

Catching Creatures

by
James R Warren

It is also worth noting that the expression 'Do there exist any so-and-sos?' is often equivalent to '*Are there* any so-and-sos?' Thus '*Are there* any dodos?' means the same as 'Do any dodos *exist*?', while '*Are there* any prime numbers between 25 and 30?' means the same as, 'Do any prime numbers between 25 and 30 *exist*?' Although there is a temptation to assume that 'things which exist' are necessarily *solid* items, standard uses of 'exist' do not justify us in thinking this way. Dodos, when they existed, could properly be described as 'solid' and it would make sense to speak of *capturing* a few - perhaps in a net. However in the case of prime numbers the idea of capturing them or failing to capture them - whether in a net or by any other means - makes no sense. Similarly, if someone were to ask, 'Are there (or do there exist) any duties which are totally overriding?' then, whatever the answer, there is no expectation that, if the answer is 'yes' one might capture some duties in a net. Similarly we may believe that there is a virtue in necessity or that there is safety in numbers without being committed to saying that virtue or safety are 'real entities' - a statement to which it does not seem possible to attach any sense.

Thus with avuncular charm and delicious insolence the psychologist and philosopher Tim Miles casts his gauntlet to whichever theologically-inclined mathematicians may be out there.

In "Speaking of God"¹, Tim asks us, like latter-day Corinthians, to put childish things aside and repudiate "Magnus", the autonomous sentience of tutelary Immanence as we move to a more adult appreciation of Godhead, the Essence of our own best Aspirations. My contention is that Tim's analysis is deeply flawed, but it is very gladly that I receive the gift of his richly-considered Testimony, which wrought with scholarship and humor, is a milestone contribution to postmodern theology and the evolving Quaker debate on doctrine.

Since 1931 even mathematicians have had to accept that certitude is not of earthly life and whilst I can adduce no Proofs it may be that if there can be Virtue even in Necessity then I can demonstrate that there is no Safety in Numbers, whether very little numbers, such as some Societies muster, or very big numbers, as some Churches boast. For whilst the rectitude of the individual eludes him, the error of the multitude is unanimous.

The epigraph gives you an inkling of "Speaking of God"'s conceptual density, adumbrating primality, existence, network, plenum and void in a mere 228 words. These concepts of primality, existence, network, plenum and void are so inextricably intermeshed that it would take another Euclid^a to abstract the axioms and build a systematic elaboration.

But before we may address these fascinating issues we must first discuss nothing, and in particular nothing at all.

One day in 1973 an undergraduate geologist doodled on his note-pad as he awaited the arrival of a friend in The Leamington Rooms^b. Euclid said that a point is that with no part and a line that which has extension without breadth. The student quickly determined that the most primitive zero-dimensional object has one vertex (point); the basic one-dimensional figure has two vertices and an edge (line); the fundamental two-dimensional object, three edges, three vertices, and one surface (triangle); and finally the basic three-dimensional solid, the tetrahedron, has four vertices, six edges, four faces and one volume.

Clearly these counts are the coefficients of polynomial expansions of $(x+1)^{d+1}$ where x is an arbitrary substrate and d the object's dimensionality, so that the indices of x denote the dimensionality of the component form.

For example, for the line:-

$$(x+1)^{1+1} = 1x^2 + 2x^1 + x^0$$

Equation 1

and for the tetrahedron:-

$$(x+1)^{3+1} = 1x^4 + 4x^3 + 6x^2 + 4x^1 + x^0$$

Equation 2

whilst by extrapolation the basic four-dimensional polytop sports five contained volumes, and ten faces with ten edges meeting at five points on its "periphery".

These expansions generate the Pascal triangle beloved of statisticians, but our interest centers upon that ever-present lowest-degree term whose coefficient is always unity and which characterises every dimension for it represents the very principle of geometrical nullity: The Void which inheres everywhere.

Even the poor old point, standing partless and apparently naked, marking position without inclusion, has his invisible partner standing forever at his side like some binary twin whose presence is betrayed only by subtle and eccentric nutations.

It is important to realise that x^0 is the "marker" of The Void, in some sense *descriptive* of nullity. Mathematically it is of course one so it is certainly not zero, which cipher is a recent concept, possibly of Indian origin, and at any rate unknown to The (European) Ancients. However, our Ancients certainly understood The Void and declared that "Nature abhors a vacuum", a view to which medieval Aristotelians assented, until Evangelista Torricelli began to develop its physical reality. Indeed, so far as such interpretations *can* make sense, it seems that Democritus and his Epicurean followers at Rome conceived of particles entirely filling available space even if this had to imply a crystalline ether in the superlunary wastes, a concept not wholly abandoned until the days of Relativity.

Dalton resurrected Democritus and particulate nature filled every interstice of the plenum until the probings of Wilson and Rutherford and the paradigms of Einstein corroded the concept of the solid. We now know that almost the entire volume of any atom is void: That its curtilage is patrolled by tiniest motes of matter, epicene in their indecision over whether they are bodily stuff or smeared energy: That the nucleus is composite: That the baryons of the nucleus are composite and that Absolute Nothingness is not just ubiquitous, but immanent.

So why shout "liar!" when John tells us that The Risen Christ walked through walls and locked doors, or Luke that He ate broiled fish and honeycomb, or vanished from the table at Emmaus?

Why balk at Resurrection when Christ Himself was casual to insouciance about the performance of what is clearly a technical procedure, whether by Himself or others? And The Ancients treat it as a common trick amongst both pagan holy men and secular physicians?

Tim makes much of both "the supernatural" and of the Post-Renaissance emergence of "the supernatural" as a concept to discredit "Magnus thinking" but he correctly notes that the idea was alien to The Ancients and the words "supernatural" and "non-material" are absent from The Bible. For clearly "the supernatural" is only the "unexplained" as that not assimilated to human understanding and accordingly "natural" or "scientific". Men who believe that a luminosity above a grave is the spirit of the departed or "Will of the Wisp" have not heard of fools' fire from the burning of carbon tetrahydride, the same phenomenon as takes place in any modern gas-fired kitchen.

Never mind The Answer: What is the question?

Tim makes much of "facts" and their influence on "Magnus thinking" but numbers do not exist in the realm of "solid items" and questions about the existence of dodos are qualitatively different and utterly incomparable with number theoretic statements. Existence itself is of several different species and if God created the dodo then man created the count.

Post-Classical European Science is based upon Mathematics, the art of systematic generalisation. Normal people call the selection and articulation of generalisations opinion. Ergo Science is opinion. So far so postmodern. But the fallibility of opinion cannot be used to disprove the creation or its contained creatures, for opinion itself is created. So what argument may be adduced to talk the Creator out of His Scheme, whether or not the Creator engendered The Universe in any materialistic sense?

We do not have to capture Categorical Imperatives in a net, for duties are defined by description not selection, as are Virtue and Safety.

If Resurrection is a reality then "when they existed" is a specious qualifier of dodos, for they persist, or shall regenerate, and maintain their arrestability and their elusoriness as ever they did.

The point of this argument is that when we speak of "solid" items of the kind we can capture "in a net" we have to remember that solidity is highly qualified, and to argue that only the "solid" can "exist" is not necessarily materialist. Conversely, it is neither an argument for or against "Magnus": the primitive omnipotent personal godhead satirised by Tim in his provocative little book.

There is another conception of nullity which is neither zero nor any reification, physical or metaphysical, of The Void. It is something known to mathematicians as The Empty Set $\{\emptyset\}$. It can be imagined as a

container with infinitely-thin glass walls and inside it is Literally None of the category of objects under discussion. If the category under discussion is "Life, The Universe and Everything" then The Empty Set, the contents of your magic glass box, is Literally Nothing At All. Note that this is *not* 0 (zero)^c and it is not x^0 (the void): It is $\{\emptyset\}$ (nothing at all). For example, consider the set of counting integers $n=0,1,2,3,4,5,\dots,1067,1068,\dots,\infty$. (This species of ∞ [infinity] is called \aleph_0 [aleph null], for a description of which see below). If a set contains 1, 6 and 7 it is clearly not empty if you are discussing a set of integers. And if it contains 0 and zero only it *is not empty* and is not The Empty Set $\{\emptyset\}$.

This implies that there are at least three different conceptions of nullity:-

(a) Denotative

This attaches a purely *nominal* label to nullity, i.e. 0 (zero), which is a purely practical convenience but enormously dangerous because careless people confuse it with "the real thing". My name means "the pursuivant domestic dog which guards the game" but were you to hire me to sire a race of mastiffs you would waste your money, however doggedly dutifully I may follow you.

(b) Descriptive

Description tries to *define* the subject implicitly by elaborating some or all of its *properties*. Set theory is a simple scheme of description which treats of association. The Empty Set $\{\emptyset\}$ attempts to describe pure non-association in terms of the wholly absent *constituting* nothing at all.

(c) Ipsitive

This is not symbolism but "the real thing" standing there in your face being itself. It has no need of names and no arts of description, whether scientific, graphic, plastic, literary or prophetic, can make it more or less real. Even x^0 is only a symbol, at some level both Unity and Vacancy, and even this only intimates a starker reality adumbrated by that undergraduate's theory of primitive figures.

The Ancients were very familiar with certain technologies which are obscure to us, or even forgotten. It is only in the last ninety years that informatic exigencies in the pressure of war have renewed human interest in the character of some things Ancients took for granted: The Filter and The Net.

The idea of capturing primes in a net makes eminent sense for that is how our father of primes, Eratosthenes^d first caught them. The Sieve of Eratosthenes² locates prime numbers by elaborating integral multiples, m_n , of $n=2,3,4,\dots,n_{\max}$ when n_{\max} ² is the largest integer of interest. For example, let n_{\max} ² be 25 for the largest multiplied number of 5. Then $m_2=4,6,8,10,12,14,16,18,20,22,24$ so that all even numbers (save 2) drop through the sieve: $m_3=6,9,12,15,18,21,24$ (24 again, because $24=2\times 3\times 4$): $m_4=8,12,16,20,24$: $m_5=10,15,20,25$. Any integers not listed are primes caught in the sieve, i.e. 1,2,3,5,7,11,13,17,19 and 23.

Nets and Filters are not always made of nylon, paper or gallium arsenide. Indeed the old thermionic valves that De Forest would have recognised were almost all vacuum ("the void", "nothing at all").

We have spoken of nets of the flesh and the mind. Perhaps it was a net of the spirit that The Preacher had in mind when he said:-

For man also knoweth not his time: as the fishes that are taken in an evil net, and as the birds that are caught in the snare; so are the sons of men snared in an evil time, when it falleth suddenly upon them.^e

Tim asks "Do any prime numbers between 25 and 30 exist?". I should explain to non-mathematicians that a prime number is a whole number which is only *integrally* divisible by itself and unity. Thus as above 1,3,5,7,11,13,17 and 23 are all prime, but so, uniquely for an even number, is 2. The primes are a subset of the set of counting integers, $\{n\}$. Why? Because we say so. To me, Tim failed to ask the really interesting question "Do any prime numbers between 14 and 16 exist?". Some would be astonished that a forty-six year-old doctor of philosophy might pose such a question: Some would merely be astonished that such a question was possible.

You see, the answer devolves about primacy in more ways than the obvious, because all our knowledge of prime numbers is of a second-level descriptive character: We cannot just call them "primes" and leave it nominally at that, for labels are only of value when the objects to which they adhere are manifest. On the other hand, we cannot behold the naked splendor of the *res* itself, since primes are neither corporeal or spiritual, being (as Kronecker would have had it) "works of man". You may as well can call "James Randolph Warren" any convenient name such as "Florence"

or "The Luguvalian" since all such appellations are only of interest in distinguishing the entity from similars whilst description is superfluous save for clinical or identificatory purposes.

Now we Europeans see Eratosthenes, Euclid and even Fermat^f as the pioneers of primes. With typical oracularity Euclid *declared* the prime to be "that which is measured by the unit alone", but the Chinese³ had priority over Eratosthenes by two hundred years when they *defined* the odd prime, p, using:-

$$w = \frac{2^{p-1} - 1}{p}$$

Equation 3

where $w=1,2,3,\dots,u_0$; any whole number.

The Chinese thought that they had defined the prime in the vulgar Western sense but what they had *actually* defined was a more general class of pseudoprimes, more plentiful than the primes, and yet also of infinite abundance.

For Cantor proved that just as nothingness comes in several different sorts so does boundlessness. u_0 (Aleph Null) is what you or I call ∞ (infinity), denumerable with matches to each natural number. u_1 is also infinite but yet denser and "more" than u_0 since it is the count of the functions of completed infinity.

Now Euclid proved the infinity of the primes, and yet since primes are clearly sparser and "fewer" than the counting numbers they boast an inferior sort of infinitude^g. Let us call the cardinality of primes u_1 .

Mercy is a sub-category of Love, so the natural theological implication is that whilst The Love of Christ is limitless yet it is more than what we could ever cope with. Therefore Christ offers instead his Mercy which is "less" than Love but equally infinite.

In fact it was AD1819 until the prior Chinese definition was *invalidated by accepted Greco-Roman criteria* when it was discovered that $2^{340}-1$ was exactly divisible by 341 (a European composite: $341=11 \times 31$) which is the first known pseudoprime. Since that discovery the Chinese Conjecture has been generalised to:-

$$w = \frac{n^{p-1} - 1}{p}$$

Equation 4

and whole swarms of new pseudoprimes have emerged from the interstices of the natural numbers, including 9,15,91,124 and others, numbers normally indubitably composite.

That which is crooked cannot be made straight: and that which is wanting cannot be numbered.^h

But Ecclesiastes was clearly no geometer and less an arithmetician!

Tim gave us "Magnus": the personal Almighty Father of Old Testament Creation and Magnus has spent three thousand years inculcating crude and even materialistic "Magnus thinking". Tim contrasts this with a gender-neutral, thoroughly postmodern, genius of collective consciousness "beyond theism and atheism", finite in time and collateral with, if not generated by, the human will. Tim does not dignify this latter creature with an appellation but for common convenience I christen him "Albertus" because I seem to remember from my boyhood reading of chemistry that Albertus Magnus discovered antinomy (or was it arsenic?).

But Tim's discrimination of these two godheads depends upon a valid distinction of Realism and Idealism and the implicit thesis that they are mutually-preclusive philosophies. My argument is that Albertus-Magnus is a non-concept which arises from a mistaken (but very sophisticated) vision of either/or logico-ideological exclusion. I am at pains to reassure hurried readers that my emphasis upon culture, history and the definitional integrity of primes elaborated above does *not* reinforce the postmodern manifesto of relativism and projection. It merely illustrates the way in which unknowables are cataphatically described by human thinkers. Such descriptions are for ever incomplete, erroneous, special or even self-referent, but this cannot prejudice the ipsitive reality of the *res* which such descriptions reflect. I am, if you will, proposing an inverse Platonic Cave in which the Forms mirror the Substance they shadow.

I think you agree that Tim and Jim have said enough for now. So let John have the Last Word:-

Simon Peter saith unto them, I go fishing. They say unto him, We also go with thee. They went forth, and entered into a ship immediately; and that night they caught nothing. But when the morning was now come, Jesus stood on the shore: but the disciples knew not that it was Jesus. Then Jesus saith unto them, Children, have ye any meat? They answered him, No. And he said unto them, Cast the net on the right side of the ship, and ye shall find. They cast therefore, and now they were not able to draw it for the multitude of fishes. Therefore that disciple whom Jesus loved saith unto Peter, It is the Lord. Now when Simon Peter heard that it was the Lord, he girt his fisher's coat unto him, (for he was naked,) and did cast himself into the sea. And the other disciples came in a little ship; (for they were not far from land, but as it were two hundred cubits,) dragging the net with fishes. As soon as they were come to land, they saw a fire of coals there, and fish laid thereon, and bread. Jesus saith unto them, Bring of the fish which ye have now caught. Simon Peter went up, and drew the net to land full of great fishes, an hundred and fifty and threeⁱ: and for all there were so many, yet was not the net broken. Jesus saith unto them, Come and dine. And none of the disciples durst ask him, Who art thou? knowing that it was the Lord. Jesus then cometh, and taketh bread, and giveth them, and fish likewise. This is now the third time that Jesus shewed himself to his disciples, after that he was risen from the dead.^j

References

- 1 "Speaking of God"
TR Miles 1998
William Sessions Limited of York
ISBN 1-85072-202-1
pp 111
(The epigraph is Paragraph 3: Page 21)
- 2 "Numbers, Their History and Meaning"
Graham Flegg 1983
Pelican Series
Penguin Books of Harmondsworth
ISBN 0-14-02.2564-1

- 3 "Think of a Number"
Malcolm E Lines 1990
Institute of Physics Publishing of Bristol
ISBN 0-85274-183-9
pp 163
(Pages 67 and 68)
- 4 "History of Mathematics"
David Eugene Smith 1923
Volumes I and II
Dover Publications Incorporated of New York
ISBN 0-486-20429-4
- 5 The Mathematical Gazette
V82:N495 November 1998
ISSN 0025-5572
(Page 378)

Notes

- a Euclid of Alexandria (born c365BC) compiled the thirteen books of The Elements, an exhaustive compendium of early Hellenistic mathematics, and the basis of numerical science until the 1820's AD.
- b The basement of The Faculty of Arts Building at The Victoria University of Manchester, England.
- c Confusion over notation persists, whether unconsciously or with specialist intention. Computerists (including I) usually write zero as \emptyset which can even be confounded with "cancelled naught" as illustrated in the elegant Proof of Divine Beatitude with which "Theologian" further enlivened the already uproarious pages of the latest Mathematical Gazette⁵:-

$$GO\emptyset D \times \underline{1} = GOD$$

$$\emptyset$$

∴ God is infinite good

- d Eratosthenes (276-198BC), (post-Euclid) mathematician and poet, was educated at Athens and taught at Alexandria University where he was librarian. He computed the circumference and diameter of the Earth by comparing the noontide zeniths of the Sun at Syene (Aswan) and Alexandria, towns known to be separated by 5000 stadia of longitude. Since the zeniths differed by $7^{\circ}12'$ it followed that the circumference of the planet was 250000 stadia or 24465.8 miles or 40030 kilometers, an error of 1.7%.
Plutarch reports that Eratosthenes gave the range of the Sun as 804 million stadia and the Moon 780 thousand. At a rate of 10.218356 stadia to the mile the respective errors are 18% (less at perihelion) and 313%.
- e Ecclesiastes 9:12
- f Pierre de Fermat (1608-1665), French jurist and mathematician, a student of Diophantus and the author of several great and fecund conjectures in number theory.
- g Galileo demonstrated the denumerability of the cubes of integers against the natural numbers so that in modern parlance the cardinality of integer cubes is also \aleph_0 . But readers should note that this Galilean correspondence depends upon there being a *systematic* way of locating integer cubes on the number line (i.e. a formula) reflected in predictable intervals between cubes. Since primes are dispersed randomly (despite *statistical* attenuation of density) along the natural number series it follows that one-to-one matches with integers cannot be made.
- h Ecclesiastes 1:15
- i 153 is pregnant both with number theoretic and numerological "meaning" based upon operations involving

three and has obvious Trinitarian implications.
It is the seventeenth triangular number.

j John 21:3;14