The "Dual Nature" of the Point

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Abstract

In this paper, I would like to illustrate the dimension paradox surrounding the point with an artistic vision.
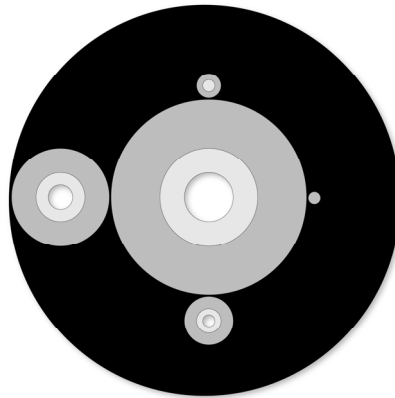
Figure 1: *SAXON, Poly-Dimensional Point 1990, oil on wood, Ø 152 cm*

Introduction

During my work, whenever I concentrate on one point, the crucial fact that the point is actually an entity without extent, the tiniest unit, an axiom in the mathematical sense overwhelms me. And right there I could even stop doubting and attacking the bases of the natural sciences, if my subsequent question were not this: if something has no extent, then one may as well assume, however rough the approach may be, that on the whole it does not exist, it equals nothing, or "0" (zero); and this proposition is in itself more than nothing. After all, this infinitesimal point of no size, a paradox of dimensional status, constitutes the lines, the planes, and space itself, our world in short, and even the infinitely large universe. Thus the point can practically mean the ultimate stage, the absolute boundary and limit of our physical world, of our existence, that is, of our own dimensional structure.

For Demosthenes, it was the atom that was synonymous with this boundary, impossible further to divide. Since then, science has managed to answer the question that triggered this train of thought: what is beyond the point – the smallest unit that has bugged thinkers ever since antiquity? It is eventually the world of structures constituting the atoms, which is astonishingly similar to every perceivable hierarchic region, cosmic energy level, and dimensional system of total cosmos both in its construction and its function. With the help of our organs of perception, we may define the point as a multidimensional phenomenon, the space-time concentration of all dimensions as well. Hence the point partakes of and remembers every dimension; either as the intersection of two lines or as the basic unit of the plane or as the indivisible minuscule element of space – ultimately, it is the borderline of the black hole and white hole conditions, where all the space-time dimensions of the given world collapse completely and irreversibly. We must therefore, as a peaceful paradigm shift, conclude that the point has a "dual nature": on the one hand, it is the "0" dimension, while on the other, it is infinite, and while it converges to absolute zero, ever-changing internal laws govern it in the ever newer ranges of scale and size.

The Point: A Paradox of Dimensional Status

Let us do a simple thought experiment departing from the following logical formula: Suppose we have a solid planar region. We may subdivide the region into two or more smaller regions, and each of these may in turn be subdivided into still smaller regions, and so forth, ad infinitum. Then we may witness the coming to an end of the plane as a form, its becoming a set of individual points. If we experiment with space, on the other hand, then the same process leads to the depletion of space or an object, and the substance, after having squeezed itself through the infinitely fine "immaterial passage" of our mind, is transfigured definitively. Let us now reverse the above train of thought by building backwards, that is, instead of taking away the infinitesimal planes, we add them to the experimental set. Let us tilt the point from its point of inertia and shift one scale up in order to interpret visually the intention of the original painting (See Figure 1).

Let us now examine the "infinitesimal" point in relation to the straight line. For the sake of illustration through artistic creation, let us assume that Saxon's "polydimensional point" or "PdP" is nothing else, by appearance, than the heaped-up set of the cross-sections of a batch of straight lines, quasi their "infinitesimal" planar projection (See Figure 2). Within the point-like, zero-extent cross-section of this multidirectional line, paradoxically, an infinite number of ever "smaller" and "smaller" fibres are rendered side by side. This is best imagined as if we were looking at the interior of a one-dimensional batch of cables (See Figure 3).
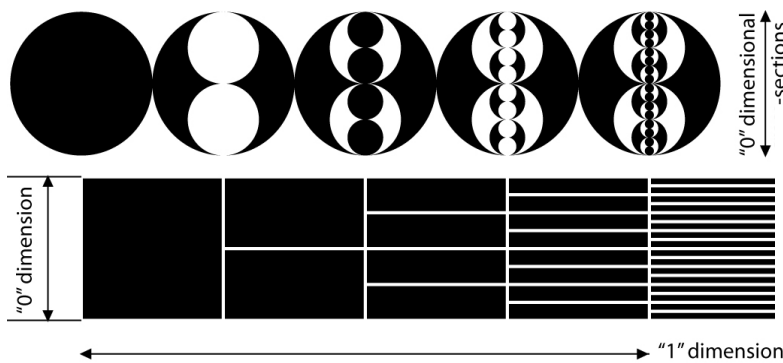

Figure 2   **Figure 3**

In a classical case, a point has no extent, hence it cannot be further divided. In Saxon's "PdP" interpretation, we evidently speak of an imaginary point which is the heaped-up projection of the "0-dimensional" cross-sections of a "1-dimensional" line. Since the cross-sections themselves are "0-dimensional" like points themselves, as long as we only allow a finite number of cross-sections to heap upon each other, the "PdP" complies with the tradition expectation, too, that is, it remains a point-like set. But if we allowed an infinite number of cross-sections to heap up, then we would no longer be speaking of a point but introduce a line. In our present experiment, stunningly, the fate of infinity depends upon no more than a "non-existent," that is, a "0-dimensional" layer. The "PdP" thus culminates in the interval between nothing and everything, being within the $0 < PdP < 1$ dimension, but can never be a line.

It does not matter whether we continue our contemplation in terms of the dimensions of line, plane, or space; sooner or later we come to the same conclusion. The fate of the infinite, that is, the "all," is determined in all three cases by a "0-dimensional" "nothing." The creative mind has a predilection to search and research in and around the realm of creation; hence it is understandable that in most cases it also attempts to resolve paradoxes. The world of artistic fantasy may allow us to interpret mathematical axioms, such as the point in this case, in a different way. Our logical experiment aimed but to hint and suggest that while there is nothing in the "0-dimensional" point taken in the classical sense, the infinitesimal "PdP" incorporates and enshrines "everything" outside of the "nothing."

(Translated by Boldizsár Fejérvári)