

A Sketch of Dooyeweerd's Philosophy of Science¹

Roy A. Clouser

INTRODUCTION

This sketch is intended to supply background specifically for the chapters in this volume by Strauss, Zylstra, van der Meer and Petcher. It stands, therefore as a mediating link between my introduction to the point of view we all share in Chapter 3,² and the subsequent chapters by those authors. As such it does not attempt to give anything like a full account of the significance of Dooyeweerd's philosophy of science, but is confined only to explaining the concepts and terms those authors employ. Such an abbreviated account must, of course, assume the reader is already acquainted with the broader background presented in Chapter 3 and take that chapter as its point of departure. Thus I will begin reviewing the last point of Chapter 3 and developing it in greater detail.

A NONREDUCTIONIST METAPHYSICS: CONTINUED

The point to which I am referring is one that concerned the relations among what Dooyeweerd calls "aspects" of reality. As we saw, he presses this ordinary English term into special service to designate the most basic *kinds of* properties and laws exhibited by the things, events, relations, states *of* affairs, etc., we directly experience. Aspects are not, therefore, types or classes of things, but kinds of properties things appear to have, along with the nomological order that holds for those properties. A large number of such aspects have been distinguished over the past 2,600 years, each of which has become the field of investigation of a particular discipline or science. (The term "*science*" is used by Dooyeweerd in the sense of the German term *Wissenschaft*. It connotes a distinct domain of investigation and theorizing rather than any particular method for carrying that out. In that sense, then, every distinct discipline is a science including history, aesthetics, ethics, etc.) On this meaning of the term, then, every science begins by

¹ This chapter differs from the others in this volume in that it did not originate as one of the papers given at the first international Pascal Centre conference of science and belief in August 1992. It was subsequently requested by the editor when it became clear that the chapters based on the philosophy of Herman Dooyeweerd would need an introduction for those unfamiliar with this philosophy.

² R.A. Clouser, "On the General Relation of Religion, Metaphysics and Science," in *Facets of Faith and Science. Volume 2: The Role of Beliefs in Mathematics and the Natural Sciences: An Augustinian Perspective*, edited by J.M. van der Meer (Lanham: The Pascal Centre for Advanced Studies in Faith and Science/University Press of America, 1996).

abstracting one or more particular aspects, which become the standpoint from which it investigates created reality. This abstractive separation of aspects does not correspond to our pretheoretical experience in which creatures appear to exist and function under the governance of the laws *of* every aspect simultaneously, and to exhibit properties *of* each. We do not, for example, experience creation as including external objects which are solely physical, sensations which are exclusively sensory, or concepts which are purely logical. Such proposals are the hypotheses *of* (reductionist) metaphysics, and should not be confused with a description of reality as we experience it. This is important because it highlights the fact that the process of abstraction and hypothesis formation must begin with what is given to pretheoretical experience, and must ultimately be judged by how well it accounts for that experience.

Of course, it does not follow that simply because creation is *experienced* as multi-aspectual from the pretheoretical viewpoint, that it really must be so. And surely the vast majority of metaphysical theories purport to show that pretheoretical experience is misleading, and identify the basic nature of reality with only one or two of its aspects. Such claims are defended by trying to show that the remaining aspects are to be reduced to the selected one(s) either by being denied outright or by being explained as generated by the one(s) identified as the basic nature of creation. The result is that the selected aspects are enthroned as the nondependent (and thus “divine”) reality on which all else depends.

We have already seen why Dooyeweerd not only rejects all such theories as being at odds with creation’s dependence on God, but also rejects every attempt to accommodate such theories to theistic belief. He argues that belief in God requires the elimination of reductive theories in favor *of* a metaphysics in which all the aspects *of* creation are regarded as equally dependent on God and therefore equally real, mutually irreducible and simultaneously true of all creatures. It is this program—the systematic elimination of all reductionism—which is one of the guiding principles of all the other concepts and hypotheses *of* Dooyeweerd’s philosophy. And that is the point at which we left off in Chapter 3—namely, with the question of whether this position is plausible. Does it make any sense to say that rocks, for example, have biological, sensory or logical properties? The answer, we saw, was affirmative, provided we emphasize the law side of each aspect and distinguish between two ways a thing may be said to be governed by aspectual laws and thus to possess its properties: actively and passively.

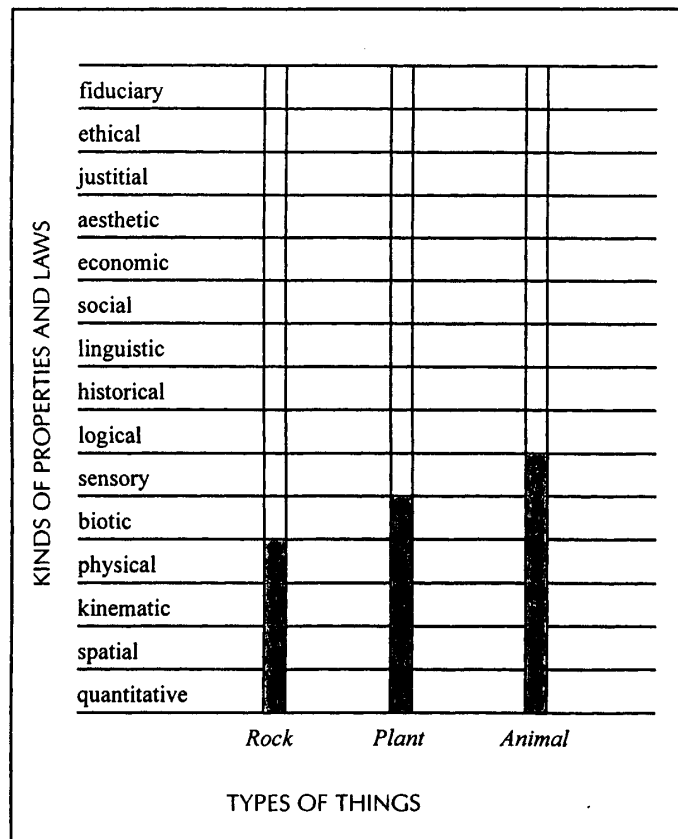
Let us now develop this idea further by illustrating how three sample types of things may be said to exist and function in all aspects.³

To say that a thing exists and functions *actively* under the laws of an aspect means that it has properties of that kind which are not in constant dependence upon other things having properties of that kind. For example, the rock has quantity, occupies space, is capable of movement, and has physical mass and weight in a way that does not depend on other things imparting those properties to it. That is, a rock is actively subject to the laws for the quantitative, spatial, kinematic and physical aspects, but it is not actively subject to the laws for the

³ This list is not presented as the only correct one. But it has intuitive plausibility, and its members have been widely acknowledged and studied as distinct domains for various disciplines. For our purposes here, it is not necessary to argue for any particular list; the important point is that both philosophy and the sciences must recognize some list or other.

biotic aspect since the rock is not alive. So any biological function it may have will passively depend on its being related to things that are alive, that is, to things whose biotic properties and functions are active. Each thing's passive properties are indicated by the open part of the bars in Figure 4.1. So what biotic functions can a rock have passively? It can become part of the life space of an animal by being the wall of its den; it can pass into the gizzard *of* a bird and play a role in its digestive processes; it can be the object on which a sea gull drops clams to open them. The way it functions passively in these cases depends on the uniquely biotic use to which it is put by a living organism. We say that a rock is passively subject to biotic law because the exact way in which it functions passively depends on the unique biotic behavior of an organism as distinct, for instance, from how a rock may be passively perceived although it cannot itself perceive. For were it not subject to sensory laws and in possession of sensory properties passively it could not be perceived by animals and humans who have active sensory functions. The same holds for the other aspects listed above the

Figure 4.1: The scale of aspects of creation. Individual objects exhibit properties and behave in ways unique to each aspectual kind of law that governs them. The shaded part of the vertical bar represents the aspects in which each object exhibits properties and behaves actively and passively, while the open part of the bar indicates aspects in which an object exhibits properties and behaves only passively.



sensory. The rock does not actively engage in logical thinking, but it must be subject to logical laws and passively have logical properties in order to be conceived by beings that can think; it does not buy and sell, but it must be subject to economic norms of supply and demand or diminishing returns in order to have the properties that enable it be economically valued. Such passive properties remain potential until actualized in relation to entities possessing an active function in the corresponding aspect.

Perhaps it is already clear that a plant would differ from the rock by having an active function in the biotic aspect which the rock lacks. And an animal would have an additional active function in (at least) the sensory aspect of perception and feeling which the plant lacks. But each of these things would function in every aspect passively, so the differences in their natures lie (at least partly) in the aspects in which they function actively. In fact, the list of aspects, from bottom to top, is intended to reflect the order in which higher aspects seem to presuppose lower ones. That is: a thing's actively having quantitative, spatial, kinematic and physical properties is a precondition of its actively having biotic properties, which are in turn preconditions for its having active sensory perception, which is a precondition for logical thought, etc. It is this order of aspects that Dooyeweerd calls the "cosmic order of time."⁴ In that expression, "cosmic" refers to all creation, while calling it a time order means two things. On the one hand, it points to time as the common denominator of all aspects, while on the other hand the aspects are recognized as the different senses of temporal order we experience. For example, physical time is the rate of change in matter/energy measured against the speed of light, while psychological time is our sense of how time drags on when we are bored or flies when we are having fun. Similarly, biological time is counted as the birth, growth, maturity and death of an organism, while mathematical time is the way quantities occur earlier or later in the natural number series.

QUALIFYING FUNCTIONS AND THE NATURES OF THINGS

This aspectual order is supported not only by the ways the ideas and concepts in the higher aspects presuppose those in the lower ones, but also by the ways active functions actually appear in things. Much of the difference in nature among a rock, a plant, and an animal seems to lie in the fact that a rock's highest active function is physical, while a plant's is biotic, and an animal's is sensory. Pretheoretical thinking intuitively recognizes this in its common sense classification of them as in reverse order-animal, vegetable, mineral.

Dooyeweerd proposes that such differences in aspectual active functions can serve as a nonreductive account of the natures of things. He terms the highest aspect in which a thing functions actively its "qualifying function," and points out that a thing's qualifying function also corresponds to its aspect whose laws govern its internal organization taken as a whole. So a rock is said to be physically qualified both because it has no higher active function than its physical properties, and because physical laws govern its internal organization. This can account for its distinctive nature in a way that does not require the rock to be regarded as solely physical or require that any one aspect be the cause of any

⁴ H. Dooyeweerd, *A New Critique Theoretical Thought 4 vols.* (Philadelphia: Presbyterian and Reformed Publishing, 1955).

other. Similarly, a plant's highest active functions are biotic, and it is the biological order which governs its internal organization; thus it is *qualified* as a living thing. But this difference in its nature does not need to assume that physical properties and laws actually produce biotic properties and laws. In the order of aspectual qualifying functions, having active physical properties is a precondition for a thing having active biotic properties, but is not the *cause* of them. For physically qualified things to combine into a thing with active biotic properties, biological laws would already have to be in place. Nonliving things that combine to form a living one already have the potentiality of (passive) biological functions. Thus it is not correct to understand the integration of nonliving things into a living thing as the "emergence" of the biotic aspect from a reality which is solely physical. Nothing is solely physical, and aspects do not emerge. It is only a thing's acquisition of a new *active* function which emerges, and that is possible only because the thing is already passively governed by the laws of the aspect in which the new active function is acquired.

Of course for this account to be true, there would also have to be interaspectual laws governing how properties, parts and wholes can combine to form new wholes. These are the laws that determine what is possible across aspects rather than merely establish what is possible or necessary *within* aspects. Since these laws determine the types of individual things which are possible or impossible in creation, I have dubbed them "type laws."⁵ To illustrate their distinct role, consider the difference between the notion of a square circle and that of a talking tree. A square circle is impossible because of the law-order within the spatial aspect of creation. But the impossibility of a talking tree is not due to any one aspectual kind of law. Rather it is due to the fact that the cross-aspectual type laws are such that no properties or parts can combine in such a way as to form that type of thing.⁶

This concept is important because the combination of the concept of a thing's type law together with its qualifying function can be substituted for the reductive concept of metaphysical substance. Instead of abstracting one or two aspects and enthroning them as the nondependent cause of all the others (which is the classical definition of "substance"), every creaturely entity exists and functions—at least passively—in all the aspects simultaneously. Entire aspects do not emerge into being as products of some one or two taken to be "substance," but all exist in mutual correlation with one another and with the entities they qualify.

⁵ The expression "type law" is my replacement for Dooyeweerd's term "individuality structure." The latter has caused a lot of confusion, often being taken to mean the internal organization of a particular individual. However, by "structure" Dooyeweerd meant "law," and he himself explained it as a law for a *type* of individual rather than an individual.

⁶ This part of Dooyeweerd's theory is an expression of a point made long ago by John Calvin and defended by Al Wolters in "Creation as Separation: A Proposed Link between Bible and Theory," in *Facets of Faith and Science. Volume 4: Interpreting God's Action in the World*, edited by J.M. van der Meer (Lanham: The Pascal Centre for Advanced Studies in Faith and Science/ University Press of America, 1996). Calvin says: "[God] fills, moves, and invigorates all things by virtue of the Spirit, and that according to the peculiar nature which each class of beings has received by the Law of Creation" (J. Calvin, *Institutes of the Christian Religion*, translated by F.L. Battles [Philadelphia: Westminster Press, 1960], II: 2, 16 [emphasis added]). Wolters argues that the Genesis account of (secondary) creation centers on the idea of God articulating a coherent variety of distinctive types of creatures under divine law. Dooyeweerd's theory now invests this point with real explanatory power.

It must be emphasized, however, that despite the emphasis on laws in this account, laws are not being regarded as existing separately from or prior to the things and properties of things of which they are the order; they do not have a status like that of the Platonic Forms. The laws of the universe are the law *side* of creation, built into it as its created order, and so exist in correlation with the properties of the kind they govern. This is true of type laws such as those for a water molecule, daisy or frog; as well as of aspectual laws such as those of mathematics, logic or physics; as well as of norms such as those of ethics or economics.⁷

ANALOGICAL CONCEPTS

As was just mentioned, Dooyeweerd argues that the aspects are not only correlates of the entities which are governed by their laws and exhibit their properties, but also are inseparable from one another. This raises a serious question. Since we must abstract the various aspects from objects as pretheoretically experienced in order to distinguish, investigate and theorize, are we not then attempting to separate what cannot be separated? Dooyeweerd's answer is that the process of abstraction is indispensable and is also legitimate provided that we make an important distinction. Abstraction can succeed in mentally isolating a particular aspect from the concrete things which exhibit it. But we cannot, even in thought, completely isolate the aspects from one another because they are unbreakably connected in so far as their *meaning is* concerned. This connection is evident in the ways that our concepts of properties, functions, laws, processes, etc., formed within any one aspect, always exhibit connections to properties derived from other aspects without which they cannot be understood. Dooyeweerd calls these "analogical concepts." (The term "analogical concepts" is very misleading in this context because it suggests that what is being pointed out are merely similarities. As will soon be apparent, the point is much stronger than that.)

This point can be better understood if we contrast these "analogical" concepts with the ideas with which one approximates the nuclear or focal meaning of each aspect.⁸ Each aspect has a distinct focal meaning centered in a metaproperty that qualifies all the other properties and laws of its kind. For example, the quantitative aspect has as its defining nuclear meaning the metaproperty of discrete quantity, that of the spatial aspect is extension, while that of the economical is the distribution of scarce goods, and that of ethics is love. Such nuclear meanings are, like colors, *primitive*, that is, they are indefinable: we must already know them from encountering them in experience or no amount of explanation could convey what is meant by them. We come to distinguish them only by contrasting them to one another so that we cannot conceive of any one apart from all the rest. This is what we mean when we insist that these metaproperties are not grasped conceptually. Since the nuclear meaning of an aspect is indefinable, it has to be approximated by an idea which is designated by a primitive term. So Dooyeweerd distinguishes sharply between concepts and ideas. A concept is the combining in thought of two or more properties, relations, parts or things, in

⁷ In this philosophy what are usually called causal laws are regarded as complex relations rather than laws of a specific aspect or types of things. That is, a real causal relation always exhibits all the aspects and is a complex interaction of all their laws.

⁸ ["Nuclear meaning," "focal meaning" and "original meaning" are synonyms. *Editor.*]

accordance with the laws of logic. A concept, therefore, has parts which can be analyzed on reflection. An idea, on the other hand, abstracts something of experience which cannot be analyzed into parts. For example, besides the aspectual metaproperties, we have ideas of temporal duration, or of existence, or of individuality.⁹

A similar but much more complicated connectedness is also exhibited by specific properties (and complexes of them) conceived *within* any aspect to properties of all the other aspects. Take the example of the aspect of space. In its original, nuclear sense it refers to extension that is simultaneous in all its points. But we are able to see an unavoidable connection to spatial properties in concepts arising in other aspects. There is, for instance, *physical* space which is not identical with the space of pure geometry; there is the biological concept of *life* space or bio-milieu, and the space of *sensory* perception which is not the same as that of mathematics or biology; we also speak of *logical* space (extension), and of juridical space as the domain of legal competence, etc. All such “analogies” are made possible by the close connectedness of the aspects; each is interwoven with all the others by tendrils of meaning consisting of the ways the properties of each aspect require and requalify those of the others.

For a nonreductionist metaphysics, these “analogical” connections call for careful analysis to trace out the various aspectual senses and qualifications which properties and concepts (and thus also terms) can acquire. Only in that way can we be on guard against confusing the original sense of an aspectual focal meaning with any of the ways it takes on additional meanings in connection with other aspects. In fact, mistaking the original aspectual meaning of a property (or term) for one of its requalified connections in another aspect is often taken as support for reductionist views. For example, Newton, following the ancient Greeks, recognized space as pure form apart from all material and sensorily perceivable things. But Kant tried to construe space as a form of sensory perception, which would require perceptions to appear in the form of Euclidean space! That, of course, is impossible. Hume was surely right in holding that if “space” is taken to mean “perceived space” then (nonformalized) Euclidean geometry is destroyed. At the same time, however, we cannot understand perception without its connection to the spatial properties that are an intrinsic part of seeing, hearing, touching, etc. Here again, we can see how this line of argument reflects Dooyeweerd’s emphases: all aspects are equally real and mutually irreducible, but they are also unbreakably intertwined and true of all the concrete things, events and relations given to pretheoretical experience.

These property and meaning connections between aspects are given special terms by Dooyeweerd. When we discover that a property of an aspect lower on the list (Figure 4.1) reflects in its meaning an unavoidable connection to a property or a law higher on the list, that meaning connection is said to be an “anticipation” of the higher aspect. For instance, the concept of social security in sociology anticipates the fiduciary (trust), the concept of credit in economics anticipates the fiduciary, and the concept of social justice in sociology anticipates the justitial. When the connection holds in the reverse direction, it is called a “retroicipation” of a lower aspect. For instance, the concept of juridical space (domain of legal

⁹ [Compare with Stuart’s “primitive concepts” C.I.J.M. Stuart and T. Settle, “Physical Laws as Knowledge and Belief,” in *Facets of Faith and Science. Volume 3: The Role of Beliefs in the Natural Sciences*, edited by J.M. van der Meer (Lanham: The Pascal Centre for Advanced Studies in Faith and Science/University Press of America, 1996). Editor.]

competence) in jurisprudence retrocipates the spatial, and the biological concept of environment (life space) retrocipates the spatial.

ANTINOMIES AND THE CRITIQUE OF THEORETICAL THOUGHT

So far I have been sketching Dooyeweerd's nonreductionist account of the natures of things and of the connections between aspects, without the extensive argumentation he gives for these points. The account so far has relied on its background given in Chapter 3 to provide a general idea of why the biblical idea of God and the scriptural teaching that belief in God impacts all truth and knowledge require such a systematically nonreductionist metaphysics. Dooyeweerd has in fact provided powerful arguments against reductionist claims and their consequences. These arguments cannot be treated in detail here, but a rough approximation of them is as follows.¹⁰

Dooyeweerd begins his work with what he calls a transcendental critique of theoretical thought by which he means the following: to abstract any aspect of creation and then propose that it is really independent of the other aspects is to confuse the consequences of our act of abstracting with the real state of affairs. To be sure, we must engage in abstraction in order to distinguish any aspect from the others, and in order to conceptualize individual properties, relations, functions, laws, patterns, etc., within that aspect. Such abstraction is also the basis for our being able to frame new conceptual combinations of abstractions in order to propose hypothetical entities. But if we think we can completely isolate any one aspect from the others so as to make it appear that it can exist independently of the rest, and thus be the cause of the rest, we are wrong. We cannot completely isolate any one aspect from all the others, however hard we may try. Thus all metaphysical theories which claim to have identified an aspect that can exist independently of all the rest have confused the limited extent to which an aspect can be distinguished with its real independence. Such claims mistake limited distinguishing for total isolation because they mistake the product of our abstractive activity with the real state of affairs. There are two arguments that show why these are both errors.

The first is in the form of what is called in science a *Gedanken*, or thought experiment. For this reason it does not have premises which can be disputed, or draw an inference which needs to be checked deductively. Rather, it calls upon the reader to perform an action and take note of its results. For its force to be appreciated, therefore, it must really be performed. The experiment is as follows: since the reductionist strategy is to find the aspect(s) of reality that can exist independently of all the others, let us try to conceive of any of them in exactly that way. Let us strip away all other aspects from any one supposed capable of independent existence, and see what we have left.

Take the physical, for instance. What is left if we strip from our idea of matter every element of and connection to quantity, space, motion, life, sense perception and logic? When I try this I get literally nothing. Similarly for the sensory aspect. Can all reality be sensory as Hume thought? What is left of our idea of sensation if we perform this experiment with the sensory aspect? Is it not also destroyed? Kant almost saw this point in his critique of Hume. Kant pointed out that if Hume

¹⁰ Elsewhere I have given a detailed account of these arguments considered as criteria for theories. See R. A. Clouser, *The Myth of Religious Neutrality: An Essay on the Hidden Role of Religious Beliefs in Theories* (Notre Dame: University of Notre Dame Press, 1991), 68-73, 191-95.

were right about quantity, space, time and logical relations not being perceived, then the sensory data must be a chaos. What Kant failed to see is that a genuine chaos “lacking every kind of order” would then also fail to be *sensory*. Apart from its own order, and its connection to all the other kinds of order, we have no idea whatever of what is meant by “sensory.”

What of the logical aspect? This has been a favorite candidate for independent existence for almost 2,000 years. But can its properties and laws really be conceived of in total isolation from their connection to all the other aspects? Does not the concept of a logical class require the idea of quantitatively distinct members? Does not the law of noncontradiction itself refer to other “senses” in which things cannot both be and not-be? And at the same “time”? Can we really dispense with the notion of logical space as the domain of a quantifier? Or can mere logical possibility show us what is *really* possible? Does it not fail to do that just because the logical sense of possibility must always be taken together with other aspectual sense of possibility in order to show what really can or cannot be the case?

If this is denied, then how will it be shown that a concept of a talking tree or flying rock contains a logical contradiction? Or take the case of a square circle. This impossibility cannot be only a matter of definition, since the definition involved is itself grounded in our intuitive experience of space and not merely in matters of convention. Besides, “square circle” can be defined: “an enclosed plane figure which is equidistant at every point around its circumference from its center, and which has four equal sides and four interior ninety degree angles.” Logic alone tells us nothing of why that is impossible; it is the experience of spatial properties and laws (together with those of logic) which tell us that.

Even if my readers get the same results from this experiment that I do, however, it may still be questioned just what this thought experiment proves. Can we conclude from our inability to conceive of any aspect in isolation that no aspect can really exist independently? That, I think, would be more than is warranted. Such a conclusion could always be countered with the proposal that though we cannot conceive of any aspects in isolation they might still exist that way. And that is true enough.

But there is also a great problem for any theory relying on that reply: for believing any aspect to have independent status means believing it to exist in a way we can literally frame no idea of. Reductionist theories therefore ascribe the status of metaphysical independence to an aspect in the face of the fact that it has no such status so far as it can be known at all; and that is fatal to every reductionist claim as *a theory* for it would then be incapable of theoretical justification: what we can form no idea of we cannot justify by argument. And that is the conclusion to be drawn from the experiment in thought. It shows that the real ground of belief in any aspect of experience as absolute is faith, not theoretical justification.

This, by the way, constitutes our answer to the question raised at the end of Chapter 3 as to whether the world was totally physical in its earliest stages. The answer is that we cannot even conceive of anything being totally physical. Try as we may, we cannot help but perceive, conceive, imagine and speak of the world as multiaspectual, so there is literally no reason whatever to suppose it is not.

The second argument consists of noticing the way in which any attempt to eliminate an aspect in favor of another, or to regard it as totally dependent on another, results in antinomies. Dooyeweerd uses the term “antinomy” in a wider sense than its literal meaning, “conflict of laws,” so that it also includes a conflict of properties.

The point is that because of the close connectedness of aspects, the elaboration of a reductive theory will eventually involve it in using laws or properties of the reduced aspect(s) in its explanations. This can occur in the actual statements of a theory, but more often it arises between a theory's explicit contents and what it assumes. For example, Nietzsche once suggested that perhaps there are no things with properties at all. His reason was that since humans are the products of random evolution, it could be that our experience of things with properties is a result of the way our brains happen to have evolved rather than a reflection of reality. In this theory Nietzsche assumes: 1. evolutionary theory could only be true if there are things with properties whose development it explains; 2. brains are things with properties. The antinomy arises because Nietzsche's theory assumes to be true what it at the same time purports to deny.

Dooyeweerd suggests that the exclusion of such antinomies can serve to distinguish genuine from spurious aspects. If we are in doubt as to whether a particular aspect is genuine, he says, try to understand it as reduced to some other. If antinomies result, we have good evidence that the reduction is mistaken, and we are confronted with a genuine aspectual difference.¹¹

ENCAPTIC RELATIONS

Dooyeweerd applies his nonreductionist program not only to interaspectual connections but also to understanding the internal composition of individual things. This leads him to draw a distinction between two ways things can combine to form a new, larger whole in accordance with type laws. Things can combine in such a way that the constituents of the larger whole are actually its parts, or they may do so in a way in which the larger whole is a binding of subwholes in a way that does not subsume them as parts. The difference is based on the concept of a thing's qualifying function (as explained earlier), and it is important because the philosophically prevailing view of the relation between parts and wholes would lead to reductionist consequences if this view presented the only way entities could relate to form larger wholes.

Roughly speaking, ancient and medieval philosophy sought to understand the nature of a thing's parts in terms of the nature of the whole thing, while philosophy since the Renaissance has sought to explain wholes in terms of the nature of their parts. Since we have already seen the senses in which the "-isms" of modern metaphysics are reductionist and incompatible with belief in God, let us briefly consider the older view.

On the ancient view a whole is, in Aristotle's words, "prior to" its parts in the sense of being basic to them. A part cannot exist, or function, or be understood apart from the whole of which it is a part. For example, an organ of the human body cannot come into existence or perform its natural function apart from the body, nor can it be understood except in terms of the way it functions in relation to the internal organization of the whole body. But it must be added that not every whole has components which are parts in those three ways. At times wholes are composed of subwholes which can exist apart from the larger whole, can function outside the larger whole or can be understood apart from it. Earlier we

¹¹ There are more criteria for distinguishing aspects. See M.D. Stafleu, *Time and Again: A Systematic Analysis of the Foundations of Physics* (Toronto: Wedge Publishing Foundation and Bloemfontein: Sacum Beperk, 1980), 15; M.D. Stafleu, "Criteria for a Law Sphere," *Philosophia Reformata* 53 (1988): 171-86.

considered the example of a small rock in a bird's gizzard which actually functions in its digestive processes. This can now serve to illustrate the present point since the rock does not thereby become *a part* of the bird. The rock has only a passive function in the biological or sensory aspects, while the bird functions actively in them; it is actually alive, and perceives and feels. Because the rock has a different qualifying function from the bird, it cannot be part of it. Instead it is a subwhole which is encapsulated within the larger whole that is the bird. Notice that the rock can also exist without the bird, even though it cannot perform the same digestive activity outside it. But the crucial point here is the difference in nature between the two: genuine part-whole relations exist only between entities which have the same qualifying function. When the difference in the natures of two entities is too great, that is, when they have different qualifying functions, they are said to be encaptically bound to one another. The latter relation may be characterized as one in which a subwhole exists and acts within the internal organization of a larger whole which has a different qualifying function from the subwhole, while the qualifying function of the subwhole is overridden by that of the larger whole.

This sort of relation would hold, then, between the atoms included in the bird and the bird as a whole. The atoms do not have an active biotic or sensory function. So the atoms are not parts of a bird, but encapsulated subwholes within it. And, as is typical of capsule relations, their physical qualifying function is overridden by that of the larger whole, and made to serve the biotic and sensory needs and purposes of the animal. In fact, there are cases in which this "overriding" can be quite amazing. The coding of genetic information in a DNA molecule exemplifies the "overriding" of molecules for a biotic function. Some groups of molecules behave in highly uncharacteristic ways outside their being encaptically included in living things.¹²

Another example of this difference between part-whole and encapsis is that of the water contained in the cells of a plant. Since H₂O is physically qualified while the plant is biotically qualified, the water is not part of the living plant but is encapsulated within it. The plant's cells, on the other hand, are actually parts of it. They have the same qualifying function, and they cannot exist or be understood except for the role they play within the internal organization of the plant.

The difference between part-whole relations and encapsis, as expressed by their different qualifying functions, also makes clear why the nature of a larger whole cannot be predicted or explained from knowledge of the subwholes which are bound within it. And for the same reason subwholes can never be considered the causes of the larger wholes in which they are bound; they are always necessary but not sufficient conditions for the encapsulate wholes which include them.

GROUND MOTIVES

The last of Dooyeweerd's ideas to be introduced here refers back to the very beginning of Chapter 3 where we considered the definition of religious belief. There I argued that belief in anything as non-dependent—no matter how that is

¹² For details, see J.M. van der Meer, "Religious Belief in Sociobiology: How a Physical Analogy Introduces Materialism in Human Sociobiology," in *Facets of Faith and Science. Volume 2: The Role of Beliefs in Mathematics and the Natural Sciences: An Augustinian Perspective*, edited by J.M. van der Meer (Lanham: The Pascal Centre for Advanced Studies in Faith and Science/University Press of America, 1996).

conceived—is a religious belief. While Dooyeweerd is in agreement with that definition (though he usually uses the word “absolute” rather than “nondependent”), he is more often concerned with the vaguer expression of religious belief that comes to prevail in an historical era. This less precise, but widely pervasive, idea of what is divine consists of a rough differentiation between the divine and the nondivine; rather than being a precise idea of divinity it “locates” the divine in a certain area of reality.

For example, among the ancient Greeks there were two divine principles which were later called form and matter. Form was the whatever-it-is that provides the orderliness to the cosmos, while matter was the whatever-it-is that gets formed and ordered. Both were regarded as nondependent, and when theories arose the philosophers all started from the assumption that form and matter were divine. Their differences were over how, exactly, to interpret them. For instance, there were proposals about matter that said it is basically earth, or air, or fire, or water, combinations of those four proposals, or atoms; and there were proposals about form that said it is numbers,¹³ or Forms, or logical essences. While the theorists had quite specific interpretations of the divine that were highly intellectualized and beyond the grasp of the average person, everyone in that culture saw the stuff of the world and the orderliness of that stuff as the “location” of divinity. (However, there were occasional extremists who denied the existence of anything but matter or anything but form.)

Such vague, culturally ensconced notions of divinity are called “religious ground motives” by Dooyeweerd. He rejects the more genteel term “motif” as accurate but inadequate. “Motive” is better because it conveys the way religious beliefs drive the development of a culture-theories included. Of course, he is particularly interested in the way religious beliefs motivate the direction of philosophical and scientific theories. In our own era, Dooyeweerd sees the prevailing ground motive as that of nature and freedom-though more thinkers of our era tend to locate the divine in one side or the other rather than accept both as the Greeks did. So modern philosophy is driven by the need to explain everything naturalistically or to find a way to save human freedom. This latter motive can be seen at work already in the metaphysics of Descartes, and it drove Kant to a the subjective idealism in which all nature is understood as a product of the human mind.

Over against such “locations” of the divine, Dooyeweerd contrasts the biblical teaching that God alone is divine. The biblical ground motive for culture and theories is therefore centered on the difference between Creator and creature. Nothing in creation is divine; nothing within creation is the law-giver to creation; nothing exists except in direct dependence on God. So the driving motivation of genuinely biblically controlled theories is the revealed knowledge of creation, fall, redemption and fellowship with God through his Spirit.

¹³ [see D.F.M. Strauss, “A Historical Analysis of the Role of Beliefs in the Three Foundational Crises in Mathematics,” in *Facets of Faith and Science. Volume 2: The Role of Beliefs in Mathematics and the Natural Sciences: An Augustinian Perspective*, edited by J.M. van der Meer (Lanham: The Pascal Centre for Advanced Studies in Faith and Science/University Press of America, 1996). *Editor.*]

CONCLUSION

Even from this brief introduction, it should be apparent that Dooyeweerd has constructed a philosophy which provides more “hands on” engagement with the sciences than any other. And he does so in a way that harbors no reservations or hostility toward the sciences, while conveying to them the benefits which flow from belief in God. More importantly, the way Dooyeweerd transmits the consequences of that belief to scientific theories is much more than merely a matter of judging the external compatibility of a given theory with specific biblical teachings. For he provides a set of principles whose impact on the entire scientific enterprise is internal to the constructing and reforming of theories to provide systematically nonreductionist explanations of every aspect of creation. By doing this Dooyeweerd is able to show how the biblical claim that all truth and knowledge is impacted by belief in God works: for not only every theory but every *concept* arising in every science is either reductionist or it is not.¹⁴

¹⁴ [For further reading I recommend: R.A. Clouser, “A Critique of Descartes and Heisenberg,” *Philosophia Reformata* 45 (1980): 157-77; Clouser, *The Myth of Religious Neutrality*; H. Dooyeweerd, *A New Critique of Theoretical Thought*; H. Dooyeweerd, *The Roots of Western Culture* (Toronto: Wedge Publishing Foundation, 1979); L. Kalsbeek, *Contours of a Christian Philosophy* (Toronto: Wedge Publishing Foundation, 1975); J.M. Spier, *An Introduction to Christian Philosophy* (Toronto: Wedge Publishing Foundation, 1954); Stafleu, *Time and Again*; M.D. Stafleu, “Spatial Things and Kinematic Events (On the Reality of Mathematically Qualified Structures in Individuality),” *Philosophia Reformata* 50, no. 1 (1985): 9-20; *Editor*.]