METAMATHEMATICS: SPATIAL DIMENSIONALITY, INFINITY, ZERO, PURE GEOMETRY

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ABSTRACT

Via metamathematical analyses, proven is that mathematics are inaccurate that include discussion of "zero dimensional", "one dimensional", "two dimensional", "four dimensional" et seq, "infinity", and "zero": The concepts of each, except the concept "infinity", are arrived at via conceptual dissociation, and as such cannot represent facets of the universe, and the language of each are of linguistic alteration ("infinity" is an antonymic linguistic alteration), and as such are absent of mathematic meaning. Of the three dimensional, the three dimensions that comprise it are inextricable, such that none exist without the others: It cannot be constructed by, nor deconstructed into, "lower dimensions". Regarding the concept "pure geometry": It is a conceptual dissociation of the geometry of existents from the existents; and anything arrived at via conceptual dissociation cannot represent facets of the universe.

I

SPATIAL DIMENSIONALITY VIA A METAGEOMETRY

I-I

(1) Regarding a "one-dimensional line", which, as such, is stated to have only length: It also has depth, because it rose into the pictorial medium, such as a graph (that is, it rose into space), via a pictorial medium, such as a writing instrument; and it also has height, because it is extended vertically on the pictorial medium, such as a graph, via a pictorial medium, such as a writing instrument. Regarding a "two-dimensional plane", which, as such, is stated to have only length and height: It also has depth, because it rose into the pictorial medium, such as a graph (that is, it rose into space), via a pictorial medium, such as a writing instrument. (The above and below language that is quoted must be so because their meaning is in question).

(2) Therefore: A "line without height and depth" is the same as no line; and a "plane without depth" is the same as no plane.

(3) Stating, via mathematic language and non-mathematic language, that a line does not have height, nor depth, does not mean that it does not. Stating, via mathematic language and non-mathematic language, that a plane does not have depth does not mean that it does not.

(4) Moreover: A "heightless and depthless line", and "depthless plane", cannot be coherently conceived of (that is, per I-II below, non dissociatively conceived of), for the same reasons in *(1) – (3)*. Stating that they have been conceived of via such language (that is, via the meaning of such language) does not entail that anything has been conceived of.

(5) Moreover: If a "one dimensional line", and a "two dimensional plane", did not have depth, they would not appear when viewed from the side views, nor the top views, nor the bottom views. And there is nothing of the universe that is of this nature, nor could there be.

(6) Moreover, per *(1) – (5)*: If a line did not have height, there would be nothing to see; if a line did not have depth, there would be nothing to see; and a line's length cannot be produced without concurrently producing height and depth. Moreover, per *(1) – (5)*: If a plane did not have depth, there would be nothing to see; and a plane's length and height cannot be produced without concurrently producing depth.

(7) Per *(1) – (6)*: The three dimensions of a graphical line and plane, and non-graphical line and plane, can be measured: The media that were used to produce both entails the production of depth via the media, which can be measured, as well as the production of (for the "one dimensional"), height, which can be measured.

(8) Therefore, stating via mathematic language and non-mathematic language that a line and plane have less than three dimensions is to, per I-II below, dissociate, from the line and plane, the dimensions that they are stated to not have.

I-II

(9) There can be only three spatial dimensions, namely length, height, and depth. Moreover, all three can only exist concurrently, such that there is no facet of the universe that does not have all three.

(10) The mathematic concepts "one-dimensional" and "two-dimensional" are produced by conceptually dissociating two of the components of the concept three-dimensional from the concept three-dimensional, namely, regarding "one-dimensional", length, and regarding "two-dimensional", length and height.

(11) That the three-dimensional is an amalgam of three dimensions provides the opportunity for the aforementioned dissociation.

(12) The prevailing concept is that the graphical three-dimensional is constructed from the sequential addition of length, height, and depth, and that, as such, the graphical three-dimensional can be deconstructed into the "two-dimensional" ("length and height only"), and "one-dimensional" ("length only"). The third dimension, namely depth, cannot be dissociated from the three-dimensional, because it is the final stage of the aforementioned additive sequence – that is, it is the final dimension. Dissociating from it would result in the dissociation of the three-dimensional from the graph, which would result in the absence of any spatial dimensions.

(13) Anything that is arrived at via dissociation cannot represent a facet of the universe, because the dissociation entails dissociating inextricably combined facets of the universe from one another. That is, dissociative concepts cannot represent facets of the universe because they are dissociations of the universe: Dissociation of the universe entails the absence of association with the universe.

(14) Therefore, the mathematic language and non-mathematic language 'one-dimensional' and 'two-dimensional' are conceptually meaningless. Moreover, they are only subtractive linguistic alterations (subtractive mathematic, and subtractive non-mathematic, linguistic alterations): They are only subtractive language of the meaningful language 'three-dimensional', namely, for 'two-dimensional', a subtraction of one from the 'three' of 'three-dimensional', and for 'one-dimensional', a subtraction of two from the 'three' of 'three-dimensional'.

I-III

(15) Lisa Randall, regarding her discussion about the "two-dimensionality" of book pages, states the following (Randall, 2006, p22):

"... for the pages to be truly two-dimensional they would have to be infinitely thin slices with no thickness at all in the third dimension. For now, though, two dimensions is a fine approximation for pages as thin as these."

Regarding, "infinitely thin slices with no thickness at all in the third dimension", the concept "infinitely thin" expresses that there is depth, namely X thin, yet she concurrently conceives of this thinness as "no thickness at all". That is, her concept of the "two-dimensional" is that the thinness that there is, is of no thinness. This is incoherent.

I-IV

(16) Regarding a "zero-dimensional point": It is stated to have no spatial dimensions.

(17) "Zero-dimensional" is a dissociation from the three-dimensional, because it is stated that the three-dimensional consists of an array of "zero-dimensional points": The dissociation is that the claimed "zero-dimensional" component of the three-dimensional is conceived of as existing independently. (However, see *(19)* below).

(18) However, according to the dissociation "zero-dimensional": When the "point" is viewed from the front view, rear view, top view, bottom view, and side views, the point would not appear. There is nothing of the universe that is of this nature, nor could there be.

(19) However, the "point" appears at each view, which demonstrates that it is three-dimensional. Moreover, as was discussed in I-I about a line and plane: The point has depth, because it rose into the pictorial medium, such as a graph (that is, it rose into space), via a pictorial medium, such as a writing instrument; it has length, because it is extended horizontally on the pictorial medium, such as a graph, via a pictorial medium, such as a writing instrument; and it has height, because it is extended vertically on the pictorial medium, such as a graph, via a pictorial medium, such as a writing instrument.

(20) As such, regarding *(17)*, the three-dimensional actually consists of an array of three-dimensional points.

(21) As such, the dissociation method in *(17)* is a failed attempt at dissociation, because the three-dimensional does not consist of the "zero-dimension": The "zero-dimension" cannot be dissociated from the three-dimensional because the amalgam (per I-II) of the three-dimensional does not include the "zero-dimension": The inextricable facets of the three-dimensional, namely length, height, and depth, does not include the "zero-dimension".

(22) Therefore: A "point without dimensions" (that is, a "zero dimensional point"), is the same as no point, or nothing. And, 'zero dimensional point' means no point, or nothing.

(23) As such, "zero-dimensional" is not a dissociation, but rather a linguistic alteration, namely 'zero-dimensional', which is a zeroed linguistic alteration: The meaningful language 'three-dimensional' is zeroed.

(24) Linguistic alterations, because they are only linguistic alterations, cannot have conceptual meaning, and can only have the only alternative meaning, namely psychological meaning.

(25) Linguistically expressing, and mathematically expressing, that something is "zero-dimensional", including attempting to geometrically represent "it" via the aforementioned pictorialization, does not mean that there is such a thing, nor that there could be such a thing, nor that the concept of such a thing is coherent.

I-V

(26) "Extra-Spatial Dimensionality" is only mathematic-linguistic additive alteration: (a) There is no conceptualization, because there are no observable "extra spatial dimensions", and (b) there is no geometry (no pictorialization), because there is no pictorialization of "extra-spatial dimensions".

(27) The mathematic-linguistic additive alteration consists of using mathematic language that has meaning, namely 'three-dimensional', and altering it via additive mathematic-linguistic alteration to express "extra-spatial dimensions", namely 'four-dimensional', 'five-dimensional', etc.

(28) The expressed "four-dimensional", "five-dimensional", etc, are therefore only the language 'four-dimensional', 'five-dimensional', etc.

(29) Mathematic language that is arrived at in that way cannot have mathematic meaning, and instead has the only alternative meaning, namely psychological meaning.

(30) The dissociation, and linguistic alteration, are engaged in to create the psychological experience of accurate scientific discernment and accurate mathematic discernment.

(31) Aside, Randall states (Randall, 2006, p17):

" … let's think more about the meaning of the term "multidimensional space" ['multidimensional space']."

And she states (Randall, 2006, p18):

"Extra dimensions are other directions entirely. They are hard to describe, but they may be easier to understand by analogy."

She invokes *Flatland* for the analogy (Randall, 2006, p17-22; Closer To Truth, 2019), stating that, hypothetically, people who reside only in the "two-dimensional" cannot experience, nor understand, the three-dimensional, and that this is a basis to think that there may be "extra-dimensions" that we cannot experience nor understand.

"In 1884, to explain the notion of extra dimensions, the English mathematician Edwin A. Abbott wrote a novel called Flatland." "... in Flatland three dimensions are beyond its inhabitant's comprehension. Everyone thinks it is obvious that the universe holds no more than their two perceived dimensions." "It is not until A. Square has been lifted out of Flatland into the surrounding three-dimensional world that he can truly imagine a sphere." "... while he is still confined to Flatland, he watches a three-dimensional sphere travel vertically through his two-dimensional world." "... he sees a series of disks that increase and then decrease in size, which are slices of the sphere as it passes through A. Square's plane ..."

However, and momentarily ignoring what I have presented about "two-dimensional": It is implied that she assumes that the people who reside in the "two-dimensional" have "two-dimensional" vision, namely that they cannot look up, nor down, and that due to this, they cannot experience, nor understand, the surrounding three-dimensionality. However, there is no such kind of vision: The visual field of vision is always three-dimensional, even when one's eyes remain still. Even disease that produces spatial deficit, or regional blindness, cannot replicate the absence of superior quadrant vision, and inferior quadrant vision. As such, they could see three-dimensionality. Moreover: Regarding the aforementioned "... for the pages to be truly two-dimensional they would have to be infinitely thin slices with no thickness at all in the third dimension", this would entail that not only can nothing exist in the "two-dimensional", but that there is no "two-dimensional". And relatedly: Regarding the aforementioned sphere that A. Square visually observes, there actually would not be anything to observe because the "two-dimensional" does not permit "size" (for example, "slices"). Moreover: A "two-dimensional" person being "lifted" (moved upward) would not change anything for that person: The person would remain "two-dimensional", and concurrently experience only the "two-dimensional", regardless of where in the three-dimensional the person is. Moreover: The person is always in the

three-dimensional; and as such, moving the person upward would not result in the person becoming three-dimensional.

(32) Nima Arkani-Hamed, et al, invoke *Flatland* for the same purpose in "The Universe's Unseen Dimensions". (Arkani-Hamed, et al, 2000; p62, first paragraph; p69, final paragraph)

(33) Leonard Susskind invokes *Flatland* for the same purpose in *The Black Hole War: My Battle With Stephen Hawking To Make The World Safe For Quantum Mechanics*, at pages 234, 398, 400, 411, and 416-417. (Susskind, 2008)

(34) Paul Davies invokes *Flatland* for the same purpose in "Expanding The Universe" (Davies, 2005; p1161, first paragraph)

(35) Michio Kaku invokes *Flatland* for the same purpose in *Hyperspace: A Scientific Odyssey Through Parallel Universe, Time Warps, And The Tenth Dimension*, at pages 46-48, 55-61, 70-74, 76-77, 90-91, 96, 106, 180-181, 204, and 340-341. (Kaku, 1994)

(36) Carl Sagan invokes *Flatland* for the same purpose in *Cosmos* (Sagan, 1980) at pages 276-278; and in the television series, Cosmos: A Personal Voyage (Sagan et al, 1980-1981), he reconstructs an aspect of that discussion: At 0:52 to 1:07, he says, referring to what he refers to as "two dimensional" pieces of paper:

"Now, we have width and length, but no height at all. Now these little cut-outs have some little height; but let's ignore that: Let's imagine that these are absolutely flat."

Aside from what I discuss above about the issues that underlie his statement, I will add that his statement, "let's ignore that", is a request that the issues that underlie his statement be dissociated from.

I-V-I

(37) The prevalent theory that "extra-spatial dimensionality" is compacted (the theory of compactification), such that "extra-spatial dimensions" cannot be observed, nor measured, because they are too small, because they are "curled up on themselves" (for example, Greene, 1997, and Grana, 2006), (a) dissociates from spatial-dimensions what they formally are (that is, what their general nature is), namely that they are the pervasive spatial context of the universe, and non-physical, and (b) associates to "extra spatial-dimensions" a property that they do not have, namely that they are physical, and as such geometric, and as such of size and shape.

(38) Only physical existents can be curled up on themselves, etc.

(39) Spatial dimensions, as such, cannot be "curled up on themselves" (that is, compacted).

(40) "Extra-spatial dimensionality" is therefore a dissociative concept and associative concept, and as such cannot represent anything of the universe: Anything that is arrived at via dissociation cannot represent a facet of the universe, because the dissociation entails dissociating inextricably combined facets of the universe from one another. That is, dissociative concepts cannot represent facets of the universe because they are dissociations of the universe: Dissociation of the universe entails the absence of association with the universe.

(41) The dissociation and association are engaged in to produce the belief that novel fundamental facets of the universe have been uncovered.

(42) Aside: Randall above states: "Extra dimensions are other directions entirely", and adds that they are "... extra-dimensional passages", and adds the example, "... what he had was a device that moved in any direction,

so long as it was a direction in the three-dimensions", and that it "didn't really go any way "you can think of"". (Randall, 2006, p17-18) While she demonstrates that the "extra dimensions" that she discusses are, like three-dimensionality, spatial, she misbelieves that existents can move in only one of the spatial dimensions at a time. As I discuss above, existents are always three-dimensional; and as such, their movements are always three-dimensional, notwithstanding that they always move in a relatively greater degree of one or two of their dimensions. (It is not possible to move in a purely three-dimensional way, because movement has to be up, down, right, left, in, out, and possible combinations thereof, such as up-right, up-right-out, etc. However, existents can expand and contract in a purely three-dimensional way).

(43) Aside: Randall above states, regarding "extra-spatial dimensions": "They are hard to describe, but they may be easier to understand by analogy." She, nor the others who are mentioned above, describe them; and stating that they are "curled up on themselves", and unobservable, is not an even minimally complete description of them; and as I discuss above, no one has observed "curled up" spatial dimensions. Moreover, using mathematic language to represent them, which is the same as using the non-mathematic language 'fifth dimension', 'sixth dimension', etc, does not mean that there are such dimensions, as I discuss above.

I-VI

(44) Notwithstanding that the following has not yet occurred in mathematics and physics, it would be consistent with the aforementioned to engage in the negative linguistic alteration of expressing "negative spatial dimensions", such as "negative one-dimensional", etc.

(45) In this case, there would not be dissociation, because there would not be dissociation from the three-dimensional: "Negative spatial dimensions" are not stated to comprise the three-dimensional, and as such, cannot be dissociated from the three-dimensional. Instead, there would only be negative linguistic alteration via the use of 'negative'.

(46) "Negative" in this context would therefore have only psychological meaning: The linguistic alteration is engaged in to create the psychological experience of accurate scientific discernment and accurate mathematic discernment.

II

INFINITY

II–I

(1) Of course, "infinity" has never been observed, nor measured. ("Infinity", when "it" is the subject of meta-analysis, should always be quoted to indicate that nothing has yet been instantiated).

(2) "Infinity", according to the form of "its" own definition, cannot be observed, nor measured: "Infinity" (including "infinite", "infinitely", "infinities", "infinitesimal", etc) partly means unobservable and unmeasurable, and as such, precludes "itself". For example:

(3) There is nothing of the universe that can be observed, nor measured, to be "infinitely divisible", "infinitely extended", of "infinite distance away" ("infinite micro-distance away", and "infinite macro-distance away"), of "infinite size" ("infinite micro-size" ("infinitesimal"), and "infinite macro-size"), "infinitely continuous" (in minimization, and maximization), of "infinite speed", etc.

(4) The concept "infinity" is, therefore, actually an antonymic linguistic alteration of the term 'finite', and as such, can not represent a facet of the universe.

(5) "Infinity" is therefore only 'infinity', and therefore has no mathematic meaning, nor scientific meaning, and instead only psychological meaning.

(6) Linguistic alterations cannot represent facets of the universe.

II–II

(7) 'Infinity', in structure, actually means not finite, which does not convey the structure of its use, namely as greater than finite. As such, what is structurally accurate is 'superfinite'.

(8) Per *(1-6)*, 'superfinite' is actually an additive linguistic alteration of 'finite', and as such, does not represent a facet of the universe.

(9) There is a vast extent of mathematic language and non-mathematic language that can be structurally altered in the aforementioned ways; and that they can be altered as such does not entail that they must therefore represent facets of the universe.

III

ZERO

(1) Whereas there can be zero particular existents, phenomena, etc, there cannot be "zero itself": "Zero itself" has the same meaning as "nothing"; and for the reasons that are presented in IV about "nothing", there is no "zero itself".

(2) Therefore, "zero" is actually a dissociation, namely a dissociation from zero particular existents, phenomena, etc, such that it is believed that there is "zero itself". That is: Let 0x represent zero particular existents; and the 0 is dissociated from x.

(3) Anything that is arrived at via dissociation cannot represent a facet of the universe, because the dissociation entails dissociating inextricably combined facets of the universe from one another. That is, dissociative concepts cannot represent facets of the universe because they are dissociations of the universe: Dissociation of the universe entails the absence of association with the universe.

IV

NOTHING

(1) "Nothing" would be a region of the absence of universe, which is impossible:

(2) Anything that exists is universe; and there are no regions of the universe that are "non-universe".

(3) "Nothing" would be a region of "non-universe".

(4) Moreover, "non-universe" cannot be conceived of, and instead "it" is only 'non-universe', namely an antonymic linguistic alteration of 'universe', which as such is conceptually meaningless, and which instead has the only alternative meaning, namely psychological meaning.

V

PURE GEOMETRY

(1) The concept "Amplituhedron" (Arkani-Hamed, et al, 2013), namely an object of "pure positive geometry", is arrived at via conceptual dissociation of the geometry of an object from the object.

(2) However, geometry is not an existent. Conceiving of it as such is analogous to conceiving of the various properties of matter as existing in the universe without the matter. For example, temperature itself, weight itself, mass itself, color itself, spin itself, etc.

(3) Notwithstanding, what is arrived at via conceptual dissociation cannot represent a facet of the universe.

(4) What is further conceived is that the "pure geometry" is "positive geometry", namely that it is the causal source of the universe. That is, that the universe arose from the geometry that was imparted to it by Amplituhedra.

(5) However, since there is no geometry apart from geometric things, geometry cannot be a causal source.

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