
Intelligent Design – A Descendant of Vitalism?

(Modern biology wrestling with God's Law-Order)¹

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Opsomming

Kan 'n historiese perspektief op die "Intelligente Ontwerp" (Intelligent Design = ID) beweging dit vermy om die verbintenis daarvan met die eeue-oue tradisie van vitalistiese denke op te merk. Hierdie vraag word in hierdie artikel ondersoek mede in die lig van uiteenlopende strominge in die twintigste eeuse biologie. Dit lei vanself tot nadenke oor allerlei sistematiese onderskeidings. Hoewel die vroegste Griekse denkers reeds 'n monistiese vitalisme verdedig sou die erfenis van die Grieks-Middeleeuse filosofie eerder dualisties van aard wees. As alternatief word aandag gegee aan die idee van polinomiese entiteite, wat ook gesien kan word as individualiteitstrukture. Die Middeleeuse universalisteryd het uitgeloop op die botsende bekouing van die realisme en die nominalisme. Figure soos Darwin en Simpson sou die nominalistiese denktradisie kontinueer. Die onderskeiding tussen modale wette en tipe wette fundeer die verdere onderskeiding tussen ongespesifiseerde en gespesifiseerde universaliteit. Entiteite besit tipiese funksies synde die universele struktuur van die verskillende aspekte en dit hou verband met die verskil tussen die orde vir en die ordelikheid van dinge wat

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op sy beurt 'n nie-reduksionistiese ontologie veronderstel. Die idee van 'n gapingloos-kontinue oorgang sou 'n problematiese metgesel in die emergensie-evolutionisme vind. Die neo-vitalisme en die organismiese biologie beliggaam alternatiewe 20ste eeuse biologiese standpuntnames. Die dialektiek van natuur en vryheid speel 'n eie rol in hierdie konteks. Die benadering van die ID beweging word uiteindelik ondermeer toegelig aan die hand van die jongste gegewens rakende die "Cambrium explosion". Dooyeweerd se teorie van 'n enkaptiese struktuurgeheel word as alternatief vir die nalewende Griekse opvatting van 'n Demiurg (of: Boumeester) na vore gebring. Die idee van tipe wette word as alternatief beide vir 'n fisikalistiese en 'n ID oriëntasie aangebied.

Abstract

Can a historical perspective on the ID (Intelligent Design) movement avoid noticing its links with the long-standing legacy of vitalism within philosophy and biology? This question will be investigated below by taking into account diverse biological trends within 20th century biology and by relating it to a number of systematic distinctions.

1. Monistic vitalism

The extreme forms of vitalism were *monistic*, attempting not to reduce reality philosophically to *two* fundamental principles, but rather posit a single all-inclusive and universally explanatory principle. The same applies to the mechanistic tradition in its monistic forms. Hans Jonas designates these two extremes as *pan-vitalism* and *pan-mechanicism*.

Greek philosophy is from its outset familiar with *hulèzoism* (*zoè = life; hulè = matter*): one of the indirectly preserved aphorisms of Thales supposedly was that *everything lives*. From this perspective it is unimaginable that "life" may not be the universal rule. Jonas comments:

In such a world view death is a riddle confronting one, a contradiction of the natural, self-explanatory and understandable, of the common life (Jonas, 1973:20).

The paragraph in which this statement appears sets out to discuss the following theme: *pan-vitalism and the problem of death* (Jonas, 1973:19ff).

By contrast, those who think in a pan-mechanistic fashion emphasize the notion that living phenomena are peripheral in an encompassing, homogeneous, physical world. Quantitatively negligible in the immeasurable expanse of cosmic matter, qualitatively an exception to the rule of material characteristics, scientifically inexplicable in an explicable (physical) natural reality, “life” becomes an insurmountable obstacle for pan-mechanicism:

Life as problem here indicates recognition of its strangeness in the mechanical world, which is the real world; to explain it means – on this level of the universal ontology of death – to deny it, reducing it to a variant of the possibility of the lifeless (Jonas, 1973:23).

This statement is phrased in a paragraph dedicated to: *pan-mechanism and the problem of life* (Jonas, 1973:22ff).

2. The dualistic legacy of Greek-Medieval philosophy

Alternatively the dualistic trends in Greek philosophy struggled with the relationship between matter and form, both conceived as eternal and mutually exclusive principles.

The elaboration of this dualism is found in the account given of the relationship between *form* and *substance*. It gave birth to a method of hierarchical classification where higher level concepts united what is common between the different entities on the previous or lower level. During the Middle Ages, the Latin formulation of this (entitery-directed) method of classification became well-known in the form of the distinction between a *genus proximum* and *differentia specifica*. This method of concept formation is well at home within domains where a typological classification is required, as is apparently the case within biology as a discipline. Within the domain of biological classification a *Genus* encompasses various *species*. Yet different Genera belong to one or another *Family*, a number of Families to one or another *Order*, and so on.

It should be noted that this kind of classification is also applicable to the level of material (physical) entities. Matter assumes different *forms*: the solid, fluid and gaseous states are well-known to us. Furthermore, there is not just *one kind* of matter. There are elementary particles, which are constitutive for atoms, atoms are constitutive for molecules, molecules for macromolecular conformations and so on.

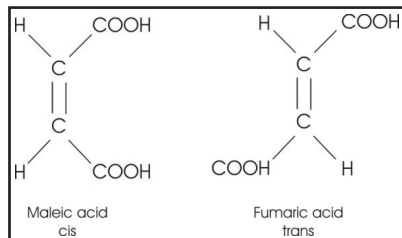
3. Natural and societal entities are polynomic

Consider a material entity such as an atom. How do we appreciate the *law for being an atom*? Surely this law is different from “single-aspect” laws, such as quantitative laws (addition, multiplication, etc.), spatial laws (symmetry laws), kinematic laws (the law of inertia or Newton’s laws) or physical laws (gravitation, energy-constancy or the law of non-decreasing entropy). We may use a term introduced by Bernhard Rensch to characterize a type law (the meaning of this expression will become clear in the course of the discussion). Since laws from different aspects co-determine such entities, we can designate it as *polynomic* – literally referring to entities at once determined by “multiple laws” (see Rensch, 1991:249 ff.).

The *law for being an atom* is therefore a “totality-law” in a polynomic sense since at once it *specifies* quantitative, spatial, kinematic and physical properties of the atom. Contemplate the properties of oxygen in different chemical bondings. Concerning H_2O , Pauling observes that the binding angle of oxygen is $104^\circ 40'$ while Seel notes that within Cl_2O the binding angle of oxygen is $110^\circ 48'$ (see Pauling, 1963:110 and Seel, 1963:41). While maintaining its internal structure, an oxygen atom displays *typical* properties within different molecular bondings.

Clearly the polynomic (“totality-law”) holding for being an atom, first of all applies to the distinct number of elementary particles within the internal structure of an atom. Then it applies to their mutual spatial ordering, as well as for the orbits of these moving particles, and finally for the atom as a *physical energy-unit* (see Planck, 1920:135). By means of its typical functioning within these four aspects the atom is configured as a spatially founded physical-chemical polynomic micro-totality.

The peculiar spatial configuration which is manifest in the internal structural arrangement of an atom reflects the *typical foundational function* of atoms. The same applies to molecules. When the twelve atoms $C_4H_4O_4$ are arranged in different spatial ways they respectively yield *maleic acid* (cis) and *fumaric acid* (trans). The physical aspect is the *typical* qualifying function of a molecule.



A more appropriate designation of the idea of a polynomic “totality-law” is found in the expression: *type law*, although it confronts us with the long-standing controversy about *universality* and what is *individual*. Dooyeweerd introduced the term *individuality-structure*: “The philosophy of the cosmologic idea does not first break up a thing’s unity into modal law-spheres, and then, in *retrospect*, seek *unity* in a thing. *The transcendental idea of the individual whole precedes the theoretical analysis of its modal functions. It is its pre-supposition, its cosmological a-priori*” (Dooyeweerd, 1997-III:65).

4. Subject unit and individuality-structure

Vollenhoven employed the notion of a *subject unit*, which functions in all law-spheres “if not as subject, then as object” (Vollenhoven, 2005:48). Both Dooyeweerd and Vollenhoven therefore acknowledge the universality of *modal aspects*, i.e., their modal universality. Initially, both also merely accepted the idea of a guiding or qualifying function (see Dooyeweerd, 1997-III:76 ff. and Vollenhoven, 2005:47 where he speaks of a “leidende functie” = *guiding function*). Dooyeweerd initially believes (1935-1936) that natural things do not have a typical foundational function. In 1950, however, he relinquishes this position (see Dooyeweerd, 1950:75 note 8).

5. Between universality and what is individual: realism and nominalism

The term *universality* has at least two important meaning-nuances: (i) modal universality and (ii) typical universality. Both are instances of *ontic* universality, i.e., of universality “out there”. Both forms of universality condition the nature of concept-formation. A proper understanding of universality should acknowledge the universality of God’s law, the lawfulness (law-conformity) of creatures subject to God’s law and the universality of features or traits united in (non-theoretical and theoretical) concepts.

The *realistic* tradition stumbled upon these forms of universality by distinguishing between the ideas in God’s “Mind” (*ante rem*), the ideas in existing things (*in re*) and as human concepts (*post rem*). *Nominalism* rejects every form of universality outside the human mind and therefore rejects both God’s *order for* and the correlated *orderliness of reality*. Our concepts are merely mental substitutes (*nomina*) for the multiplicity of *individual* entities outside the human mind. Descartes categorically states: “number and all universals are only modes of thought” (*Principles of Philosophy*, Part I, LVII;

Descartes, 1644-1965:187). Nominalism is *rationalistic* and *irrationalistic* at once. Rationalism results from a deification of universal features, that is, it absolutizes *conceptual knowledge*. Irrationalism, on the other hand, deifies what is unique, individual, unrepeatable and contingent, thus restricting knowledge to the approximating understanding of concepts stretched beyond the limits of their natural application (i.e., *concept transcending knowledge* or *idea-knowledge*). The perplexing fact is that nominalism comprises both these elements: in respect of the typical structure of entities, nominalism does not accept any conditioning order (universal structures) for, or any orderliness (universal structuredness) of such entities. Every entity is strictly individual. In terms of the distinction between rationalism and irrationalism, nominalism therefore represents an irrationalistic view of the nature of entities since every individual entity is completely stripped of its universal orderliness (law-conformity) and conditioning order, and a rationalistic view of the universal concepts or within the human mind (in *mente humana*). This characteristic applies to both moderate nominalism, viz. conceptualism (Locke, Occam, Leibniz and others), and to extreme nominalism, that rejects all general and abstract ideas and only accepts general names (Berkeley and Brentano).

6. The nominalism of Darwin and Simpson

The orientation of modern nominalism was digested by Darwin in respect of living entities. First of all he states that “no line of demarcation can be drawn between species” (Darwin, 1859:443) – and to this he adds the nominalistic remark: “In short, we shall have to treat species in the same manner as those naturalists treat genera, who admit that genera are merely artificial combinations made for convenience” (Darwin, 1859:456).

To the mind of the neo-Darwinian thinker, George G. Simpson, the physical sciences are largely typological and idealistic in nature for they “usually deal with objects and events as invariant types, not as individuals with differing characteristics” (Simpson, 1969:8). It is only when biotical phenomena are considered that types are denied. Nominalism denies any and all *type concepts*: “Organisms are not types and do not have types” (Simpson, 1969:8-9). Yet implicitly Simpson here distinguishes between two *types* of phenomena, namely *physical phenomena* and *biotical phenomena*. In other words, in order to demarcate the domain of biotical phenomena where a typological (and even idealistic) method would be of no use, Simpson himself uses a *typological method* – a striking internal contradiction: biology can function non-typologically if and only if it is founded in a typological distinction!

7. Modal laws and type laws

The distinction between aspects and entities first of all requires an insight into the difference between *modal laws* (aspectual laws) and *type laws*.

Directing our theoretical attention toward the modal aspects or functions of reality (such as the spatial aspect, the physical facet or the social function) exceeds the attempt to classify entities according to the *kinds* or *types* to which they belong. The mere distinction between economic and un-economic, for example, is not specified in any *typical* way. Both a state and a business can waste their money (and thus act un-economically) and both are called to function under the guidance of economic considerations of frugality. But it is only possible to phrase these perspectives when the economic aspect is understood in its *modal universality*, i.e. when the typical nature of the business and the state is *disregarded*.

The main point is that modal laws hold universally without any specification – universities, businesses, states, families and sport clubs all have to observe the general meaning of economic norms. When Breuer discusses “theories about everything” he approximates the idea of modal universality, for he believes that a theory is universally valid if it holds for the “entire material ‘world’”, i.e. when “no part of the material world is excluded from its domain of validity” (Breuer, 1997:2). Yet he does not realize that this view presupposes *modal universality*. The physicist Von Weizsäcker has a better understanding of this issue when he refers to the universal validity of physical laws.

Since *modal laws* – like the laws of quantum physics – hold for all possible “objects” they do not account for the *typicality* of physical entities. Von Weizsäcker observes: “Quantum theory, formulated sufficiently abstract, is a universal theory for all Gegenstandsklassen (classes of objects)” (Von Weizsäcker, 1993:128). On the next page he correctly explains that one cannot deduce the *kinds* of entities of experience from the universal scope of quantum theory. This insight implicitly alludes both to *universal modal laws* and *specified type laws* (the latter with their own typical universality). Modal physical laws therefore encompass all types or kinds of physical entities.

Without being aware of the fact that he stumbled upon this distinction between type laws and modal laws, Meyer states that “some scientific disciplines distinguish and classify natural entities, while others attempt to formulate overarching laws that apply to all entities” (Meyer, 2013:387).

8. Unspecified and specified universality

The law holding for a particular *kind* or *type* of entity still has its own universality, but this universality is *specified*. The law for being a state is universal in the sense that it holds for all states. But because not *everything* is a state, this type law is specified – it applies to states only. Likewise businesses and states belong to different kinds of societal entities, and this typical difference is seen in the typical differences between the function of a state and the function of a business within the economic aspect – business economy differs from state economy (a business cannot ‘tax’ its clients, but the state can tax its citizens). In general, one can say that modal laws encompass all possible entities, whereas type laws only hold for a limited class of entities. Bernhard Rensch approximates this distinction between modal laws and type laws in his work on the universal world view where he discusses, in Chapter 18, *universal laws* and *special laws* (Rensch, 1991:236 ff., 241).

9. Typical functions of entities within modal aspects

Natural and social entities function in a “typical” way within every modal aspect. The word “typical” therefore actually refers to the *typonomic* specification of entitary functions (*typos* = type and *nomos* = law). Therefore *typical functions* can also be designated as *typonomic functions*.

Modal laws apply to every possible entity or process entailing that they apply universally. Their scope is not limited to any class or any specific kind of entities. Quantitative laws do not merely hold for atoms, apples or apes, they apply to any multiplicity (plurality) of whatever kind.

Conversely, the law for any specific kind of entity is solely applicable to those types of entities. The law for being an atom does not apply to mammals or states alike. Similarly, the structural principle for the state as public legal community does not apply to other kinds of societal institutions, such as ecclesiastical communities or businesses.

In general, it can be said that modal laws hold for all possible classes of entities, whereas type laws hold for a limited class of entities only. This explains why even Kant was compelled to make a distinction between his (supposedly universally valid a priori) thought categories on the one hand, and so-called *empirical laws* of nature on the other (the latter represents his account of type laws):

We rather have to distinguish empirical laws of nature, which always presuppose particular perceptions, from the pure or general natural laws, which, without having a foundation in particular perceptions, only contain the conditions of their necessary connection in an experience. In respect of the latter nature and possible experience are entirely the same; and since within these the law-conformity of the necessary connection of appearances in an experience (without which we are totally incapable of knowing any object of the world of sense), actually is based upon the original laws of the understanding, so it initially does sound strange, but it is nonetheless certain, when I state with respect to the latter: understanding creates its laws (a priori) not out of nature, but prescribes them to nature (Kant, 1783 par. 36:320).

Stafleu explains this distinction as follows:

Hereby we distinguish laws which are valid for a limited class of subjects (typical laws) from those which are valid for all kinds of subjects (modal laws). Typical laws, in principle, delineate a class of subjects to which they apply, describing their structures and typical properties.

Examples of such laws are the Coulomb law (applicable only to charged subjects), the Pauli principle (applicable to fermions), etc. Often the law describing the structure of a particular subject (e.g., the copper atom) can be reduced to some more general laws (e.g., the electromagnetic laws in quantum physics). On the other hand, modal laws are those which have a universal validity (Stafleu, 1980:11, cf. pp.6 ff.).

For example, the law of gravitation applies to all physical subjects, regardless of their typical structure. We call them modal laws because, rather than circumscribing a certain class of subjects, they describe a *mode of being, relatedness, experience, or explanation*.

10. Order for and orderliness of

The (universal) conditions for being this or that type of thing must be distinguished from the (universal) way in which particular entities evince their conformity with these conditions (laws). In being an atom or being human, this or that atom/human being shows that it meets the conditions for what it is. Sometimes the word “structure” is used both for the “law for” an entity and for the “actual composition of” an entity. The structure (composition) of the latter reveals what is correlated with (and therefore distinct from) the order for entities. A *structure for* has the meaning of a *law for*, while a *structure of* represents the universal way in which individual entities reveal their

conformity with the given law for their existence (also known as their law-conformity). [Unfortunately Dooyeweerd did not properly distinguish between *law* and *lawfulness* (law-conformity) – he simply used these expressions interchangeably.]

Although a hierarchical classification of different kinds (or levels) of entities does lead to higher levels of abstraction, it does not escape from the entitary dimension of reality as such. Therefore this method of concept-formation cannot be used to arrive at an insight into the nature of modal aspects.

We are now in a position to understand what is actually intended by the idea of ID (Intelligent Design).² This idea ultimately wrestles with the nature of biotic and sensory *type laws* as well as the polynomic type law for being human.

11. The ever-important distinction between aspects and entities

Of course the modal nature of the physical and biotical aspects remains a constant *functional* condition for *concrete* entities which continue to function in these (and other) aspects of reality in a *typical* way. What is first of all at issue here is the basic distinction between the *aspects of reality* and the *dimension of entities* – a distinction continually disregarded by the different points of view in biology, which time and again speak of modal functions as if they are *concrete entities*, frequently found in the habitual reference to the origin of “life”, rather than to the origin of (multi-aspectual) *living things*. As an aspect of reality, *life* has to do with the *how* of entities, not their concrete *what*.

In our everyday experience the implicit awareness of typical entities and their type laws is all-permeating. The first feature of reality, which we experience from childhood is the rich diversity of entities within creation, but it is never stripped from the equally basic experience of modal (functional) properties.

2 An excellent explanation of the evidence and arguments called upon by the ID approach is found in an article written by Arthur Jones: *An Introduction to Intelligent Design* (see Jones, 2013).

12. The need for a non-reductionist ontology

This view entails the idea of a non-reductionist ontology, which is at odds with *Enlightenment* rationalism and its intellectual influence up to the present. Sterelny points out that Richard Dawkins strictly continues the *epistemic ideal* of *Enlightenment* rationality – according to which the scientific description of the universe is “true ... beautiful and complete” (as Sterelny formulates it – 2001:13, 14).

Characteristic of modernity is that it produced theoretical orientations, which constantly aimed at explaining the universe in terms of one or another modal aspect. The diversity within reality, for example, witnessed theoretical orientations in which reality could be explained in terms of (discrete) “elements” serving as ultimate principles of explanation. These atomistic or individualistic views are usually defended as an alternative to *holistic* or *universalistic* approaches in which (analogies of) continuity (that is, *wholeness* and the whole-parts relation) play an explanatory role.

13. The continuity postulate in modern philosophy and biology

Already during the 17th century this split also surfaced in the thought of Leibniz. As counter-balance for his discrete monads, he introduced his idea of the *lex continui* (the *law of continuity* – see Leibniz, 1692-1976:397). During the 19th century *discreteness* once again surfaced within the discipline of mathematics, particularly enhanced by the development of set theory and its arithmeticistic claims without eliminating the alternative emphasis on wholeness found in certain parts of intuitionistic mathematics, in the thought of Frege close to the end of his life, among the French “continuum” theorists, and recently in the *Smooth Infinitesimal Analysis* (SIA) of John Bell (2006).

The mentioned aphorism, *natura non facit saltus*, influenced Linnaeus and subsequently also Charles Darwin himself. In his *Origin of Species* one finds four places where the phrase is employed, although the idea of continuity permeates the entire work. Darwin indeed developed his new ideas with an explicit appeal to this *continuity postulate* – in an *a priori* fashion, that is to say, without the support of empirical evidence, which caused serious problems for his theoretical stance.

14. Continuity and discontinuity

Darwin's first reference to *natura non facit saltus* is slightly critical of what is designated as the *canon in natural history*: "It certainly is true, that new organs appearing as if created for some special purpose, rarely or never appear in any being;- as indeed is shown by that old, but somewhat exaggerated, canon in natural history of 'natura non facit saltum'" (Darwin, 1859:116). A few pages further this "exaggeration" is left behind in the claim that once we broaden our perspective to include the known and unknown inhabitants of the past time it is "strictly true" (Darwin, 1859:124).

It is quite remarkable that amidst the dominant nominalistic orientation of (neo-)Darwinism one of its recent adherents had to surrender for "objective" traits in reality as the basis for our concept of a *species*. Just consider how Coyne accounts for discrete clusters of living entities known as *species*: "And at first sight, their existence looks like a problem for evolutionary theory. Evolution is, after all, a continuous process, so how can it produce groups of animals and plants that are discrete and discontinuous, separated from others by gaps in appearance and behaviour?" (Coyne, 2009:184). In following Mayr and Dobzhansky a discrete cluster of sexually reproducing organisms is designated by Coyne as a *species*. On the same page he continues saying that the discontinuities of nature are "not arbitrary, but an objective fact" (Coyne, 2009:184).

In other words, while Darwin advances a typical nominalistic view in respect of living entities, Coyne reverts to a realistic idea of (currently!) living entities. This view approximates the idealistic orientation of Wilhelm Troll, who believes that it is not descent that decides over morphology, but the other way around.³

However, the acknowledgment of discreteness (discontinuity) is irreconcilable with the notion of evolutionary continuity – unless one subscribes to the intrinsically antinomic stance of *emergence evolutionism*. The latter idea claims continuity in descent and discontinuity in existence. It fits the spirit of the irrationalistic leg of nominalism, rejecting any structural or typical feature belonging to "reality out there". Nominalism denies universality outside the human mind. However, faithful to the inherent inconsistency of nominalism (being rationalistic and irrationalistic at the same time), Coyne, at once, acknowledges that species have "an objective reality and are not simply

3 He categorically states that the question concerning the origination of life on earth, owing to its speculative nature, does not belong to the domain of biology as an empirical science (Troll, W. 1973:8-9).

arbitrary human constructs” (Coyne, 2009:186). From what is asserted on the previous page, it is clear that in the thought of Coyne primacy is given to the irrationalistic side of nominalism, because it is the continuous process of evolution that *produces* discrete groups: “For years after publication of *The Origin*, biologists struggled, and failed, to explain how a continuous process of evolution produces the discrete groups known as species” (Coyne, 2009:185).

15. Ambiguities caused by the continuity postulate

A related ambiguity is found in the thought of Wentzel van Huyssteen who believes that our universe and “all it contains is in principle explicable by the natural sciences” (Van Huyssteen, 1998:75). Yet, contradicting this Enlightenment conviction he also warns that we should not overextend rationality “to explain everything in our world in the name of natural science” (Van Huyssteen, 1998:115). Does the last statement mean that we have to account for different (irreducible) levels in the process of evolution?

Julian Huxley wrestles with this question when he warns against the “nothing but” fallacy on the basis of the inherent tension between continuity and discontinuity:

We begin by minimizing the difference between animals and ourselves by unconsciously projecting our own qualities into them Though early scientific thinkers, like Descartes, tried to make the difference absolute, later applications of the method of scientific analysis to man have, until quite recently, tended to reduce it again. This is partly because we have often been guilty of the fallacy of mistaking origins for explanations – what we may call the ‘nothing but’ fallacy: if sexual impulse is at the base of love, then love is to be regarded as nothing but sex; if it can be shown that man originated from an animal, then in all essentials he is nothing but an animal. This I repeat, is a dangerous fallacy (Huxley, 1968:137).

The discontinuities revealed by the *Paleontological Record* and the *Natural System* (the currently living entities discussed by Coyne) are simply relativized by the speculative claim of an all-embracing continuous process of transition (evolution as continuous change). Emergent evolutionism accepts both continuity in descent and discontinuity in current existence. All variants of an emergent-evolutionistic perspective therefore appears to struggle with the tension between *continuity* and *discontinuity* (reducibility and irreducibility).

Material entities have their highest active (i.e. subject) function within the physical aspect of reality. The idea of emergent properties may therefore suggest that increasing complexity can produce, from a mere physical constellation, biotic properties or even the biotic aspect of reality. This would entail that an additional *subject function* can “emerge”, namely the biotic aspect – as Klapwijk argues in 2008. A penetrating analysis of this work is found in an article of Henk Geertsema (2011). However, in a recent communication to Thinknet (a Web discussion group on *Reformational Philosophy*) he defends the view “that phenomena present on a higher level of being have emerged in the process of time, but not the basic laws that control such an innovation; these laws are God-given orderings, laws as old as creation” (Thinknet remark, 8 June, 2015).

16. Problems attached to emergent-evolutionism

Van Huyssteen refers to Stewart who argues on the basis of the “notion of emergence”: “Life is flexible, life is free, life seems to transcend the rigidity of its physical origins. And it is this kind of transcendence that is called ‘emergence’” (Van Huyssteen, 2006:55).

Can a particular function (modal aspect) change into another aspect? Just consider the conviction that physical entities were transformed into biotic (i.e. living entities).

The problem here is a quite serious theoretical issue, for if we accept that the physical function can change (be “transformed”) into the biotic aspect, the next problem is, will there still exist a physical aspect of reality after the physical aspect “developed” into the biotic? This seems to be impossible if the physical aspect “developed” into the biotic aspect. Since an aspect determines the modal properties of entities functioning within it, biotic properties would presuppose the distinct modal structure of the biotic aspect. One cannot simply add biotic features to physical ones without a prior account of the “emergence” of the biotic aspect from physically qualified entities. In general a less rigorous version may contemplate the question whether or not it is possible for one aspect to give rise (“birth”) to the existence of another aspect. That this is not merely a strawman argument flows from the fact that if physical entities evolve into biotic entities the emergence of such biotic properties presupposes the irreducible modal structure of the biotic aspect. The transmodal idea of emergence inevitably terminates in the view that new aspects “emerge” through an evolutionary process, as claimed by Huxley in 1959: “This is one of the first public occasions on which it has

been frankly faced that all aspects of reality are subject to evolution, from atoms and stars to fish and flowers, from fish and flowers to human societies and values – indeed, that all reality is a single process of evolution” (quoted from his lecture “The Evolutionary Vision” presented at the Convocation Ceremony that took place on *Thanksgiving Day* 1959).

For in this case the continued existence of the initial aspect may be maintained. Yet, if this transition does not eliminate the initial (or primary) aspect, it is incorrect to claim that it changed into a different aspect. While holding on to the idea of transformation the only other option seems to be to defend one or another view of emergence in terms of which it is claimed that an on-going process eventually gives rise to various new aspects of reality. It is often asserted that once these additional aspects emerged (came into existence) they are irreducible. Emergent evolutionists (such as defended by Lloyd-Morgan, Whitehead, Alexander, Woltereck, Bavink and Polanyi) indeed want to have it both ways: *continuity* in descent (in the process of origination) and *discontinuity* in existence (in structure). Structure thus becomes the product of the genetic process of becoming. It seems as if some attempts at establishing a synthesis between Christianity and evolution get entangled in these antinomies present in the thought of emergent-evolutionistic thinkers.

Th. Dobzhansky calls the origination of a new level, i.e. discontinuity, “evolutionary transcendence” (Dobzhansky, 1967:44). The term “transcendence” is derived from the theologian Paul Tillich (1968):

The flow of evolutionary events is, however, not always smooth and uniform; it also contains crises and turning points which, viewed in retrospect, may appear to be breaks of the continuity. The origin of life was one such crisis, radical enough to deserve the name of transcendence. The origin of man was another (Dobzhansky, 1967:50).

Furthermore, Dobzhansky holds that “the phenomena of the inorganic, organic, and human levels are subject to different laws peculiar to those levels” (Dobzhansky, 1967:43). At this point something intriguing could be noticed. This quote from Dobzhansky sounds very much like the reformational philosophical idea of *sphere-sovereignty*, embedded in the perspective of an unbreakable correlation between law and what is subjected to law. One important difference, nonetheless, is that Dobzhansky holds that it is unnecessary to assume any intrinsic irreducibility of these laws” in spite of the fact that he adds that it is “unprofitable to describe the phenomena of an overlying level in terms of those of the underlying ones” (Dobzhansky, 1967:43).

However, the “pan-psychistic” and “identistic” biologist, Bernhard Rensch, accepts irreducible *Gesetzlichkeiten* (law-conformities) determining our polynomic universe. In particular he holds that “the universal constants, such as mass, and respectively energy, charge, spin as well as place and temporal properties, are not reducible to something else” (Rensch, 1991:249-250).

17. Alternative biological trends of thought in 20th century biology

17.1 Neo-Vitalism

It seems as if vitalism is based upon a principled choice for an irreducible alternative basic denominator, namely the *biotic*. Unfortunately the biotic is not understood in the sense of an aspect or mode of being of reality. The father of neo-vitalism, Hans Driesch, speaks of an immaterial vital force (to which he refers as *entelechie* or *psychoide* – see Driesch, 1921:357 ff.), which is much more than just the biotic aspect of reality. Without surrendering the validity of the mechanistic analysis of matter, and without denying the causal claims of the classical humanistic scientific ideal with regard to nature, Driesch tried to apply the concept of natural law (in just as deterministic a sense) to biotical phenomena. In agreement with Driesch Rainer Schubert-Soldern defends the vitalistic position with a range of biochemical arguments. As the functional and formal unit of life, the existence of the cell depends, according to Schubert-Soldern, on the actualization of a twofold potential: “(a) the ‘form’ or order of the cell, and (b) the chemical laws governing molecules ... This principle of order may be called the ‘active potentiality’ of the material parts” (Schubert-Soldern, 1962:102). His view of the principle of order returns to Aristotle: “Hence the Aristotelian concept of entelechy corresponds exactly with the principle of order, which we see at work making the cell into a whole. It is a principle of wholeness which forms a unity from parts which would otherwise go their separate ways. Thus a hologenous system is born” (Schubert-Soldern, 1962:113).

Where Aristotle, Thomas Aquinas, and even Driesch still account for individuality in terms of *material* components, Schubert-Soldern chooses another route: “Since the form brings about the individualization of something, which previously had been poli-substantial or poli-individual, it must be the form, which expresses the individuality, which itself must be the individuality” (Schubert-Soldern, 1959:285). In his view the form of a body “brings about a real entity with a non-material character, concerning a substance which in its essence possesses its dynamic character” (Schubert-Soldern, 1959:286).

Simpson chose the term *organization* to indicate the essential distinctive characteristic of living things (Simpson, 1969:7). In neo-vitalist circles, organization is understood in terms of their particular understanding of form (order). The botanist E.W. Sinnott, for example, writes “Uexküll and others have emphasized this idea and regard organic form as essentially an independent aspect of an organism, parallel with its matter and energy. ... Indeed, the concept of organization as something independent of the inner and outer environment implies that form must be a basic characteristic of all living things” (Sinnott, 1972:51).

According to Sinnott, throughout the universe there are “regions of orderly diversity” from “atoms, molecules and crystals to stars and galaxies”. Displaying a “formative quality” is “particularly conspicuous among living things while differing from ‘particles and the material substances they produce’”. Form “consists of *relations* among particles, of orderly patterns in them. It is a category of being very different from matter, for it is not the nature of the material particles themselves that is involved, but rather how they are related to one another” (Sinnott, 1963:199). While matter is “conservative, moving toward uniformity and maximum entropy”, form by contrast “is changing and creative”, it “is a continuous entity and cannot be divided into pieces” (Sinnott, 1963:199).

The neo-vitalist biologist J. Haas emphasizes the obedience of every living thing in the elaboration of the course of its life to an inherent law or programme, which he prefers to designate as its *life plan*: “The life plan contains as components the blueprints of each of its expressions; the genetic plan for their succession; the functional plan for carrying out its activities; the behavioral plan for all its ‘acts’.” (Haas, 1974:336). Life plans have (similar to norms and laws in general) an ideal being (*ideales Sein*) in Haas’s view (Haas, 1974:338), and cannot be explained physico-chemically: “Physical-chemical forces and laws are in themselves unable to bring forth the structures of meaning which we identify as the life plan, and even less can it produce a non-material bearer of life plans” (Haas, 1974:355). The Being responsible for bridging the abyss (*Kluft*) between the non-living (*Unbelebten*) and the living (*Lebendigen*) must conform to the following conditions: (1) It must dispose over a creative intelligence exceeding everything imaginable [*Es muss eine alles Vorstellbare überragende schöpferische Intelligenz besitzen*], for only such a Being can produce a meaning-structure such as what we recognize as “Lebenspläne” (*designs of life/vital plans*) (Haas, 1974:355-356). (2) It must be capable of realizing the “life plans” of organisms, i.e., it must have power over being as such (Haas, 1974:356).

Following the (idealistic-morphological) Austrian botanist Wilhelm Troll (cf. his standard text book, Troll 1973:19 ff.). Walter Heitler speaks of a *Zentralinstanz* which must exist in every organism (Heitler, 1976:6). Heitler uses this expression in the context of the following hypothesis which he would like to defend (against a consistent physicalism): “The organism has its own laws, which partly displaces the laws of physics and chemistry with something more general” (Heitler, 1976:3). He believes an important point of departure for his argument to be the fact that neither physics nor chemistry knows or uses a true concept of *Gestalt* or *Ganzheit*. The analytical treatment of these sciences disturbs the Gestalt. This happens because physical analysis can only be expressed in the systematic measurements of length, time, weight, and temperature (the so-called c.g.s. system). Due to this “merely analytical methodology the laws are differential, i.e. it makes direct statements only about the behaviour of objects for immediately neighbouring points in time and space. By means of integration one is able to obtain statements concerning the entire relationship (e.g. the form of planetary orbits), but these must follow from the differential elements” (Heitler, 1976:5). The *Gestalt* of a cell (or of the paw of a cat) transcends all the descriptive possibilities of the c.g.s. system. For such descriptions it is not rich enough. After all, if one only used differential laws, such as those of physics, cells would have to divide ad infinitum without the emergence of a cellular complex. In these terms the expression of a cat’s paw is unimaginable (Heitler, 1976:5-6). The central instance directing the eventual teleological activities of living things, is referred to by Heitler as the *biologische Instanz*, which also specifies the following sub-instances (*Unter-Instanzen*): organs, cells, organelles (Heitler, 1976:16).

17.2 Organismic biology

Related to vitalism one finds the organismic biology founded by Von Bertalanffy and developed into a general systems theory in which the terms *whole* and *totality* are central, with organization similarly functioning as a key term. Von Bertalanffy considers the organismic worldview to be a step beyond the mathematical *more geometrico* ideal and also beyond the *mechanistic* worldview: “First came the developments of mathematics, and correspondingly philosophies after the pattern of mathematics – more *geometrico* according to Spinoza, Descartes and other contemporaries. This was followed by the rise of physics; classical physics found its worldview in mechanistic philosophy, the play of material units, the world as chaos ... Lately, biology and the sciences of man come to the fore. And here organization appears as the basic concept – an organismic worldview taking

account of those aspects of reality neglected previously” (Von Bertalanffy, 1968:66). Beckner elsewhere comments that “Even though in fact many biologists agree with the organismic position, they will say they disagree” (Beckner, 1971:60-61).

18. The continuity postulate relativizes distinct levels

We have seen how the *continuity postulate* succeeded in relativizing Dobzhansky’s recognition of different kinds (or: levels) of laws. However, within 20th century biology it is notable that this *continuity postulate* could be explored from different perspectives (basic denominators), such as a *pan-psychistic* orientation (Rensch), *mind* (Wright), or *human freedom* (Jonas).

Dobzhansky mentions a view of Wright on “mind”, which runs parallel with the *pan-psychistic identism* of Bernhard Rensch (“with which Wright is apparently not acquainted”). Dobzhansky provides two telling quotes from Wright.

Wright stated the problem: “If the non-living world is completely devoid of mind, and if, as it seems necessary to believe, there was a time when no life could exist, how did mind appear?” (see Dobzhansky, 1967:28). Wright rejects the “[E]mergence of mind from no mind at all” as “sheer magic”. To escape from this “sheer magic” the only satisfactorily solution of these dilemmas “would seem to be that mind is universal, present not only in all organisms and in their cells but in molecules, atoms and elementary particles” (quoted by Dobzhansky, 1967:28). The *continuity postulate* requires that what appears at the end of the evolutionary process must already be present right at the beginning – it does not want to surrender to any discontinuity, such as the sudden occurrence of “life”, “consciousness”, or “mind”.

Nonetheless, the acceptance of the postulate of continuity does not necessarily imply the choice of a *physico-chemical* basic denominator (such as in neo-Darwinism). A position basically similar to the just mentioned views of Wright is pursued by the German zoologist, Bernhard Rensch, which is still in line with the modern deterministic science ideal.

Although Rensch accepts the continuity postulate of the science ideal, he explicitly distances himself from both the mechanistic and vitalistic points of view (the former deals with continuity in terms of a physical-chemical denominator and the latter in terms of a biotic denominator). Although he accepts the validity of the natural scientific causal analytical method, Rensch rejects every monistic theoretical picture of reality which attempts to reduce

all of reality to a single principle. According to him world events are governed by multiple basic laws: “Despite all evidence in favour of the monistic principle, the primal ground of world events is pluralistic” (Rensch, 1971:33). Rensch refers in particular to “the causal law, universal constants, the law of conservation, the principles of symmetry, and the logical laws” (Rensch, 1971:33 – see also Rensch, 1991:236 ff.).

Rensch characterizes his own position as ‘pan-psychistic’ and ‘identistic’ – that is, all events are founded by something which is neither psychic nor material, but which has psychic and material characteristics (Rensch, 1971:159). It implies considering the evolutionary continuum in terms of a psychic basic denominator. If no discontinuities exist in the evolutionary line of descent, then lower animals, plants, and even the inorganic sphere should exhibit certain corresponding “psychic” components – a conclusion drawn by Rensch: “According to our previous findings and discussions we are justified in assuming ... psychic (parallel) processes of some kind in all living beings” (Rensch, 1959:352).

“Psychic” continuity also bridges the transition from living to non-living: “Here again it is difficult to assume a sudden origin of first psychic elements somewhere in this gradual ascent from nonliving to living systems. It would not be impossible to ascribe ‘psychic’ components to the realm of inorganic systems also, i.e. to credit nonliving matter with some basic and isolated kind of ‘parallel’ processes” (Rensch, 1959:352).

Rensch believes that such a pan-psychistic approach has the advantage of not having to assume that the psychic, as something basically distinctive from the material, appeared on our planet at some stage after the emergence of living creatures. As a substitute for the assumption that psychic phenomena appeared suddenly after an astronomic and geological prehistory of millennia, Rensch considers it far more conceivable and acceptable to link the evolution of the psychic to the evolution of the material (*anzufügen*), i.e. to ascribe a protopsychic nature to matter (Rensch, 1969:134-135 and Rensch, 1991:250).

It is nonetheless noteworthy that in spite of adhering to the *continuity postulate* regarding the descent of human beings, a prominent neo-Darwinist such as Simpson almost fully surrenders to *discontinuity* when he states: “Man has certain basic diagnostic features which set him off most sharply from any other animal and which have involved other developments not only increasing this sharp distinction but also making it an absolute difference in kind and not only a relative difference of degree” (Simpson, 1971:270).

19. The underlying dialectic of nature and freedom

The modern anthropocentric or humanistic science ideal, emerging during the time of Descartes out of the quest for autonomous freedom (the personality or freedom ideal) as an instrument of control with the aid of which all of reality could be brought in the grip of the natural sciences, has threatened the humanistic freedom ideal from its inception, because a closed causally-determined natural order leaves no room for genuine human freedom. Just as Rensch retroprojects psychic characteristics to the realm of material things, H. Jonas is “forced”, in the interest of the primacy of the freedom ideal, to “recover” freedom on the level of *matter*: “Our position is in actual fact that it is possible to observe freedom already at the level of metabolism – yes, even that it is the first form of freedom” (Jonas, 1973:13). According to Jonas “life manifests this polarity in a durable fashion in the fundamental antithesis within which its existence weaves itself: the antithesis of *existence* and *non-existence*, of *self* and *world*, of *form* and *matter*, of *freedom* and *necessity*” (Jonas, 1973:15-16).

20. Intelligent design (ID)

In his book *Signature in the cell* (2009) Stephen Meyer gives an account of the diverging worldviews among Western intellectuals already present in ancient Greek thought:

According to one worldview, mind is the primary or ultimate reality. On this view, material reality either issues from a pre-existing mind, or it is shaped by a preexistent intelligence, or both. Mind, not matter, is, therefore, the prime or ultimate reality—the entity from which everything else comes, or at least the entity with the capacity to shape the material world. Plato, Aristotle, Roman Stoics, Jewish philosophers such as Moses Maimonides, and Christian philosophers such as St. Thomas Aquinas each held some version of this perspective [Quotations are from a Kindle version of this work.]

He points out that during the scientific revolution (1300-1700) most of the founders of modern science also adhered to this mind-first view of reality:

Many of these early modern scientists thought that their studies of nature confirmed this view by providing evidence, in Sir Isaac Newton’s words, of “an intelligent and powerful Being” behind it all. This view of reality is often called idealism to indicate that ideas come first and matter comes later. Theism is the version of idealism that holds that God is the source of the ideas that gave rise to and shaped the material world. The opposite view holds that the physical universe or nature is the ultimate reality. In this view, either matter or energy (or

both) are the things from which everything else comes. They are self-existent and do not need to be created or shaped by a mind.

The general contemporary view advocates the idea that natural “interactions between simple material entities governed by natural laws eventually produce chemical elements from elementary particles, then complex molecules from simple chemical elements, then simple life from complex molecules, then more complex life from simpler life, and finally conscious living beings such as ourselves”.

However, in the *Prologue* of another book, *Darwin’s Doubt* (2013), Stephen Meyer observes: “The type of information present in living cells – that is, ‘specified’ information in which the sequence of characters matters to the function of the sequence as a whole – has generated an acute mystery. No undirected physical or chemical process has demonstrated the capacity to produce specified information starting ‘from purely physical or chemical’ precursors. For this reason, chemical evolutionary theories have failed to solve the mystery of the origin of first life – a claim that few mainstream evolutionary theorists now dispute” (Meyer, 2013:vi). This book investigates the mystery of the Cambrian explosion which was initially dated between 20 to 40 million years ago, now reduced to 5 or 6 million years (Meyer, 2013:72).

21. Increasing complexity exceeding traditional genetics

Although neo-Darwinians therefore have to concede that the origination of the first living entity is a mystery they still *believe* that it happened “spontaneously”, that is to say through purely *material* processes. Moreover, apart from the extreme improbability of such a process, there are no clues as to how the information found in living entities came into being – the “hardware” (material) does not explain the “software”, ordered Desoxiribonucleic (DNS) sequences [based upon the nucleotides (adenine, cytosine, guanine and thymine – in the double helix structure of DNS molecules, epigenetic information or complex proteins].

The equally mysterious appearance of new animal phyla during the Cambrian explosion is currently attributed to *epigenetic information* not stored in genes. Furthermore, similar information sequences do not affirm common ancestor genes. That genes with information-rich sequences cannot be derived from common ancestral genes, is underscored by recent “genomic studies which reveal that hundreds of thousands of genes in many diverse organisms

exhibit no significant similarity in sequence to any other known gene” (Meyer, 2013:215). Meyer also mentions that these ORFan genes (the acronym derived from “open reading frames of unknown origin”) have “turned up in every major group of organisms, including plants and animals as well as both eukaryotic and prokaryotic one-celled living entities. In some organisms, as much as one-half of the entire genome comprises ORFan genes” (Meyer, 2013: 216). In the absence of any homologs, ORFans cannot be related to a common ancestral gene, a “fact tacitly acknowledged by the increasing number of evolutionary biologists who attempt to ‘explain’ the origin of such genes through *de novo* (‘out of nowhere’) origination” (Meyer, 2013:216). Erwin and Davidson allege that no current theory of evolution explains the origin of the *de novo* body plans found in the Cambrian explosion (see Meyer, 2013:356). Erwin even says that establishing these novel body plans does not have “any parallel to currently observed biological processes”. He insists that the events of the past were *fundamentally different*. The upshot is clear: “the cause responsible for generating the new animal forms, whatever it was, must have been unlike any observed biological process operating in actual living populations today” (Meyer, 2013:356). When the principle of uniformity is challenged the door is opened for speculating about origination phenomena which are indeed unlike any biotical processes observed in currently living populations.

The biologist Geoff Barnard questions the view that the genome provides evidence for a common ancestry. He remarks that retroviral arguments pointing at common ancestry could be interpreted alternatively “on the basis of independent species infection”. G. Barnard, “Does the genome provide evidence for common ancestry?” In Norman C. Nevin, Ed., *Should Christians Embrace Evolution?* (Nottingham, UK: InterVarsity Press, 2009 – pp. 166-86, at p.186).

It becomes increasingly difficult to accept the neo-Darwinian mechanism of random mutation and natural selection. Reverting to an “out of nowhere” explanation and speculatively postulating a “fundamentally different past” rather underscores the true mystery surrounding the assumed unique origination of living entities. This unease includes the evidence of the Cambrian explosion which, according to Erwin and Davidson (2002), is not accounted for by any known (micro or macro) theory of evolution.

22. The idea of a *Bauplan* is shared by different orientations

The mere fact that someone like Gould frequently employs the term *Bauplan* (*Structural Design*) reveals that not even thinkers shaped by the Darwinian tradition succeeded in avoiding an acknowledgement of type laws for plants and animals (see Gould, 2002:154, 582, 1156, 1198, 1202). The same applies to Bernhard Rensch, also one of the key figures of the “New Synthesis” from the early 40s of the previous century, who frequently speaks of “Baupläne” (see Rensch, 1991:97, 120).

The main focus of Meyer’s Book investigating *Darwin’s Doubt* is therefore aimed at showing that the body plans involved are mainly flowing from epigenetic information. Moreover, the fossil record does not, as one might expect from a (neo-)Darwinian approach, reveal a bit-by-bit (incremental) movement from the bottom to the top, but rather the other way around, from top to bottom: “The fossil record suggests that the major pulse of diversification of phyla occurs before that of classes, classes before that of orders, orders before that of families. . . . the higher taxa do not seem to have diverged through an accumulation of lower taxa” (Erwin, Valentine & Sepkoski, 1987:1183).

The implicit account of type laws present in the contemporary approach of ID scientists largely accepts a “matter-mind” split. When Meyer explains the basic contours of his own ID orientation he stresses the fact that “many evolutionary biologists see intelligent design as a religiously based idea—a form of biblical creationism”, whereas, “contrary to media reports, intelligent design is not a biblically based idea, but instead an evidence-based theory about life’s origins—one that challenges some, but not all, meanings of the term ‘evolution’” (Meyer, 2013:338). Two pages further on he adds the remark that many evolutionary biologists “think of intelligent design as a religiously based idea” causing that people might want “to affirm the intelligent design of life as part of their religious beliefs” and not, as Meyer sets out to argue, “as a consequence of scientific evidence” (Meyer, 2013:340).

Dr. Wolf-Ekkehard Lönnig, Senior Scientist (Biology), Max Planck Institute for Plant Breeding Research, Emeritus, Cologne, Germany evaluates Meyer’s book as follows: “*Darwin’s Doubt* is by far the most up-to-date, accurate, comprehensive and in-depth review of the evidence from all relevant scientific fields that I have encountered in 40 years of studying the Cambrian explosion. An engaging investigation of the origin of animal life and a compelling case for intelligent design” (see Lönnig, 2014).

The paleontologist Mark McMenamin writes as follows about *Darwin's Doubt*: "It is hard for us paleontologists, steeped as we are in a tradition of Darwinian analysis, to admit that neo-Darwinian explanations for the Cambrian Explosion have failed miserably. New data acquired in recent years, instead of solving Darwin's dilemma, have rather made it worse. Meyer describes the dimensions of the problem with clarity and precision. His book is a game changer for the study of evolution and evolutionary biology. Stephen Meyer points us in the right direction as we seek a new theory for the origin of Cambrian animal phyla" (McMenamin, 2015).

One of the remarkable facts about the Cambrian fossils is present in the incredibly complex nature of trilobite eyes. Bergman points it out: "For example, trilobite eyes, which are among the most complex forms of vision known appeared abruptly and *very early* in the fossil record. The optics of trilobite eyes are anything but primitive, and would have required eons of time to evolve, yet there are no clear and unequivocal antecedents" (Bergman, 2008:46-47).

23. The challenge and mystery of the Cambrian explosion

An escape route from the embarrassing absence of Precambrian ancestors of the multiple animal phyla which appeared in the almost simultaneous limited time-span of 6 million years was found in the claim that sedimentary rocks cannot preserve soft-bodied fossils. However, 95% of the 70,000 specimens found at the Burgess Shale in Canada are either soft-bodied or have thin skeletons. Meyer remarks: "The discoveries near Chengjiang [in the Yunnan Province of China] demonstrated beyond any reasonable doubt that sedimentary rocks can preserve soft-bodied fossils of great antiquity and in exquisite detail, thereby challenging the idea that the absence of Precambrian ancestors is a consequence of the fossil record's inability to preserve soft-bodied animals from that period" (Meyer, 2013:64).

Meyer's concern for animal form (body plans) brought him into contact with the way in which these animal forms are exemplified in "hierarchical arrangements or layers of information-rich molecules, systems, and structures" (Meyer, 2013:364-365). He continues by pointing out that developing embryos, for example, "require epigenetic information in the form of specifically arranged (a) membrane targets and patterns, (b) cytoskeletal arrays, (c) ion channels, and (d) sugar molecules on the exterior of cells (the sugar code). ... Much of this epigenetic information resides in the structure

of the maternal egg and is inherited directly from membrane to membrane independently of DNA” (Meyer, 2013:365).

It should be noted that

the role of epigenetic information provides just one of many examples of the hierarchical arrangement (or layering) of information-rich structures, systems, and molecules within animals. Indeed, at every level of the biological hierarchy, organisms require specified and highly improbable (information-rich) arrangements of lower-level constituents in order to maintain their form and function. Genes require specified arrangements of nucleotide bases; proteins require specified arrangements of amino acids; cell structures and cell types require specified arrangements of proteins or systems of proteins; tissues and organs require specific arrangements of specific cell types; and body plans require specialized arrangements of tissues and organs. Animal forms contain information-rich lower-level components (such as proteins and genes). But they also contain information-rich *arrangements* of those components (Meyer, 2013:365).

This phenomenon, also designated as “the organismal context principle”, exemplifies what Dooyeweerd designated as *enkapsis* in order to account for the maintenance of the internal structure of a certain layer while serving the structural requirements of a higher layer or structure (see Dooyeweerd, 1997-III:695-780). It also accounts for what developmental biologists discovered, namely the pattern of “same genes, different anatomy”, something recurring “throughout the bilaterian phyla, for features as fundamental as appendages, segmentation, the gut, heart, and sense organs” (Meyer, 2013:367). Meyer continues on the same page by pointing out that this pattern contradicts what evolutionary biologists expected, namely that “disparate adult structures should be produced by different genes” – a prediction that “follows directly from the neo-Darwinian assumption that all evolutionary (including anatomical) transformations begin with mutations in DNA sequences – mutations that are fixed in populations by natural selection, genetic drift, or other evolutionary processes”.

Moreover, the neo-Darwinian prediction that similar genes would produce similar structures appears to be mistaken. Gould mentions the “unexpected character of these findings” and states that they have “discombobulated the confident expectations of orthodox theory” (Gould, 2002:1065). New species appearing in the Cambrian “manifest completely novel, morphologically disparate, and functionally integrated body plans” manifest in a “top-down” fossil pattern (Meyer, 2013:372, 373).

What Meyer and other ID theorists want to account for is the fact that “the animal forms that arose in the Cambrian not only did so without any clear material antecedent; they came on the scene complete with digital code, dynamically expressed integrated circuitry, and multi-layered, hierarchically organized information storage and processing systems” (Meyer, 2013:381). He argues that “invoking the activity of a mind provides a causally adequate explanation for the pattern of abrupt appearance in the Cambrian fossil record” (Meyer, 2013:377), while also explaining the “observed stasis in the fossil record” (Meyer, 2013:375). This stasis concerns “animal body plans that define the higher taxa, including classes and phyla” that “remain especially stable in their basic architectural designs, showing ‘no directional change’ over geological history after their first appearance in the Cambrian. As a result, the morphological disparity between distinct animal body plans remains unbridged” (Meyer, 2013:377).

24. The “designing” capacities of an “intelligent mind”

Unfortunately, the ID movement proceeds from the idea of a “mind” capable of designing something without accounting for the foundational (hierarchical) conditions presupposed in such “(human) minds”. We have briefly mentioned that the idea of *enkapsis* concerns the interlacement of two differently-natured structures such that each retains its inner sphere of operation. The constitutive physical configuration of living things does not lose its physical chemical qualification when it functions within living entities. Such entities are functioning enkaptically – that is, retaining their physically qualified nature – within living things. Similarly, the biotic organs and the sensory sub-structures of the human body are enkaptically interwoven in the total bodily existence of a person, which is qualified by the in itself unqualified normative structure. Against the intention of this movement these minds first appear to be “dis-embodied” and then secondly elevated to the divine level of the Workmaster portrayed to us in Plato’s dialogue *Timaeus* – which gave form to the visible world according to transcendent *eidè* (arche-typical forms). ID “attributes the origin of information in living organisms to thought, to the rational activity of a mind, not a strictly material process of mechanism” (Meyer, 2013:395). To the question how “the intelligent agent responsible for the information in living systems transmitted that information to a material entity such as a strand of DNA” is: “We simply don’t know!” (Meyer, 2013:395).

What we do know is that all “intelligent agents” (other human beings) we know in this world are embodied and therefore presuppose the complex information present in their sensitive, biotic and physico-chemical substructures. Moreover, design by an “intelligent mind” is just as *immaterial* as the “laws of nature” holding for physical entities. The materialist claim that “everything is material” is self-contradictory, as we noted earlier, for the conditions (laws) for being material are not themselves material, just as little as the conditions for being green are themselves green. The type laws holding for different kinds (types) of entities are created and evince typically specified universal traits which enable us to *conceive* them (concepts are constituted by *universal* features). The ID-argument attempts to account for the *intelligibility* of these features by postulating an *intelligent* agent, without critically reflecting on this jump from *intelligibility* to an *intelligent agent* or an *intelligent design*. Artefacts are the *result* of formative human actions *presupposing* the type laws holding for different kinds of cultural objects. Yet modal laws and type laws are not artefacts.

25. The idea of type laws as an alternative to physicalism and ID

Rather than taking the leap to *Intelligent Design* (ID) or a physicalist reduction, modern physics and biology should have attempted to explore the idea of polynomic *type laws* holding both for “material” and for “more-than-material” entities. After all, what we experience in the “natural system” (the currently living plants and animals) as well as the paleontological record (underscored by the Cambrian explosion) unequivocally displays the *discontinuity of type laws* merely holding for a limited class or group of entities, also confirmed by the abrupt appearance of fossils and the dominant pattern of the stasis (often over alleged millions of years). Just recall the internally inconsistent position assumed by Coyne mentioned earlier. He fell back to “objective” traits as the basis for our concept of a *species*. Just consider how Coyne accounts for *discrete clusters* of living entities known as *species*: “at first sight, their existence looks like a problem for evolutionary theory. Evolution is, after all, a continuous process, so how can it produce groups of animals and plants that are discrete and discontinuous, separated from others by gaps in appearance and behavior?” (Coyne, 2009:184).

In the light of the current evidence it is clear that the idea of type laws does not support the *continuity postulate* entailed in the claims of neo-Darwinism and emergent-evolutionism regarding the continuity of this process of evolution.

By contrast, the vitalistic approach explores the idea of an *entelechie*, which is supposed to be *immaterial*. Driesch holds that *entelechie*, as an *immaterial vital force*, is something that cannot be determined in any positive sense, for it is a “system of negations” (Driesch, 1921:513; 459 ff.), i.e., it cannot be positively determined: “entelechie” is something *non-mechanical*, it is not *energy*, not *force*, not a *constant* (Driesch, 1921:460) and *non-spatial* (Driesch, 1921:513). The difference between the atomistic *Einzelkausalität* and the holistic “*Ganzheitskausalität*” is also framed in terms of the opposition *Ganzheit* and *Zufall* (*totality* and *chance*). In the thought of Driesch *determination* is opposed to *genuine freedom*. He declares that the question about freedom is to be considered as a metaphysical question of faith which cannot be answered by the science of philosophy (cf. Driesch, 1931:93-122). Although Kant and Driesch differ in their view on the nature of philosophy, they agree that freedom is not a question of scientific proof, but one of (practical) faith.

In his theory of the freedom of the will, Arnold Gehlen continues Driesch’s negative description of the “entelechie”. However, with an explicit appeal to the freedom idealism of Schelling, he immediately transforms it in order to provide a point of entry for freedom. At the same time he realizes that Driesch actually brought biotical phenomena under the reign of the classical deterministic ideal of science. Therefore, once again he wants to restrict causality to mechanical causality: “Since causality is only thinkable as mechanical causality, the entelechie is negatively free, i.e. spontaneous and primary in a sense which cannot be subjected to a closer determination” (Gehlen, 1965:60).

At this point we enter the domain of philosophical anthropology which will need a different study in its own right. It will suffice just to mention that Dawkins and Gould respectively represent the nature pole and the freedom pole of the humanistic ground-motive of nature and freedom.

26. Concluding remark

We have direct access to all the modal laws and type laws holding for the universe. Therefore, when we are analyzing these laws through modal abstraction and on the basis of discerning what is lawful (orderly) in a typical way within reality, we are equally confronted with the mystery of ALL laws. In this sense one can only approximate *creation* in a concept-transcending way pointing beyond itself to its Creator. God upholds and sustains His creation through His Law-Word, through His creational laws as His commands to

whatever exists. We do not need to postulate a disembodied rational intelligence or intelligent designer to comprehend what is scientifically accessible to us, but we do need the modesty to realize that ultimately reality exceeds the grasp of rational understanding. The mystery of the assumed origination of the first living entity and the mystery of the discontinuous paleontological record as well as the currently living natural system should cause us to acknowledge what we really do not know, rather than to jump to speculative modes of explanation, such as the unsubstantiated *continuity postulate* or the idea of an *Intelligent Designer*.

Once we are confronted with the creation order, encompassing modal laws and type laws, we are also facing the *limits* of our conceptual scientific understanding, because a transcendental-empirical investigation of modal laws and type laws on the basis of the orderliness of reality does not tell us how God created the universe. It only informs us about the order for creatures created by God. On the one hand, the idea of modal and type laws accounts for the access we have to God's law order and at the same time illuminate the fact that this law order forms the delimiting horizon for what we can know. Acknowledging this boundary amounts to a concept-transcending understanding of creation which ultimately points beyond itself to God as Law-Giver.

In terms of our current knowledge, the observation of type laws and how they are manifested in the paleontological record and natural system does not tell us anything about how these laws originated. In other words, acknowledging these laws uncover the *limits* of our scientific endeavours and at once it confronts us with the horizon of what is scientifically accessible. The history of modern biology opted for alternative basic denominators by reifying different modal aspects of creation, such as the mechanical (kinematic), physical, biotic, sensitive-psychic, freedom of mind, resulting in *ismic* orientations such as the mechanicism, physicalism, (neo-)vitalism, holism, organismic biology, intelligent design, pan-psychism, and projections of human freedom. The implicit acceptance of the *continuity postulate* practically intersects with all these theoretical points of view and is also found in emergent evolutionism with its acceptance both of continuity (in descent) and discontinuity (in existence).

The idea of polynomic type laws, exceeding the boundaries of any modal aspect in which many-sided concrete entities function, at once also exceeds the reductionism entailed in one-sided *ismic* orientations. Although it is, from a scientific perspective, pretty unsatisfactory to concede that we do not really know anything decisive in a scientific sense about the origination of entities

conforming to the distinct type laws, we have to accept this ignorance as part and parcel of the current state of natural scientific knowledge. Earlier we have mentioned that Meyer is fully justified in writing that “chemical evolutionary theories have failed to solve the mystery of the origin of first life” (Meyer, 2013:vi). Add to this what we quoted earlier regarding the conviction of prominent neo-Darwinist biologists regarding the mystery surrounding the Cambrian explosion, namely that the “cause responsible for generating the new animal forms, whatever it was, must have been unlike any observed biological process operating in actual living populations today” (Meyer, 2013:356) and that the origination of diverse body plans must have been unlike any biotic processes observed in currently living populations (Meyer, 2013:356).

It should be noted that Darwin, in one of his last letters, doubted that one can avoid the assumption of a plan (*design*) in nature (see Eisenstein, 1975:412). Since the notion of “design” echoes the Greek-Platonic-Aristotelian *dualism* of form and matter, we should rather hold on to the idea of polynomic type laws (regarding the dualism of form and matter in Greek philosophy see Dooyeweerd, 2012 and Strauss, 2012).

The German scholar Happ points out that the “Matter-Form relation ... is ultimately based in a Primordial Relation (Ur-Relation) ‘matter in itself’ (‘pure matter’): and ‘pure form’” (Happ, 1971:799), to which he adds: “the ‘pure form’ needs the ‘pure matter’, the *energeia* the *dunamis*” (Happ, 1971:26). It is striking that he also states that matter is *subjected* to form (owing to the *primacy* of the latter). Matter is “a ‘principle of being’, which means: it is an operating factor *sui generis* that, although in rank subordinate to form, and it cannot be reduced to it in any way (such as a ‘pure relation concept’, that is as the ‘form of the lowest level’), neither directly or indirectly”. His final assessment is that an irreducible original opposition (dualism) is here present: The “highest matter” cannot be reduced to the “highest form”: “As in Plato and the Academy an original opposition [Ur-gegensatz] here continues to exist” (Happ 1971: 805, note 628).

Our knowledge of genetic and epigenetic information questions materialistic or physicalistic explanations, but it does not necessarily require the idea of ID. The complexity of the information needed to account for the pattern in the fossil record certainly reflects the fact that when “new species appear in the Cambrian, they manifest completely novel, morphologically disparate, and functionally integrated body plans” (Meyer, 2013:372).

Since Meyer has *body plans* in mind (actually *type laws*), the mere idea of a body plan or a type law does not tell us anything about the assumed process of origination of entities embodying body plans or type laws.

One final remark. Since type laws hold for different kinds of entities and since entities in principle function in all aspects of reality, type laws encompass both the subject functions of entities and the object functions of those entities which are qualified by pre-normative modal aspects (such as material things, plants and animals). All typical entities are *identifiable* and *distinguishable*, their latent logical-analytical object function, whether or not they are actually observed. If these object functions are not intrinsic to such entities, they cannot be disclosed.

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