

# The Indispensable Role of Systematic Philosophical Reflection in Scholarship

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## Abstract

Sometimes systematic theoretical thinking is identified with abstract (formal) schemes. This opposition is also found in Malan and Goosen's dismissal of Dooyeweerdian reformational thinking. This article aims at making a contribution to this issue by analysing the indispensable role of systematic philosophical reflection within the world of scholarship. One way in which systematic thinking could be justified is to highlight the need for consistency and the role of logical principles in achieving it. It is argued that, since we are living in the same world, all philosophical orientations have to account for shared states of affairs. At this point attention is given to the question whether or not these "states of affairs" are "static or dynamic." An alternative for the distinction between static and dynamic is proposed by alternatively considering the relationship between constancy and change. Von Weizsäcker articulates the problem aptly by pointing out that although our experience exhibits constant change, something exists that remains unchanged through all these changes. In conclusion it is pointed out that scholars have only two options: either they give an account of the philosophical presuppositions and systematic distinctions with which they work—in which case they *have* a philosophical view of reality, or implicitly (and uncritically) they proceed from one or another philosophical view of reality—in which case they are the *victims* of a philosophical view. The primary aim of this article is, therefore, to highlight the indispensability of systematic thought by referring to some of the main distinctions included in such a system of thought.



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## **Introduction**

In the following sections attention is given to the systematic philosophical problem of uniqueness and coherence and its implications for primitive terms and antinomies. This led to a brief analysis of the question if arithmeticism has the last word in (contemporary) mathematics. Special attention is given to the inevitability of philosophical stances within scholarship, illustrated with reference to the so-called mathematical continuum, which, according to Bernays, originally is a geometric idea expressed by analysis in an arithmetical language. Then it is emphasised that the theory of modal aspects does not transform the real aspects of the universe into abstractions. The aspects are simply not abstractions, even though theoretical access to them requires an act of modal abstraction. That *Reformational Philosophy* responds to states of affairs exceeding each and every philosophical trend, is underscored by the fact that scholars coming from other traditions do appreciate the way in which Dooyeweerd developed his own account of reality. The article highlights the indispensability of systematic thought by referring to some of the main distinctions included in any such a system of thought.

## **Questioning Systematic Thinking?**

The great traditions within philosophy are all marked by a comprehensive totality view of reality. Nonetheless, it is sometimes claimed that systematic reflection derails thought into the dead alley of “abstract schemes.” During my student days scholars from different South African campuses critically discussed these issues. Some of them defended the legitimacy of systematic philosophical reflection, while others rejected it as dogmatic, aprioristic and a threat to the freedom of scholarly thinking.

## **A Recent Discussion**

A recent discussion once more touches on these issues. It appeared largely in the journal *Tydskrif vir Geesteswetenskappe* (Journal for the Humanities). The discussion relates to the way in which Malan and Goosen criticise the idea of the territorial state, as presented by

some critical articles written by Raath (see Goosen 2011, 2013, 2016a, 2016b; Malan 2011; Raath 2015, 2016a, 2016b, and 2016c).

What was supposed to be a reaction to my first concise contribution (see Strauss 2016) to the discussion received a strange response from Goosen and Malan did not respond to or interact with the main focus of my argument. In my short article I aim at the important *systematic* distinction between *modal laws* and *type laws* (to which we shall return later on in this article), as well as giving a provisional characterisation of the underlying paradigm discernable in the distorting systematic views of reality found in atomistic (individualistic) and holistic (universalistic) approaches.

### **Abstract, Aprioristic and Formalistic Thought-Schemes?**

Malan accuses the Dooyeweerdian approach as operating with an “abstract, sometimes esoteric scheme” which “does not justify the effort of a more detailed debate,”<sup>1</sup> while Goosen simply disqualifies the Dooyeweerdian “denksisteen” (*thought-system*) as “aprioristic and formalistic in nature”: “In spite of the excellent nature of their thought-system their political thinking is at once too formalistic, aprioristic and theoretically self-sufficient to serve as an answer to the challenges of our time.”<sup>2</sup>

### **The Application of Logical Principles Requires Systematic Thinking**

Those who appear to oppose the idea of “thought-systems” have to answer the next question: Is there necessarily anything aprioristic, abstract or speculative about *systematic thinking*? If *systematic thinking* as such is questioned the status of *logical* discernment becomes problematic, for without a *coherent* body of distinctions there is no secure way to avoid contradictions. The logical principles of identity and non-contradiction are necessary conditions norming human thinking. Of course, as Immanuel Kant already underscored, the principle of non-contradiction cannot decide which one of two contradictory statements is true. It is merely a negative condition of truth establishing that both cannot be true at the same time. “Therefore the purely logical criterion of truth, namely the agreement of knowledge with the general and formal laws of the understanding and reason, is no doubt a

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1 “Strauss weer werk met ’n abstrakte, soms esoteriese skema” and therefore “loon dit nie die moeite om in besonderhede met hulle in debat te tree nie” (Malan 2016, 1253).

2 “[D]ie aprioristiese en formalistiese aard van hul denksisteen”; “Ondanks die voortreflike aard van hul denksisteen is hulle politieke denke tegelyk te formalisties, aprioristies en teoreties selfgenoegsaam om as ’n antwoord op die uitdaginge van ons tyd te dien” (Goosen 2016a, 1246).

*condition sine qua non*, or a negative condition of all truth. But logic can go no further, and it has no test for discovering error with regard to the contents, and not the form, of a proposition” (Kant 1787–B:84).

The principle of the excluded middle does not help us in this respect, because its general application merely refers us to an infinite totality and as a consequence loses its value for any mathematical point of view, such as the intuitionism of Brouwer and Weyl, rejecting the actual infinite (the at once infinite and with it the idea of an infinite totality—see Strauss 1991). We therefore have to proceed by contemplating the logical principle of sufficient reason.

### **The Importance of the Principle of Sufficient Reason for Systematic Thinking**

This principle, originally formulated by Leibniz, asserts that for a judgement to express a piece of knowledge, it must appeal to a sufficient ground or reason (*Grund*), for only this quality will justify its truth. Truth is, therefore, dependent upon something different from it—and according to Schopenhauer this “something” is designated as the “ground” or “reason” of the judgement (Schopenhauer 1974, 156). But the important insight here is that this principle points us beyond the boundaries of logical thinking. The grounds or reasons given are after all derived from *ontic states of affairs*.

In order to avoid illogical thinking (illogical concepts or illogical arguments), it is necessary to call upon states of affairs, i.e., upon what *is the case*. Of course the underlying assumption is that these ontic states of affairs are embedded in a coherent world order which guarantees the sound norming effect of logical principles. Without a uniform world order no truth will be possible because when A and non-A are asserted, anything follows. Logical inferences may be valid or invalid but only the premises or conclusions could be true or false. Without an implicit awareness of logical normativity, identifying what is *antinormative* would be impossible.

### **An Integral Order—Reflected in Systematical Thinking**

These remarks entail important consequences for our general theme of *systematic thinking*. If the world in which we live is structured as a unity-in-diversity, displaying an integral order,

then reliable distinctions ought to be able to reflect the order of the world and also guide the distinctions needed for systematic thinking. This implication in the first place applies to *logical thinking*, for without an order for logical thinking the normative contrary logical-illogical loses its force. Moreover, only beings with an accountable free will are capable to act either *in conformity with* logical principles or by *violating* them in antinormative thought-actions. How do these distinctions relate to diverging philosophical trends of thought?

### **What Are the Implications of Living in the *Same* World?**

A part of the relative unity of the Western philosophical legacy is found in the fact that diverse schools of thought are constantly confronted with particular states of affairs which exceed the confines of one single philosophical trend. We all live in the *same* world and are therefore confronted with the *same* phenomena, generating the same or at least similar *problems* which are accounted for by developing coherent distinctions embedded in a systematic understanding of the world. The subtle switch from shared ontic states of affairs to the contribution of epistemic subjects certainly requires an investigation of the contribution proceeding from the thinking subject, as explained below.

### **Is the Claim of Having Epistemic Access to State of Affairs Justifiable?**

Such an investigation immediately reminds us of the considerations raised by Van Peursen in his critical reflection on the philosophy of Dooyeweerd, captured in the question: “Does ‘meaning’ make sense?” (see Van Peursen 1965, 157–165). He concedes that philosophy is “characterized by its special analytical effort” (Van Peursen 1965, 162). On the same page he continues by stating that the same question confronts philosophy and pre-theoretical experience: “... is it possible to distinguish structural data from their meaning, laid bare in an interpretation [which can be a good or a wrong one] as every human, including non-theoretical, experience is an interpreted one?” Although this question appears to relativise an appeal to “states of affairs” it explicitly posits its own invariable “truth”—namely that “one could not state a truth without interpretation.” The “state of affairs” at stake in this argument cuts deeper, because it actually recognises that within our integral experience everything has a function within all aspects of reality, including the sign-mode where we find the core (and undefinable) meaning of “interpretation.” [A discussion of 10 criteria applicable to the identification and distinguishing of modal aspects is found in Strauss 2009 (pages 77–79). The aspects themselves are briefly characterised from pages 82–102.]

Sixteen years later Van der Hoeven addressed the same issue. He does it by taking serious those who are critical of *Reformational Philosophy*. For them the so-called undeniable (law-conformative) states of affairs give the impression of a “static” and pretentious “system,” positing various kinds of law-structures in a scholastic fashion. He continues by mentioning the objections of some opponents: “... that there is much more perspective in acknowledging from the outset that we cannot *grasp* the ultimate structure of states of affairs—if there is such a thing—because we cannot step outside our interpretations and their accompanying subjective points of view” (Van der Hoeven 1981, 100–101). The position assumed by Van der Hoeven rejects the idea of presenting law-structures as kinds of “entities” but then states that no philosophy can operate without an idea of law.

### **Outside our Intellectual Grasp?**

It is noteworthy that these critical remarks mentioned by Van der Hoeven do not acknowledge an “ultimate structure” of “states of affairs,” but simply “positions” it outside our intellectual “grasp.” This brings the argument to the verge of explaining genuine *concept-transcending knowledge*, for Kant already realised that one needs a *thought-form* to think what we cannot grasp conceptually. This is what an *idea* is all about, because it approximates what exceeds the grasp of conceptual knowledge. Note that conceptual knowledge is bound to universality. Rationalism overemphasises *conceptual knowledge* and irrationalism overemphasises *concept-transcending (idea-) knowledge*. Van der Hoeven could have benefited from the lucid understanding advanced by Von Hartmann in this regard.

Von Hartmann points out that within the thought of Kant, the *thing-in-itself* (*Ding an sich*) is not merely an *idea*. Precisely the opposite is the case, because what is unknowable (though thinkable) has to be approximated in an *idea* (*Grenzbegriff*). Von Hartmann therefore correctly emphasises this *state of affairs* in the thought of Kant: “For with Kant it is not so that the thing-in-itself was merely an idea: it is the opposite, for since we cannot know the thing-in-itself ... but are capable of thinking it, there must be a form of thought, a mode of conceptualization, through which it can be thought, be it as unknowable. That is the ‘idea’” (Von Hartmann 1957–II, 311).

## **The Systematic Philosophical Distinction between Conceptual Knowledge and Concept-Transcending Knowledge**

The implicit distinction between concept and idea (concept-transcending knowledge) appears within different contexts and is often phrased in slightly different terms. Compare the Kant-Hartmann account with what Tillich explained, while keeping in mind that *form* is sometimes associated with what is “static” as opposed to “dynamics” (to what is *dynamic*)

In a way similar to this distinction between form and dynamics, the theologian Tillich advances his own systematic point of orientation. His aim is actually to account for what we have in mind by distinguishing between *concept* and *idea*. According to him *dynamics* transcends a delimited *form* and therefore it cannot be *grasped in a concept*. Yet, according to him, we nonetheless find an approximation of this *dynamic* element almost in all mythologies:

It underlies most mythologies and is indicated in the chaos, the tohu-va-bohu, the night, the emptiness, which precedes creation. It appears in metaphysical speculations as *Urgrund* (Böhme), will (Schopenhauer), will to power (Nietzsche), the unconscious (Hartmann, Freud), *élan vital* (Bergson), strife (Scheler, Jung). *None of these concepts is to be taken conceptually* [own italics DS]. Each of them points symbolically to that which cannot be named. (Tillich 1964, 198)

Clearly we have now unveiled an important systematic philosophical distinction, namely that between concept and idea (conceptual knowledge and concept-transcending knowledge). The ontical reality to which it refers is not a creation of the epistemic subject. Widely differing philosophical orientations account for this distinction in their own way.

### **An Alternative for the Static-Dynamic Distinction**

Instead of operating with the scheme “static/dynamic,” as it is found in critics of *Reformational Philosophy* mentioned by Van der Hoeven, it should be realised that the state of affairs at stake in this context is the problem of *constancy* and *change*. Even if an attempt is made to avoid what is believed to be “static” by emphasising “dynamics,” the ultimate point of reference is still given in the implicit acknowledgment of *constancy*. The term “dynamics” (i.e. “change”) is normally accompanied by another (unnoticed) term

representing the underlying element of constancy. Just consider a well-known phrase like “things are always changing”—where “always” could be replaced by (constancy-equivalent) terms such as “continuously,” “ever,” “constantly,” “persistently,” “ceaselessly,” “continually,” “perpetually,” and so on.

### **A Systematic Epistemological Distinction**

What confronts us here is the intersection of two influential systematic philosophical distinctions, namely the challenge to account for the distinction between conceptual knowledge and concept-transcending knowledge, in relation to the distinction between constancy and dynamics (change).

Surely, even if the so-called “states of affairs” are constantly changing, Plato’s insight still holds, namely that whatever changes, presupposes something *enduring* for without an element of persistency no knowledge will be possible (see Plato’s dialogue *Cratylus* (439 ff.)). In his *Metaphysics* Aristotle remarks that Plato already in his youth got acquainted with the doctrines of Heraclitus, namely that all perceivable (sensory) things prevail in a state of flux, such that no knowledge of them is possible (*Metaph.* 987 a 30).

The relationship between an epistemic subject, capable of discerning multiple aspects, entities and processes within reality, and what is identified as a particular aspect or a specific entity allows for a twofold dynamics: first of all systematic philosophical insights are always open to re-affirmation, improvement or even refutation. However, acknowledging this does not justify a jump to relativism, because if an insight or a systematic distinction could be false, it does not logically imply that it *is* false, for we have seen that the issue of truth and falsehood requires the necessary (ontic) epistemic grounds on the basis of which it has to be shown to be false. Secondly these “grounds” form part of the world in which we live. During the past century different philosophical orientations accentuated our embeddedness within the human life world. This orientation of everyday life recognises a diversity exceeding the confines of our logical abilities. We do not have to abolish this pre-scientific awareness in order to enter the domain of scholarly thinking simply because it constitutes the inescapable foundation and starting point of all scholarly intellectual endeavours.

When we perform acts of identification and distinction, properties of aspects and entities are disclosed, are opened up. Such a disclosure taking place through subjective acts of identifying and distinguishing reveals a dynamics on the object-side of reality. Our logical-analytical abilities are rooted in what is structurally given and it is only through acts of lifting out and disregarding, i.e. acts of abstraction, that theoretical knowledge is attained.

### **Confusing what is Studied with the Act of Investigating It**

Although it appears to be self-evident that theoretical and non-theoretical knowledge are different, we are often caught in modes of speech confusing this distinction. Janich understands this issue quite well. He commences by referring to the term “biological” and points out that the word “biological” is the adjective belonging to “biology,” which indicates a “doctrine” or “science” of things alive. Yet we are used to confuse what is investigated in a scientific discipline with the academic discipline involved in studying it. Janich explains it further: “We say ‘sociological’ when we mean ‘social’ and we say ‘psychological’ when we mean ‘psychic.’ Elucidating: poverty is a social problem; whether or not poverty is dependent upon the level of education, is a sociological problem. Whoever is anxious [suffer from anxiety] has a psychic problem; whoever wants to define the special scientific term ‘anxiety’ has a psychological problem” (Janich 2009, 11).

### **What is Individual: The Limits of Conceptual Understanding**

In the case of terms like biological, psychological or sociological the suffix “logical” is a hall-mark for the theoretical-scientific enterprise in which scholars are involved. Every scholarly discipline, however, is co-constituted by the first part of composite phrases like *bio*-logical, *psycho*-logical or *socio*-logical. When we analyse the logical-aspect the underlying reference is to the logical-analytical aspect of reality. But if the focus is on the “logical” part of composite phrases such as these, it is clear that all academic disciplines are employing theoretical *concepts*. However, since concepts are built upon uniting *universal* traits they are blind towards what is individual. This was already realised during the medieval era where it is stated: “*Individuum ineffabile*,” which means that “what is individual cannot be expressed or described.” In addition, the phrase “*de singularibus non est scientia*” underscores that “no science is possible about what is individual” (see Janich 2009, 110).

Since what is individual escapes the grasp of concept-formation because the latter proceeds on the basis of universal features, it is clear that the distinction between universality and what is individual runs parallel with the distinction between conceptual knowledge and concept-transcending knowledge—keeping in mind that the latter is not restricted to Kant’s “thing-in-itself”—for everything displays both a universal and an individual side. Furthermore, the acquisition of concepts depends upon an element of constancy entailed in the universal traits involved in the configuration of concepts. Once again this leads us back to the related problem of constancy and change, because we have remarked that change can only be detected on the basis of what endures.

### **The Underlying Systematic Philosophical Distinction between Constancy and Change**

The systematic distinction underlying the foundational coherence between constancy and change is given in an understanding of the relation between the *kinematic* and *physical aspects* of reality. In his discussion of the work of the German physicist Robert Mayer, the well-known philosopher-physicist Von Weizsäcker focuses on the “*Energiesatz*” [“Energy-law”] which is a generalisation of a law found in the discipline of mechanics. What he has in mind is the “first main law of thermodynamics” for it turned out that the only theory of classical physics that resisted a reduction to mechanics is “*Elektrodynamik*” [“electrodynamics”] (Von Weizsäcker 2002, 225). During the course of development of 20th century physics there is no single experience known to us challenging the certainty of this law, which approximates the conjecture that the first law holds *a priori* independent of every particular experience (Von Weizsäcker 2002, 224–225).

At this point two systematic problems intersect in a striking way: the nature of universality which articulates the spatial awareness of “everywhere” is now related to the *scope* of a physical law. By designating it as *modal universality*<sup>3</sup> we are at once also on the edge of the difference between modal aspects and concrete entities, because the multiple different classes that we can distinguish are all limited to a *specific type*. Typical entities share a specified universality, whereas modal aspects display a mode of universality that holds for all possible classes without any specification. Von Weizsäcker states categorically:

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3 The term “modal” is derived from the Latin: *modus quo* = mode of being. We still use similar expressions in phrases such as *modus vivendi* and *modus operandi*.

“Quantum theory, formulated sufficiently abstractly, is a universal theory for all classes of entities” (Von Weizsäcker 1993, 128).<sup>4</sup> He continues by explicitly relating the universal scope of physical laws to their constancy. Mayer points out that under specific conditions for working forces (such as the absence of friction) general mechanics has shown that the sum of kinetic and potential energy is *constant*.

Von Weizsäcker remarks that this mode of concept formation already contains the basic principle of the universal energy law [the law of *energy-constancy*]. He phrases this assessment in terms of the problem of *constancy* and *change*: “Although our experience exhibits constant change, something exists that remains unchanged through all these changes.”<sup>5</sup> Acknowledging the irreducibility of the kinematic and physical aspects (constancy and change) may render a service to a non-reductionist ontology, highlighted through the history of modern physics, briefly discussed below.

### **Philosophical Distinctions Serving a Non-Reductionist Ontology**

Max Planck explicitly addressed the intrinsic untenability of the mechanical understanding of reality which aimed at *reducing* all physical processes to the motions of mass-points:

The conception of nature that rendered the most significant service to physics up till the present is undoubtedly the mechanical. If we consider that this standpoint proceeds from the assumption that all qualitative differences are ultimately explicable by motions, then we may well define the mechanistic conception as the conviction that all physical processes could be reduced completely to the *motions* [own italics DS] of unchangeable, similar mass-points or mass-elements.<sup>6</sup>

Janich explains the distinction between *phoronomic* (kinematic) and *dynamic* arguments by means of an example. Modern physics has to employ a dynamic interpretation of the statement that a body can only alter its speed continuously. Given certain conditions, a body

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4 “Die Quantentheorie, hinreichend abstrakt formuliert, ist eine universale Theorie für alle Gegenstandsklassen.”

5 “Obwohl die erfahrung uns einen ständigen Wandel der Erscheinungen zeigt, gibt es etwas, was durch alle Veränderungen hindurch unverändert bleibt” (Von Weizsäcker 2002, 227–228).

6 “Diejenige Naturanschauung, die bisher der Physik die wichtigsten Dienste geleistet hat, ist unstreitig die mechanische. Bedenken wir, daß dieselbe darauf ausgeht, alle qualitativen Unterschiede in letzter Linie zu erklären durch Bewegungen, so dürfen wir die mechanische Naturanschauung wohl definieren als die Ansicht, daß alle physikalischen Vorgänge sich vollständig auf Bewegungen von unveränderlichen, gleichartigen Massenpunkten oder Massenelementen zurückführen lassen” (Planck 1910, 53).

can never accelerate in a discontinuous way, that is to say, it cannot change its speed through an infinitely large acceleration, because this would require an infinite force.<sup>7</sup>

The outcome of this distinction between the kinematic and the physical aspects is also important in the context of indefinability and irreducibility. When it comes to something truly *primitive*, both indefinability and irreducibility ensue. There are only two options: (i) Attempt to define what is indefinable in terms derived from a different aspect, in which case the original aspect is actually reduced to the one used to define it; or (ii) Use synonymous terms which terminate in a mere tautology. For example, in early Greek philosophy a thing is identified with its *place* while at the same time “motion” is defined as a *change of place*. But if something *is* its place, it cannot *change* its place without terminating its own existence. Zeno illustrates this impasse strikingly. In his fourth authentic Fragment he explains: “What moves neither moves in the space it occupies, nor in the space it does not occupy” (Diels-Kranz B Fragment 4). He first grants movement and then shows that motion is impossible. Any attempt to explain motion from the perspective of static spatial positions will inevitably result in *antinomies*, in a clash of laws (anti = against; nomos = law).

Antinomies such as these highlight the impasse of all attempts at defining what is truly primitive and undefinable. Acknowledging “primitive terms” sheds new light on the problem of accounting for the coherence of what is irreducible. Gödel had a special understanding of this state of affairs. Yourgrau tells us that he “insisted that to know the primitive concepts, one must not only understand their relationships to the other primitives but must grasp them on their own, by a kind of ‘intuition’ ” (Yourgrau 2005, 169). On the next page Yourgrau points out that Gödel believes that “the fundamental concepts are primitive and their meaning is not exhausted by their relationships to other concepts.”

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7 “Die Tragweite einer strengen Unterscheidung phoronomischer (im folgenden kinematisch genannt) und dynamischer Argumente möchte ich an einem Beispiel erläutern, das ... aus der Protophysik stammt. Die Aussage ‘ein Körper kann seine Geschwindigkeit nur stetig ändern’ kann von der modernen Physik nur dynamisch verstanden werden. Geschwindigkeitänderungen sind Beschleunigung, d.h. als Zweite Ableitung des Weges nach der Zeit definiert. Zeit wird von der Physik als ein Parameter behandelt, an dessen Erzeugung durch eine Parametermaschine (‘Uhr’) de facto bestimmte Homogenitätserwartungen geknüpft sind ... Bezogen auf den Gang einer angeblich so ausgewählten Parametermaschine kann ein Körper seine Geschwindigkeit deshalb nicht unstetig, d.h. mit unendlich großer Beschleunigung ändern, weil dazu eine unendlich große Kraft erforderlich wäre” (Janich 1975, 68–69).

## Uniqueness and Mutual Coherence between Number and Space

Mathematics provides us with significant examples of scholars wrestling with “primitive terms” and the problem of “indefinability”—also displayed in the developments within modern mathematics. In fact, the entire history of mathematics is stamped by a fluctuation between attempts to choose either for discreteness or continuity as basic denominator. Yet there is a third alternative: accept the *uniqueness* and *irreducibility* of number and space and analyse their *mutual coherence*. The philosophical distinction between the aspects of number and space here serves as another example of the inevitability of philosophical distinctions within the various academic disciplines.

Since the beginning of the 21st century, French “continuum-mathematicians” emphasise that continuity precedes discreteness (see Longo 2001). They actually returned to the position assumed by Frege almost a century ago (in 1925), when he confessed: “The more I have thought the matter over, the more convinced I have become that arithmetic and geometry have developed on the same basis—a geometrical one in fact—so that mathematics in its entirety is really geometry” (Frege 1979, 277). René Thom and several other mathematicians are convinced that “the continuum precedes ontologically the discrete, for the latter is merely an ‘accident coming out of the continuum background’, ‘a broken line’” (Longo 2001, 6). Later on Longo adds the remark: “By contrast Leibniz and Thom consider the continuum as the original giving, central to all mathematical construction, while the discrete is only represented as a singularity, as a catastrophe” (Longo 2001, 19). It should be remembered that Greek mathematics initially was arithmeticistic in nature but that the discovery of “incommensurability” caused a switch to space (geometrisation). Since Descartes this orientation once more started to revert to arithmeticism, a process that was carried through during the 19th century by Bolzano, Weierstrass, Dedekind and Cantor. Frege and the “continuum-theorists” completed the circle for the second time by opting for continuity as basic philosophical explanatory perspective.

At the young age of 25, Gödel astonished the mathematical world in 1931 by showing that no system of axioms is capable—merely by employing its own axioms—to demonstrating its own consistency (see Gödel 1931). Yourgrau remarks: “Not only was truth not fully representable in a formal theory, consistency, too, could not be formally represented” (Yourgrau 2005, 68). The upshot of this result from Gödel’s 1931 demonstration is that

formal (axiomatic) systems require an intuitive insight exceeding the boundaries of any formalism. One of the exceptionally gifted students of Hilbert, the above-mentioned mathematician Hermann Weyl, aptly summarised the predicament of Hilbert: “It must have been hard on Hilbert, the axiomatist, to acknowledge that the insight of consistency is rather to be attained by *intuitive reasoning* which is based on evidence and not on axioms” (Weyl 1970, 269). In the light of this undeniable state of affairs Hilbert, in his proof theory, had to revert to intuitionistic (finitistic) principles. At the same time it underscored the relativity (not: *relativism*) of all theoretical endeavours, equally strikingly reflected in what Wang quotes from Gödel: “Gödel says explicitly that we do not have any absolutely certain knowledge” (Wang 1988, 285). We may expand on what was argued in the above sections by once more briefly reflecting on the philosophical foundations of physics and mathematics.

### **Inevitable Philosophical Stances in Physics and Mathematics**

The “intuitive evidence” operative at the basis of the various academic disciplines underscores the state of affairs that the special sciences cannot function without a foundational philosophical frame of reference. That this follows from the distinctive feature of scholarly (scientific) thinking, namely *modal abstraction*, has been argued in detail in Strauss (2009, 53–60). Von Weizsäcker once commented on the presuppositions of modern natural scientific thought, saying that “it is an empirical fact that virtually all leading physicists of our time philosophize.”<sup>8</sup> Janich draws our attention to the same issue where he quotes Von Weizsäcker saying: “Every physicist has his own philosophy; and those who claim that they do not have one, as a rule have a particularly bad one.”<sup>9</sup> Monk says something similar about the discipline of mathematics: “Practising mathematicians, consciously or not, subscribe to some philosophy of mathematics (if unstudied, it is usually inconsistent)” (Monk 1970, 707).

Paul Bernays, the co-worker of David Hilbert, opts for a position intermediate between geometricism and arithmeticism, one in which continuity is accepted in its own right (irreducible to discreteness), while at the same time leaving open an arithmetical treatment of the *continuum* in analysis (with the aid of the *real numbers*). He rejects what he designates as

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8 “Es ist ein empirisches Faktum daß fast alle führenden theoretischen Physiker unserer Zeit philosophieren” (Von Weizsäcker 1972, 42).

9 “Jeder Physiker hat eine Philosophie; und wer behauptet, keine zu haben, hat in der Regel eine besonders schlechte” (Janich 2009, 16).

the “arithmetizing monism in mathematics.” According to him it is an “arbitrary thesis” because it is forgotten that the “idea of the continuum originally is a spatial idea” (Bernays 1976, 188). His own view is that the “idea of the continuum is a geometric idea expressed by analysis in an arithmetical language” (Bernays 1976, 74).<sup>10</sup>

Bernays finds himself in good company, because Kurt Gödel also acknowledges something *spatial* in set theory (in which mathematical analysis is embedded). He discerns in sets something “quasi-spatial” and Wang comments: “I am not sure whether he would say the same thing of numbers” (Wang 1988, 202). Similar to Bernays we have to note that Gödel also opts for an intermediate position, for he acknowledges both *uniqueness* and *coherence*.

The history of philosophy and the various academic disciplines are a constant reminder of the fact that no thinker can avoid to respond to the challenge of systematically accounting for the uniqueness and coherence prevailing between the various aspects of reality. Implicitly or explicitly the thought-community of the West must come to terms with systematic problems such as:

- 1) What is the relationship between universality and what is individual?
- 2) What is the connection between uniqueness and coherence?
- 3) What is the relationship between the one and the many (unity and diversity)?
- 4) How should we understand the relationship between multiplicity and wholeness?
- 5) How should we account for infinity (the so-called potential and actual infinite)?
- 6) Are space and movement interrelated?
- 7) Why is it impossible to speak about change without presupposing something constant?

Intellectual traditions responding to these systematic problems gave rise to theoretical stances captured by terms such as rationalism, irrationalism, psychologism, atomism, individualism, holism, universalism, realism, nominalism and in particular multiple monistic *isms* (such as mechanicism, physicalism, vitalism, psychologism, logicism, historicism, and so on). That all these *ismic* orientations are problematic can only be demonstrated in confrontation with what is given, with an appeal to ontic states of affairs. For example, as soon as the question is

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<sup>10</sup> This is as close as one can get to an idea of the (modal) principles of sphere-sovereignty and sphere-universality!

asked: “What makes it possible in the first place that we can discern quantitative relationships, spatial configurations, movement and physical interactions?” this question actually embodies the aim of what has been called the transcendental-empirical method of investigation. The word *transcendental* represents what makes possible our awareness of numerical, spatial, kinematic and physical relationships, a list that can be extended to include all the other (post-physical) aspects of reality as well. And the term *empirical* refers to the various ways in which we can experience different kinds of relationships and account for the different ways in which concrete things, societal entities and processes function within the various aspects.

The abacus already highlights the thrust of the transcendental-empirical method, because what first strikes us is its *multi-aspectual* nature. One can discern colours, movement, shapes and multiplicity, i.e. physical, kinematic, spatial and numerical relationships. However, in order to learn how to add and subtract one has to advance by disregarding non-arithmetical properties and merely or solely focus on quantitative relationships. These aspects belong to the concrete reality in which we live. Although they could be identified and distinguished (lifted out while disregarding others), the aspects themselves are not “abstract”—even though the abacus-example shows that they can be abstracted. Consequently, there is nothing “mysterious” or “abstract” in the theory of modal aspects developed by *Reformational Philosophy*—as Malan and Goosen suggested. The aspects are simply not abstractions, even though theoretical access to them requires an act of modal abstraction

The theory of modal aspects makes an appeal to *states of affairs* known throughout the history of philosophy and the special sciences. The decisive question is whether or not *Reformational Philosophy* or any other philosophical trend succeeds in developing a satisfactory and *fruitful systematic account* of the above-mentioned systematic problems. The unique contribution of *Reformational Philosophy* is given in its ability to appreciate insights from other intellectual traditions, while at the same time maintaining a critical distance from one-sided isms. This appreciation of worthwhile insights and distinctions generated by different schools of thought also explains why philosophers, who are motivated by antithetically opposed ultimate commitments and distinct systematic theoretical frames of reference, can still express their admiration for the originality and scope of influential philosophers.

## **Appreciating Dooyeweerd's philosophy**

As far as *Reformational Philosophy* is concerned, a few quotes from the archives of the *Dooyeweerd Centre* may remind us of the appreciation which Dooyeweerd received from scholars coming from other traditions. G.E. Langemeijer, former Attorney General of the Dutch Appeal Court and a former Chairman of the Royal Dutch Academy of Sciences said in 1965 that Dooyeweerd is the “most original philosopher Holland has produced, even Spinoza not excepted.” Giorgio Del Vecchio, a well-known Italian neo-Kantian philosopher, categorically stated that Dooyeweerd is “the most profound, innovative, and penetrating philosopher since Kant.” The President of the “Humanist League” in The Netherlands. P.B. Cliteur, Professor of philosophy at the Technical University of Delft, also expressed his respect for the contribution of Dooyeweerd in no uncertain terms when he claimed: “Herman Dooyeweerd is undoubtedly the most formidable Dutch philosopher of the 20th century ... As a humanist I have always looked at ‘my own tradition’ in search for similar examples. They simply don’t exist.” The equally well-known Dutch philosopher, C.A. Van Peursen at the end of his life remarked that “many books written within the domain of philosophy of science should not have been written had the authors familiarized themselves with Dooyeweerd’s insights.”

We may therefore conclude that special scientists have only two options in this regard:

- (i) Either they give an account of the philosophical presuppositions and systematic distinctions with which they work—in which case they *have* a philosophical view of reality, or;
- (ii) Implicitly (and uncritically) they proceed from one or another philosophical view of reality—in which case they are the *victims* of a philosophical view.

This state of affairs is acknowledged by scholars coming from different intellectual traditions. In addition to what we quoted above, we now, in conclusion, add two more of them.

Agazzi says: “Precisely because it is impossible to dispense with a philosophy of nature, even present natural science adopts a philosophy of nature. But since it has sensed and removed this philosophy at a conscious level, very often reduces itself to using an implicit

one, that results from scattered items, is usually unreflected and, practically, is that which was contained in the science of past times but is now insufficient” (Agazzi 2001, 11).

In a similar vein Von Bertalanffy emphasises the guiding role of concepts: “Philosophical reflection must begin with the analysis of concepts we use; for these provide the frame of reference and determine the direction our inquiry will take” (Von Bertalanffy 1966, 116).

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