The *typical* functioning of humans within the physical and biotic aspects of reality

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Abstract

Within the modern scientific dispensation one often encounters one-sided and reductionist approaches, theoretical views which attempt to explain creation merely in terms of one or another aspect. Although such approaches do see something within creation, something we have to appreciate, a biblically informed perspective liberates us from the distortions present in such reifying ismic views, such as physicalism and biologism.

The implications of such a biblical starting-point are articulated with reference to dominant current trends of thought regarding the Big Bang *theory and with reference to a number of additional problems confronting present-day neo-Darwinian views not considered in the previous article.*

It appears that Christians who explore the possibility of theistic evolution, trying to explain how God can direct an undirected random process, move along the line of physicalism and (neo-)vitalism and mostly end with an orientation to emergent-evolutionism. Alternatively human beings are understood in terms of a multi-aspectual perspective *which also attempts to elucidate the unique ways in which they function within the various aspects of reality. This entails that distinctions are required flowing from a biblically*

informed philosophical anthropology. In terms of this perspective specific attention is given to the typical physical function of living entities, the antinomic nature of physicalism, and, in the light of the typical biotic function of human beings, to the ontogenetic uniqueness of humankind.

Opsomming

In die moderne wetenskaplike bedeling word eensydig-reduksionistiese benaderings dikwels aangetref. Dergelike sienings strewe daarna om die skepping slegs te verduidelik in terme van die een of ander aspek daarvan. Alhoewel sulke benaderings inderdaad iets binne die skepping raaksien wat positief waardeer moet word, bevry 'n skriftuurlik-geïnformeerde perspektief ons van die skeeftrekkings wat in eensydig-verabsoluterende ismiese sienings aanwesig is, soos die fisikalisme en biologisme.

Die implikasies van 'n Bybelse uitgangspunt word toegelig met verwysing na dominante denk-strominge insake die "Big Bang" teorie en met vermelding van 'n aantal bykomende probleme wat die hedendaagse neo-Darwinisme konfronteer. Dit blyk dat Christene wat die weg van teïstiese evolusie volg probeer verklaar hoe God rigting kan gee aan rigtinglose prosesse. Gewoonlik loop hierdie benadering uit op die stygende lyn van fisikalisme, (neo-)vitalisme wat dan meestal eindig in 'n emergensie-evolusionistiese benadering. 'n Alternatiewe siening verstaan mense in terme van 'n menigvuldigheid aspek-matige perspektiewe wat ook 'n poging aanwend om die unieke wyse waarop die mens in hierdie verskillende werklikheidsaspekte funksioneer te verantwoord. Die implikasie hiervan is dat onderskeidinge benodig word wat voortvloei uit 'n Bybels-gefundeerde wysgerige antropologie. In terme van hierdie perspektiewe word ook aandag gegee aan die tipies fisiese funksie van lewende entiteite, aan die antinomiese aard van die fisikalisme, en in die lig van die tipiese fisiese funksie van lewende dinge ook aan die ontogenetiese uniekheid van die mensheid.

1. Orientation

A biblically informed understanding of the *relation* between humans and the realms of *material things* and *living entities* is needed. We commence therefore with a brief indication of the meaning attached to the phrase "biblically informed".

The central perspective of the Bible entails the direction-giving distinction between God and creation, precluding any (theoretical) attempt to elevate anything *within* creation to the level of the divine (of *deifying* it). This distinction entails another important one, namely that between God's *law* and creaturely reality which is *subject* to this law. By "law", as Kuyper already noted, one should not only intend the "Ten Commandments; not even the Mosaic law, nor the moral or ceremonial law". Instead, "what must come into view is that whole concatenation of laws, in every creaturely thing, by which everything exists that God created on, or above, or under the earth" (quoted by Veenhof, 1939:30). Within every domain of creation we find this correlation between laws and what are factually subjected to these laws. What is known as "laws of nature" is normally merely understood to refer to *physical laws*, ignoring the existence of *quantitative* laws, *spatial* laws, *kinematic* laws, *biotic* laws, and so on. The biblical emphasis on entities created after their kind on the one hand does not provide us with *articulated scientific distinctions* but on the other it does direct theoretical thinking towards a *non-reductionist ontology*, which is relevant for all the academic disciplines, theology and philosophy not excluded.

The rich diversity of aspects found in our experiential world indeed embraces the existence of every creature, because all creatures function within all aspects. While *material things* (elementary particles, atoms, molecules, macro-molecules and macro-systems) are *physical entities* subject to *physical laws* (such as the law of energy-constancy, non-decreasing entropy and gravitation), plants in addition are *biotic subjects*, while animals, as sentient creatures, are *sensitive subjects*. A different way to articulate this is to say that the highest *subject function* of material things is found in the physical aspect of reality, the highest subject function of living things is found in the biotic aspect of reality, the highest subject function of sentient creatures things is found in the sensitive mode of reality, whereas human beings are not uniquely qualified by any aspect.

Material things therefore have *object functions* in all post-physical aspects, plants have *object functions* in all post-biotic aspects and animals have *object functions* in all post-sensory aspects of reality.[1]

1 The contemporary suggestion that we have to distinguish up to five realms within living nature is critically discussed in Strauss, 2009:476-479.

These *object functions* need to be "opened up" or "disclosed", through the active functioning of subjects within the aspects concerned. This insight avoids the mistaken distinction between so-called *primary* and *secondary qualities*. If a physical entity did not have a *latent* sensory object function, a perceiving sensory subject would not have been able to *disclose* it, to make it *patent*.[2] Humans have subject functions in all aspects of reality.[3]

At this point we may briefly highlight the *mystery* confronting attempts to account for the *genesis* of human beings. Lyall Watson, a former assistant of the famous Raymond Dardt, underscored the scarcity of fossil material in 1982: "The remarkable fact is that all the physical evidence we have for human evolution can still be placed, with room to spare, inside a single coffin. … Modern apes, for instance, seem to have sprung out of nowhere. They have no yesterday, no fossil record. And the true origin of modern humans … is, if we were to be honest with ourselves, an equally mysterious matter" (Watson, 1982:44).

In 1990 Richard Leakey, perhaps the most famous paleoanthropologist in the world, honestly confessed that regarding human origins "all we have is a huge question mark" (PBS Documentary, 1990). On June 10, 2012, commemorating the death of prof. Philip Tobias, *Carte Blanche* once again inserted a recording of a presentation of prof. Tobias from the year 1995, in which he expressed his enthusiasm for regarding *Homo habilis* as an ancestor of modern humans, while shifting aside the southern apes (*Australopithecines*).

During the early seventies of the previous century, with the discovery of *Homo habilis* and the fossil which received the

2 A diamond as physical entity can be named (its latent object function within the sign-mode of reality, but only when a name is given to it this latent object function is disclosed, is made manifest.

3 Every individual is *one* person (numerical), occupies a *place* (space), *moves* (kinematic), is *strong* or *weak* (physical), is *alive* (biotic), can *perceive* and have *feelings* (sensory), can *identify* and *distinguish* (logical-analytical), can exercise *formative control* (cultural-historical), can *name* things and *speak* (lingual), can *socialize* (social), can be *frugal* instead of *wasteful* (economic), is *beautiful* or *ugly* (aesthetic), has a sense of what rightfully belongs to a person (*tribution* – the jural aspect), can *love* (the ethical or moral mode), and can *believe* (trust, have *faith* – certitudinal).

registration number 1470, it seemed as if the picture may be captured in the succession of *Australopithecus*, *Homo habilis*, *Homo erectus*, *Homo sapiens*, with the 14 million-year-old *Kenyapithecus* as a probable ancestral member of the *hominidae* family. However, the latter (*Kenyapithecus*) turned out to be nothing more than an ape and the tests of Spoor and his friends have shown that *Homo habilis* habitually did not walk upright at all. Eventually also the *Australopithecines* lost the race, because Gould argued for "the removal of the different members of this relatively small-brained, curiously unique genus Australopithecus into one or more parallel side lines away from a direct link with man" (Gould, 1992: 60). Ten years later Gould added:

> Needless to say, no true consensus exists in this most contentious of all scientific professions – an almost inevitable situation, given the high stakes of scientific importance and several well known propensities of human nature, in a field that features more minds at work than bones to study (Gould, 2002: 910).

In a recent issue of *National Geographic* (August 22(2)2011:120-133) Josh Fishman wrote an article: "Part Ape, Part Human, A new ancestor emerges from the richest collection of fossil skeletons ever found." The recent finding of *Australopithecus sediba* (in South Africa) occupies the center of attention in it. Fishman remarks that the origins of the genus Homo are "murky" because only "a few scattered and fragmentary fossils older than two million years have been argued to belong to the genus" (Fishman, 2011:131). He then mentions two to three possible *Homo* species, such as *Homo habilis* and *Homo erectus* (the latter contemporaneous with *Homo habilis*), followed up by the question where did all these characters come from? He writes:

> Attempts to look deeper into the past only increase the frustration, says William Kimbel, a paleoanthropologist at Arizona State University and Director of the Institute of Human Origins there. "There are only a handful of specimens. You could put them all into a small shoe box and still have room for a good pair of shoes," he says.

The biggest problem with *sediba* is timing. "If two-million-year-old sediba is indeed the true ancestor of Homo, how could it give rise

to those even older fossils assigned to Homo in Bill Kimbel's shoe box? A fossil cannot be ancestral to something older than itself any more than a daugther can give birth to her own mother. One possibility is that the Malapa specimens represent a late stage of an enduring species that gave rise to Homo at an earlier date. But Berger's team questions whether that shoe box really contains any Homo fossils in the first place – after all, they're just fragments" (Fishman, 2011:133).

It should not be surprising to note that both the *Big Bang* theory and the stance of *neo-Darwinism* are currently contested by specialists within the fields of physics and biology. In the *New Scientist* of May 22, 2004, four hundred and five physicists and scholars from related disciplines published "An Open Letter to the Scientific Community" in which the growing number of hypothetical (unobserved) entities is questioned – "things that we have never observed – inflation, dark matter and dark energy".

The "Big Bang" is sometimes portrayed as proceeding from a primordial initial hot and condensed condition preceding time and space. In some respects the mode of speech attached to the Big Bang hypothesis closely imitates the theological tradition of a *negative theology* – where one cannot positively say what God is like, but only state what God is *not*. Of course in all instances of a negative theology one always finds one or another last remnant of a positive characterization. In the case of the *Big Bang* it is therefore not surprising that *size* and *heat* play a crucial role – just consider terms such as *density* and *temperature*. Hubble and Lemaître contributed to the idea of the expanding universe.[4]

However, the physicist Gentry questions the expansion postulate, arguing that "the universe is relativistically formatted in accordance with the Schwartzschild static spacetime solution of the field equations, not the Friedmann-Lemaîtrespacetime" (see Gentry, 2001:1). Whatever the outcome of this controversy may be, it cannot qualify as an account of *creation*. Dating this primordial event to almost 14 billion years ago (or even reducing it drastically in terms of Gentry's alternative) appeals to *time measurement* and time measurement

4 The equations formulated by Alexander Friedmann are based upon Einstein's General Theory of Relativity and they presuppose the conditioning role of the first four aspects of reality – number, space, the kinematic and the physical.

always involves the *time duration* of a *process*. Any time duration is always delimited by and subject to a specific (correlated) *time order*.[5] Therefore it will always be a circular undertaking to attempt to determine (or "date") the origin ("creation") of the presupposed *time order*. For this reason it is in principle impossible to *date* creation.[6]

Recently more than 700 scholars from biology and related fields expressed their skepticism about the "claims for the ability of random mutation and natural selection to account for the complexity of life" (see their WEB-site entitled "A Scientific Dissent From Darwinism"). The reaction from the 'establishment' points out that those subscribing to the *Dissent* statement represent just a small minority – thus becoming a victim of the majority fallacy (the majority is nota criterion of truth). In addition we have to remember that biological thinking prior to Darwin reflects the influence of vitalism and that of idealistic morphology.[7] The vitalism of Aristotle continued to find adherents, also within the 20th century – compare the neo-vitalism

5 Consider, for example, the difference between the physical and biotic time orders and what factually corresponds with them. Within the biotic aspect the *homogeneity* of physical time is absent because the time phases correlated with the *biotical time order* – such as the duration of *birth*, *growth*, *maturation*, *ageing* and *dying* – are accelerated in the sense that the older a living entity gets, the quicker the process of ageing occurs. The French biologist, Lecomte du Noüy, confirmed this accelerated process of biotical ageing through empirical research. Even the so-called "moment of death" eludes the scope of the physical understanding of time. Whatever criteria are applied by the biologist, only once they *have been applied* and the living entity (plant, animal, or human being) is declared "dead", the on-looking physicist may look at a physical clock and note the (thus externally correlated) "moment of death".

6 Without questioning the validity of any physical laws it remains sound to realize that constantly changing conditions might have obscured our time estimates (in the ultimate sense of the word we can only reliably measure what happens in the *present*). For example, stripped of their electrons the beta decay rate of atoms increase billions of years (see Bosch, 1996). With a half-life of 5000 to 6000 years carbon-14 would not be detectable in layers older than one million years. Radiocarbon lab tests have shown that diamonds supposedly billion years old still contain carbon-14 and are therefore far less than a million years old (see Sarfati, 2010:190-191 and his remarks about clocks that were not really zeroed).

7 During the second half of the 20th century an extensive *Botany Handbook* based upon the assumptions of an *idealistic morphology* was still used – see Troll, 1973.

of Driesch and his followers, such as Haas (1968), Heitler (1976), Overhage (1972, 1974, 1977), Sinnott(1972) and Schubert-Soldern (1959, 1962). Currently the vitalistic idea of a teleological, immaterial *vital force* (*entelechie*) or *Bauplan* is advocated by using the word "design".[8]

The above-mentioned orientations are all accompanied by the exploration of a specific *mode of explanation*. The striking reality, however, is that these alternative modes of explanation display a *discontinuous* picture. While both the fossil record and the current diversity of living entities show an equally discontinuous pattern, speculating about the origination of this diversity exceeds the horizon of our experience. In addition, the mentioned theoretical attempts to subsume the assumed process of evolution under one or another basic denominator run into theoretical anomalies.

Theistic evolutionism attempts to synthesize the Darwinian story of natural selection and random mutations with the guidance of God as Creator and Sustainer of this process culminating in the appearance of humankind. The first shift it has to make, however, is to add *guidance* or *direction* to this process, a twist which immediately creates the problem of explaining how God can *direct* an *undirected* process? The most plausible option for theistic evolutionism seems to be the adoption of elements of vitalism (purposefulness) and emergence evolutionism (continuity and discontinuity at once).

2. The inevitability of a philosophical anthropology

The many-sidedness of being human in principle exceeds every aspect within which a human person merely functions. Therefore every attempt to characterize humans merely in terms of *one* or just a *few* functional aspects, will be one-sided and therefore distorted. For example, is it meaningful to see a human being as a *rational-ethical* being?

Both within the West and the East it was assumed that the *rational* soul or mind was combined with another distinctive feature:

8 The 20th century also knows other biological approaches, such as holism (Jan Smuts and Adolf Meyer-Abich), pan-psychism (Teilhard de Jardin and Bernard Rensch), and organismic biology (Von Bertalanffy).

morality. The outcome of this combination is that a person is characterized as a *rational-moral* being – where the domain of *morality* is supposed to encompass all forms of *normativity*. From the perspective of philosophical anthropology two points should be raised in this regard.

(i) the normativity of human life cannot be restricted to what is traditionally designated as the "moral," and
(ii) merely lifting out the "rational" and the "moral" does not do justice to the truly multi-aspectual normative functioning of human beings.

Re (i) – Can the normativity of life be restricted to the "moral"?
In respect of (i) it must be realized that there are different *kinds* of norms or principles and that one therefore cannot identify normativity merely with the *moral* or *ethical*. The typical human ability to form culture presupposes the possibility to perform logical-analytical acts, that is to say, to identify and distinguish or to *conceptualize.* In the case of human tool-making we have to be able to distinguish between *means* and *ends*.

Since concepts unite a multiplicity of (logically objectified universal) features, they are subject to *logical* principles, such as the principles of *identity* and *non-contradiction*. But concepts are *blind* towards what is *individual*. Language does provide access to the designation of universal concepts but in addition it can point at what is individual, known as the *deictic function* of language. The same capacity is inherent to human perception – just consider the construction of an "identity-kid" in criminal investigations. "Seeing" is of course also an ability of animals, although the latter lack the possibility to (logically) identify a *criminal* and (lingually) pointing at the criminal *as* a criminal.[9]

9 Once they are formed concepts can be *named* or *designated*. For this reason they cannot be *translated*. Only the words designating a concept can be translated into a different language. A concept or an argument (*inference*) is "grasped", or "understood". It depends upon immediate *insight*. Whereas language is *formed*, presupposing the immediate functional foundation of the cultural-historical aspect, concepts are *acquired* and this acquisition occurs on the basis of *intuitive insight*: one either *obtains* this insight or one *does not*. For this reason the well-known expression that we *form* a concept actually represents a *metaphorical* mode of speech.

Human thinking can conform to or may disobey these principles and this possibility underlies the difference between logically sound and antinormative identification and distinguishing, manifested in the contrary between what is *logical* and *illogical*. This normative contrary underlies the contraries found in all the post-logical aspects, such as historical – un-historical, polite – impolite, economic – un-economic, legal – illegal and moral – immoral. The post-logical contraries therefore *analogically* reflect the meaning of the *logical principle* of (non-) *contradiction*.[10] Although there may be contrasting opinions regarding what is appreciated as economically norm-conforming or economically antinormative, these differences of opinion *presuppose* accepting the contrary between what is economically norm-conformative and economically antinormative, i.e., between *frugality* and what is *excessive*. Generally speaking the same applies to all the contraries presenting themselves within the post-logical aspects.

Re (ii) – The multi-aspectual functioning of human beings

Human beings actively function within all aspects of reality. From a systematic point of view one may also say that humans have subject functions within all aspects. Naturally the same can be said in respect of animals, plants and material things, for they also function within all aspects of reality. Does this imply that material entities, plants and animals are not different from humans? Certainly not, but explaining these differences needs important distinctions. Although humans share *subject* functions with material things within the first four aspects of reality (the numerical, spatial, kinematic and the physical), with plants up to the biotic aspect and with animals up to the sensory mode, humankind nonetheless differs from these three natural realms in an important sense. Every natural realm is characterized by its specific *qualifying function*, which at once is also its *highest* subject function – respectively the physical (material things), biotic (plants) and the sensory (ani-

10 An analogy embodies a difference shown in what is similar or a similarity in what is different. In this case the difference is that an *illogical concept* is not the same as *wasting your money*. Yet what is similar in both instances is that what is illogical and un-economic are both *antinormative*. In other words, in both instances norm-conformity and antinormativity are at stake. In this similarity the difference is shown.

mals).[11] As we noted earlier, in each case the realm under consideration has (latent) object functions within all the aspects succeeding its qualifying role. Therefore none of the three realms of natural things has subject functions within the post-sensory aspects, that is to say they do not display an accountability which is based upon a normative freedom of choice.

An understanding of the uniqueness of humankind may therefore pursue two avenues. The first one is to investigate those aspects in which we *share* subject functions with things, plants and animals, while focusing on what is distinctively human in this functioning. The second option is to investigate the (distinctive) typical normative subject functions of human beings.

3. The typical physical function of living entities

The smallest entity displaying the ability to live as an independent entity is the *cell*. Although the biotic aspect *qualifies* the cell as a vital unit, the biotic functions of the cell are founded in the material building blocks found in all living entities, namely atoms, molecules and macromolecules. While the cell has a geometrically defined (macroscopic) surface, not even the largest macromolecules are delimited by such a *surface* (see Trincher, 1985:336). In addition Trincher distinguishes four macroscopic characteristics evincing the *physical uniqueness* of a living cell (Trincher, 1985:336):

1) Spatial macroscopy, which defines the cell as a spatially delimited surface;
2) Temporal macroscopy, which determines the finite time in which the energy cycle of the cell endures;
3) The isothermal nature of the cell, which is responsible for the constancy of temperature throughout the cell; and
4) The persistent positive difference between the higher internal temperature of the cell and the lower external temperature of the environment adjacent to the cell surface.

After Von Bertalanffy expanded the scope of the second main law of thermodynamics to encompass *open systems* as well, the

11 In Strauss, 2009:476-479, a brief critical evaluation of the current distinction between up to five kingdoms/realms within living entities is given.

famous physicist, Erwin Schrödinger, wrote a book with the title: *What is life*? *The physical aspect of the Cell* (1955). This work explores the perspective that from a thermodynamic point of view, living entities are open systems and therefore this feature does not highlight a *distinctive trait* of such entities, because a fire, glacier or even an idling motor vehicle are examples of thermodynamic open systems.

Modern genetics enabled us to reach a new level of understanding in this regard. As a scholarly discipline it benefits from the developments within the fields of organic chemistry and biochemistry. These two disciplines succeeded in analyzing the intricate macromolecular conformations found within living entities, while realizing that as such these macromolecules are not *alive*. Obtaining knowledge of the structure of any macromolecule in principle falls within the field of investigation of *organic chemistry*. Only when those functions of these molecules are considered that are directed towards the *biotic* functioning of living entities, biochemistry should enter the scene – as it did with the spectacular unveiling of the multiple metabolic pathways present within the cells of every living entity. The molecular structure of the nucleotides operative inside living things is not sufficient for an understanding of biotic processes, because the decisive factor is found in the *arrangement* in which they are configured. The *patterns* required in these configurations point at *information* and the latter appears to confront any conjecture regarding the assumed (accidental physical) origination of the first living entity with insurmountable problems.

Even Simpson concedes that molecules and macromolecules are not alive and therefore they do not have a subject function within the biotic aspect. Since it is scientifically clear that no single molecule, however complex its structure, is alive, Simpson had to admit that the expression “molecular biology” is self-contradictory: “Since biology is the study of life and molecules, as such, are not alive, the term ‘molecular biology’ is selfcontradictory” (Simpson, 1969:6).

4. Physicalism eliminates original biotic terms

Molecules are not “healthy” or “sick” – which means that as soon as it is attempted to reduce the biotic aspect of reality to the physical aspect, as physicalism intends to accomplish, the terms *healthy* and *sick* lose their *biotic* meaning. Von Bertalanffy explicitly uses the

distinction between physical and biotic terms to indicate the *limitations* of (evolutionistic) attempts to understand living entities in physical terms only. He points out that "in biology, the behavioral and social sciences, we encounter many phenomena which are not found in inanimate nature and for which no concepts are provided in the system of physics" (Von Bertalanffy, 1968:37).

He writes that physics cannot even indicate the difference between a *living* and a *dead* dog: "The laws of physics do not tell a difference. They are not interested in whether dogs are alive or dead." On the same page he says that this remains true even if we take into account the most recent scientific advanced molecular processes in the cell are determined by physical and chemical laws which makes it absurd to characterize some of them as better, healthier or more normal than the other (Von Bertalanffy, 1973:146).

When humans are ill it involves a defect in their *biotic* functioning. It can be the result of a shortage of necessary chemical elements, defects in particular (biotic) organs, or it may even be psycho-somatic (tension, worry, excitement, and so forth). Primarily the duality *illness-health* has its origin and modal seat in the *biotic aspect* of reality – physics does not deal with these original *biotic terms*. Therefore, Von Bertalanffy once more emphasizes that from "the viewpoint of physics, there is no difference between physical and chemical processes taking place in a living organism or those in a corpse; both follow the same laws of physics and chemistry – and that's all that can be said from the standpoint of conventional physics . . . To the biologist, however, there is a lot of difference between processes so ordered as to maintain the system, and those running wild to destroy it" (Von Bertalanffy, 1968:37).

Since Descartes modern philosophy and biology is familiar with a *machine model* of living entities. Although we may think that this model constitutes a straightforward reduction – even of the human being – to "nature", the implicit technicistic undertones of this model are lost sight of. The nature of a *machine* ought to be scrutinized first, because a machine only came into being in the course of human civilization. Von Weizsäcker is therefore correct when he states:

> Thinking nature – and with it the human being – as a machine, subjects nature and with it the human being to a specific

> industrial mode of thought, the ability of what can be designed. Not the reduction of the human being to nature is the mistake here, but the reduction of nature to the structural properties of a very specific human artifact (Von Weizsäcker, 1993:38).

Yet the mechanistic point of view in addition explored the physicalistic stance according to which a living entity has a physico-chemical identity constituted by its atoms, molecules, and macro-molecules. The question then is: which of these physico-chemical components should be considered constitutive of this supposed physico-chemical *identity* of living things? Could it be those atoms, molecules, and macro-molecules currently present in it, those present years ago, or those which will be present a few years hence!? When living things are reduced to their material constituents, their *biotical identity* is necessarily lost – since the supposed elements of identity *continually vary*.

Jones points out that all "the atoms of our body, even of our bones, are exchanged at least once every seven years. All the atoms in our face are renewed every six months, all our red blood cells every four months and 98% of the protein in the brain in less than a month. Our white blood cells are replaced every ten days and most of the pancreas cells and one-thirteenth of all our tissue proteins are renewed every 24 hours" (Jones, 1998:40).

5. The typical biotic functioning of humans

From a "similarity-perspective" it is certainly true that plants, animals and human beings are all *alive* for they share an active functioning within the *biotic mode*. When the Swiss biologist, Adolf Portmann, investigates higher developed mammals in comparison with human beings, his focus equally involves what is similar and what is different between them. While similarities are normally lifted out, he in addition restored the reality of differences, a "difference-perspective". This led him to a new and remarkable appreciation of the ontogenetic uniqueness of humans.

5.1 The ontogenetic uniqueness of humans

Portmann points out that "the theoretical trains of thought that have been triggered by theories of evolution have often obstructed more true insight into the human race than they have revealed" (Portmann, 1990:6). In addition, according to him, "it is a grave error

to believe that the basis for evaluating human existence can be found with certainty by studying animal behavior" (Portmann, 1990:16). His investigations considered the impression that the "helpless newborn human reminds us of similar developmental states in mammals and birds" which made "the animal mother seem more human to us, more closely related than the animal would otherwise appear to be" and this misleading assessment gave rise to his following statement that can be seen as outlining his research program: "This impression of accord goes so deep that it is scarcely noticed how unusual the nature of the human baby actually is, how much it deviates from what is the rule for higher mammals" (Portmann, 1990:19).

5.2 Nesthocker and Nestflüchter

Flowing from the findings of his research in this respect Portmann introduced a distinction between two different *ontogenetic types*, namely *Nesthocker* (*altricial* – literally: "nest-squatter") and *Nestflüchter* (*precocial* – literally: "nest-fleer"). The term *Nesthocker* is normally applied to birds, such as song birds and woodpeckers (which also have "naked early stages with closed eyes"). But there are similar developmental states in mammals. It includes the "development of mammals whose body structures show little specialization and whose brains are only slightly developed" and they are "usually characterized by short periods of gestation, a large number of young in each litter, and the helpless condition of the babies at the moment of birth". In their early stages these animals are "usually hairless, their sensory organs still closed, and the temperature of their bodies still completely dependent on warmth from an external source (insectivores, many rodents, and small carnivores – the marten, in particular)" (Portmann, 1990:20).

Amongst the more highly organized mammals a totally different picture of their developmental levels is found. Their "body structures are more specialized" and their "brains are more complex (ungulates, seals, whales, prosimians, and apes)" (Portmann, 1990:22). Portmann explains that for "these creatures, development within the uterus lasts quite a while, the number of young in each litter is reduced to two or one, and the newborn are well developed, appearing much like adult animals in both form and behavior. Again, chickens, ducks, snipe, and other similar birds produce well-

developed young, and the usual term applied to the latter, *Nestflüchter* (nidifugous, precocial), is also extended to cover the corresponding developmental state of mammals" (Portmann, 1990:22).

The newborn primates are *Nestflüchter* for at birth their eyes are open and their sensory organs are well-developed. They have special clinging instincts dominating their early behavior. Portmann remarks that this compulsion causes their hands and feet to be completely geared towards holding on (the mother serves as the first "tree"). While the human baby appears to be much more "helpless" at birth, it displays a remarkable free play of the limbs "which gives our infant possibilities so much richer than those available to the newborn ape" (Portmann, 1990:25). Comparing the *Nestflüchter* with the human baby at birth in terms of bodily proportions is surprising. The young of higher mammals, from their birth, "maintain bodily proportions close to those of the adult forms":

> Thus, on the first day of their lives, foals, fawns, young whales, and small harbor seals are already miniature versions of their parents, …; in the same way, the newborn ape is similar to the adult in the size ratio of limb to torso. Anthropoids also follow this rule. The long limbs of orangutan or gorilla fetuses are immediately conspicuous. If fetuses of different ages are depicted as being equal in overall length, such a series exhibits exactly the same length ratios between torso, arms, and legs even at very different ages; … (Portmann, 1990:38).

Portmann makes a plea for seeing "the human aspect of the entire body more clearly" given the "forceful attraction exerted by the head". Theories of descent have often been taken up with the head exclusively: partly because we are partial to that focal point of the human phenomenon; partly because our attitudes are compelled by evidence that consists mostly of skull fragments (Portmann, 1990:40-41).

When the respective growth-patterns of anthropoids and humans are compared a "numerical expression of this important difference between anthropoids and humans" is provided (Portmann, 1990:38).

Comparison of lengths between anthropoids and humans
(At birth : At maturity)

Table

	Chimpanzee	*Human*
Torso	1 : 1.95	1 : 2.65
Arm	1 : 1.69	1 : 3.29
Leg	1 : 1.69	1 : 3.94

At birth the *Nesthocker* type displays a rather immature developmental stage, whereas the figures for ungulates and primates show that in *Nestflüchter* the brain at birth is pretty close to its mature state (Portmann, 1990:44). This explains why *Nesthocker* evinces a brain increase-factor of more than 5 and *Nestflüchter* one of less than 5.

During their fetal stage humans go through a period of eye and ear closure (also found amongst large ungulates), as if preparing for an early birth similar to an altricial infant. Portmann continues his analysis by showing that humans do not obey the same "Bildungsgesetze" (developmental laws) as the highly organized groups of mammals. The newborns of the latter are all *Nestflüchter* with sensory organs well functioning and developed. By and large these newborns are "miniature versions of the mature form, and their behavior and locomotion are to a large extent the same as [those of] their parents" (Portmann, 1990:50). These infants have command "of the means of social communication that are typical for its species" – "this is the state at birth for ungulates, seals, and whales, as well as for anthropoids" and it also applies to the great apes (Portmann, 1990:50).

The question is what a "true human-mammal" ("Tiermensch" or "Menschtier") would have looked like at birth? Portmann answers:

> In accordance with this definition, a true mammal of the human type would have to have a newborn whose bodily proportions are similar to those of the adult, one that can assume the erect posture appropriate to its species, and that has command of at least the rudiments of our communication system—language (and the language of gestures). This theoretically necessary stage does in fact exist during the course of our development:

> the stage is reached about a year after birth. After one year, the human attains the degree of formation in keeping with its species that a true mammal must have already realized by the time of its birth. Therefore, if the human were to arrive at this state in the true mammalian mode, our pregnancy would have to be longer than it is by about that one year; it would have to last for about twenty-one months (Portmann, 1990:51).

Portmann deduces as preliminary conclusion "that the actual length of human pregnancy is much less than it should be for typical mammalian development at our level of organization" (Portmann, 1990:51). However, he has to remark that the true significance of this "physiological early birth" of humans has "been blurred by the suggestive power of the commonalities that link humans and the great apes" – therefore a frame of reference is needed to make more distinctly visible what is unique about the human ontogeny.

The post-fetal growth taking place during the first year of humans is twice as rapid and intense as that of the great apes. The weight of the former increases at a relatively constant rate during this year. After this first rapid developmental the curve is smooth up to the 8th or 9th year when the second rapid occurs (puberty: 8-15 years), after which it is again smooth until maturity is reached (20-22 years). The growth curve of comparable animals is smooth and continuous, lacking the two phases of accelerated growth found in the human growth pattern.

***Remark*: The fraudulent embryological sketches of Haeckel**

> On the basis of similarities between the embryos of humans, apes and dogs Haeckel formulated his biogenetic basic law in 1868. According to this law every individual human being (from conception up to maturity) manifests those phases through which the species went in its phylogenetic development. Although his theory immediately obtained general acceptance, it was soon (already by the end of the 19th theory) realized that it is not valid. Two of his contemporaries accused him of producing *fraudelent* sketches, namely the embryologist Wilhelm His (in 1874) and the anatomist Carl Semper (in 1875). Haeckel, for example, described ancestral micro-organisms found nowhere because they certainly do not exist. The embryologist, Erich Blechschmidt, repudiated Haeckel "law" and consider it to

> be one of the most serious errors in the history of biology (see Blechschmidt, 1977:32). Another embryologist and Nobel Prize winner, Christiane Nüsslein-Volhard, in an interview with the German weekly Newspaper *Die Zeit*, said: "Ernst Haeckel acted fraudulently (*gefälscht*). Many of his pictures are merely inventions to confirm his theory. Haeckel actually acknowledged that perhaps six to eight percent of his drawings were 'gefälscht'! In the absence of the required observational material he hypothetically bridged the gaps" (see the work of Di Trocchio, 1999).[12]

The human embryo is from its inception *fully human*. It does not go through successive phases in which the human being is first a *fish*, then an *amphibian*, then a *reptile* and then a *mammal* (see Blechschmidt, 1977). By contrast Portmann emphasizes that the dominant "zoological interpretation of early human development is inadequate and in many respects misleading". He rather speaks of "an independent human type of development before birth" which implies that even "the early prenatal development is the 'ontogeny of a human', not a kind of schematic primate formation in which the stages of animal systems appear in sequence, as in a graduated classification" (Portmann, 1990:64).

The larger mammals by and large evince a rapid increase in weight practically reaching their final (fully mature) weight between one and two years. Growth during the subsequent years (varying from three to six years) is very slight.

> All mammals (other than humans) grow very rapidly right from the start of their independent lives, and have the major part of their growth behind them by the time they become sexually mature. Any growth still to come is slow and slight. In humans, on the contrary, growth processes experience a marked increase in intensity at the very moment of sexual maturation, and it is during this late phase that a significant part of the total growth takes place (Portmann, 1990:101).

12 Haeckel did not merely "acknowledge" his fraudulent behaviour, he *confessed* to have done it. He used the German expression "ich bekenne", which means: "I confess"!

From the analysis of Portmann it follows that human beings are not fitting within either the *Nesthocker* or the *Nestflüchter* type. With the *Nesthocker* it shares being helpless at birth, at birth being disproportionate to mature humans and not being able to move as adult humans. With *Nestflüchter* it shares a relatively long gestation period, relatively small offspring, an increase of the brain size factor of less than five, and coming into this world with open ears and eyes. Moreover, the growth pattern of humans is not matched by either of the *Nesthocker* or the *Nestflüchter*. The uniqueness of the human ontogenetic type expresses itself also in what Portmann calls the extraunterine time of humans. Compared to the *Nestflüchter* humans are born one year too soon. Whereas the higher mammals, immediately after birth, commence to move and perceive in accordance with species behavior, the human being, by contrast, at birth has "not yet attained the type of movement, the body posture, or the power of communication typical of its species at maturity" (Portmann, 1990:81-82).

6. Concluding remarks

Within the modern scientific dispensation one encounters reductionist orientations, such as both physicalistic and biologistic standpoints. Such theoretical views attempt to explain creation merely in terms of one or another aspect of creation. Although such approaches do see something within creation, worthy of appreciation, a biblically informed perspective does liberate us from the distortions present in such one-sided deifying views. The implications of such a biblical starting-point guided questions about the status of the *Big Bang* theory and a number of problems present in contemporary neo-Darwinian views. It appeared that Christians who explore the possibility of theistic evolution, trying to explain how God can direct an undirected random process, move along the line of physicalism and (neo-)vitalism which mostly end with an orientation to emergent-evolutionism. Alternatively a systematic investigation may proceed from a *multi-aspectual perspective* which elucidates the unique ways in which humans function within multiple aspects of reality. This required distinctions flowing from a biblically informed philosophical anthropology. In terms of this perspective Part A focused in particular on the typical physical function of living entities, on the antinomic nature of physicalism, and, in the light of

the typical biotic function of human beings, on the ontogenetic uniqueness of humankind. From its inception the human embryo turned out to be *fully human* since it does not go through successive phases in which it is first a *fish*, then an *amphibian*, then a *reptile* and finally a *mammal*.

Understanding of the similarities and differences between animals and humans will be discussed in a follow-up article.

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