SPATIAL THINGS AND KINEMATIC EVENTS

(On the reality of mathematically qualified structures of individuality)

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In the course of his extensive investigation of the so-called 'structures of individuality', Herman Dooyeweerd poses the question: 'Why can we not find any original types of individuality in the mathematical modalities?', and he proceeds: 'In this context we have to explain more precisely why original types of individuality are not present in the numerical, spatial and kinematic spheres. The reason is that in these three mathematical aspects no single qualifying or foundational function is to be found characteristic of the structure of an individual real whole. No single thing or event is typically qualified or founded in an original mathematical aspect.

The energy-aspect appears to be the first modality in which the radical function of a kingdom of individual totalities presents itself.'1

This is virtually the whole answer Dooyeweerd gives to his question. In the same context, he argues in favour of the existence of atoms, because these are perceptible, because '.... it is now possible to view their activity objectively by means of the senses.'2

In line with traditional views, Dooyeweerd distinguishes three 'radical types' of a pre-logical qualification. 'They delimit three kingdoms, viz. 1) that of inorganic kinds of matter, things and events, all of which have a typical qualification in the energy-aspect; 2) that of plants and their bio-milieu, which kingdom has a typical biotic qualification; 3) that of animals, inclusive of their typical symbiotic relationships, their form-products and animal milieu, a kingdom which is typically qualified in the psychical aspect.'3

It seems that Dooyeweerd's identification of the natural kingdoms hinges on three points, to wit, naive experience, sensory perception, and tradition. These three points are related, for naive experience strongly depends both on sensory perception and on tradition, and vice versa. All three points are open to criticism, however, as Dooyeweerd himself shows by admitting atoms and molecules to be genuine individual things, though they cannot be observed in naive experience: 'The reality of atoms and molecules has been definitely established from their perceptible operations.'4

In the present paper, we shall challenge Dooyeweerd's view, in particular with respect to the spatial and the kinematic modal aspects. We shall
argue in favour of the existence of spatially and kinematically qualified structures of individuality, mainly along two lines. In Secs. 2-4, we investigate the assumed arguments against the reality of individual spatial or kinematic 'things' or 'events'. We shall try to neutralize the argument taken from sensory experience, to criticize the tradition, and to win naive experience to our side. With respect to tradition, it will be necessary to pay attention to Aristotle's theory of change. Next, in Secs. 5-8, we shall present positive arguments in favour of the existence of a kingdom of spatial 'things', as well as a kingdom of kinematic 'events'.

This means that we agree with Dooyeweerd as far as the numerical aspect is concerned.

1. The case against numerically qualified typical wholes

Can we speak of typical individual numbers? It cannot be denied that 'typical' numbers exist, like the number π = 3.14 ..., but these derive their typicality from spatially qualified structures like circles. At present we investigate purely numerical structures. Natural numbers (1, 2, 3, ...), integers (including zero and the negative numbers), as well as rational numbers (fractions of integers) are easily recognized as 'numerical modal subjects'. Their meaning can be fully understood by their being subject to purely numerical laws. Within this context, the nearest one could come to 'typical numbers' would be in the concept of prime numbers.

Although it cannot be denied that the set of prime numbers has some very peculiar properties, it can hardly be said that a particular prime number has anything 'typical'. Even the definition of 'prime number' implies an absence of a property: a natural number is 'prime' if it can not be factorized.

We shall leave aside the question whether a set of numbers may be typical, for the concept of a set already involves the spatial temporal order of simultaneity (a set contains simultaneously a number of elements). Now we want to point out that a number cannot be a structural whole, because it has no parts. Of course, any number can always be considered the sum, the difference, the product, or the quotient of two or more other numbers, but this does not constitute anything like a typical whole. This is not even the case with factorizable numbers, like 12 = 2x2x3, for it is quite arbitrary to exclude the number 1, and even to exclude negative integers, or rational numbers (why not: 12 = 1x1x2x2x3? or 12 = ½x8x3? or 12 = (-2)x(-2)x3?). Only if we accept the arbitrary restriction to natural numbers larger than 1, the factorization of 12 = 2x2x3 is unique, but still does not determine any kind of typical individuality.

To constitute a typical whole, having parts is a necessary condition, but by no means a sufficient one. In order to bring this home, consider a typical spatially qualified structure, that of a circle. It is clear that a circle has parts, e.g., its segments, but this does not make a circle a typical structure. Rather, we consider a circle a spatially qualified typical structural whole, because (contrary to any number) it is bounded, and because it binds properties which refer to an earlier modal aspect, in this case, the numerical one. In this particular example, the structure of a circle implies the invariant numerical ratio of its circumference and its diameter (this ratio is π = 3.14 ...).