clearly, requires emphasis, because voices are often raised to reject theoretical biology as 'merely speculative' and 'superfluous'.<sup>27</sup>

This misunderstanding of theoretical biology is the result of a current confusion of the various domains pertaining to the philosophy of biology. The biomathematical field of theoretical biology is certainly the least related to the other, let us say, more speculative domains. Nevertheless, if we are to overcome the state of crisis in biology, which has been reiterated hitherto several times, we require theoretical biology in both the 'first' and in the 'second' senses as well as all the other domains belonging to the philosophy of biology.

In fact the most important point is that the groundwork for a 'theory of life' has been prepared as a result of researches undertaken on the molecular level since the 1950s. The modern theory of evolution, which has been bolstered by experimental data of these molecular investigations, assumes, more often than not explicitly, that there is a fundamental uniformity among living beings, that the basic machinery is the same in all. The best illustration of this assumption is the fact that the genetic code itself, that is to say the chemical mechanism of inheritance, works according to the same basic principles and the same code in every known living being from bacteria to man.<sup>28</sup>

What remains to be achieved, according to some theoretical biologists, is the re-formulation of the above-mentioned data within the frame of an integrated set of deductively related ('deductive-nomological') with the logical of  $(x)(Ax \supset Bx)$ . Even in such a situation however, we could not regard 'the law' or 'theory of life'<sup>1</sup> as possessing such an all-embracing validity as, for instance, Newton's law of gravitation. But this, of course, is an ontological rather than epistemological question.<sup>29</sup>

Besides such high-flying laws or theories like the 'law' or 'theory of life'<sup>1</sup>, biology as natural science possesses of course a lot of simpler laws and theories which await their share of a formalised language. Surely it will be much easier to formalize them than the 'theory of life'. The latter is subject to an immense aggregate of boundary

conditions, which render it extremely difficult, if not completely im-possible to arrive finally at a more or less reliable theory.

it has been endeavoured to construct some minor biological laws and theories in a formalised language. To a great extent this formalised language is mathematical. There are also some attempts to formalize biological statements with logical notations other than the pure mathematical ones. We can include within the logico-mathematical notation system cybernetics too.

One of the most outstanding pioneers of biomathematics is Nicholas Rashevsky, whose "Mathematical Biophysics" emerged eventually as one of the classical reference works written on this subject. In the preface to his book Rashevsky reasons on the meaning and necessity of biomathematics. Thus: "... as no theoretical science can be developed without an experimental foundation, so can no experimental science be really meaningful without some theoretical insight. This requires a certain autonomy of the mathematical natural science, which must develop in agreement with the results of experimental research, but should not be made mere handmaidens of the experimentalist. A theoretical problem may have an interest of its own and should not be tabooed only because at present it does not appear applicable to a definite experiment. The history of physics shows how frequently such 'purely theoretical' developments led, few decades later, to the most astonishing results."<sup>30</sup>

Like many other contemporary theoreticians, Rashevsky maintains that as a *natural positive science* biology should also depart from those basic principles, which have proven themselves useful in promoting physics to the rank of a model for all other sciences. One of the most basic principles is, no doubt, the fundamental belief in the *uniformity of nature*, without which no science can exist.<sup>31</sup> The other is the formal language, namely mathematics. It is obvious, however, that although every biological phenomenon can be explained in terms of a physical model, it *does not follow that the existence of biological phenomena can straightaway be deduced from the sets of postulates on which physics is based*

Rashevsky asks whether it is not more appropriate to represent an *organism* in a rather abstract form, namely by a class of relations. Then we could study, according to him, mappings of such classes of relations. However, there is a point we have to add to the foregoing proposition: transformations need something more than mere geometric rules so that we can express the time component besides the spatial one; that is, *qualitative* values in addition to *quantitative* ones; because the concept of biological time reveals something more than a causal-quantitative sense.<sup>33</sup>

If the time factor is left out of consideration, the transformations from primordial simpler organisms into more complicated multicellular organisms will remain incomprehensible to us. While horizontal transformation stipulates the space component, the lateral one asks for the component of time. Consequently, each of them will require a mathematical, or at least another logical expression proper to its own subject matter.

The subsequent example may serve to shed light on both notions of horizontal and lateral transition:

"During a very long geological period - so about 1000 to 500 million years ago - organisms were living in the sea, while on land life was still nonexistent. The CO<sub>2</sub> content of the atmosphere altered between 0.01 and 0.1 present atmospheric level (P.A.L.). The atmosphere was composed in such a way that ultraviolet light could reach the Earth and inflict mortal injuries to the organisms. After this period the CO<sub>2</sub> content, an ozone layer was formed, which absorbed ultraviolet light, and so a varied life found the chance to emerge and evolve on Earth. The above-stated data are sufficient to explain adequately that 500 million years ago no life could come about on land."<sup>34</sup>

The foregoing argument also presents an appropriate illustration of genetic explanation, because the causal, functional purposive (namely, teleonomic), chronological and statistical statements are derived from one another. The facts contained in it can be formulated in the following manner:

1.  $(x) (d) [ (\exists i) (G2iI) (x, d) \supset ?? (\exists y) (Qy(x,t)) ]$
2.  $G2iI(a,b)$
3.  $?? (\exists y) [Qy(a,b)]$

d: duration: (t<sub>2</sub>-t<sub>1</sub>)

x: place.

i: intensity,

I: a constant value,  $G2iI = i > I$ .

Qy: y is an organism.

1. in any place 'x' and any duration 'd', if there is an intensity T such that  $i > I$ , then at place 'x' and during duration 'd', there is no living organism 'y'.
2. At place 'a' and during 'b',  $I_0 > F$ .
3. Therefore at place 'a' and during 'b', there is no living organism 'y'.

Obviously enough, formalization of biological statements, beside bearing immeasurable advantages, as already mentioned on various occasions, carries with it some dangers too. The most perceptible one is, as David L. Hull suggests, the failure of communication between theoretical biologists - especially biomatematicians - and experimental biologists, caused by the formal reconstruction of biological statements in the logico-mathematical notation.<sup>35</sup>

This method of doing philosophy of biology according to Hull, has two drawbacks. The obvious one is that few experimental biologists are familiar with the notation. But is this not the fault of experimental biologists? Is it not up to them to learn set theory or symbolic logic, so that they can reap the benefits of this large body of literature? The straightforward answer Hull gives to this question is "no". Formalists such as Joseph Henry Woodger and Gregg have made some biologically significant points in their work, but few that could not have been made just as clearly without extensive use of these notations. Perhaps the discovery of certain logical distinctions was aided by the use of these techniques, but the results need not have been communicated in these same terms. Too often the application of logico-mathematics to problems in biology gives the impression that more or less commonplace ideas have been expressed in tiresome exactitude when they could have been conveyed more easily and more directly in a few plain sentences of an ordinary vernacular tongue.<sup>36</sup>

The second drawback of the formalist method is that more often than not the method becomes the message; in other words, formalist analyses are made for the sake of formalistic analyses.<sup>37</sup> The principle aim, however, should be to attain a sound *synthesis* as the conclusion of a well-founded network of analyses.

### III- History of Biology in general

#### A - The History of Biosciences

It is often overlooked how much a historical survey can contribute to the understanding of the present level of a specific problem and to the furthering of its development. Technically minded scientists in particular do not pay attention to such surveys or accounts, politely dismissing the idea by saying they do not have enough spare time for useless 'hobbies'. It is fact open to discussion whether an experimental scientist or even a technician needs any insight into the historical background of his specific discipline for getting a better comprehension of his subject matter. Contrariwise, besides his main occupation, the necessity of disclosing, at least briefly, the historical contours of his discipline presents itself to every theoretician as a matter beyond discussion. In this way the theoretician's comprehension concerning his research field is intensified. No progress can ever be achieved unless the previously attained progress is sufficiently appreciated. Historical apperception supplies us with a broadening view over our field and prevents us from becoming agents. Specialization in itself, that is, the state of being deprived of the consciousness of the particular historical process which has necessitated that specialization, inevitably succumbs to one-sidedness. Of course there is no question that the enormous wealth of experimental data, the sophisticated techniques and complicated concepts of modern science require specialization. Nevertheless, a theoretician is expected, after all, to detect the thread binding certain previous conclusions to their premises, since some of these conclusions will serve him in turn as his own set of premises. The condition for finding out this very thread is a historical appraisal of the discipline in which the theoretician carries out his research work.

Every theoretical (philosophical) approach is expected to avoid one-sidedness by adopting both the historical and the logical points of view. Now, as far as the cognitive sphere of biology is concerned, *history*, together with *experimental science*, 'nourishes' the theoretical domain with the necessary 'materials' - information about past and

present achievements - originating from different research fields in connection with biotic phenomena. Indeed to work up these necessary 'materials' - information, ideas ... - supplied by history into a rational, coherent system we require the substantial help of formal logic or dialectics.<sup>38</sup>

Moreover, *"the logical approach, as we find it in innumerable philosophical writings, is, in broad outline and oversimplification, something like this: we are confronted by observation with facts, pointer readings, protocol sentences ... From these we derive generalizations, which, when properly formulated, are called laws of nature. These are fitted into conceptual schemes called theories, which on hypothetico-deductive view, allow for the explanation, prediction and control of nature. The logical operations involved could be carried through even better and neater with sufficiently capable computers ... The history of science, however, shows that the actual development of science is nothing of this sort. Psychology has shown that cognition is an active process, not a passive mirror-ing of reality. For this reason, there are no facts as ultimate data; what we call facts has meaning only within a pre-existing conceptual system. The famous pointer readings which positivist philosophers were so fond to speak of as being the basis of scientific knowledge simply make no sense without a conceptual scheme ...in consequences, history of science does not appear as an approximation to truth, a progressively improved mirroring of an ultimate reality. Rather, it is a sequence of conceptual constructs which map, with more or less success, certain aspects of an unknown reality. For example, one of the first models was that of myth and magic, seeing nature animated by gods and demons who may be directed by appropriate practices. Another one was Aristotle's seeing the universe guided by purposeful agents or entelechies. Then there was the Newtonian universe of solid atoms and blind natural forces ... Nowadays we seem to be dedicated to still another model, epitomised by the term 'system'... Neither were the previous models and world views simply superstitious non-sense, nor were they completely eradicated by subsequent ones. The mythical world view served mankind admirably well through many millennia, and produced unique achievements, such as the array of domesticated plants and animals which modern science did not essentially increase. And there is still far too much demonology around, in science and particularly in the pseudo-science of politics. Aristotle's physics was a bad model, as was shown by Galileo; but problems posed by him, such as that of teleology, are still alive in the theory of evolution - see Teilhard de Chardin - and in the considerations of cybernetics. That our thinking is still much too Newtonian is the common complaint of physicists, biologists and psychologists."*<sup>39</sup>

For getting a better comprehension of biosciences, rapidly advancing since the 1750s, we have to possess an incisive insight into the historical development of their recent as well as remoter sources, or even, resources.

## **B - History of Biophilosophy**

Unlike *theoretical biology*, philosophy about the living being, hence *biophilosophy*,<sup>4</sup>® does not solely treat the *conceptual* framework of biosciences as such to an certain extent, but has something to say quite apart from what science generally asserts.

Today, even those philosophical trends which are not directly linked to the biotic sphere are amply pervaded by biological considerations. This means also a deviation from orthodox Materialism, mainly nourished by classical Mechanicism. The mid-Nineteenth-century Romantic movement, which chiefly grew as a reaction against the Materialistic-Mechanicistic conception of the world could partly account for the thriving interest philosophers showed toward the living being and its realm. However, the principal cause of the aforesaid change sprang from the steadily increasing store of tough problems mankind has been facing and was un-able to solve by using conventional tools only.

Physics, particularly its Galilean-Newtonian version, may easily be regarded as the embodiment of an 'optimistic-progressive' world conception, basically hostile to nature, which it considers more or less as an object good to be exploited. It can be said that the adherents of such a world conception would aspire to the erection of almost an artificial environment. The more we approach the end of the present century - and with it the final stages of the First Millennium AD - the more we get alienated from our natural surrounding. This situation has not failed to bring about results of its own sort, calamitous for the human kind. To get out of this entanglement we need something in addition to the mentality shaped by the physico-chemical sciences, which may be counted among the chief responsables of the present state of affairs. The key to undo this deadlock is a new manner of evaluating facts and problems. Accordingly the inquiring mind is not any more expected to look upon the *'decur'* matter as its sole object of study. *Life* stands now in the middle of all experimental and theoretical investigations as well as speculative debates.

## i. History of Metabiology

While Rene Descartes considered the living being as a '*perfect engine*'^ Henri Bergson, who took life processes as the basis of his doctrine, proclaimed that even the '*thing*' was a living being, 'solidified' by our 'physicalist' mode of thinking, which obstructs the flow of events and takes out any one of them at random from its 'natural' circumstances.<sup>42</sup>

in its essentials Bergson's mode of thinking reminds us of the Aristotelian reflections, which are later to be found in both Müslim - like Avicenna, one of the most outstanding among them - and Christian philosophers.

According to Avicenna (Abu Ali Ibn Sina) even the seemingly inanimate 'spherical' («kurewî») 'bodies' («edjsâm») make their way to each other because of a certain 'love' («a'shq») existing between them - finalisin. But ultimately they get a 'beloved' («mua'shuq») in common, namely the 'Necessary Existent' («Wadhib al-Wujud») towards Whom they all strive - theological finalism.<sup>43</sup>

in spite of the similarities between Vitalistic ideas in contemporaneous and ancient philosophies, still a deep gap separates them. Contemporaneous biophilosophies, just like modern biosciences, are inconceivable without the influences from Jean Baptiste de Lamarck's and Charles Darwin's epoch-making hypothesis about Evolution.

As in almost all domains of modern philosophy, it was again Immanuel Kant who paved the way towards the philosophy of biology which is at work of our time. in the last of his three Critiques, namely *The Critique of Judgment*, Kant discusses, for the first time in the history of ideas, consciously and seriously the philosophical foundations of biology. in his First Critique he even does something more as he attempts to explore *the biological basis of the human intellectual powers*. \*\*

Kant, throughout his painstaking investigation, is uniquely aware of the crucial difficulty biology faced and which it still faces today, when it wants to express its research data: the dichotomy between *causality* and *finality*. However, far from being that sort of thinker who at first uncovers and exposes the question, retiring afterwards to his den, Kant had something of his own to propose. Moreover, his proposition is the consequence of a meticulously worked-out argumentation. Therefore, it still keeps its validity in present philosophical discussions on life in general and biology in particular. For elucidating organic processes, we need, according to Kant, two models of explanation: Mechanistic and Teleological.<sup>45</sup> in case one of them is missing we shall not be able to grasp the phenomena of life, since it is the *Mechanistic cause* which expounds *how* a living being is a natural product and it is the *teleological principle* which sets forth *why* it exists.<sup>46</sup> Kant warns that if these two principles are applied in wrong instances, then the results we acquire may be misleading. If for example we ask why a living being is a natural product, we can easily be dragged to the point of answering this question in terms of either *Occasionalism* or the *pre-establishment of the cause*. On the other hand if we merely ask how it exists, we may tend to reason in a brute *Mechanistic* manner.<sup>47</sup>

Kant, above all, revolutionised philosophical inquiry in particular, and our representation about the world in general. The majority of the most influential thinkers and researchers before him took it for granted that the perceived phenomena corresponded adequately to the *reality* of them. Kant removed the second pole of this bilateral relationship. "*Laws*" he says, "*limit our freedom in relation to conditions ... How objects are themselves*", that is, how their real entity looks like, "*how things, standing beneath a principle are constituted and how they should be determined according to pure concepts, is, at least, a claim which does not make any sense.*"<sup>>48</sup> Accordingly it is understood that our representation concerning nature does not adequately mirror the natural order. We interpret every single happening, process and fact in accordance with our *intellectual faculties*, namely understanding and reason. Therefore, it is Kant's conviction that we must turn our attention from the things, which can become objects to our cognitive faculties, toward the faculties themselves. This shift of interest paved the way towards contemporaneous gnoseology as well as epistemology. it might therefore, be regarded as a turning point in the evolution of philosophy as a whole.

As shown before, epistemology of biology is part of theoretical biology and thus some part of natural science. To 'philosophise', however, means for certain philosophical circles an investigation into man's cognitive possibilities, and into the conceptual structure of individual sciences and their various disciplines, to uncover those common logical elements underlying them. Furthermore, 'to philosophise' has come to denote the study of ethical problems arising from scientific research.

in this context, different manners of philosophical inquiry add to mankind's common intellectual treasure. But is there still a place for philosophies allegedly concerned with factual investigations, when natural sciences are already busy with the factual world, surely with much more competence than philosophy could ever dream of?

Thus two pitfalls should be avoided by all means: extreme specialization resulting in insulation; and immoderate generalization overrunning the limits of competence with regard to facts. We often witness oversimplified specialization in bio-sciences and particularly in biotechnologies. On the other hand, the wholesale transgression of competence and of facts forms a subject matter by itself, called *parabiology*.

## ii. History of Parabiology

Why do we then call this transgression, 'parabiology', instead of including it under the subheading of 'metabiology'? What criterion do we possess to distinguish the former term from the latter?

Indeed, at first glance, both terms indicate the same sense: 'The overstepping of facts pertaining to the biosphere.'<sup>1</sup> However, as described in the foregoing section, 'metabiology' oversteps the factual world guided by reason, without losing a firm sight of facts,<sup>49</sup> whereas speculative tendencies gathered together under the subheading 'parabiology', surpass above all the assignments of reason and do not care to keep up even the necessary minimum of contacts with reality.<sup>50</sup> This designation is not intended to convey a derogatory sense, but only to indicate that these tendencies stand 'alongside' other domains of philosophy as well as the science of biology. "*For the progress of biological science, however, they seem to be useless, or even harmful in so far as they mislead non-biologists about the real character of scientific biology and divert the expert from a correct formulation of his problem.*"<sup>51</sup>

Since contemporaneous thought is so much affected by biological considerations, and since it gets nowadays thanks to massmedia easily within the reach of everybody interested in material as well as intellectual problems of his time, biology becomes more and more fashionable. As an outcome of this fashion we have *ideologies* and *world views* peculiar to our century. Almost all of them try to live on fragmentary ideas taken over mainly from biology. If at least these ideologies and world conceptions stayed silently 'alongside' scientific investigations, as Felix Mainx wishes to see them, no one could raise any serious objection against them. They could in such a case be a harmless ingredient of the treasury known as culture. However, it is just contrary to their essence to remain modest.

*Every* philosophy of life (Lebensanschauung), just as Felix Mainx points out appropriately,<sup>52</sup> rests on a conviction, on a decision to trust, which can only be reached from an *inner human experience*. But on the basis of empirical science a philosophy of life can hardly ever be built. Biology as an empirical science therefore cannot answer those 'great questions of life', which move men from within. Yet, this does not mean that a person occupying himself with biology or any other empirical science is not at all supposed to believe in or adhere to a certain philosophy of life. A happy synthesis of both of these seemingly contrary domains is always possible as long as they are not confused. No doubt such confusions are the breeders of ideologies; and wherever these loom large - just as it has happened throughout the modern European spiritual history - we can be sure to find the symptoms of weakness of faith and uncertainty. *Ideological systems clearly bear the stamp of religious substitutes.* They seek to fill the substance of faith, hollowed out by the Enlightenment, Humanism, Secularism and Liberalism with pseudoscientific content.

## IV - Bioethics

The purpose of this treatise is not only to *analyse* what the term 'philosophy of biology' may denote, since our problems-loaded age expects the fulfillment of a special duty from the philosophy of biology.

As alluded to before, man rediscovered his origin in the biotic sphere. In order to prevent a tendency towards extremes, namely towards a new '-ism', as it has been the case so often throughout history, solutions have to be sought in the first place in man's biotic realm. However, unique as he is, man transcends life in its organic aspect, thanks to reason, which must fundamentally be biotic too.<sup>53</sup> Herewith, it becomes clear enough that for attaining a sound notion about man, both aspects should be taken into consideration. In case the stress falls solely on life in the sense of a pure organic process, *savagery* will be the result; and if reason, together with its derivative, culture, is merely accentuated, then the outcome will be an inclination towards *degeneracy*?\* So what we urgently need is a happy *combination* of both components. This new and ingenious synthesis has been epitomised into a single term by one of the most prominent thinkers of the Twentieth century, Jose Ortega y Gasset: '*Living Reason*' ("razon vital").

Thanks to this assignment of reason to its right place - within the frame of life - those timeworn opponents, Mechanicism and Vitalism - in other words Realism and Subjective Idealism - have been obliterated from the agenda of the philosophy of biology. Consequently there should be no sense to debate anymore 'which of them is valid: realism or subjective idealism'. Ortega y Gasset warns us to re-frain from giving priority to *things*, as Realism does, or to *me* over them, as Subjective Idealism does. Reality is an indivisible whole of me and things around me.<sup>55</sup>

Herewith the principal function of the philosophy of biology appears clearly before us: to expose the causes of certain human actions within individual as well as social frames, after having studied the entire living nature thoroughly; and then to evaluate these actions inside an integrated structure. To achieve this end, general biology and particularly the philosophy of biology pursues a path, which may be called evolutionary and integrative. "*The new lawfulness arising out of new structures*", as a matter of fact, "*never abolishes the laws of nature prevailing within the living system previous to the new event of integration. Even the systemic properties of the newly united subsystems need not be entirely lost. This is true of every step taken by evolution, even of its greatest and initial step from the inorganic to the organic ... The processes of life are still physical and chemical processes, though, by virtue of the complicated structure of chain molecules, they are something very particular besides. It would be plain non-sense to assert that they are 'nothing else but' chemical and physical processes*".<sup>56</sup>

Philosophy of biology, as now becomes evident, strives to integrate various basic biological facts and processes inside a coherent system considering at the same time all domains of human achievements: religion, science and arts. Moreover, the main aim of this system is to attain a position where an adequate explanation of human activities can be presented. Here, no doubt, we enter the realm of *ethics*, seen from the biological standpoint.

Conrad Hal Waddington argues that the particular character of ethical values is indeed defined by their developmental involvement with the proceedings by which the *human individual becomes a functioning part of a new type of evolutionary process, based on the cultural or socio-genetic transmission of information from one generation to the next*. This, in fact, is the major line of demarcation, separating man from animals. "*The developing human individual becomes an 'Ethical Animal' by the operation of the same processes as those by which he becomes a member of a species with a socio-genetically transmitted system of evolution*".<sup>58</sup>

In addition to this philosophical kernel, topics like *Medical Deontology*, *Sociology* (or biosociology), *Ecology*, *Ethology* form either wholly or partly the constituent elements of *Bioethics*. Beside their necessary interdependence, each of them leans for its own part on other sections of biology; like the dependence of medical deontology mainly on biochemistry and genetics.

The vital importance of almost all the themes treated within the frame of bioethics go much beyond the limits of this field, and even as a whole, of biology. They concern the entire sphere of human activities. Let us not forget above all that one of the most deep going revolutions in history has been brought about by a biological hypothesis, namely Charles Darwin's assumption concerning evolution. With it the Physicalist world conception arrived at its zenith; and consequently man abdicated his throne, which, till then, stood in the centre of a created and purposively evolving universe.

The natural outcome of this chaotic moral state, into which man has been thrown, is very strikingly summed up by Jacques Monod: "*Thus the appearance of life itself, within the biosphere, the emergence of Man, can only be*

conceived as the result of a huge Monte-Carlo game, where our number eventually did come out, when it might as well not have appeared and, in any case, the unfathomable cosmos around us could not have cared less. ""^

Let us leave aside for a moment whether this relentless surmise can ever gain pure scientific validity through experimental work. Its impact, at any rate, upon the sphere of human values is already sufficiently devastating that it should be reconsidered if it could by any chance be accepted as it is. Here of course the dilemma arises whether human life and those values upholding its dignity should, when necessary, be submitted to science and technology or any other considerations but life itself; or, should science simply serve life and its aureola of values.

It was certainly not in vain that Plato chose the latter of the above alternatives. He, no doubt, foresaw clearly enough all the destructive consequences of the former assumption. Mainly this highly *ethical* consideration might have moved him to meditate upon the realm of ideas, which appear today to us, 'men of the pure scientific era', quite ambiguous or even unintelligible, nay nonsensical.

Again, it was not by accident that Plato built up his complicated doctrine of ideas: to find, and then to establish such a firm and unquestionable basic criterion, so that man will never again see himself in a turmoil, caused by futile hesitations about what is true and what is false. Everything could and even should be made a matter of question, except this very Criterion, the supreme measure of all other minor criteria, which are more or less liable to alteration. In this context therefore it has to be understood why Plato rejected resolutely Protagoras' assertion: "*Man is the measure of everything.*"^

Now, since this 'Supreme Criterion' is declared to be 'dead', and consequently everything is left over to wild haphazard contingency, all the age-old essential values, like the Hippocratic Oath (Orkos),<sup>61</sup> which as a lifesaving agent comes long before the physician himself and the drugs prescribed by him, lose totally their significance.

If we accept values - as we should - as the lasting products of the human being as a whole, for 'regulating' his 'field of activity', then in the light of the foregoing argumentation we can conclude that contemporary man has fallen into a 'valueless sphere'. Here with the human being stands now in a total contradiction to the living nature, where every organism finds itself surrounded by certain, at least physico-chemical 'boundary conditions'.

As Biology becomes more and more an autonomous field of research, there arises a glimpse of hope that we will get closer towards some reasonable solutions to this crisis.

TABLÖLAR sayfa 71-72-73

## Endnotes

1. See: Immanuel Kant: *Critique of Pure Reason* (B663).
2. Nermi Uygur, "Das Problem der 'Ergründung\*' in der Philosophie" in *Zeitschrift für philosophische Forschung*, p.286.
3. See: Immanuel Kant: *Critique of Pure Reason* (B352).
4. Ludwig von Bertalanffy, *An Introduction to Theoretical Biology*, p.5.
5. Metin Bara and Arthur W. Galston, "Experimental Modification of Pigment Content and Phototropic Sensitivity in Excised Avena Coleoptiles" in *Physiologia Plantarum*, p. 109.
6. Cf: Francisco J. Ayala, "The Autonomy of Biology as a Natural Science"<sup>11</sup> in *Biology, History and Natural Philosophy*, p. 1.
7. See: W.J. van der Steen, *Inleiding tot de Vijfsbegeerte van Biologie*, p.84.
8. Carl G. Hempel, "Explanation and Prediction by Covering Law" in *Philosophy of Sciences*, vol. I, pp. 108 and 109.
9. Carl G. Hempel, Loc. cit., p. 110.
10. Ernest Baldwin, *The Nature of Biochemistry*, p.96. The italics have been inserted by me.
11. Aristotle, *Parts of Animals* (639b/15-25) - throughout the passage, excerpted from Aristotle's work, I have used capital letters and italics wherever I thought it was necessary to emphasize.
12. See: Marjorie Grene, *Aristotle and Modern Biology*, p.77.
13. Carl G. Hempel, Loc. cit., pp. 113 and 114.
14. Ernest Nagel, "Teleological Explanations and Teleological Systems" in *Readings in the*

*Philosophy of Science*, pp.107 and 108.

15. Cf: Ernest Nagel's term, "Condition of derivability".

16. Francisco J. Ayala, *The Autonomy of Biology as a Natural Science*, pp.3 and 4.

17. Ludwig von Bertalanffy, *General System Theory*, p.98.

18. Jacques Monod, *Le Hasara el la Necessitt*, pp.59 and 60. The term Teleonomy was coined in opposition to *teleology* analogously with the contrary pair of astronomy - astrology.

19. Every living being, according to Ludwig von Bertalanffy, is essentially an *open system*. "it maintains itself in a continuous inflow and outflow, a building up and breaking down of components, never being, so long as it is alive, in a state of chemical and thermodynamic equilibrium but maintained in a so-called steady state which is distinct from the latter. This is the very essence of that fundamental phenomenon of life w/uc/1 is called metabolism, the chemical processes within living cells" - Ludwig von Bertalanffy, *General System Theory*, p.38.

20. Nicholas Rescher, *Scientific Explanation*, p.67.

21. According to the local category on which a systematic or taxonomic theory depends, five main classificatory trends can be distinguished:

(1) Essentialism: from Aristotle up to Carl von Linnæus;

(2) Nominalism: Middle Ages;

(3) Empiricism: mainly from the Fifteenth century onwards;

(4) Cladism: modern;

(5) Evolutionary classification: modern; - Cf: Ernst Mayr, *Principles of Systematic Zoology*, p.65.

22. Genetical explanation has nothing to do in particular with genetics. Refer for further details, W.J. van der Steen, *Inleiding tot de Wijsbegeerte van Biologie*, p.94.

23. See: J.Lever, *Geïntegreerde Biologie*, p. 162.

24. See: Bernhard Rensch: "Polynomial Determination of Biological Processes" in *Studies in the Philosophy of Biology*, p.251.

25. See: Bernhard Rensch, *Loc. cit.*, p.245.

26. Ludwig von Bertalanffy, *An Introduction to Theoretical Biology*, p.5.

27. See: Ludwig von Bertalanffy, *Ibidem*.

28. Cf: Jacques Monod, *Loc. cit.*, p.7.

29. We presume that mass is found all-over the universe. Thus our law of gravitation works everywhere; whereas it does not seem so likely that another planet exists where there is life. Consequently, a 'formal law concerning life'<sup>1</sup> has, at least for the time being, to content itself with a worldwide validity instead of a universal one.

30. Nicholas Rashevsky, *Mathematical Biophysics*, vol. I, p. 10.

31. See: Nicholas Rashevsky, *ö. cit.*, vol. II, p.326.

32. See: Nicholas Rashevsky, "A Unified Approach to Physics, Biology and Sociology", in *Foundations of Mathematical Biology*, vol. III, p. 178.

33. Cf: p. 13 of the present treatise.

34. W.J. van der Steen, *ö. cit.*, p.87.

35. See: David L. Hull, "What Philosophy of Biology is not?" in *Synthese* p. 173.

36. See: David L. Hull, *Ibidem*.

37. See: David L. Hull, *Ibidem*.

38. Cf: H.J. Vleeschauer, *Di Alcune Anomalie Nella Storia della Filosofia Greca*, p.29.

39. Ludwig von Bertalanffy, "The Model of Open Systems: Beyond Molecular Biology" in *Biology, History and Natural History*, pp.17 and 18.

40. The term 'biophilosophy'<sup>1</sup> has been taken from the title of Bernhard Rensch's book, *Biophilosophie*.

41. Cf: "... let us consider that God created us as an engine, which has been constituted by a huge amount of bones, muscles, nerves, arteries and all other parts. Every animal body is incomparably better arranged and possesses a capacity of self-movement much more admirable than man made automates and mobile machines ... ", René Descartes, *Discours de la Methode* (V), p.64.

42. Cf: "God ... has nothing of the already made; He is unceasing life, activity, freedom. Creation, so conceived, is not a mystery ... That new things can join things already exist-ing is absurd, no doubt, since the thing results from a solidification performed by our un-derstanding ... (262) ... So that all life, animal and vegetable, seems in its essence like an effort to accumulate energy and then to let it flow into flexible channels, changeable in shape, at the end of which it will accomplish infinitely varied kinds of work. That is what the vital impetus (*âlan vital*), passing through matter, would fain do all at once", p.267, Henri Bergson, *Creative Evolution*.

43. See: Abu Ali Ibn Sina (Avicenna), *Metaphysics* (54), p. 100.
44. Cf: Immanuel Kant, *Critique of Pure Reason* (B578).
45. Cf: "For the purpose of keeping strictly within its own bounds physics entirely *non* the question whether physical ends are ends designedly or undesignedly. To deal with that question would be to meddle in the affairs of others - namely, in what is the business of metaphysics. Suffice it that there are objects whose one and only explanation (*erklarbar*) is on natural laws that we are unable to conceive otherwise than by adopting the idea of ends as principle, objects which, in their intrinsic form, and with nothing more in view than their internal relations, are cognizable (*erkennbar*) in this way alone. It is true that in teleology we speak of nature as if its finality were a thing of design (*absichtlich*). But to avoid all suspicion of presuming in the slightest to mix up with sources of knowledge something that has no place in physics at all, namely a supernatural cause, we refer to design in such a way that, in the same breath, we attribute this design to nature that is to matter. Here no room is left for misinterpretation, since, obviously, no one would ascribe design, in the proper sense of the term, to a lifeless material. Hence our real intention is to indicate that the word design, as here used, only signifies a principle of the reflective, and not of the determinant, judgement, and consequently is not meant to introduce any special ground of causality, but only to assist the employment of reason by supplementing investigation on mechanical laws by the addition of another method of investigation, so as to make up for the inadequacy of the former even as a method of empirical research that has for its object all particular laws of nature ... " (68/383-384), Immanuel Kant, *Critique of Judgement*.
46. Cf: "... the mechanism of nature is not sufficient to enable us to conceive the possibility of an organised being, but that in its root origin it must be subordinated to a cause acting by design - or, at least, that the type of our cognitive faculty is such that we must conceive it to be so subordinated. But just as little can the mere teleological source of a being of this kind enable us to consider and to estimate it as at once an end and a product of nature ... The possibility of such a union of two completely different types of causality, namely that of nature in its universal conformity to law and that of an idea which restricts nature to a particular form of which nature, as nature is in no way the source, is something which our reason does not comprehend" (81/422), Immanuel Kant, *Critique of Judgement*.
47. See: Immanuel Kant, *Critique of Judgement* (81/422).
48. Immanuel Kant, *Critique of Pure Reason* (B358).
49. Max Hartmann emphasizes the point, already mentioned by Immanuel Kant in his First Critique (B 198), that "natural science is the rationalization of the world of phenomena. Were there nothing rationalizable in nature, natural science could not be formed", Max Hartmann, *Gesammelte Vorträge und Aufsätze* vol. II, p. 122.
50. Cf: Immanuel Kant, *Critique of Pure Reason* (B663).
51. Felix Mainx, "Foundations of Biology" in *International Encyclopedia of Unified Science*, vol. I, part 2, p.627.
52. See: Felix Mainx, *Loc. cit.*, p.651.
53. Cf: p.88 of this chapter in connection with Kant's assumption about the biological basis of the human intellectual powers.
54. Cf: Eusebio Castro, "José Ortega y Gasset; su Influencia ..." in *Revista Mexicana de Filosofía*, p.62.
55. Cf: Julián Manas, "Ortega y su Filosofía de la Razon Vital" in *Historia de la Filosofía*, p.435.
56. Konrad Lorenz, "The Enmity Between Generations" in *The Place of Value in a World of Facts*, p.388.
57. Cf: Aristotle's term describing the human being as a "zōon politikon", refer: *Historia Animalium* (488a/10).
58. Conrad Hal Waddington, "The Importance of Biological Ways of Thought" in *The Place of Value in a World of Facts*, p.99.
59. Jacques Monod, "On Values in the Age of Science" in *The Place of Value in a World of Facts*, p.24.
60. Platon, *The^tete* (170c).
61. See: *Hippocratic Collection*, p. 298.

## **Part Three**

### **Biological Foundations**

#### **Of**

#### **A Priori Cognitive**

#### **Faculties**

### **I – Synopsis**

Leaning on Kant's assumption concerning the a priori faculty of cognition, I mainly take up the question here, 'what is the substratum of our knowledge? within the framework of current biological data. This question then leads me to ask the following one: is our ability 'to know', 'to gather knowledge', and further-more 'to convey it to others' a characteristic which emerged with our appearance as Homo sapiens sapiens or has it been passed over to us from other species?

Kant's First Critique contains a discernible research programme. The objective of this part is to show that taking into account the conclusions he attained with re-gard to the above-mentioned question - i.e. 'what is the substratum of our knowledge? -, it is possible to advance on his path. Accordingly, this is not an interpretation of Kant's thoughts concerning knowledge. it is a philosophico-scientific position developed as a result of an examination of whether Kant's principal the-ses about the formation of knowledge can be underpinned by recent achievements of life sciences.

After all, the author of this study considers himself not a commentator, but only a pupil of Kant.

### **II - Can the Hypothesis of A Priori Knowledge ever become a Scientific Theory?**

This question has become actual in our time again. Not only in philosophy, in the history of ideas where it has often figured, but also within the theoretical domains of current natural science. in our century, general ideas easily become fashionable all over the world. Though this is not the case with the problem of a priori knowledge, an ever increasing number of thinkers and researchers get either directly or indirectly involved in it. Indeed, if it were solved

by empirical and / or philo-sophical (more specifically: logical) means, a variety of other riddles - especially gnoseological, epistemological and ethical ones - could be disentangled as well.

General philosophy may assume three principal functions in research on such problems:

- *Inventing and reshaping questions which will promote explorations in science ;*
- *examining the logical structure as well as the informative power of scientific propositions*
- *analysing ethical implications of such propositions.*

These philosophical matters clearly do not belong to the domain of experimental research itself.

However, philosophy - especially philosophy of knowledge (gnoseology) - is now handing over to *biology*, the pacemaking natural science of our epoch, one of its most fundamental assertions, namely that '*all our knowledge begins with experience, while it does not follow that it arises from experience*', for experimental investigations.

Immanuel Kant tied the above assertions to a priori notions of space and time: according to his Transcendental Aesthetic, the highest principle underlying the possibility of any intuition (Anschauung) related to sensibility is, that all the manifold in the intuition should be subjected to the formal conditions of space and time.<sup>2</sup>

*in respect of time, no knowledge within us is antecedent to experience* all knowledge begins with it. This still *does not mean*, according to Kant, *that all knowledge arises from experience*. Experience does supply us with the '*raw material*', necessary for producing knowledge. However, it is self-evident that '*raw material*' - which the British empiricists used to call "*sense impressions*" - does not constitute knowledge in its entirety.

Will it be possible to understand, in biological terms, how sense impressions are worked up into knowledge? And how we human beings can understand each other to some extent although we basically differ in the interpretation of our own sense data?

### III - The Biological Origin of A Priori Cognitive Faculties and their Implications

From a physico-geometrical standpoint<sup>3</sup> the Kantian contention that space constitutes one of the a priori forms of intuition cannot anymore be considered tenable. Nevertheless, this does not mean that fundamentally the whole 'problem' of a priori knowledge 'collapses'.<sup>4</sup> Even though Kant arrived at this assumption under the influence of *Euclidian geometry* and *Newtonian physics*, which are no longer entirely valid in present natural science, it applies effectively to part of the current science. First of all, let us remark that in its core Kant's supposition is indeed confined by modern biology. Research on cerebral dominance in split brain patients has shown that our awareness of space does not simply result from outer experience through some process of abstraction. In fact the "*... right hemisphere (RH)*" as Eran Zaidel states "*is superior in some spatial, gestalt, and non-verbal, abstract patterns.*"<sup>5</sup>

The relevant investigations lead to the following general conclusion: "*Studies of positive unilateral hemispheric competence in the split brain have led to the view that each hemisphere is a complete cognitive system which specializes for but is not restricted to particular tasks... Each hemisphere specializes for a different style of information processing applied to visual and linguistic material alike.*"<sup>6</sup>

Apparently the *capacity to process sensory information* is tied to a *faculty of a priori knowledge* residing in our *biological make-up*.

Biology, indeed, yields a more natural approach to the problem of a priori knowledge than physics. In retrospect, it is unfortunate that physics rather than biology dominated the scene of natural science in Kant's days.

If Kant could have based his views of a priori knowledge on biological rather than physical research data, his conception of space and certainly that of time would have been quite different. His views, perhaps, have been less 'unhistorical' in this case. That at least is what Dialectical materialists say about Kant. His notion about knowledge, according to them, is detached from reality and isolated in the "*transcendental consciousness*" \* it would however be wiser to brand his attitude as unevolutionary rather than unhistorical.<sup>9</sup>

According to contemporary ethologists and evolutionary biologists, our faculty of gathering sense data and then processing them into knowledge has never been immutable. It must have arisen through a gradual process in the course of evolution, and this process is likely to continue. The implication is that cognitive patterns may change substantially due to interactions between genetic and environmental factors.

it would be incorrect to regard Kant's *a priori knowledge as a posteriori* from the point of view of *evolutionary biology*. Indeed, as Rupert Riedl maintains, our cognitive apparatus right at the beginning of its individual existence, is nothing but the integration of all those experiences which have been accumulated during a long phylogenetic course. ^ Kant could not have drawn this conclusion for lack of biological data. "*The organization of sense organs and nerves which enables the living being to find its way in the world*"\ say s Konrad LORENZ, "*has phylogenetically evolved in the struggle with the process of adaptation to the concrete data which it clearly lets us experience as a phenomenal space. This organization therefore is certainly 'a priori' for the individual in order that experience becomes possible. Nevertheless, its function is historically conditioned, and consequently it is not obligatory to think that it is so. There are also other kinds of solution: the paramecium, for example, contents itself with one dimensional 'space intuition' (Raumanschauung). How many dimensions the 'space in itself (Raum an sich) possesses, we cannot know.*"\*

I suppose that the problem seems, at least rudimental, to be brightened up. Many contemporary evolutionary ethologists, like Irenäus EIBL-EIBESFELDT, Ernst MAYR and particularly Konrad Lorenz who we may easily consider as a bridge between the classical philosophy of nature<sup>12</sup> - Immanuel Kant, Jean Baptiste de LAMARCK, Jakob Johann von UEXKÜLL - and modern biosciences - starting mainly with Charles DARWIN, Gregor MENDEL and Claude BERNARD - claim that just as in the embryonic development of horses or fish, hoofs or fins are formed long before the adult animal can use them; so, human *intelligence* is furnished too with general hereditary notions before they are brought into use; notions which constitute the preliminary conditions for all *cognitive functioning*. "*More precisely*", say s Jean PIAGET, "*these a priori 'categories' would constitute forms or frameworks, comparable to innate knowledge in animal conduct.*"^

However, as shown above with reference to Lorenz's example about paramecium's one dimensional perceptive faculty, these 'categories'<sup>1</sup> are not inflexible, as Kant believed. Science discovered this fundamental fact thanks to two of its eminent minds, Charles Darwin and Gregor Mendel, who revolutionised our whole understanding of living nature. Since Darwin's Mendel's and then Hugo de VRIES' investigations, we know very well that hereditary content of living beings and the *instincts* themselves, can vary considerably from one species to another - *interspecific difference* - and from one generation to another - *mutation and adaptation*\ but also to some extent between synchronous individuals belonging to the same species - *intraspecific difference*.

According to Piaget, Konrad Lorenz very logically draws the consequences of what has been stated above: "*the cognitive structures would indeed be 'preliminary' to all experience, but they would not be 'necessary' in Kantian sense of the term.*"^

Here arises a new question, extremely important in its scope: in case the hereditary cognitive content of the species *homo sapiens sapiens* may vary from one generation to another - even among contemporary and consanguineous individuals - how could we interpret and consequently understand, not only each other, but also all those material as well as moral inheritances, transmitted to us from the remote past through diverse means of communication, like artifacts and texts? There are three possible answers to this question: Either the hypothesis about which we talk here is wrong - until now neither any experimentation nor any observation has refuted it - ; or we misinterpret cultural data, inherited from the past - for being able to judge this, we do not possess any sufficient criterion - ; or the species *homo sapiens sapiens* has not undergone any noteworthy mutation since the very early ages of its history until the present era.

The assumption that the elementary structure of hereditary differs drastically from one species to another and moreover between human beings, if accepted without question, seems to imply that we are condemned to misconceive all sensory information received from other species. Consequently, we can never be sure whether our interpretation of the acts of an animal which is directly or indirectly in contact with us, really corresponds to its intentions. If we push this way of reasoning to its extreme, it will apply to interhuman relations as well, although all human beings belong to the same species. We could maintain that every individual possesses a particular *genome*, and therefore a particular cognitive faculty. As a result, not only interspecific, but even intraspecific communication would be impossible. This, of course, is incompatible with any reasonable conception of reality. How, then, can we get out of the dilemma?

Truly, *evolution*^ in general and the *science of evolution* - conceived as a synthesis of *genetics, embryology, paleontology and systematics* - refute ARISTOTLE's and Kant's *timeless categories*. However, they certainly admit a slightly changing *groundwork*, carrying swiftly altering types and situations. For instance, we recognize any person notwithstanding his or her skin, eye and hair colour, bodily and facial features, as a human being. This illustrates quite clearly what is meant by the notion of a *groundwork* underlying all altering accidents. Naturally, the 'groundwork'<sup>f</sup> itself is also submitted to change. However, the rate of *change*<sup>16</sup> will be so slow that it does not really disturb continuation of some patterns in *time*.

The foregoing abstract and somewhat vague argumentation must surely be rendered more concrete and accurate.

The groundwork underlying behaviour and cognition has the form of "general closed genetic programs", which are found in all living things. They are the rudimentary forms of the "specific open genetic programs" occurring in organisms with high level of organization.

in the words of Ernst Mayr, "the longer the life span of an individual, the greater will be the selective premium on replacing or supplementing closed genetic programs by open ones. In the most primitive organisms we find that most of their behaviour is genetically fixed and largely predictable. The direction of many evolutionary pathways, thus, is clear. It often leads to a gradual opening up of the genetic program, permitting the incorporation of personally acquired information to an ever greater extent."<sup>17</sup>

"There are two prerequisites for this to happen. Storage of personally acquired information requires a far greater storage capacity than is needed for the carefully selected information of a closed genetic program; in other words, it requires a larger central nervous system. In-deed it has long been known that brain size and 'intelligence' - defined as the 'ability to learn from experience' - are closely correlated. A subsidiary factor favoring the development of an open program is prolonged by parental care. When the young of a species grow up under the guidance of their parents, they have a long period of opportunity to learn from them - to fill their open programs with useful information..."<sup>18</sup>

It is obvious that Mayr's "closed genetic programs" are associated with 'instincts'<sup>1</sup>. Jean Piaget has elaborated the view of biologists by the distinction of three hierarchical levels of instincts:

<sup>11</sup>1 - At the base is a set of general coordinations - relations of order, of inclusion, of correspondence, and so forth - common to all forms of biological organization...

2- At the intermediate level there is indeed hereditary programming - which varies from one species to another.

3- At the highest level there are the individual's adaptations to circumstances which are half-way between level (2) and learning. Now with the phylogenetic burst of human intelligence there is no hereditary programming, and only level (2) is missing, while the levels (1) and (3) are immensely heightened. The behaviours characteristic of the level (3) go in the direction of practice, exogenous acquisitions, learning from physical experience, and so forth, while those characterising the level (1) develop in the direction of multiple regulation, leading to the structures whose inherent - but not hereditary - necessity we are trying to understand."<sup>19</sup>

Truly, it is this strange, amazing 'jump' from instinct<sup>20</sup> or, in Mayr's words, "closed genetic programs" - to intelligence - "open genetic programs" - which has confused human wits a lot until the theory of evolution came to shed light on it. Even though certain aspects of this 'jump' are still poorly understood, its main features are no longer puzzling.

in the field of cognitive scheme, which also includes patterns of sensorimotor nerves, "hereditary and maturation set up certain boundary-stones around the region of impossibilities as well as possibilities of acquisition. Moreover, acquisition requires an outward contribution from the environment and an inner progressive organization, dependent on autoregulation. In a general manner, if we need to have recourse to the endogenous factors, which fact is usually neglected by the empiricists, for explaining the cognitive behaviours, like every other modification taking place in the organism, we must conclude that anything which is endogenous, derives necessarily from a hereditary programming." ^

On the basis of his own and other scientists' investigations, Piaget comes to the following conclusion: "The burst of instinct causes two correlative movements, although they proceed in distinct directions: The one, towards inside - in the logico-mathematical sense ... -, and the other towards outside - in the sense of experience..." ^

This result may seem too general and too abstract to many of us. Let us try, then, to clarify the foregoing argumentation. It was argued that a 'jump' has taken place from instincts to intelligence. However, we cannot speak merely of one intelligence. "Although human intelligence can be considered unique thanks to its realizations", Ernest Schoffeniels asserts "it has been demonstrated that like monkey's or rat's intelligence it possesses a molecular basis. We differ from our 'inferior brethren' quantitatively rather than qualitatively... However, there is no doubt that two chimpanzee brains never give us one human brain. Nevertheless, the most recent neurophysiological findings do not allow us to affirm that the functioning of rat's brain differs fundamentally from that of man. The metabolism of neurones and glial cells found in mammals as well as the control on the electric activity of neuronal aggregates have got identical molecular bases." ^

The relevance of biology for the understanding of intelligence and cognitive mechanism is not limited to evolutionary aspects. Anatomical and physiological aspects are equally important.

Here in conclusion let us refer to Boris Rybak's subsequent statements: "The integration of the sensations is a transformation of the peripheral messages into a certain code; it is their translation. This integration implies the functional and therefore anatomical interconnections inside the cortex. So, to each primary receptive - such as somatosensitive, visual, auditive - area, there is an adjoining cortical field of association. These areas of

association are fundamental for the maintenance of the highest mental activity at each evolutionary stage of the mammals. They are in fact essential for assuring the identification of stimuli. In other words, while the primary areas intercept the stimuli, the areas of association elaborate sensations... "2^

"The human frontal lobe in its anterior portion - area 4, 6, 8 - is supposed to be in relation with the highest psychical functions. Destruction of this cortical zone through lesions is the cause of troubles in these remarkable nervous superstructures which are the individual - moral - and collective - social - behaviours: indifference towards the surrounding environment... Yet, a lot of critical attitudes have been assumed against the exclusive 'localization' of 'intelligence' in the frontal lobes; the psychical activity is indeed a general function associated with the whole telencephalon and with the rest of the organism, but in particular with the endocrine glands. No doubt there is even more than one intelligence?6

As stated before, the formation of information contents out of the so-called 'raw material' cannot be strictly localised in the brain. The cerebral cortex' function is, so to speak, to regulate the inflowing sense data and their being worked up into meaningful information. "Hence there is not any concrete product of the cerebral cortex, perceivable in the individual's behaviour", says Franz Seitelberger and goes on to argue: "The entire information mass, which is the continuous input-information from one's own body and environment, has to be distinguished from the information found already fixed in the brain. The latter, first of all is genetically conditioned, thus embedded in the organic structure as our evolutionary theory of nature tries to explain; secondly it further represents individually acquired information in the form of molecular traces of recollection on which our conscious memory depends. "27

We, therefore, do not reflect straightaway in our cognition objects and phenomena we perceive. Cognition, moreover, is not an arranged sum of the sense data we receive from within ourselves and from the outside. It is above all the result of certain brain activities. "The manner, brain deals with input-information in its genetic make-up brought about by evolution, is the formal condition of our perception, of our world picture so to say, on which our behaviour depends. These conditions, as it is the case with the Kantian categories, are undeniable (unabdingbar). They can be recognised in our dreams, in optical illusions (Tauschungen) and even on occasions when there is a pathological deviation in brain's working manner. "28

Thus, as can be seen from the foregoing passage, Seitelberger furnishes us with new evidence that our cognition is the outcome of a very sophisticated play between the so-called "input-information" and the 'evolutionally built in information'. So let us sum up this last attained position by referring ourselves to the Kantian dictum, smartly formalised by Albert Schweigler: "whilst perceptions without notions are blind, and notions without perceptions are void, cognition (knowledge) is a union of both, in this way, that it fills up the frames of the notions with the matter of experience, disposes the matter of experience into the net of notions. "^^

It must be reiterated that the assumption of a priori knowledge gains plausibility only if it is based on empirical data supplied by biosciences. This, no doubt, is a necessary condition, but not a sufficient one. Besides the biological data we need an unambiguous formation, such that the 'assumption of a priori knowledge' is transformed into the 'hypothesis of a priori cognitive faculties' and finally can achieve the status of a scientific theory. The latter element is of course as important as the former one. Its role is critical especially where natural philosophy and natural science meet. E.C. Zeeman has developed a sensible course of action for this case. In his article *A Dialogue Between a Biologist and a Mathematician* he exposes a general 'mould' inside which any hypothesis belonging to the theoretical sphere of life sciences - including the theory of knowledge - could be clearly and rather unambiguously formulated.

His strategy involves the following steps:

1. Choose biological hypotheses, acceptable to experimentalists at present or in a foreseeable future;
2. translate these into mathematical hypotheses;
3. prove mathematical theses;
4. retranslate these back into biological conclusions;
5. the composition of the last three steps (2, 3, 4) furnishes us with the deduction, going from hypotheses to biological conclusions. Thus the difficult mathematics is isolated in step (3). Meanwhile any doubt about the biological conclusions (4), or any experimental contradiction of them, can be blamed upon the biological hypotheses (1) or upon one of the two translation processes (2) and (4). Furthermore, Zeeman points out that this method of exposition is in general the reverse of the order of discovery, which experience has as its starting point.<sup>30</sup>

## IV - Conclusion

Here again our main topic: "... although all our knowledge begins with experience, it does not follow that it arises from experience." This ingenious statement of Kant, when interpreted within the framework of the actual philosophy of biology, comes to mean that the faculty of knowledge-formation, which does not arise from experience in the form of sensory impressions, is indeed <sup>M</sup>"a priori". It is distinguished from *empirical* knowledge, which has its sources "a posteriori", that is, in *experience*.

This treatise - it is hoped at least - has shown in a succinct, preliminary way, that general and specific aspects of this hypothesis are compatible with various branches of biology. Some of the fundamental ideas associated with this hypothesis concerning, for example, the space-time patterns are not commonly accepted today. But it seems likely that the majority of experimentalists will approve them sooner or later. As yet, only the first step in Boris Rybak's scheme has been completed for our views. The other steps will not be easy in this case, because the assumptions involved are very complex.

## Endnotes

1. See: Immanuel Kant: *Critique of Pure Reason* (B I).
2. See: Immanuel Kant: *Öp çit* (B I 36).
3. Refer in this connection: John O. Wisdom: "Methods of Refutation in Metaphysics" in *Boston Studies in Philosophy of Science*, p. 534; and Bertrand Russell: *Introduction to Mathematical Philosophy*, p. 145.
4. Cf: Bertrand Russell: *Mysticism and Logic*, p. 89.
5. Eran Zaidel: "Concepts of Cerebral Dominance in the Split Brain<sup>11</sup>" in *INSERM Symposium*, p. 263.
6. Eran Zaidel: *Loc çit*, p. 263.
7. Eran Zaidel: *Loc çit*, p. 264.
8. See: Anton Dimitru: *History of Logic*, vol. III, p. 193.
9. Since the living being and its specific stock is not merely shaped by outer conditions, it cannot be simply qualified as *historical*, but needs a more embracing term. Thus as a generally accepted fact the living being is *evolutionary*. The only living being to be both *historical* and *evolutionary* is *man*.
10. See: Rupert Riedl: *Über die Biologie des Ursachen-Denkens*, p. 25.
11. Konrad Lorenz: *Die Rückseite des Spiegels*, p. 20.
12. There is a rather deep-rooted distinction between *philosophy of nature* and *philosophy of science*. While the former term indicates data of experience, the latter implies the mental activity to find out the probable causes of the observed phenomena. Therefore the *experimental* region of *modern science* can be considered as the offspring of the natural philosophy, whereas its *theoretical* domain possesses certain particularities in common with the philosophy of nature - Cf: Michel Ambacher: *Les Philosophies de la Nature*, pp. I, 49, 73.
13. Jean Piaget: "Operational Structures of the Intelligence and Organic Controls" in *Brain and Human Behaviour*, p. 936.
14. Jean Piaget: *Ibidem*.
15. Julian Huxley defines evolution in general as: "... a one-way process in Time; unilinear; continuous; irreversible: History. Self-transforming; and generating variety and novelty during its transformations: Genetics" - Julian Huxley: *Evolution in Action*, p. 10.  
And Ernst Mayr defines the same concept as follows: " 'Evolution' implies change with continuity, usually with a directional component. Biological evolution is best defined as change in the diversity and adaptation of populations of organisms" - Ernst Mayr: "Evolution" in *Scientific American*, vol. 239, p. 39.
16. In the biotic sphere 'radiance changes' take place in the form of *mutalion*. Mutations typically occur with a frequency of 1 to 1 million - refer to Ludwig von Bertalanffy: "Mutation und Evolution" in *Genetik*, especially p. 106.
17. Ernst Mayr: "Behaviour Programs and Evolutionary Strategies" in *American Scientist*, vol.

62, p. 657.

18. Ernst Mayr: *Ibidem*.

19. Jean Piaget: *Loc cit*, p. 397.

20. Jean Piaget determines three fundamental types of knowledge:

1) The inborn knowledge whose prototype is the *instinct*

2) the *knowledge about the physical world* which extends up to the experience relative to the environment;

3) the logicomathematical knowledge - see: Jean Piaget: *Biologie et Connaissance*, p.

504. Thus, what is instinct? Usually it is conceived "*as a natural, involuntary, inherited*

*tendency to perform a specific action or to follow a certain behaviour pattern*" Edwin

B. Steen: *Dictionary of Biology*, p. 253.

21. On the other hand *intelligence "is nothing but a collective term, which designates a considerable number of processes and mechanisms whose signification becomes clear provided that they are explained one by one and following the order of their development... intelligence is, for instance, the coordination of conceptual operations, or sensorimotor schemes..."* - Jean Piaget: *Biologie et Connaissance*", p. 67.

22. Jean Piaget: *L'Epistemologie Genetique*, pp. 66 and 67.

23. Jean Piaget: *Öp cit*, p. 69.

24. Ernest Schoffeniels: *L'Anti-hasard*, pp. xiv and xv.

25. Boris Rybak: *Cours de Zoophysologie*, vol. II, p. 236.

26. Boris Rybak: *Ibidem*.

27. Franz Seitelberger: "Das Menschenbild der heutigen Hirnforschung" in *Universitas*, pp. 262 and 263.

28. Franz Seitelberger: *Öp cit*, p. 264.

29. Albert Schweigler: *Handbook of the History of Philosophy*, p. 218.

30. See for further detail: E.C. Zeeman: "A Dialogue Between a Biologist and a Mathematician" in *Biosciences Communications*, pp. 225 and 226.

## Part Four

### Philosophy-Science

### from the

### Biotic Standpoint

#### 1 - Synopsis

At the turn of the century, in the wake of the general disintegration of the traditional cultural life in Western Europe and North America, philosophy and science got completely separated. While *philosophy* was losing its unifying and

catalysing capacity, *science* was drifting away from its primary aspiration, that is, research and establishment of knowledge within an empirical framework. Instead of establishing coherent and meaningful *cognitive systems*, *science* has since turned into a *pragmatic* or *utilitarian* endeavour. Thus, especially after the Second World War, *philosophy-science*, as an institution disappeared and was superseded by *technology* which has got an almost absolute grip on the whole of humanity. At present, every statement that claims to be scientific must be verified and explained according to criteria set by the established physico-chemical science, otherwise, it is liable to face the charge of being unscientific and unobjective, fully confused and confusing. The case, however, is not as simple as that. The universe, at any rate, is so amazingly manifold that it would be utterly nonsensical to approach it with a single and clear-cut presupposition. Even the most intelligible of concepts would be extremely far from enabling us to cast completely light onto the most diverse corners of the universe. The life sciences present us with the chief example of this difficulty. That we can explain some biochemical interactions in accordance with physico-chemical principles and laws, certainly does not mean that we can reduce all biotic phenomena to mechanistic patterns of explanation and definition. To the existing physico-chemical axioms, principles, nomenclatures, explanatory and definitional patterns and theories we must create new ones in response to the necessities emerging from the biosphere. Moreover, biology's patterns of description, definition, explanation and law-formation can by and large be adapted to be used in the humanities. All the arguments presented in this paper show us that *life sciences* assume at present the function of a *link* between the *physical, biotic* and *cultural layers* of being. Accordingly, a well-founded philosophy of biology may do as a scaffolding of a would-be philosophy-science that could reinstall our chaotically dissociated world picture and answer the questions proper to our times.

## II - The Process of Humanization

### A - Hominization - Humanization Complementariness

As Stefan ZWEIG expressed the situation of mankind succinctly: There are key moments in history (*Sternstunden der Menschheit*). Because of their paramount importance their events are minimal. Moreover, among them there are those which are greater in calibre than the ones quoted in Stefan Zweig's *Sternstunden der Menschheit*. These are the turning points of history. At first glance we can enumerate four major events: First and foremost, the enormous shift of certain communities from food-gathering to agriculture around 8000 BC mainly in Southwest Asia (Mesopotamia). Second, the introduction of the writing system at circa 3600 BC by the Sumerians again in Southwest Asia. Last but not least that tremendous innovation, maybe the greatest in history, once again in western Asia, the emergence of Monotheistic religion based on revelation, and the origination of philosophy-science within the realm of the Antique Aegean civilization.

The first cultural revolution brought about a brand new situation: After having roamed around in pursuit of bare living for tens of thousands of years man eventually took roots in a patch of land he began to call his home, his hearth. This was not simply an economic event as certain Marxist thinkers would like to make us believe. The transformation in question marked a milestone in mankind's humanization process. The very patch of land endowed man - most certainly still does so - with a spirituality that expresses his most human characteristics. So then, what is spirituality? Briefly and simply all the capabilities he possesses beside and beyond his biotic reality.

Man's basic reality is biotic. He shares this very particularly with all other living beings of this world. *Livingness*, so far as we know, is a peculiarity of our planet, the Earth. The unfolding of livingness and ultimately the emergence of man as a living being is apparently covered by *evolution*. *Hominization* is the *biotic*, whereas *humanization* represents the *cultural* (or *spiritual*) aspect of becoming the human being. Hominization and humanization complement one another to bring about the human wholeness. Hominization, or put it in another way, the evolutionary aspect is, indeed, not the beginning of the story. There still remains a lower layer, in the ontological sense of the term, to be tackled; and that is the physical one. Just as with every living thing, man's most fundamental building blocks are of a physico-chemical - i.e. subatomic, atomic and molecular - nature.<sup>1</sup>

In addition to the biotic one, like all other living beings, man finds himself surrounded by the physico-chemical environment. Thus briefly stated, in due course he has got three main aspects to be taken into account: the physico-chemical, the biotic and finally the cultural one. If one of these happens to be missing, we will get an incomplete, nay, a shattered picture of man.

## **B - The Antecedents of Humanization: The *Cosmic* and *Biotic* Formations**

If asked to qualify the phenomenal layers of the world, one can begin by stating that the underlying material stratum, taken up by the physico-chemical sciences, consists of depictable and quantifiable phenomena which can be analysed down to their most fundamental components. Then, starting from these, one can securely proceed to the higher structures. Why? Because a depictable phenomenon, studied within the bounds of physico-chemical sciences is accepted as a material object which in turn assumes in principle the aspect of a static or inert entity.

*Matter*<sup>2</sup> is an utterly abstract, generic term. It comprises bodies, macromolecules, micromolecules and atoms. Atoms in turn are protons and neutrons bound together in a nucleus, which is surrounded by a 'cloud' of electrons. Individual elements are distinguished by their number of protons; and these together with neutrons appear to be composed by elementary particles known as quarks. An individual quark is not expected to be isolated or observed alone; quarks are always part of composite particles known as hadrons. They, in turn, include the proton and neutron as well as the more exotic pion and kaon. Electrons are part of another family of so-called elementary particles known as leptons. There are flavours of leptons too: The electron, the muon, the tau particle, the electron neutrino, the muon neutrino and the tau neutrino. All interactions between leptons and quarks can be accounted for by four kinds of force: Gravitation, electromagnetism, the strong force, the weak force. The electromagnetic force binds electrons and nuclei to make atoms. The atoms, although electrically neutral, interact through a residual electromagnetic force to form molecules. The strong force binds quarks to make protons, neutrons and other hadrons, and the residual strong force between protons and neutrons is the so-called nuclear force that binds them into nuclei. The weak force is responsible for such phenomena as some nuclear decays and aspects of the fusion process that releases energy from the sun.

The theory that describes the quarks and the leptons and their interactions has come to be called the Standard model. An important unifying element of the standard model is the concept of symmetry defined by Haber and Kane. The interactions among the various particles are symmetric (that is, invariant, or unchanged) in the face of a number of subtle interchanges.\*

## **C - The Furthest Stage of Humanization: *Mentality***

With the advent of Modern secular European civilization in the Fourteenth and Fifteenth centuries, the hitherto unitary human *soul* started to be split mainly into two halves: while in these new tides of storm and crisis *faith* went on abiding in the *spirit*, *skeptical reasoning* found its dwelling in the *mind*. In spite of the apparent antagonism between these two sides, a stern belief in a deterministically running world order remained as the sole crossing. Since religiosity came to be considered anachronistic and therefore an obstacle in one's advancement in society in Europe for more than two hundred years, those who tried hard to dissimulate their religious sensibilities or conventions switched from destiny or fate to determinism. It almost shares fatalism's connotation. Only, contrary to fatalism, determinism has no immediate moral denotation. In view of all that has been said, determinism is not a conception that has roots in the phenomenal world. We assume that the world is an orderly entirety: Cosmos. There is no hard evidence that can document to us whether a cosmic rule prevails or not. We project upon the universe the cosmic rule we think prevails.<sup>4</sup>

Presumably it is the human soul - mainly the mind - which holds the lever that transforms chaos into cosmos. Moreover the structure of the cosmos, that is, the universal order is to some extent engraved in our mind. To what extent? If we could ever find the answer to this question, we would seal our destiny!

However, the above-mentioned state of affairs does not include the existence of the outside phenomenal world. It is this world, after all, that forms the pattern, the prototype of mind images. Thus the basic components of our mind images must correspond with the outside phenomena. In René DESCARTES' terminology, the structuring capacity that brings forth the mind image is "res cogitans", whereas "res extensa" expresses the quantitative structuring of our world at large.

## **D - The Development of Mentality: *History***

Herewith we see that the world is neither given to us nor the product of our men-tal forging. In other words, the world, whatever it is as such, is not an aggregate of the sense data we receive from the outside. If it were so, individual differences would shrink to such a degree that they could not be noticed any more. In this case, *history*, which stands for the process of humanization that brought forth the specifically human feature *culture*, could not emerge. On the other hand, the world does not merely consist of my will and representation. If it were so, I could never communicate and thus interact with anyone either contemporaneous or foregone. Unlike other living beings man's constitutive and regulatory inbuilt mechanisms - generally labeled as 'instincts' - are too few and weak for his survival. This, in fact, is the key to the human problem in general. History is the whole story that mankind has attempted and achieved in order to substitute for what which it lacks biotically. History seems to some people, including myself, to be a rather particular continuation of evolution. Unlike evolution it is driven by the will of reason and sentiment, which after all has not got an evolutive-genetic aspect. Over and above this, the most basic features of history depend still on the genetically encoded information-gathering and cognition-forming capacities stretching over a tremendously vast temporal - i.e. evolutionary - scale.

Until now our discussion wheeled about three concentric circles: The physico-bio- and anthropospheres. Although the innermost centre belongs to the physico-sphere, it is, at least, not feasible to explain away the subsequent ones by depend-ing only on the physicosphere centre. On the other hand to obtain a full picture of the world, including the bio- and anthropospheres, we must primarily get deep into the core of the first 'circle'. By slowly moving onto the other two circles and studying them too, we may gradually work out a general picture of the world. Nevertheless, every systematic general world picture, especially one that stems from a scientific basis, takes one of these three as its epicentre. In addition, a world picture with a positive countenance assumes as its basis a corresponding phenomenal sector of the whole circle accepted as the focal point.

World picture, which in fact is the English rendering of the German "Weltbild", "*is our entire knowledge about the world, particularly the knowledge we get from natural sciences concerning the constitution and structure of as well as the forces and laws prevailing over nature; and as a consequence is our unitary and vivid (anschaulich) view of everything that we call in turn cosmos.*"<sup>5</sup> So we can rightly reach the conclusion that world picture is the total synthesis that can be made of all observable as well as hypothetical facts. In this sense world picture is synonymous with cosmos. Consequently cosmos is that total synthesis we construct out of the facts we can perceive and those we could conceive by analogy of the already perceived ones. There is not one unified global world picture. Any world picture throughout the ages displays the mental attitude of the universally reflecting thinker - the most systematic and logic-bound one is known as philosopher-scientist. Eventually the philosopher-scientist affects the very culture he has grown out of. On that account, any such culture or society which has been endowed with a philosophically tinted world picture I qualify as a *philosophised culture* or society. Furthermore, a philosophised culture gets the upper hand in determining the whole development of the humanity.

In fact each culture permeates its constituent members with a certain set of values which altogether form the world view of every individual belonging to that culture. It was only with the advent of philosophy-science that - especially the Occidental - man, began vehemently to research whether he could establish coherent concordance between his value judgement based on the cultural background and the factual reality.

## **E - History's Sequential Antecedents: *Formation and Evolution***

So the, when and where did this so-called factual reality begin? According to our present-day knowledge, the universe, which represents the totality of all that has been, is being and is expected to be given to us, presumably came into being so about fifteen to twenty billion years ago as a result of a huge explosion, the *big bang*. This explosion was followed by a steady expansion lasting for fifteen to twenty billion years and that is still going on.

All existence sprang from an initial homogeneous purevoid of any organization - i.e. the level of organization was zero. The array of existence comprises first of all the simplest building blocks of subsequent gaseous, liquid and corporeal beings.

As we have seen, "*the observable universe may have emerged from an extremely tiny region that experienced inflation and then populated the resulting cosmos with particles and radiation created from the mass-energy of the vacuum. An ancient question emerges in a new context: How did that tiny region come into being from which the observable universe emerged? Is it possible to understand the creation of a universe ex nihilo?*"

Current scientific speculation about "*the ultimate origin of the universe*" appears to have begun in 1973, with a proposal by Edward P. TYRON that the universe was created from nothing as a spontaneous quantum fluctuation of some preexist-ing vacuum or state of nothingness. Central to the conjecture was a hypothesis that the universe has zero net values for all conserved qualities. Accepting the conventional wisdom of that time, Tyron believed that baryon number was strictly conserved, hence that a universe created from nothing would contain equal amounts of matter and antimatter. He therefore predicted equal numbers of matter and antimatter galaxies, which was then marginally consistent with observations simply because ground-based data remained inconclusive of distant galaxies.

"... it is obvious that inflation greatly enhances the plausibility of creation *ex nihilo*. There remain, however, profound questions about which one can only speculate: At what stage did the primordial quantum fluctuation occur? What is meant by a vacuum or state of nothingness prior to our universe? What is meant by laws of physics predating the universe? These and other questions lack compelling answers, and may well defy resolution. It is nevertheless interesting that quantum uncertainties suggest the instability of nothingness, in which case inflation might have converted a spontaneous microscopic quantum fluctuation into our cosmos."<sup>6</sup>

Thus, the 'de-velopment', the 'un-folding' of organization from 'dis-organization' in the most general, universal term is the *cosmic evolution*^ it is presumed to take its start from *pristine primordium* (chaos)<sup>8</sup> to achieve a mature order (cosmos).<sup>9</sup> Hence we see that the farthest away background of our 'human-beingness' is the cosmic process. This background we share with everything that there is. Except, in cosmic terms, a tiny segment of the universe, everything that there is, has to be of physico-chemical texture. Now, here comes the crux of our problem: Our 'human-beingness' consists of three ontic layers, the physico-chemical, the biotic and finally the psycho-cognitive one respectively. In spite of the fact of our supposition that every layer ontically depends on the foregoing one, each is autonomous in its own right.<sup>10</sup> Since the 'human-beingness' covers the three consecutive layers, it is the richest and most complex of entities we have come to know so far.

### III - The Top Stage of Humanization: The Emergence of *Philosophy-Science*

The three-layeredness of the human being misled the greater part of the philosophers or philosophising thinkers, from the dawn of Modern times, and especially since Rene DESCARTES until the first half of the present history. They assumed that the puzzle surrounding the human could be solved by breaking his structure to its presumptive minutest building blocks. They tried to explain everything by taking the most elementary particles. According to their assumption every structure was a more or less complex outcome of a machine-like interplay of these basic elements. Thus as long as we remained on rational grounds and empirical evidence we could offer a tenable account of all sets of events occurring in nature - and also in society, being an integral part of nature. So far as a case was analysable to its basic elements, it could be considered to be apt to investigation, and thus contained nothing mysterious. Rational attitude, as it was accepted, barred us from taking any other way of investigation as this implies that there may be other ways of investigation as this implies that there may be other ways of asking "how?" and getting a 'causal' account. Moreover the results of our investigations had only one legitimate manner of being expressed, and that was a formal and preferably numerical formulation.

In contrast to those Physicalist or Mechanicist reductionists, another group of philosophers - Spiritualists and Idealists - chose man's so-called spiritual aspect or his closely related psycho-cognitive features, as their focal point. Some among them see mankind and through it the whole world as a reflection of their own mental faculties - Subjective idealists and Solipsists.

All of these philosophical trends and their originators to be sure brought forward a certain aspect of the truth. There are, nonetheless, those outstanding paradigm-makers, such as PLATO, ARISTOTLE, AVICENNA (Ibn Sina: 980 - 1037), Galileo GALILEI, Immanuel KANT, Charles DARWIN (1809 - 1882) and Albert EINSTEIN (1879 - 1955), rather who furthered humanity's only respectable addiction, the one that urges us to pursue and research the truth. Above all it was Plato who composed for the first time virtually the entire array of the principal problems on which philosophy-science still works for more than two thousand years. And Aristotle was the first to set out to define the main features of the scientific research mentality, known thenceforth as methodology.<sup>11</sup> The third milestone in philosophy-science system which has prevailed throughout recent history. This system sprang mainly from the Newtonian version of classical mechanics and comprised as many contemporaneous achievements as possible. Accordingly, in

the Kantian sense, a system molds all, at first sight, disparate, but nevertheless intrinsically affiliated achievements into a cohesive and coherent whole. Such a cohesive and coherent intellectual whole he called an *architectonic structure*. "By an architectonic structure" says Kant, *we understand the art of constructing systems. As systematic unity is what first raises ordinary knowledge to the rank of science, that is, makes a system out of a mere aggregate of knowledge, architectonic is the doctrine of the scientific in our knowledge, and therefore necessarily forms part of the doctrine of method.*

*in accordance with reason's legislative prescriptions, our diverse modes of knowledge must not be permitted to be a mere rhapsody, but must form a system. Only so can they further the essential ends of reason. By a system I understand the unity of the manifold modes of knowledge under one idea. This idea is the concept provided by reason - of a form of a whole - in so far as the concept determines a priori not only the scope of its manifold content, but also the positions which the parts occupy relatively to one another.*"<sup>12</sup>

So, according to Kant, an architectonic structure is a *system*. And after all, system is the most complex, most involved mental texture man has ever composed. At the one end, even if indirectly, it reaches the shores of *experience*, while at the other it draws its connecting and regulating capacity from its own '*a-prioriness*'. Thus, the system idea is, so to speak, the farthest-ranging, most comprehensive intellectual network we can think of.

*Science* starts from *experience*, more specifically from experimentation, and attains its ultimate grade of generalization and abstraction at the theoretical level. Beyond that is the domain of *metaphysics* of which the constituting element is a system. So we see that system transcends the domain of science. With these wide-ranging connecting, regulating and finally transcendental characteristics in store, a system displays to us an illustrative and comprehensible picture of the world. Illustration and comprehension necessitate each other. While illustration has its roots in the empirical realm (a posteriori), comprehension's principal components emanate from mental sources (a priori).

Everything there is, is a case. We are born straight into a world of cases. There is absolutely nothing which might not be considered as a case. Whether it is a falling stone, an electron revolving around a nucleus, something happening in the heavens, the twittering of a bird, a wounded reindeer's slow, agonising death, or a person's feelings of gnawing guilt, shame, doubts, or the composition of a melody ... of all these cases<sup>13</sup> some are concrete but rather unrepeatable, apparently happening fortuitously, which we call 'events'<sup>14</sup> or 'happenings'. Some others are similarly concrete, but apt to repeat seemingly regularly. These we may specify as '*facts*'. And those very facts with which we deal out of the urge for knowledge constitute the subject matter of our scientific researches.

Our daily lives pass through a torrent of events. Although many of the similar events seem to us the same and so render life routine, they are in fact usually one-offs. As already said, events do not recur in exactly the same manner. And those which do, as mentioned theretofore, are facts. Indeed those events we assume to recur in nearly the same manner are mostly contrived, and so their usual milieu of occurrence are laboratories where we try to replay certain aspects and segments of nature. Whereas *events* in daily life supply us with our *experiences*, *facts* form the basis of the researches<sup>1</sup> *experimentations*. Bygone experiences prepare us to encounter new events. And the more experiences we live through the less we will get astonished by coming across new and unexpected events, and so be prone to commit errors out of sheer ignorance. The bulk of experiences one has gathered throughout a lifetime forms that person's life experience (what is called "Erlebnis" in German). It is composed out of the already encountered events as well as of presuppositions and ultimately of beliefs. The last mentioned ones are the building blocks of culture.<sup>15</sup> Right from the outset of our lives we perceive almost everything through the pane of beliefs. They are the guidelines which we follow in order to find out the right path. Beliefs replace those inborn mechanisms, the principal driving forces in other living beings which, in turn, we lack to a great extent. Contrary to the *inborn mechanisms*, and by extension to the highly organized animal's *instincts*, we do not find *beliefs* ready made. They are the product of man's historical wearing endeavour. In the formation of beliefs, man's mental capacities play a role alongside his experiences. In this process of formation of the beliefs, which of these two contenders bear the main burden: the mental capacities or the experiences? This has been then question that caused the principal dissent between philosophers ever since Plato's days down to the present age. While on the other hand there have been those defending the priority of mental capacities over the experiences, there have been philosophers, on the other hand, arguing in favour of the precedence of experience. To my view, neither group is right. The steady interaction between mental capacities and experiences bring forth the belief. Accordingly they can be seen as complementary to rather than adversaries of each other. There can be no belief without the appropriate experiences, and we cannot form experience if we lack the belief that enables us to link together the relevant events. Thus we receive the sense data and turn them into impressions that, in turn, we work up into events, the patchy pictures out of which we ultimately build a whole 'tableau' of the world. Yet, we will never know to what degree the factual world corresponds - even, if it does at all - to our mental 'tableaux'. It is indeed a dramatic fact to admit that the 'tableaux' we work out depend on the constitution of the human sensory receptivity and mental elaboration. They are, so to speak, hammered out with our very own tools. We 'see', in repetition of Kant's imagery, the world through our own 'eyeglasses'. Without sensation (Sinnlichkeit) no object (Gegenstand), and without intellect (Verstand) no thought

of any object (Gegenstandsgedanke).<sup>16</sup>

So if there is no positive evidence about any direct correlation between the so-called essence of sense objects existing out and inside ourselves and the corresponding mental pictures we fashion out of them, how does it come that we are still able to establish a working communion with others as well as with our own selves? Are we after all involved in a dialogue of the deaf; do we talk about seemingly the same things but with completely different implications? "No!"<sup>11</sup> said most of the leading thinker-researchers from Plato, and even before him, from time immemorial until Kant: According to them the world of facts runs a parallel course to that of our feelings and thoughts. Just as Descartes formulated this viewpoint so succinctly, factuality - in Descartes' terms, *res extensa* - and mentality - *res cogitans*<sup>11</sup> - are the two equivalent aspects of the one and the same world-order, rooted in Divinity.

To a minor extent it was first Aristotle in the fourth century BC who shook systematically this age-old belief which finally endured a mortal blow at the hands of Kant in the Eighteenth century AD. This overthrow ranks with the achievement of Nicholas COPERNICUS and Galileo Galilei in demolishing the doctrine of the universe which held that the Earth stood, in particular, spiritually, at the centre of world-all; and the achievement of Charles Darwin overturning the conviction that the human is a living entity occupying, more or less in a celestial sense, the optimum abode, cut off from everything else. These four thinkers are the forerunners out of whose mental schemes the Modern West European mentality was carved that, in turn, eventually rocked all the customary, conventional social textures worldwide.

With Kant we began to draw our eyes from the physical nature onto our minds.<sup>17</sup> Because the most age-old universal, absolute and highest unifying principle, God, has been withdrawn from the philosophico-scientific context, no chance remains anymore whereby we could affirm anything about the innermost true fabric of the physical bodies. There are no criteria that could empirically introduce these bodies to us. For instance to what extent do our sensory mechanisms and mental structures thanks to which we also produce the most complicated devices that lead us deeper and deeper into the core of nature, make us know those manifold cases occurring in and outside ourselves? This question is apt to lead us to a greater and more dangerous variety of new questions: obviously, we can assume that there are no clear-cut, empirically testable yardsticks that are capable of demonstrating to us how well or, better said, to what degree we can understand each other's feelings and thoughts. So, Relativism and Secularism which set in at the advent of Modern times, evolved into disbelief, irreligion, cynicism and ultimately solipsism, toward the close of the Second millennium, humanity's most crisis-laden period wherein man - particularly the Westerner - turns over a brand new leaf in his history. In the past even during the most critical times, societies' master minds had certain reliable touchstones with regard to which they were nonetheless capable of evoking and judging short as well as long-term problems surrounding them, whereupon they could think well ahead of the period they were living in. Today, in contrast, the cruxing problem is that we possess neither epistemological, thus, nor, most important, ethical touchstones ready at hand.

From all tedious and involved arguments we are led to the conclusion that the most urgent need of the present day is the information of a new system of philosophy-science. In any event, a serious attempt to construct a new system, which tries its best to take into account the most essential requirements and necessities of our age, must start off from the few remaining valid elements of the previous one. In this context we conceive that Kant's ingenious differentiation between the transcendent and transcendental should be considered as a very appropriate basis to set out with the aim of a fresh system of philosophy-science, with metaphysics again as its core.

The term *metaphysics* evokes mainly two meanings: The first can be accepted on a par with *culture* while the second overlaps with philosophy as such. It is not altogether erroneous that as a sociocultural being the human outsteps the bare physical frame underlying and surrounding him. In this sense beside a physical, he is also a metaphysical being. These two features of his being are, as already indicated, not in complete isolation from each other. They do not cross each other out. On the other hand they are mutually irreducible. So then, what kind of link does exist between these two aspects of the human-beingness? Briefly stated it is over the *biotic* bridge that *physicality* joins the *metaphysicality* in the *human reality*. While it is the *life science*, i.e. *biology* that deals with the *ontico-physicality* of the human factual reality *metaphysics*, as an epistemo-logico-ethical endeavour, studies, evaluates and takes care of man's truest attributes lying beyond his physicality. Thus the name of this gradually growing 'marriage' between *metaphysics* and *biology* appears to be the *philosophy of biology* that might eventually lead us anew to a universal system, one of philosophy-science.

Due to its almost limitless expressive peculiarity, *metaphysics*, the midpoint of philosophy, always faces the risk of slipping away from its firm empirical ground into boundless speculation. Hence it can eventually be dragged into far off confines of mythico-mystical discourses where it will, just as Kant indicated, engender antinomies, and so lose all its philosophico-scientific legitimacy. Such a metaphysical order I call *speculative metaphysics*. However, the special systematization attempted, whereby the explanatory power is absorbed from empirical grounds, and in

particular, from a scientifically domain, I qualify as *non-speculative metaphysics*. This, in turn, forms the very science through which it receives its 'livelihood', that is to say, the raw material it evaluates and elaborates on.

Figuratively speaking we can liken a philosophy-science system to an organism wherein the non-speculative metaphysics may represent the central analysing, evaluating and ultimately synthesising power, so to speak, the brain of the system whose outstretching sensory organs are the scientific disciplines. Consequently science lacking non-speculative metaphysics would appear like eyes, ears, nose, fingers and feet abandoned by the brain, and non-speculative metaphysics, missing the relevant disciplines, were to resemble brain without the apposite sensory organs. Therefore science is the sine qua non condition of non-speculative metaphysics and vice versa. Both form that couple which I name philosophy-science. its first and foremost objective is to establish and safeguard a world order, both in the mental as well as material sense, built upon reasoning, experimentation, and as result of these, cognition.

in contrast to the world order that ensues from the Mechanicist-materialist world view which as a matter of fact is derived from the philosophy based on physics, the emerging new one will grow out of the Organicist world picture, depicted so succinctly by Jose ORTEGA Y GASSET (1883 - 1955) as "razon vital",<sup>20</sup> that in turn can only be the product of the philosophy of biology.

Present day Man, an outgrowth of the Modern mechanist-materialist Western (West European-American) civilization, has lost his "vital" mutilated <sup>M</sup>razon<sup>if</sup>. The biotic developed into the human life after it evolutionarily brought about reason. Thus human life and reason are coupled to one another; you cannot think the one by omitting the other. Reason and the ensuing knowledge are derivations of life. We can, however, approach life and think of it only through our reason. in order to be in a state to "cogitare" Descartes had first to be "sum". But what does "sum"<sup>11</sup> serve him if he had no "conscientia", and subsequently no power to <sup>M</sup>cogitare<sup>if</sup>? A future system of philosophy-science that will strive to grasp man and the world respectively in their integral form, must give life as well as reason their due. In this case, since life, not in its biotic form of course, overrides many areas of reason, a comprehensive system of philosophy-science should never break its relations with domains lying beyond its confines. The most important of them is, no doubt, religion. While the system of philosophy-science works with confirmable beliefs - i.e. hypotheses - and converts them into knowledge; religion has no need of warrantable beliefs, because it is the principal signpost whereby you can distinguish good from evil, right from wrong, bliss from suffering, and is itself not a knowledge-forming system. Whereas a system of philosophy-science should be considered on principle as worldly, time and space-bound, hypothetical, regulative, analytical, experience-dependent, explanatory, knowledge-seeking; religion ought to be seen as absolutist - initially you are free only to accept it or not -, divine, holy, integrating, instructive, intuitive, perceptive, value-laden, eternally valid, caring and devout. Since religion stands on life's side it has got intermingled with daily affairs and so sits very close to human practices from the very distant past onward. in contrast the system of philosophy-science as a tradition that has emerged comparatively recently in history appeals to pure reason, i.e. rationally, and therefore falls quite far apart from the human heart and soul. Both directions, however, embrace man in his totality. This will be the more so as the new system of philosophy-science takes biology and the philosophy of biology as its basis, while religion already runs through life. in order to find back our lost human integrity both must proceed on parallel lanes. it is in our highest interest not to confuse the one with the other, which confusion has driven us humans so many times to disaster. While on the one hand religion provides us, as beings conscious of our finiteness, with the most intrinsic moral principles and guide-lines, in other words, our elixir of life; philosophy-science, on the other hand, functions as the supplier of the necessary systematic knowledge of our biotic groundwork and of the mechanism of the universe.

## Endnotes

1. Compare: Jose Ortega y Gasset: *Historia como Sistema*, pp. 27, 28, 89, 90; compare also: Xavier Zubiri: *El Origen del Hombre*, pp. 147, 149.
2. The Latin *Materia* meant timber, hence stuff of which a thing is made - the Doric Greek 'νεοματοζ': newbuilt, the Latin '*domus*' and English '*timber*' are cognate with *materia* -, subject of discourse or consideration. The sense-development of the word in Latin was influenced by that of the Greek 'υλη' and this became the accepted equivalent in philosophical use - refer: *OED*, v: I, par. 240, p. 1745.
3. Refer: Howard E. Haber and Gordon L. Kane: *Is Nature Supersymmetric?*, pp. 42, 43, 44.
4. it is interesting to notice that a strong undercurrent - in the ontological sense - gets again hold over the minds of many contemporary physicists as we can see in the last sentence of Haber's and Kane's above-mentioned passage: "... *The interactions among the various par*

... *tide s are symmetric...*" A similar manner of viewing the phenomena we can find in Franc Laloe's subsequent passage: "... *Physics becomes again determinist... The random aspect of the re süit , yielded by a measurement, stems from the illusion about the way we perceive the re süit we obtain... Indeed it is not the first attempt to incorporate experimental data ör theories into different conceptual ör philosophical frameworks... in the quantic world there are types of correlations completely different from those we are accustomed to in our daily world, correlations which do not have anything to do mth the fluctuations of a past common cause. it is not seldom that we come across unexpected and interesting phe nomena lying hidden in simple and known equations just like the ones forming the hasis of quantum mechanics. What surprises, then, does the future bear in store for us?*" - Franc Laloe: *Leş Surprenantes Prtdictions de la Mtcanique Quantique*, pp. 1367, 1368.

5. Johannes Hoffmeister: *Wörterbuch der philosophischen Begriffe*, p. 633.

6. Edward P. Tryon: *"Cosmic Inflation*, pp. 155, 156, 157.

7. *Evolution*, stems from the Latin word *evolutio* which means 'unrolling of a book'. More generally *evolution* means 'the opening out ör unfolding of what is wrapped up (for example, a roll, a bud and so forth); in a figurative sense, the spreading out before the mental vision (of a series of objects); the appearance in orderly succession of a long train of events.' in short: "*The series of things unfolded ör unrolled*" - *OED*, v: I, par. 354, p. 911.

Thus we see that *evolution* as a term denotes a process running from simplicity toward complexity. Although this state of affairs reflects a meaning of progressiveness ör onward motion, in short, positiveness, evolution as it is used in the current Danvinian hypothesis appears value-free, which is, in turn, a different kind of value judgement.

8. *Chaos*, in its Greek origin 'το χάος' means dark immensity before there was anything, infinity, boundlessness - refer: A. Bailly: *Dictionnaire Grec - Francais*, p. 2122; also refer: F. Martin: *Leş Mots Grecs*, p. 165.

9. *Cosmos* ('κοσμος') 'orderliness', 'establishment'; from PYTHAGORAS onward 'world', 'universe' - refer: A. Bailly, *ibidem*, p. 1125.

10. Compare: Nicolai Hartmann: *Zur Grundlegung der Ontologie*, pp. 239, 240; also: Nicolai Hartmann: *Teleologisches Denken*, pp. 5, 6; and also: Emil Ungerer: *Die Wissenschaft vom Leben*, vol. III: *Der Wandel der Problemlage der Biologie in den letzten Jahrzehnten*, p. 60.

11. in Alfred North WHITEHEAD's (1861 - 1947) view the two founders of ali Western phi-losophico-scientific thought are PLATO and ARISTOTLE (viz: Part One). "*The safest general characterization of the European philosophical iradition*", however, "*is thai it consists of a series of footnotes to Plato*" (p. 33). Of these two founding fathers not only of the European, but the whole Western thought, it was after ali Plato who leveled the ground wherc-upon philosophy and her shoot were going to grow and flourish - refer: Alfred North Whitehead: *Process and Reality - An Essay in Cosmology*.

12. Immanuel Kant: "The Transcendental Doctrine of Method", chap. III: "The Archicctonic of Püre Reason" (A 832 B 860), p. 653, in *Critique of Püre Reason*.

13. *Case* from Latin 'casus', 'cassus': 'fail', 'chance', 'occurrence', 'case'. 'Cassus' is the noun form of the verb 'cadere': 'to fail' - refer: *OED*, v: I, par. 144, p. 346.

14. Latin 'eventus': 'occurrence', 'issue', from the verb 'evenire': 'to come out', 'happen', 'occur', which derives from 'e': 'out' and 'venire': 'to come' - refer: *OED*, v: I, par. 338, p. 907; well understood, while defining hereby 'case', 'event', 'fact', I deviated somewhat from their vernacular as well as specialised terminological generally accepted usages. in other words, I modified their meanings.

15. Compare: Josę Ortega y Gasset: *"Historia como Sistema"*, p. 115.

16. Refer: Paul-Heinz Koesters: *Deutschland, Deine Denker - Geschichten von Philosophen und Ideen, die unsere Welt bewegen*, p. 82.

17. in the precedent chapter I tried to examine whether the Kantian assumption about the *a priori cognitive faculties* can be biologically founded. More precisely, my question runs as follows: "What is the substratum of our knowledge, taken within the framcwork of current biological data?" A satisfactory and credible answer to this question may not only change substantially the current epistemology, but could alter the whole range of our picture, of our image about the world. If this picture is an outgrowth of our biotic constitution, what are the possibilities of discerning its genetic and evolutionary constituent parts? Moreover, today we know quite well that biological processes are fundamentally physico-chemical m-teractions. So, if our \*knowledge-building' apparatus is biologically constituted, then there must be a *parallelism* between our *apperceptive syntheses* and the *sequence of phenomena*. Even ARISTOTLE believed in such a world order. Immanuel KANT, on the ot her hand, rejected this, for the simple reason that we cannot have a warrantable insight into the m nermost fabric of the world order. in other words, we are completely unable to peer through, thus perceive what there is beyond the appearance. We receive some scattered glints from the outside, out of which *we* build up within the framework of our intelligencce, a meaningful entirety. Indeed, Kant asserts that "*the order and regularity in the appearances, which we entitle nature, we ourselves introduce. We could never find them in appearances, had not we ourselves, ör the nature of our mind, originally set them there. For this unity of nature has to be a necessary one, that is, has to be an a priori certain unity of the connection of appearances; and such synthetic unity could not be established a priori in the original cognitive powers of our mind, and if these subjective conditions, inasmuch*

*as they are the grounds of the possibility of knowing any object whatsoever in experience, were not at the same time objectively valid."*

Wherein after all are we going to find Reality: Does it coincide with the disparate single phenomena or should it be considered as one with the synthetic unity of all phenomena, formed by our understanding?

To this crucial question Kant gives the following answer: *"Sensibility gives us forms (of intuition), but understanding gives us rules. The latter is always occupied in investigating appearances, in order to detect some rule in them. Rules, so far as they are objective, and therefore necessarily depend upon the knowledge of the object, are called laws."*

So we see that Reality is the objective product of the craftsmanship of the understanding. Objectivity does not entail at all that understanding dwell upon the *object as a substantial entity* in the metaphysical sense, but on the contrary, it means that it simply works on the *apparent object*. However, *"the understanding is something more than a power of formulating rules through comparison of appearances; it is itself the lawgiver of nature."* And nature, Kant maintains further on, is the *"synthetic unity of the manifold of appearances according to rules..."* (... appearances, as such, cannot exist outside us - they exist only in our sensibility); and this nature, as object of knowledge in an experience, with everything which it may contain, is only possible in the unity of apperception... This same unity of apperception in respect to a manifold of representations... acts as the rule, and the faculty of these rules is the understanding. All appearances, as possible experiences, thus lie a priori in the understanding, and receive from it their formal possibility, just as, in so far as they are mere intuitions, they lie in the sensibility, and are, as regards their form, only possible through it. "\*"

Ever since René DESCARTES the cleavage in the Westerner's world picture has grown steadily. With the occurrence, first, of the theory of evolution, and then with the relativity theories the breach reaches completion. On the one side, there is the outside world open to be experienced, but on principle sealed off from any cognition of whether it possesses an intrinsic order. On the other side, there is the 'knowing self' which, according to Kant, imposes its own order on the realm of exterior phenomena. Hence Kant does not investigate the experience-contents themselves, but just the mechanism of how we can conceive them, and then attribute to them a meaning. He says that we must learn about our understanding in order to grasp the mechanism of conception. Furthermore the study of the understanding is nothing but logic. While it is the physical sciences' task to investigate the apparent instantaneous of the experience-contents, logic's duty is to establish links between these in conformity with its own rules, not derived from any experience. In establishing links between the most various experience-contents the understanding or logic strives to form a meaningful entirety from which cognition arises.

Thus: "However exaggerated and absurd it may sound, to say that the understanding is itself the source of the laws of nature, and so of its formal unity, such an assertion is none the less correct, and is in keeping with the object to which it refers, namely, experience. Certainly, empirical laws, as such, can never derive their origin from pure understanding. That is as little possible as to understand completely the inexhaustible multiplicity of appearances merely by reference to the pure form of sensible intuition. But all empirical laws are only special determinations of the pure laws of understanding, under which, and according to the norm of which, they first become possible. Through them appearances take on an orderly character, just as these same appearances, despite the differences of their empirical form, must none the less always be in harmony with the pure form of sensibility".'

After all that has been stated so far two principal questions at stake assume an ever growing importance:

1) Can we biologically find out to what extent any given individual understanding is capable of putting forward an empirical law that is valid for other individual understandings too;

2) are there any means or basis for detecting how much the empirical laws, legislated by our intersubjective understandings, correspond with the factual processes running in and outside ourselves?

18. From whatever society, from whatever cultural setting they may proceed, human beings usually live in a *normal* way. What first of all does this expression, 'normal way' mean? it means to be by and large in conformity with the biotic *norms*, and the avoidance of over-stepping them. The norms indicate us the basic vital necessities, like the drive for eating and drinking, self protection and reproduction. But even in trying to appease his said fundamental needs the human is impelled to go beyond the bounds of the pure biotic domain. Being physiologically deficient, man is unable to sustain his existence in the midst of a physico-biotic environment. In and with him some processes have taken place which we so far have not come across in other living beings. These, known as the 'psychocognitive' processes, filled up the void crude physiological mechanisms have left over in man. Thanks to his psychocognitive capacities man has built up a second environment for himself, the *culture*. The threefold concepts - that is, *man, society, culture* (to these we may add *religion* and *language*) - coincide in fact. To use any one of them in isolation of the other mentioned ones would not convey us its full meaning. As an indispensable condition man is born into a society - Household, kinship, clan, community... Without social care and upbringing he will not be able to develop into a fully-fledged human being and survive as such. Every sort of society is a cultural niche. Society and culture, furthermore, embody the concept 'human'. Briefly reiterated: whereas society without humans and culture without society are meaningless, the human cannot exist outside society, hence cultural environment. Given the fact that human is basically a living being, he must first and foremost respond to vital requisites and urges. But even his response to vital requisites and urges is not any more in a purely biotic manner. Almost all of his actions and reactions are culturally tinted. This shows us clearly enough that the human is part of the physico-

biotic (natural) environment as well as the member of cultural circumstances." Thus, the *human* is basically a *biocultural being*.

From food cooking to skyscraper construction, from haircut style to superconductor technology, everything man does is *culture*. He takes whatever nature offers him as raw material. Out of this raw material he is eventually going to produce that this *physico-bio-psychocognitive* urges ask him to do. Usually he does not find any model for his productions ready at hand in nature. That is to say, almost whatever he produces is peerless in the universe so far known to us. To *produce* in fact is a purely human deed. This point can already be conceived out of its lexical definition as "to compose or bring out by mental or physical labour (a work of literature or art); to work up raw material, fabricate, make, manufacture (material objects)..." The word itself is composed of two parts: "Pro": "forward", "forth"; and "ducers": "lead". in case we redefine "to produce" in accordance with its radical meaning in Latin, then, we will come closer to our original determination concerning human nature, "to lead", 'to have the lead over', so to speak, 'to change the world by what is brought forth.'<sup>1</sup> Furthermore, everything the human brings forth is a 'value'. Because whatever man brings forth, or more plainly said, produces is the result of an 'evaluation'.<sup>1</sup> There we comprehend that in the human being an aesthetico-ethical dimension runs along the biotic one. The biotic dimension forms man's fundamental reality without which the aesthetico-ethical one could never be materialised. On the other hand, without the aesthetico-ethical dimension in him, he could never have conceived the reality of his existence as well as that of its surrounding. Thus using the Cartesian terminology we could say that "res extensa" is the groundwork from which only "res cogitans" could ontologically arise. On the other hand, it is solely through "res cogitans" that man becomes conscious both of the physico-biotic and psychocognitive realms. Accordingly, so long something remains there beyond consciousness, it cannot attain 'reality-value', although ontologically it may of course be real. Hence, anything that is being, perceived, afterwards worked out by man's psychocognitive machinery will obtain the status of 'value'. Consequently, 'real' is all that has 'value'. Furthermore, all that has 'value' is 'meaningful'. Accordingly there is nothing exempt of meaning where ever humanity is to be found. These most fundamental themes around which all human activities and existential questions turn compose the problem-bulk of *metaphysics*. *Melaphysics* in particular and *philosophy* in general inherited most of them from its matrix, that is, 'wisdom' out of which it had arisen in about the Fifth century BC in western Anatolia. HERAKLEIDES PONTIKOS (388 - 312) cites PYTHAGORAS (582 - 507) invent the word, and expound it in a conversation with LEON, tyrant of Sikyon." IAMBUCHUS (Iamblichos: 250 - 330) also tells us that it was Pythagoras who used for the first time the term '*philosophy*'<sup>TM</sup> "Philosophy" said Pythagoras, "aims at purifying and conducting human life toward its end purpose. it purifies by freeing life from the confusing disorder and passions of perishable body; it conducts life toward its end purpose by enabling it to recover, rendering it to the God resembling state. This is finally the pure bliss of which life is susceptible. Thus, truth and virtue are the particular efficient means to obtain this double result by proceeding along a natural way. Virtue damps down excesses of passions, whereas truth gives to the all along ready ones the possibility of regaining the divine form."<sup>iv</sup>

Pythagoras defined *philosophy* as an *effort toward wisdom, a love of wisdom*. According to him wisdom is the research of truth. Moreover, truth is in the beings. in his view beings are all that there is immaterial, eternal, essentially active, like the self-sufficient things endowed with a proper existence and remaining always as they are. This truth is attainable only with the use of intelligence. But, since intelligence is that Godlike attribute in us, "*the more we get enlightened by relieving ourselves from the trouble caused by the passions, the more we will be purified through the intervention of dialectics and thus run closer to the purity and light of the Supreme Cause on which intelligence depends.*"

So we can see how philosophy, right at its birth from wisdom, was tightly tied to and influenced by mythical-mystical considerations. "I would be wrong, however," said John Burnet, "to suppose that... philosophy took over any particular doctrines from *religions*".\* Moreover, the influence did not only proceed from mythology to philosophy. Especially in Antiquity we see philosophy exerting some notable influences over mythology and later religion as well. Nevertheless the more they drifted apart the more they could assume their essential and primordial countenances and functions. This, however, did not happen deliberately and consciously until Aristotle's middle aged maturity. Although it was Plato who construed the principal array of problems for philosophy and thereby for science, of course, he categorically refused to cut off the umbilical cord that used to bind philosophy to her mother *Wisdom* and in this way to *religion*. This was why he became the central figure of wisdom - comprising both the Christian and Muslim conventions - as well as of philosophy. Whence it gets so arduous to comprehend his system of thoughts - by the way, the first of its kind. This utterly deep-going and far-reaching system that pins down first and foremost the religious and ethical, then, the cosmological, epistemological and aesthetic questions earned Plato the venerable qualification of "Divine Plato" ("Eflâton el-Ilâhî") in the Islamic tradition.<sup>i</sup>

Shortly after Pythagoras the term '*philosophy*'<sup>1</sup> appeared in texts of HERAKLEITUS (Herakleitos: 535 - 475) and HERODOTUS (Herodotos: 484 - 425) before being treated in its full technical sense by SOCRATES (469 - 399) and PLATO (Platon: 427 - 347). Like Pythagoras, Heraclitus too considered '*philosophy*'<sup>1</sup> within a mystical and sublime context, almost in the sense of 'wisdom'. Thus spoke Heraclitus, the *De Iliad* in Socrates' words:<sup>iv</sup>

"Nature loves to hide" (X/D 123).

"Seekers of gold dig up much earth and find little" (VIII/D 22).

Who, then, are those seekers that dig up much earth in order to find out what nature hides? These are, indeed, the wise who have an insight into the cosmic order: "*The wise one, knowing the plan (gnome) by which it steers all things through all*" (LIV/D 41). The endeavour most proper to humanness is certainly the desire for inquiry and consequently knowledge:

"Men who love wisdom (philosophoi andres) must be good inquirers (historcs) into many things indeed" (IX/D 35).

As said before, in the specific sense of the term *philosophy* was born from *wisdom* at the hands of Plato, and *science* sprang from philosophy, its founding father being ARISTOTLE (384 - 322). Thus it is plausible to

assert that before Plato's - i.e. the first genuine meta-physical - system there was yet neither philosophy nor, prior to Aristotle, science. Both strive to acquire knowledge about the human in particular and the world at large by pursuing the critical, causal, inductive, deductive and discursive manner of reasoning. Their methods and purposes being alike, they only differ in what concerns the scale of abstraction and generalization. Accordingly they form the common structure we call *philosophy-science*. By applying the methods of philosophy-science and some of the most spectacular results to practical ends *technology* came about, especially after the Tenth century in the realm of the Islamic civilization. Technology, in turn, begot modern *industry* in north-western Europe, particularly in the Eighteenth-century England. So, clearly enough, there was neither technology, nor the all-out mass producing mode, that is, industry, before the rise of the philosophy-science mentality.

Another result emerging from all that has been stated so far is that wisdom and *techniques* are a lot more ancient than philosophy-science and technology. Although all societies brought wisdom and techniques forth, only a handful of them arose to a pre-eminent status in the course of time. These were notably societies belonging to the set of the Oriental civilizations' starting with the Chinese and going on with the Indian, Persian, Central Asian Turkish and Mongolian, Tibetan, Mesopotamian, Arab, Jewish, Phoenician, Egyptian, Anatolian; then crossing over to Europe: the Greek of the pre-philosophy-science period, archaic Latin and Teutonic; not to forget, of course, Africa where for instance Mali; and America with its Aztec, Maya and Inca civilizations were outstanding too. So it is evident that the greatest, the most eminent human achievement, the philosophy-science system mentality is after all not the success of a single civilization; all societies coming down through the ages have more or less their grain of salt in this wonderful soup! *Speculate* (Latin: *Speculari*) initially meant to watch, to spy out, examine, to observe especially from a height. Subsequently it came to mean to observe or view mentally; until its noun form *speculation* (Latin: *speculatio* from *speculum*: 'mirror') began to denote a 'conjectural' or 'baseless consideration' which in turn attributed to the term a pejorative sense. For ST. AUGUSTINE (354 - 430) 'speculation' was synonymous with 'contemplation' and 'meditation'. BOETHIUS (480 - 524), on the other hand, used it as a rendering of the Greek 'theoria'. For ST. THOMAS AQUINAS (1225 - 1274) to see through a mirror ('speculum') meant to conceive the cause by perceiving the effect. Thus 'to speculate' was in his view to think and know God by contemplating His creation the nature - refer: *OED*, v: II, par. 558, p. 2952;

also: Jose Ferrater Mora: *Diccionario de Filosofia*, p. 146;

furthermore: Johannes Hoffmeister: *Wörterbuch der philosophischen Begriffe*. p. 570. As with almost all other philosophico-scientific terms, *speculative* got its definite modern version from Kant:

"Theoretical knowledge is speculative if it concerns an object or those concepts of an object which cannot be reached in any experience. It is so named to distinguish it from the knowledge of nature, which concerns only those objects or predicates of knowledge which can be given in a possible experience" - *Critique of Pure Reason*, "the Diacritical Inferences of Pure Reason", A 635 or B 663. Meanwhile here *speculative* is used in the above-mentioned Kantian sense

## TABLO sayfa 118 ve 119

# Peroration

*Credo ut intelligam*

Believe in order to understand

Saint Augustine (354 - 430)

As has been previously indicated several times, philosophy-science, mankind's ultimate achievement on the long and arduous knowledge-gathering and knowledge-processing road, originated from wisdom. From the most primeval and archaic to the most civilised and classical, all traditional cultures possessed some kinds of techniques and wisdom. The techniques served to solve immediate basic vital requirements; whereas wisdom, although taking these hard-pressing daily needs into consideration, did not restrict itself to the finding of short-term concrete solutions.

Although both pursued opposite goals, they have always been necessary conditions of one another. Like techniques, wisdom, in its traditional sense, is concerned not so much with the ascertainment of facts or the elaboration of theories as with the means and ends of practical life. But unlike techniques, wisdom involves a deeper intellectual grasp or insight.

" ... All ancient civilizations seem to have accumulated wisdom literatures, consisting largely of proverbs handed down from father to son as the crystallised results of experience. Perhaps the most ancient known collection of these is the Egyptian *^*isdom of Ptah-hotep<sup>1</sup>, which comes from about 2500 BC. The writings of CONFUCIUS (552 - 479) and MENCIUS (372 - 289), though more sophisticated, are still concerned chiefly with the Tao, the good or normal human life. The early writers of India held views at once more speculative and more disillusioned than those of China; both Buddhists and Hindus found the greatest happiness of man in deliverance from the grinding round of suffering and death through sorption into Atman or Nirvana, where personality and struggle alike disappear. But large parts of the Bhagavagita and the Dhammapada, two classics among the scriptures of India contain maxims and counsels for the conduct of life.

Of far greater influence in the West has been the wisdom literature of the Hebrew people, which consists of the more philosophical parts of the Old Testament and the Apocrypha. Perhaps the most important of these are the books of Job, Proverbs and Psalms and the apocryphal book called *The Wisdom of Solomon*. There is no certain knowledge of who wrote any of them; they are probably the work of various men, extending over centuries. They differ strikingly from the writings of the Greek and Chinese moralists in the closeness with which morality is identified with religion ... "

In fact, again in its traditional sense, *wisdom* is interlinked with morality and religiosity. The three concepts are basically interrelated with regard to both the question of an individual's conduct as well as that of the society in general. Wisdom, so to speak, was considered the supreme stage of morality. In this sense wisdom presents us with precepts in accordance with which we are expected to live. Some of these precepts - such as the doctrines of Confucius<sup>2</sup> and GAUTAMA SIDDHARTA (563 - 483) - have even assumed the strength and universality of those propagated by the Revelational religions. Hence it becomes evident that wisdom comprises components coming from opposing directions: on the one hand it has magical<sup>3</sup> - mythical-mystical components, while on the other they can be considered as precursors to rationality. The most outstanding representatives of wisdom traditions in history show us a spectacular delicate balance between the art of day to day living and some sort of primordial discursive reasoning.

We may ask what is meant by this phrase, 'the art of daily living?' Briefly, it is the appeasement of our daily simple biotic needs, such as hunger, thirst, tiredness, shelter and reproduction. Unable to satisfy these biotically in the same manner as other living beings, man has developed a range of socio-cultural abilities in order to control them. Thanks to these abilities man has invented such devices that represent customs, traditions and from which later evolved certain fixed regulations and institutions. By the founding of the State, man passed over to a brand-new cultural<sup>4</sup> stage, that being civilization<sup>5</sup>. However civilization is more concerned with man's physical features, that is to say, with his exteriority. Despite man's foremost outward feature being his sociability; and his most complex and evolved social organization being Statehood, which is in turn, the first necessary condition for the emergence of civilization, this is not yet, however, sufficient.

What is, meant then, by the concept of the State? According to Jose<sup>o</sup> ORTEGA Y GASSET, it is basically a stabilised, constituted, static coexistence. This kind of immobilised placid and well-defined situation conceals the dynamism that brought it about and keeps it going. The State is unlike the clan, tribe or other similar social structures which are based on blood-relationships, these being purely natural occurrences in which human efforts play no role whatsoever. The State is, so to speak, a new stage in man's definite departure from nature. It is that social grade where an all-pervasive homogeneity, depending particularly upon blood-kinship between the members of the community, begins to lose its pre-dominance. The State, thenceforth, stands for a more or less heterogeneous social order which is not held together by concrete biotic links. Instead, the cementing power is taken over by man-made economic and abstract spiritual-ideal factors.

The State, in its original sense, consists of a great variety of ethnicities and languages. It goes beyond the natural constitution of society<sup>6</sup>.

Initially it was the city-state (polis) that went beyond the still nature-bound community. This city-state we might figuratively call the 'mini-state'. It attained its peak when it reached the imperial phase. Thereupon we come across a 'maxi-state'<sup>1</sup> situation both in the material-physical as well as spiritual sense. Due to the harbouring of multi-ethnic and plurilinguistic subjects the prototypes of such maxi-states procured supranational designations for example the Ottoman, British and Soviet empires. Although the essential constituent elements of the first came from the Turkish, the second from the English and the third from the Russian stocks, none of these empires took on an ethnicity-indicating appellation. From this overriding of parochialism and provincialism we can comprehend that the State is thus the major step in man's thrust toward universalization.

With the onset of Statehood the humanization process gained in pace. Every aspect specifically related to the humanization process began with the coming into being of Statehood and consequently civilization. Thus the

civilising-process is inversely proportional to the biotic one. The more a society gets civilised the farther it moves away from its biotic basis. In fact, the artificiality of all human endeavours made its appearance in connection with the emergence of culture. Better said, artificiality is connotatively equivalent to culture. It then gathered an immense momentum with the rise of civilization.

The transition from a migratory to a sedentary lifestyle, beginning with food-gathering and leading to the fishing, hunting and herding levels and up to the extensive as well as intensive agrarian and finally industrial ones have been the principal steps through which cultures have shown they have sufficient ability to attain that particular stage known as civilization. Usually a number of cultures, standing more or less on a common ground, have eventually developed productive, comprehensive textures, that is, civilizations, which, in turn, have englobed their component elements, the cultures.

Just as related cultures have joined hands to bring about a certain civilization; similarly these have also connected together to form definite sets of civilizations. The two cardinal sets of civilizations in history are the Oriental and the Occidental sets.<sup>7</sup>

While the cradle of the set of Oriental civilizations is to be found in South-East Asia, that of the Occidental ones is located in South-West Asia.

The earliest planting of crops in America (manioc, potato, maize), Africa and South-East Asia (wet-rice farming) occurred around six thousand to six thousand five hundred BC, whereas fully domesticated wheat, barley and pulses were first cultivated in South-West Asia (Jericho) in circa eight thousand BC. The establishment of colonies (villages) in Western Asia (Çatal Höyük - Anatolia), East-ern Asia and North America occurred in seven thousand BC.

However, the diffusion of cultural produces was drastically hampered by several cataclysms: the rise in sea level at the end of the Ice age (8000 BC) created new islands and more coastline in South-East Asia. In 6500 BC a further rise in sea level separated Britain from the Continent and culminated in the flooding of coastal settlements in Australia and the detachment of New Guinea and Tasmania, in this manner certain peoples inhabiting vast regions were cut off from the mainstream socio-cultural developments generated by the species *homo sapiens sapiens*<sup>8</sup>.

"The earliest civilizations had arisen at a few scattered points, like lighthouses in the night or oases in the vast uninhabited or sparsely inhabited Eurasian landmass. Between 1000 BC and AD 500 the pattern began to change. Although America, Australasia and Africa south of the Sahara still remained outside the mainstream of world history, and were to stay so for a further one thousand years, the civilizations of Europe and Asia now linked up in a continuous belt. By AD 100, when the classical era was at its height, a chain of empires extended from Rome, which encompassed the entire Mediterranean basin, via Parthia and the Kushan Empire to China, forming an unbroken zone of civilised life from the Atlantic to the Pacific.

This was a new and important fact in the history of the Eurasian world. The area of civilization was still narrow and exposed to unrelenting barbarian pressures, and development in the different regions was still largely autonomous; but with the expansion of the major civilizations and the elimination of the geographical gaps between them, the way was open for inter-regional contacts and cultural exchanges which left a lasting imprint. In the west, expansion of Hellenism created a single cultural area which extended over a period of time from the frontiers of India to Britain; in the east, the expansion of the Chinese and Indian civilisations resulted in something like a cultural symbiosis in Indo-China. These wider cultural areas provided a vehicle not only for trade but also for the transmission of ideas, technology and institutions, and above all for the diffusion of the great world religions. Beginning with Buddhism, and continuing later with Zoroastrianism, Judaism, Christianity and Islam, religion became a powerful unifying bond in the Eurasian world, with consequences that were political and cultural as well as religious".<sup>9</sup>

As already indicated the set of Occidental civilizations is rooted in South-West Asia (south-east Anatolia and Mesopotamia). The origin of the peoples of that region and their relatively highly developed cultures can be traced back to 8500 BC. Their descendants and their ensuing cultures then began to spread to over a wide-ranging area extending from the Indus river in the east, to the Atlantic ocean in the west, this occurring, as was recently established genetically, during a time-span of more than six thousand years.<sup>10</sup>

To this common origin we must add the two other main components that historically make up the whole loose meshwork of the set of Occidental civilizations. The first of these two was the creation of the Monotheistic-revelational religion, a peerless event in history. The other, no less unusual, was the development of a systematic manner by which man attempted to know himself and the world; this endeavour being called *philosophy-science*.

Both Monotheistic-revelational religion and philosophy-science are the most formalised and complex aspects of human intellectuality-sensibility. They may be evaluated as the ultimate phases of the humanization process. Man, deficient by nature, needs knowledge in order to survive. There is, however, a distinction between that which he can and cannot know in principle. Both sides of the equation are equally vital for the sustenance of man's existence.

Certain *beliefs* which, in principle, are impossible to turn into knowledge, are designated as *faith* - al-though 'impossible' is perhaps not the right way to qualify the aforesaid state of affairs as 'impossible' implies its contrary, 'possible'. 'Faith', however, has nothing to do with the 'possible'. The 'belief that we do not at all expect to be verified or falsified or, in other words, screened within the frame of warrantability or test-ability is, as said before, 'faith'. This triplecity of belief, knowledge and faith began to gain conspicuousness with the onset, first, of the Monotheistic-revelational religion and later of philosophy-science. Likewise the consciousness of ones individuality was intensified by these two aspects of intellectuality-sensibility.

According to the Monotheistic-revelational religions, the characteristics of which are most appropriately brought to light in the QUR'AN, there is a unique, su-preme, competent *Authority* omniscient, omnipotent and omnipresent. This sempiternal, all-powerful Authority is the principal source of everything that was, is, will, could and can be. Indeed the most relevant modus of verb to describe this all-penetrant power is '*can*'. There is nothing that might be impossible in the range and strength of this Authority's capacity and in this context we come to understand that this thus lies beyond the human comprehension. Our limited existence, hence finite intellectuality-sensibility is not in a position to grasp rationally His infinite Being and Logos. Thus we are unable to apperceive whether creation has been all-at-once or gradual. Our observations and the ensuing reflexions over them makes us think that everything happens in a procedural manner. Since what we establish observationally forms the basis of knowledge, we take the procedure, or what can be expressed in contemporaneous terms, evolution of the uni-verse for granted. "*What I see I know, and what I do not see I assign to God*" said Prophet MUHAMMAD (570-632). Therewith we can perceive what a clear line of demarcation was drawn between faith and knowledge with the advent of the era of the three Monotheistic-revelational religions. This provided the bedrock for the evolving mentality of philosophy-science, which, in turn, prepared favour-able grounds for a better understanding of the essentialities Religion's Message wants to convey to us. Both arise from the extremely abstract intellectuality. There is no place for images in the very core of their mutual source. Their re-semblance does not even stop there. Rather, they continue running on parallel lanes for a while.

Whereas the prime principle (cardinal faith) of the Monotheistic-revelational religion is the all-embracing, all-pervasive, all-mighty and transformatory (i.e. beyond any imaginable shape) Being, the ensuing principles assume a much more concrete-appearing outlook. Religion with its Message-bearing Revelation addresses every individual throughout all times. For this reason the wording of the Message must be extremely indistinctive and metaphorical in order to be meaningful for every human, no matter how dull or intelligent, ignorant or learned she or he might be. In fact, the religious Message approaches only the person with an average or above-normal intelligence quotient. On the contrary, persons such as the mentally handicapped, the intoxicated, as well as children, are not liable to the conditions set forth by the Quranic message, because they are in no position to judge it. The most fundamental religious deed, the decision to believe or not to believe in God, is after all a matter of judgment. He who decides to believe in God within the context of a religion accepts, accordingly, all the subsequent creeds without looking around to find any relevant rational tenet. Therefore, it can be stated that the *starting point of faith is decision*. That any *decision implies* more or less *free choice*. Subsequently, *choice involves judgment*. The person *pronouncing a judgement* is an *intelligence-bearing being*. The *choice to follow or not the direction the Message indicates is the most substantial decision taken during one's lifetime*, in case the decision falls in the direction the Message indicates, all the ensuing conditions ought to be accepted unquestioningly. Thus Religion excludes all other decisions but the one that is declared as primary and substantial by the Message itself. The unconditional observance of the credo, as heralded by the Message, is the consequence of this primary and substantial decision. Furthermore, the burden of decision lies on the shoulders of the deciding person. So it can be seen that with the advent of the Monotheistic-revelational religion, as previously indicated, a completely new situation arose: firstly, contrary to the ancient conception of circularity, all events were considered as occurring along linearly running time-space coordinates. This means that except for God, everything has a beginning and an end, and is subjected to process's inevitable outwearing effects. So nothing can ever go back to its initial state, nor even, to its previous situation. Secondly, everything that there is occurs only once; hence it can never recur; and thus has a definite time limit of existence. This mode of thinking brings in its wake some kind of a notion of individuality with regard to living things, and particularly when considering the human being. Thirdly, man is the crowning of Creation and this finds its manifestation in the fact that he is endowed with *free will*. With this we now leave the domain of theologically induced *ontology* and enter the realm of *ethics*.

One of the cardinal novelties the Monotheistic-revelational religion has brought to humankind's common treasury is the assertion that man is equipped with free will. This is man's essential attribute. He is the sole creature furnished with this unique characteristic. Non-living things interact mechanically (motion). Living things, on the contrary, can move (locomotion) and behave on their own, and yet are driven by an inborn mechanism. The weaker this mechanism becomes in the living being, resulting from the evolutivo-genetic processes, the stronger grows the urge to learn. Finally in man, most particularly in certain human beings, the aforesaid ratio is reversed in favour of learned acquisition and in stark contrast to inborn drives. Learned acquisition means the first major step toward the

possibility of being able to make a *choice* or *decision*. This, in turn, opens the way in the di-rection of free will; and decision bears a heavy burden: *responsibility*. Thus every human must account for the decisions he makes and how he carries them out. Man existentially finds himself at the crossroads. Neither outer forces nor inner mechanisms can fundamentally and ultimately affect him or which way he chooses to take. He is essentially free. Furthermore, *man is the freedom-bound being. Freedom's logical pair is responsibility*. Hence *the freedom-bound being* is at the same time *responsibility-bearing*. Accordingly, he who chooses his way freely must account for all her or his intentions, thoughts, sentiments and deeds from adolescence onwards.<sup>11</sup> Moreover, among these four components forming man's moral integrity, the most important one is *intention*. But, to whom is man responsible? To God; the absolutely transcendent Being who has at the same time a total inward view and cognizance of the human individual. So, it is believed that He is completely aware of every single minute intention taking place in one's mind. For this reason intention takes precedence over the exteriorised thoughts and deeds. Therefore the primary retribution in the form of reward and punishment on the Day of Judgment is given with regard to intention rather than other things. This position is explicitly stated in the ultimate Message of the Monotheistic-revelational religious tradition<sup>12</sup>, the QUR'AN:

"O ye who believe, you should worry about your own necks - you are responsible (only) for yourselves. If the others go astray, they cannot hurt you, as long as you are guided - he who errs cannot harm you if you are on the right path. To God is your ultimate destiny, all of you, He will inform you of everything you had done - to God you will all return, and He will declare to you what you have done" [5/105].

Thus it is this intrinsic motivation, not the apparent deed and purpose accepted as the gauge by manmade morality, which impels an act towards its end. In addition, the one who perceives and considers the purpose and more importantly the motivation of our deeds is not a human or anthropomorphic authority. With the coming of the Monotheistic-revelational religion man has finally quitted the state of remaining solely under the guardianship of man. Thereby man left the anthropo-centric and anthropomorphic domain for the transhuman realm. So man, ultimately and essentially no more fettered and tutored by fellow-man, is now free to pursue his most human ambition, morality and cognition.

Thus, through the Monotheistic-revelational religion a utterly curious state of affairs has arisen: man, from adolescence onwards is in principle free in relation to his fellow-man, although paradoxically, if he is a believer, he is at the same time absolutely submitted and bound to his Creator morally and existentially. Since the believer is in constant contact with the Creator he is never alone; he cannot act just as he pleases. He is constantly under surveillance. In fact, he does not need to wait until Doomsday to stand trial. A person once having freely decided to believe in God is thenceforth completely deprived of her or his freedom with regard to the Creator. She or he is, so to speak, completely delivered from being left alone in the face of death, the ultimate end of that conscious existence which means life.<sup>13</sup>

In consequence, the cardinal concepts and terms that make up the core of our intellectual and spiritual realm - like life, death, creation, universe, the Earth, nature, matter, body, soul, spirit, belief, faith, knowledge, miracle, duty, conscience, consciousness, the good, evil, time, human and of course God, the Creator and the Supreme Authority of the created and uncreated entirety - either we come to learn in a new light or we come across for the first time through Monotheistic-revelational religion.

There are huge differences, even opposing features, between the Antique Aegean, Medieval Christian, Islamic and Modern secular European civilizations, the four main pillars of the set of Occidental civilizations.

Although originating from the same source and sharing a variety of salient properties, among which the urge to accumulate knowledge in a systematic manner stands out most prominently, the divergences between these civilizations are eye-catching. Most particularly the Modern secular European civilization has diverted to a brand new road, very different from the ones taken previously by the Medieval Christian and Islamic civilizations. From Fourteenth-century Italy onwards, due to various factors, a completely new tide of thoughts and manners began to make their way towards the north, crossing over the Alps, into France, through the Netherlands and finally reaching England.

The forerunners of this so-called 'new tide'<sup>1</sup> were already seen in Fifth-century BC Athens: a gross extension of free trade, transacted by money which was a standard of assessment completely deprived of any concrete value; a drastic change away from the 'clan-destined' and parochial mind-setting towards a universally comprising rational vision; the transformation from a community-imbued tradition-bound life style into an individually construed generally not-yet-practiced one; and consequently the shaking-off of the age-old views concerning authority and their replacement with free choice. The never-before-seen attitude continued, though with some deviations, throughout the Christian and particularly the Islamic Middle Ages before reaching its final destination in Sixteenth-century England.

In the Muslim world from the Sixth to the Fifteenth centuries the above-mentioned attitude received, basically

through the Islamic creed, a formal definition. Indeed, as mentioned earlier, 'individuality' with an unswerving devotion towards the Creator and His Creation - especially the human community - ought to be the very foundation of religiosity, and this is clearly emphasised by Islam. Let us now see how this predominant feature of Monotheistic-revelational religion has been elucidated by the contemporary Muslim scholar Hassan Abdullah Al-TURABI from Sudan: *"Religion, in the first place, is one's own consciousness of private relationship and individual responsibility to God. Total oblivion of one's unique individuality is negative of the fundamental internal dimension of faith and is tantamount to religious suicide.*

*Over-consciousness of one's ego breeds selfishness and nonconformism, which are not only antithetical to the social nature of man, but also to the religion that teaches one's origin and one's destiny for man and preaches one God, one way of life and one community for all believers".*<sup>^</sup>

With the advent of the new era starting from Italy, a location just halfway between the Islamic east as well as southern and the Christian west as well as northern parts of the Mediterranean sea, the mind-setting expressed in the second-paragraph of Al-Turabi's piece of writing gained eventually the upper hand.

From the early Sixteenth century onwards this extraordinary new trend of sensibility-intellectuality came to be known as *Humanism*.<sup>^</sup> Subsequently from the Seventeenth century onwards first in France and the Netherlands, a shift could be observed of Monotheistic-revelational religion's God-centered reference of authority towards the human individual. As a consequence of this trend *Liberal-ism-Capitalism* - the former being the political and the latter the economic face of the same phenomenon - emerged in Seventeenth - and Eighteenth-century England. This spear-headed the human individual into the ultimate focal point. PROTAGORAS' (481-411) illustrious phrases from the Fifth century BC epitomize this newly oncoming era in all its breadth and length: *"Man is the measure of all things, of things that are, that they are, of things that are not, that they are not"* [126]. *"Of the gods I know nothing, whether they exist or do not exist: nor what they are like in form. Many things stand in the way of knowledge - the obscurity of the subject, the brevity of human life"*. [127]<sup>^</sup>

Thus, we find ourselves in what we have come to recognize as 'Modern times'. All bonds linking us to nature, fellow-men and God finally have become loosened. Over-consciousness of one's ego, in Al-Turabi's words, has gained precedence over and above every other consideration. First, in the Sixteenth century, the Earth lost its central position in the Cosmos; then, living nature failed to keep its indispensable order, and fortuitousness was introduced into it; and finally man was deprived of his eminent rank as God's outchosen creature and representative in the Universe. Just as Protagoras foretold, man in his capacity as an individual became the sole measure. Henceforth, he began to believe that he was accountable primarily to himself, and only secondarily to those with whom he chose to cooperate. The scope of his deeds needed to cover nothing except worldly goods. Eventually everything that surpasses the realm of worldliness has come to be seen as null and void. Consequently economics comprising the production-consumption equation overwhelmed ethics to such a degree that the latter became obliterated. This state of affairs provided the individual with an unabated and thus unabashed capacity for free choice and action. He could feel, think and do thenceforth whatever he considered served his personal taste and interests. Things he could not perform by himself he did in cooperation with those who were in a state to share his trouble/s and gain/s. So we can see that the so-called natural society into which we are born in the irony of fate relinquished its place to a contractual one, just as Jean-Jacques ROUSSEAU (1712-1778) anticipated, a good illustration of this on a large scale being seen for the first time in history in the experience of the English founding fathers of the United States, in the old society which was closed, the individual was expected merely to live out his life. This has now come to an end and a new society has begun in which it is possible for the individual to participate only and when it is deemed profitable by him. In such a context everything perceived attains a certain value only according to the individual's own assessment and initiative. If these assessments and initiatives are in tune with the mainly economic-based evaluations then he is considered successful in the eyes of his peers who are at the same time his competitors. So friend and foe become ephemeral, and their relative positions are steadily interchangeable according to the requirements of their interests. Consequently there is nothing that remains lifelong, let alone supernatural. The individual, considering himself as the yardstick, the gauge of everything, of all events, begins to regard all that surrounds him in space and time as simply material and to be worked up alongside his economic interests. So everything found in nature, including all other people, takes on only a material value. Accordingly material wealth becomes accepted as the ultimate goal to be attained. It was this new frame of thinking which begot the mentality of free *competition* which can be regarded as the translation of biology's *"struggle for survival"* into the socio-economic sphere.<sup>18</sup>

This newly emerging picture saw its finalization in England from the Seventeenth century onwards. It was actualised by two groups the English, and the religiously as well as racial-orientedly Jewry who were confined to remain outside the definitely set socio-cultural boundaries so designed by the segregationism of the Christian Europeans. By virtue of their peculiar - and dramatic - status, European Jewry only had access to trade and it was

within this field that they were able to play the substantial role of commercial go-between within various European and, to a minor extent, non-European countries. In this way they succeeded throughout the Middle Ages and post-Medieval era to accumulate - in spite of the harsh constrictions laid upon them by the Christian authorities - a considerable amount of wealth in terms of goods as well as money. Then, in the Seventeenth - and Eighteenth-century England they discovered that their long-standing wealth could be transferred into capital, the most propitious headstone of the newly emerging 'world order'. Following the footsteps of the primarily commercial-oriented English pioneers they made worldwide use of their capital. The age-old custom of evaluating material as well as produce with regard to other goods or, later on, money, gave way to a new manner of transaction wherein money was traded in relation against money. Thence a totally abstract and arbitrary manner of evaluation evolved. He who held the economic leverage had the opportunity to play arbitrator between producer and consumer. So the producer essentially had no more say whatsoever over the end result of his labour. Consequently while the greater part of humanity became alienated to their work and its products, and through that to other people in general and particularly their kinsman - adopting the so-called enslavement-mentality - a minute minority assumed an all-dominant master's voice over what is good and bad, right and wrong, nice and ugly.

Now, the place left vacant by the archaic consistent '*homo religiosus-ethicus-bellicus*' was self-assured being faithful to his community. In contradistinction, one part of the modern '*homo economicus*' appears to be resigned, submissive, faint, a non-individual swallowed up by the mass and thus ready to be dominated whereas the other part is self-assertive, spoiled and domineering. Both are, nonetheless, non-entities. They do not identify themselves with any intrinsic communal / social affiliation. A flimsy defined 'ego' is their central residence in the world. Therefore it is not surprising to find that only in the English language, which so far expresses in the best possible way the modern mood and mentality, *ego* is written in capital: / . in those more or less conventional languages, on the other hand, the addresser is seen to be subjugated to the addressee, just as is the case with German where in contrast to English, the addressee is written in capital, 'Du' or 'Sie', while the addresser, 'ich', in small letters.

In continuation of what we said above, the modern view holds firm to one belief and that is, as elucidated by Syed Muhammad Naquib Al-ATTAS, "*everything existing is a progression, a development or evolution of what lies in latency in eternal matter. The world seen from this perspective is an independent, eternal universe; a selfsubsistent system evolving according to its own laws*". ^

*Progress* and *development* are already present in the Quranic - hence in Mono-theistic-revelational religion's - context. But there they serve as the means, as the leading agents towards a meaningful, blissful purpose. Within the Modern secular framework, however, they assume a double role: they are both the means and the end at the same time. So, we may say, 'progress for the sake of progress' or 'development for the sake of development'. In their archaic, or in other words, pre-modern purpose-bound connotation, 'progress' and 'development' always indicated a positive-oriented futurity, perfection. It being so, particularly in the scientific usage - whether we are still entitled to use the label 'science' for our technological endeavours is another question - we are strictly forbidden to work with value-laden linguistic devices. So the positive-oriented purpose-bound connoting terms 'progress' and 'development' are no longer approved of at all in the scientific and specifically the biological context where they have been in use from the days of Aristotle, passing through the Christian and Islamic Middle Ages, until Lamarck's times. Particularly from the time of Charles Darwin onwards they have been replaced by a relatively fresh, still value-free term, 'evolution'. But soon afterwards this was also seen to be teeming with value judgments. It became an emblem expressing succinctly all that the Modern secular view, supplied by Mechanistic Materialism, has in store. It transgressed biology's limits and was rapidly adopted by politico-economic factions.

The socio-cultural life left vacant by the thenceforth disesteemed religion was soon to be filled by a handful of cumbersome dogmatic outgrowths of various philosophico-scientific systems, each of them making up an *ideology*. As stated previously the central ideology from the Seventeenth century onwards has been the Anglo-Judaic-born *Liberal Capitalism*. It ensured its spread first over Europe by means of the French Revolution - which it inspired, backed and even patronised. Then, it became worldwide, and very cunningly established a fake-alternative to itself, *Communism*. It was assumed that man would not feel the necessity to replace Liberal Capitalism. But, of course it is impossible for us to anticipate down to the smallest details all the potential problems which may arise. Accordingly, the initiators of Liberal Capitalism had apparently failed to foresee the rise of an ideology totally opposed to their's, that being *National Socialism* and its milder sibling *Fachism*. Since Liberal Capitalism and its now defunct offshoot Communism were proclaimed as the single-handed progressive way of thinking and acting, any opposing, contrasting ideology or world view cannot, therefore, be anything else but revulsionary. Hence Fachism and National Socialism as well as some Theist-Spiritualist considerations - totally unrelated to the first-mentioned two ideologies - have been branded as reactionary-revulsionary. In spite of the fact that National Socialism has evolved to a degree where every-thing that Liberal Capitalism and its seemingly adversary Communism have claimed to be worthy and positive are denied, common to both sides is an *evolutionary* assessment of life and the world - though with differences in shade.

Hence stock-qualifications like 'modernity', 'contemporariness', 'progressiveness' and so on connote all over the globe 'Europeanness', and even something vaguer, 'Westernity'. So, what is Europe? A so-called continent arbitrarily chunked out of the immense landmass, known as Eurasia? Since the middle of the Nineteenth century it is conjectured to extend from the Ural and Caucasus mountains to the shores of the Atlantic ocean. Why, the Urals and Caucasus, and not, for instance, the Altai or Karakorum mountains? Who knows?

Scores of peoples and countries - the number is ever changing, especially these days - are to be found in this part of Eurasia. Which, then, of these peoples embody this fabulous way of living, world view or mentality, we briefly call 'Europeanness'? The Russians, to begin from the east, Polish, Serbs, Bosnians, Germans, Danes, Dutch or the French, Italians, Spaniards, Portuguese or the Basques?

Certainly, there is a European civilization; but no single European culture, not to speak of a European nation. Let us look for a moment at two of the three pillars of Modern European civilization, the French and German cultures. There were substantial differences between these two neighbours, not so long ago, say, a hundred years ago. We can contrast the dissimilarities existing between these two geographical neighbours with two of the three upholders of Islamic civilization, Turkish and Persian cultures which in the near past did not display any such notable disparities.

From the late Eighteenth century onwards the whole of mankind had been captured by the "Westward ... westward ... ever westward"-frenzy. Everyone's longing gaze rests on what lies towards his west-side. Russia looks towards Germany, who in turn, together with non-European Turkey and Persia has her eyes upon France. Even those countries geographically situated farther west such as Spain, Portugal, Brazil and Mexico are equally gazing at France who, in turn, stood in full admiration in front of England. And England? She and her transatlantic offspring America are at the end of the line.

Thus the present-day global civilization - the first of its kind in history, for no other civilization has ever gained such worldwide validity - should not be mis-qualified as European or Western. Specifically it should be named a Modern Mechanicist-Materialist-Secular Liberal Capitalist Anglo-Judaic<sup>20</sup> world civilization. This, as can already be deduced from the foregoing arguments, could not occur anywhere else except in the frame of the set of Occidental civilizations, especially after the Monotheistic-revelational religion's coming into being and the establishment of the tradition of the philosophy-science system. It is, after all, a harsh and deliberate deviation of the former and an emphatic, gross exaggeration of the latter. This peerless course in history got its main surge from the rising trend of *Humanism* and *Secularism*. With the *industrialization movement* it became, so to speak, 'the straw which broke the camel's back'<sup>1</sup>! It turned into a murderous race driving on at the expense of the total destruction of man's bio-cultural existence. Unabated it goes on unchecked at full speed; and it seems that this destructive course will continue in the foreseeable future. No light, yet, is to be seen at the end of the tunnel. Humanity wholeheartedly runs with an ever increasing pace towards that goal set by Modern civilization: mere material gain! This is the cardinal evil, in the wake of which exploitation, injustice, inequity, discrimination, partiality, conceit, impatience, insecurity, distrust, meanness, shallowness<sup>21</sup>, carnality and many other malignities come in rushing. We cannot seek shelter in any of the ready-at-hand intellectual constructions. Man's time-honoured asylum, not religion as such, but its conventional forms and practices, is no longer in a state to provide us with the expected integral cover or refuge.<sup>22</sup> Like butterflies leaping into the flame of a candle, do we rush, as well, headlong into a no more avoidable disaster? Are we entitled to speak, together with Francis FUKUYAMA, about the end of History? Yes, because, *unless*, we unfold a fresh world view out of a newly construed system of philosophy-science, to stand as an alternative to and consequently challenge in full vigour the prevailing one it will be the end of History.

## Endnotes

1. Brand Blanchard: "Wisdom", p. 322 in "The Encyclopedia of Philosophy", pp. 322-324.
2. Contrary to magic and myth, wisdom eventually takes the form of the written word of which the authors are usually known. Nevertheless, like magic and myth, it is not forward-looking and striving; it keeps its eyes on past sources and achievements; in short, it is traditionalist; and whenever it appears nonconformist, this happens undeliberately. Furthermore, the unexpected almost nonconformistic occurring manifestations never amount to tactless and frivolous attitudes. An ample demonstration of what has been said so far about wisdom we find in an excerpt taken from Kung Fu Tzu (Confucius), one of the most notable wisemen in history:

1 <sup>></sup>I transmit, but I do not create; I am sincerely fond of the ancient..."

2 "To take note of things in silence, to retain curiosity despite much study, never too weary of teaching others: no one surpasses me in these three things."

3 "Not to improve my Excellence, not to pass on all that I have studied, to be taught what is proper, but be unable to change, to be unable to rectify my incompetencies: these are my worries."

- 7 "I shall always teach, even if but a pittance be offered me.<sup>M</sup>
- 8 "I do not instruct the uninterested: I do not help those who fail to try. If I mention one corner of a subject and the pupil does not deduce therefrom the other three, I drop him."
- 23 "Sky begat the Excellence in me ... " - cf: Descartes' demonstration of God!
- 26 "it has not been my fortune to meet a sage, but perhaps I shall meet with Great Man. it has not been my fortune to meet a competent man, but perhaps I shall meet one possessed of constancy. But when a man pretends to possess something which he lacks; knowing nothing he claims omniscience, when, being petty, he claims to be great: such a man does not possess constancy."
- 33 "I give the best that is in me, just as others do, but as for personifying Great Man in service to the State, that I have not yet achieved."
- 34 "I make no claim to be a sage or to be Manhood-at-its-best; but it can be said of me that I act unstingingly with them in view, and that I am never weary of teaching others."

36 "Extravagance leads to disobedience; parsimony to miserliness. Of the two I prefer miserliness."

37 - "Great Man is completely at ease; Petty Man is always on edge" - chapter VII.

26 "Great Man is dignified but not proud. Petty Man is proud but not dignified" - chapter XIII: "Chung Yu ... ", *The Sayings of Confucius* \ Also refer: Alfred Fouille: *Extraits des Grands Philosophes*, pp. 13 & 14.

3. "... *The magical world was a world of relationships rather than independent objects, and was based on man's own interrelationships with the life and conditions he found around him in a world where forces were personified and everything had a specific influence*" - Colin A. Ronan: *SCIENCE / Its History and Development Among the World's Cultures*, p. 11.
4. Culture's etymological derivation: From Latin *cultura*: cultivation, tending. From *cultivare*: to till (ppl stem: *cultivai*). Thence: *cultivus (cultiva terra)* : characterised by being tilled. From *colere* (pa ppl: *Cultus*): to till, cultivate, take care of. From the Indo-European root KWEL - 1: to turn, move around, hence to dwell in. The 'turn' sense gives us the Germanic word 'wheel' and the Greek one 'cycle'. The 'dwell' sense renders us the Latin 'colony', 'cultivate', 'culture' and 'cult' (a religious group with which one dwells) - refer: *OED (The Concise Edition of the OED)* , vol. I, p. 622, §§: 1246, 1247 & 1248; also refer: Robert Clairborne: *The Roots of English*, p. 145.
5. Civilization is a modern term dating back to the Eighteenth century. it stems from *civilis*, of or pertaining to citizen (*civis*: citizen). *Civis* originally came to denote 'a member of the community' or 'a person belonging to the household', and is cognate with the Old High Germanic word *hi(w)o* (presently *Heirat*) meaning 'member of the family household'. it emanated from the Indo-European root KEI - 1: to lie, whence bed or couch; also (though

not in English) beloved, dear (the quality of one you bed with). From the 'bed' sense we get Greek *koiman*, put to sleep, whence the 'cemetery' where the dead are put 'to sleep, perchance to dream'. in Latin and the languages descended from it the root acquired the special sense of 'member of a household' (who beds down there), whence *civis, civit* -, 'citizen', 'city' (originally, the citizenry of Rome, not the physical town), 'civic', 'civil' (pertaining to or befitting a citizen, 'civilised'), and 'civilian\*' - refer: *OED*, p. 422, §: 446; also refer: Robert Clairborne: *The Roots of English*, p. 130; also refer: Günther Drowski & Paul Grebe: *Duden: Herkunftswörterbuch der deutschen Sprache*, p. 784; also refer: Guido Gomez de Silva: *Breve Diccionario Etimologico de la Lengua Espanola*, p. 168.

*Civitas* in Latin, *polis* in Greek and *madina* in Arabic mean state (city-state), statehood. *Civilis, politikos* and *madam* in addition to their original meaning, of or pertaining to citizen, urbanised, city-dwelling, and moreover to statehood, have eventually acquired new connotations such as 'civil', 'civilised' (*civilis*), 'polite' (*politikos*), 'urbane' (*urbanus*), 'well-bred' ... Hence we have got the term 'civilization' in most of the European languages (one of the exceptions to this we find in Dutch: *Beschaving*), and the originally Arabic word *medeniyet* in Turkish as well as in Persian - refer: G. Campanini & G. Carboni: *Vo-cabolarario Latino - Italiano & Italiano - Latino*, p. 112; also refer: L. Dillies: *Vocabulaire Français - Latin - Grec*, p. 45; also refer: Hans Wehr: *A Dictionary of Modern Written Arabic*, p. 899; also refer: Şemseddin Sâmî: *Kâmûs-i Türkî*, p. 1315; also refer: Ann Lambton: *Persian Vocabulary*, p. 221.

in the Muslim world, beside *madaniyat, tamaddun* is also used to denote civilization. it is cognate with 'madaniyat'. Both derive from *din*, the conventional meaning of which is religion, but which also can be reduced to the subsequent senses as well:

- 1 - indebtedness,
- 2 - submissiveness,
- 3 - judicious power,
- 4 - natural inclination or tendency

see: Syed Muhammad Naquib Al-Attas: *Islam and Secularism*, p. 48.

<sup>H</sup>The verb *dana* which derives from *din* conveys the meaning of *being indebted*, including various other meanings connected with *debt*, some of them contraries ... Being in debt and under obligation naturally involves *judgment: daynunah*, and *conviction: idanah*, as the case may be. All the above significations including their contraries inherent in *dana* are practicable possibilities only in organised societies involved in commercial life in *towns* and *cities*, denoted by *mudun* or *mada'in*. A town or city, a *madinah*, has a *judge, ruler* or *governor* - a *dayyan*. Thus already here, in the various applications of the verb *dana* alone, we see rising before our mind's eye a picture of civilised living; of societal life of law and order and justice and authority. it is, conceptually at the start, connected intimately with another verb *maadana* which means: to *build* or to *found cities*: to *civilise*, to *refine* and to *humanise* \ from which is derived another term: *tamaddun*,

meaning *civilization* and *refinement* in *culture* ... Now the very notion of law and order and justice and authority and social cultural refinement inherent in all these significations derived from the concept *din* must surely presuppose the existence of a *mode* or *manner* of *acting* consistent with what is reflected in the law, the order, the justice, the authority and social cultural refinement - a *mode* or *manner* of acting, or a *state* of *being* considered as *normal* in relation to them; so that this *state* of *being* is a state that is *customary* or *habitual*. From here, then, we can see the logic behind the derivation of the other primary signification of the concept *din* as *custom*, *habit*, *dis-position* or *natural tendency* ... " - Syed Muhammad Naquib Al-Attas: *Islam and Secularism*, pp. 48, 49 & 50.

6. Refer: Jos6 Ortega y Gasset: *La Rebelion de las Masas*, p. 176.
7. *Oriental* and *Occidental* designate the two distinguished sets of civilizations in history. They, unlike east and west, do not possess geographical, political and ideological connotations.
8. According to the latest estimates *Homo sapiens sapiens* is being dated to almost hundred thousand years back and is supposed to have come into being in Eastern Africa. - See: Colin Renfrew: *Post Worlds - The Times of Archaeology*, pp. 12 & 13.
9. "The Classical Civilisations of Eurasia" in "The Times Atlas of World History", p. 68.
10. Refer: Pierre Rosson: *Deş Migrations Inscrites dans Nos Gtnes*, pp. 52-55, "N6outhique: La Premiere RGvolution Sociale" in *Science et Vie*.
11. "God did not leave the human being without preparation. To Help the human creatures in their final chance to reconsider their decisions, every person is born with instinctive knowledge that God alone, and no one else, is our Lord and Master [7/172-173]. Additionally, God sent messengers to deliver messages, warnings, and abundant information to help us redeem ourselves. With all these elements in view, we can appreciate the fact that the only unforgivable offense (if maintained until death) is idol worship: believing that anyone besides God possesses any power.  
The human being is given forty years to study, look around, reflect, and examine all points of view before making this most important decision - to uphold Satan's point of view, or uphold God's absolute authority. Anyone who dies before the age of forty is chosen for re-demption due to circumstances known only to God [46/15 J. If one decides at a young age that God alone possesses all power, then dies before the age of forty, the most probable destiny is the High Heaven. Otherwise, the Lower Heaven is the destiny for most people who die before forty" - Rashad Khalifa: "Introduction", p. xv in *QUR'AN / The Final Testament*, translated from the original by Rashad Khalifa; some of the Quranic verses quoted in this text are taken from the authorised English version with the Arabic text.
12. in this context refer also: Maurice Bucaille: *The BIBLE, The QUR'AN and Science*", pp. i,ii,iv,v,vi,vii & Part: IV.
13. Thus speaks the QUR'AN: "it was We Who Created man, and We know what dark suggestions his soul makes to him: for We are nearer to him than (his) jugular vein" [50/16] - "God created man, and gave him his limited free-will. God knows the inmost desires and motives of man even better than man does himself. He is nearer to a man than the man's own jugular vein. The jugular vein is the big trunk vein, one on each side of the neck, which brings the blood back from the head to the heart. The two jugular veins correspond to the two carotid arteries which carry the blood from the heart to the head. As the blood-stream is the vehicle of life and consciousness, the phrase 'nearer than the jugular vein' implies that God knows more truly the innermost state of our feeling and consciousness than does our own ego" - Abdullah Yusuf Ali's commentary to the verse 16 of the Sura <sup>M</sup>Al-Qaf, p. 1412, S: 4952 in the *Holy QUR'AN*, translated by Abdullah Yusuf Ali.
14. Refer: Miguel de Unamuno: *Del Sentimiento Tragico de la Vida*, p. 61.
15. Hassan Abdullah AJ-Turabi: *An Islamic Doctrine on Human Association*, p. 32.  
We can get an idea of the extent to which the Monotheistic-revelational religion -grounded as well as philosophy-science-based Occidental civilizations have been drifting away from others, among which we may include the Chinese - one of the principal 'stars' of the Oriental civilizations - by referring briefly to Wolfram EBERHARD'S brilliant study, *Dictionary of Chinese Symbols*: "it is significant that until very recently there was no word in Chinese for what we call 'freedom', either in the political or in the philosophical sense. The word 'zi-you', which is still used for 'freedom', really means 'to be on one's own' 'to be left alone' - i. e. it has a negative connotation. Similarly, there was no word for 'individualism' and no word for 'equality for rights'. As the Chinese saw it, no man is equal to another: he is older or younger than another, superior to women in that he is male, or more highly placed in the State hierarchy. 'Brotherliness', as it was grasped in early Christianity, did not exist in China, for the individual saw himself as a member of a family, and not obliged to do anything for someone who had no family of his own. The Confucian ethic which ruled society prescribed man's duties but had little to say about his rights. The permanent guide-line of education was to regulate behaviour so that it should never offend against li - good custom and propriety" - pp. 11 & 12.
16. Initially 'Humanism' was reminiscence of the Classical Greek and Roman literary and artistic achievements. Especially it was rooted in the Roman conception of the Classical Greek way of thinking. During their heyday the Romans enthused over Greek intellectuality. They tried to copy everything the Greeks had done. It was particularly Marcus Tullius CICERO (106 - 43) who made the Romans turn their eyes toward Greece. Therefore the flimsy sort of Humanism in the late Roman era was also known as 'Ciceronianism'. During the Italian Renaissance it was actually Cicero's interpretation - as well as that of his closer and farther away contemporaries - which was taken for granted. Humanism in its modern sense, however, only came about during the Sixteenth-century France, then in England and the Netherlands and finally from the Eighteenth century onwards in Germany and other European countries - refer: Johannes Hoffmeister: *Wörterbuch der Philosophischen Begriffe*, p. 308.

17. Refer: Alan Mackay: *Dictionary of Scientific Quotations*, p. 203.
18. This fact amply illustrates why Kari MARX (1818 - 1883) took so much interest in and was influenced by Charles Darwin's findings and thoughts. Both can, indeed, be considered to be among the most thoroughgoing investigators - from differing angles, of course - and prominent forerunners of the newly emerging 'world order'<sup>1</sup>.
19. Syed Muhammad Naquib Al-Attas: *Islam and the Philosophy of Science*, p.5.
20. I am well aware that the noun *Jewry* and the adjective *Judaic* might stir up feelings of dis-satisfaction and confusion. These terms have been over-abused, especially by right-wing reactionary political trends - such as the Alfred Dreyfus affair which took place at the end of the nineteenth century in France, and the slanderous "Protocols of the Elders of Zion", forged by the Imperial Russian Secret Service in 1905 - and ideologies. I use the terms *Jewry* and *Judaic* completely out of their racial and ethnic - in short, bio-anthropological - contexts. In fact, race and ethnicity have become perilous problems within the framework of the Modern secular European civilization.
- Herein, *Anglo-Judaic* is a term which indicates exclusively a definite social, political, economic and intellectual state of affairs. There are indeed still many Orthodox Jews and Conservative Englishmen who are strongly opposed to the life style, mental attitudes and economic-political principles upheld by the Anglo-Judaic civilization. On the other hand, very many non-English and non-Jewish people subscribe to and endorse one of the ideologies or world views that sprouted up in the fertile soil of the just mentioned civilization.
21. Any flimsy, superficial analysis of our present situation will surely do more harm than good. Together with Nabil ABDEL-FATTAH we maintain that, in fact, "... rather than analyse a given crisis by deconstructing its component elements in order to discover its internal mechanism, we adopt formalistic methods of analysis which do nothing more than reproduce more of the same. Such methods cannot possibly explain the phenomenon. The machinery of the mass media, it seems, is actively engaged in perpetuating a state of myopia, where worn-out, recycled-ideas ... are given prominence" - Nabil Abdel-Fattah *Violence and Crisis of Understanding*, p. 7.
- The mass media, Abdel-Fattah just spoke about, can be seen as the display case of modern life style and mentality. *Journalese*, the language style mass media uses in communication and transmission is constituted of what the German philologist Ewe PORKSEN calls "*plastic words*". What he means by these are "*hollow expressions that could be put together to form a set of simple sentences which are meaningless, although not in themselves sheer nonsense.*"
- "These words" Ewe Porksen claims, "*are encountered every day, in science and scholarship, economics and politics. They penetrate private conversation. They give colloquial speech pseudo-scientific authority. Using them is a way of forming a social elite. Whether people are talking about the Third World or public health issues, about agriculture or town planning*", he says, "*the repertoire of plastic words can be conjured up instantly to form models and develop projects*" - Ewe Porksen: *Language and Environment*, p. 9. So, by virtue of mass media the universal speech pattern has attained the characteristic of 'hollowness'.
22. "Unless we begin to conceive of history as it really is", says Nabil Abdel-Fattah, "*that is, as movement, action and interaction, then we will keep on talking about national characteristics as historical constants, and never grasp the changes that are taking place. Similarly, discussing religion in these terms, as if it were constant and unchanging, runs contrary to the logic and nature of reality as a constantly changing process. The most sacred of religious texts, once they are subject to human interpretations, interests and biases become positivistic phenomena. The sacred is interpolated in order to clad human interests in sacred attire*" - Nabil Abdel-Fattah: *Ibidem*. This, indeed, is just what we undertake in regard of religious forms and practices.

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