

The Psychodynamics of the Mathêmatika

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Introduction

In his book *Platonism and Anti-Platonism in Mathematics*, Mark Balaguer argues that the only viable philosophies of mathematics are *fictionalism* and *full-blooded Platonism*, but that no fact of the matter can decide between them.¹ Therefore we are free to accept full-blooded Platonism, which is the view, roughly speaking, that any consistent mathematical system is true, and therefore that their mathematical objects exist in a Platonic sense.² I will argue here that some of these mathematical objects have in addition an objective *psychological* reality, for they are rooted in the neurodynamics of the brain and structure human psychodynamics. They include the archetypal numbers, such as the Monad, Dyad, Triad, and Tetrad, and fundamental geometrical forms, such as circles, triangles, and mandala-like figures. I will argue that certain numbers, as innate, unconscious psychodynamical Forms inherent in the human psyche, have qualitative psychological effects in addition to the quantitative properties studied in mathematics. Indeed, this is the valid core of Pythagorean numerology, as found for example in the *Theologumena Arithmeticae* or *Theology of Arithmetic*.³ Therefore, a complete contemporary

¹ Balaguer (1998) 4–5; see also ch. 8.

² Balaguer (1998) 5.

³ The Greek text is cited by page and line number from the de Falco edition, henceforth *TA*. Translations are from Waterfield (1988) unless otherwise stated.

Platonic philosophy of mathematics must comprehend the inherent qualitative as well as the quantitative aspects of the archetypal numbers.

In fact, human perception of small numbers is just as innate as is our perception of shape, color, size, and spatial relation. In common with some other animals, we have an innate number sense; that is, we can directly perceive the number of objects in a group without explicit counting.⁴ For humans this is limited to six or seven objects unless the objects are arranged in a regular pattern. This skill is innate, for infants from four days to a few months old already exhibit number perception.

Recent neuroimaging studies have identified a region in the brain, in the right posterior parietal cortex, in which small numbers are represented.⁵ It is approximately rectangular, 2×3 cm in size, with the areas that respond to the numbers one to seven arranged in order. Similar regions have been found in non-human primates and crows, which also exhibit number perception.⁶ It has been established that these neurons are responding to the *numbers* of objects in a group, and not to other characteristics, such as their individual size, spatial extent, density, arrangement, shape, or total area.⁷

Our innate qualitative understanding of number also involves our direct perception of symmetry, which is exhibited by infants and some non-human animals. The most salient symmetry is *reflection* or *mirror symmetry*,⁸ but we also directly perceive other kinds of symmetry, such as *translation symmetry*, in which an object is repeated one or more times, and *rotational symmetry*.⁹

Carl Jung thought that the archetypal numbers are fundamental to depth psychology, but he assigned their investigation to Marie Louise von Franz. In her book *Number and Time* she explains that numbers are not mere quantities, but have four principal aspects: quantitative, geometric, algebraic, and qualitative.¹⁰ Each of the archetypal numbers has an individual character, but the first four numbers stand out for their rich psychological structure. Here I will address them in order, comparing their psychodynamical structure as archetypal numbers with their descriptions in the *Theologumena*.

⁴ Lakoff and Núñez (2000) ch. 1, 51. Butterworth (1999a) and (1999b) are popular introductions to the topic of innate arithmetic and numerosity. They appear to be identical, but the pagination is different.

⁵ Harvey, Klein, Petridou, and Dumoulin (2013). They identify the specific region as in the “posterior superior parietal lobule, centered at mean (SD) Montreal Neurological Institute *x,y,z* coordinates of 23 (4), –60 (7), 60 (7) (18),” in Brodmann area 7. There is a similar area in the left hemisphere, but it does not have an equally precise representation of numerosity.

⁶ Wagener, Loconsole, Ditz, and Nieder (2018).

⁷ Harvey, Klein, Petridou, and Dumoulin (2013).

⁸ Tyler (2002) 25, 26.

⁹ Tyler (2002) 12, 26–8.

¹⁰ von Franz (1974) 75–6.

Monad

We begin at the beginning. The Monad is paradoxical in its unity, as attested by both the *Theologumena* and depth psychology. For example, the *Theologumena* says that the Monad contains everything potentially, therefore it comprises many things that are opposed or contrary in actuality.¹¹ This paradoxical character is consistent with the Neoplatonic Ineffable One, but also with the Jungian Self (with a capital “S”), which is “the central core of the personality.”¹² Jung says that the Self “is absolutely paradoxical in that it represents in every sense thesis and antithesis, and at the same time synthesis”; it is “a union of opposites *par excellence*.”¹³

The *Theologumena* also calls the Monad dark and obscure,¹⁴ which is appropriate to both the Ineffable One and the paradoxical unconscious Self. It says the Monad is like the creative Chaos in Hesiod, in which all the unarticulated contraries are mixed in dark obscurity.¹⁵ Psychologically, the Monad represents a state of uncritical unconsciousness in which a person submits naively to circumstances.¹⁶ Nevertheless, this state is fertile; it wants to differentiate and develop.¹⁷ It is like the Monad, which generates itself and everything else out of itself.

The *Theologumena* compares the Monad to the principle of the universe (*kosmikos logos*)¹⁸ and to God as the source and regulator of everything.¹⁹ It is like Providence because it preserves all things.²⁰ So also the unconscious Self, which Jung calls the God-image within,²¹ regulates our psyches and guides our psychological development. Gary Sparks, a student of von Franz, says, “number is a prime representation of the spirit,”²² which “is pulling us forward through the various stages of our life until we fill our potential.”²³

The *Theologumena* continues that, as the form of forms, the Monad is called Creation (*tekhne*) on account of its creativity and is called Intellect (*noësis*) on account of its intelligence (*noëtikos*).²⁴ It also calls the Monad *Nous* because it contains all the ideas that govern the cosmos²⁵ and therefore encompasses everything conceptually within itself.²⁶ Psychologically, the ideas in the *Nous* are the transpersonal archetypes in the collective unconscious, which govern

¹¹ *TA* 3.1–11.

¹² Sparks (2010) 54n46.

¹³ Jung (*CW* 12) ¶22. Citation to Jung’s *Collected Works* (*CW*) are by paragraph number.

¹⁴ *TA* 5.18.

¹⁵ *TA* 5.16–19.

¹⁶ Sparks (2010) 105; von Franz (1974) 124.

¹⁷ Sparks (2010) 112.

¹⁸ *TA* 2.17.

¹⁹ *TA* 2.17–22.

²⁰ *TA* 2.20.

²¹ Jung (*CW* 11) ¶¶282, 757.

²² Sparks (2010) 50.

²³ Sparks (2010) 119.

²⁴ *TA* 2.22–4.

²⁵ *TA* 3.21–4.2.

²⁶ *TA* 4.4–7.

our psyches. The Self is the integrative center of the psyche, and the *Theologumena* says that by virtue of its unity the Monad imparts constancy, coherence, and harmony, and that in this respect it is like God.

Dyad

Next is the Dyad. Von Franz says that, as a preconscious dynamism the archetypal Dyad underlies division.²⁷ The *Theologumena* also calls the Dyad “division” and says it is the source of difference and inequality;²⁸ it says, “when the Monad manifests unification, the Dyad steals in and manifests separation.”²⁹ It compares the Dyad to daring (*tolman*) and impulse (*hormên*) because it has advanced into action; it is the first to separate from the Monad.³⁰

According to von Franz, as a “dynamic pattern of human thought,” the Dyad creates and symbolizes the many polarities of life.³¹ Likewise, the *Theologumena* calls the Dyad “opinion” because it contains both truth and falsity.³² Psychologically the Dyad represents “the process of facing and enduring conflict.”³³

By means of the Dyad, unconscious conflict, which is devoid of definite quality, becomes manifest in consciousness, which gives the conflict reality³⁴; therefore the Dyad also represents the transition to consciousness.³⁵ According to Jung, “Conscious perception means discrimination,”³⁶ and von Franz says, “Whenever a latent unconscious content pushes up into consciousness, it appears first as a twofold oneness.”³⁷

Moreover, *conscious* manifestation and *material* manifestation are closely related, for they both involve the appearance of relatively discrete, discontinuous, stable objects from a background of undifferentiated wholeness.³⁸ Both literally and metaphorically, figures emerge from the background by means of the Dyad. Therefore the *Theologumena* calls the Dyad “matter,” because it is “the source and foundation of the diversity of numbers.”³⁹

²⁷ von Franz (1974) 88.

²⁸ *TA* 11.19–20.

²⁹ Waterfield (1988) 42; *TA* 9.6–7.

³⁰ *TA* 7.20–8.1.

³¹ von Franz (1974) 89.

³² *TA* 8.1–2.

³³ Sparks (2010) 57.

³⁴ Sparks (2010) 67, 87.

³⁵ Sparks (2010) 63.

³⁶ Translated at von Franz (1974) 92.

³⁷ von Franz (1974) 93; see also 91–93.

³⁸ von Franz (1974) 94.

³⁹ Waterfield (1988) 41, 45.

The *Theologumena* says the Dyad is “the fount of flowing and liquidity,”⁴⁰ common metaphors for the flux of material reality, and it names the Dyad “Nature” because it has advanced into being from a seed principle.⁴¹ It also calls the Dyad “Rhea,” for she is the mother of the gods and nature, and also because the Dyad is the origin of the flux — *rhoê* — of material reality, and of *rhythmic* extension,⁴² for *rhuthmos* derives from *rheô* (to flow).⁴³

The *Theologumena* also says the Dyad is the first to separate from the Monad, and therefore it is the principle of linear extension and progression.⁴⁴ According to von Franz, the Dyad *repeats*, that is, it generates a translational or repetitive symmetry.⁴⁵ She says, “Considered as a rhythm of movement, the number two represents a repetition, in the form of an oscillation.”⁴⁶ Because, however, this is a simple oscillation between two states, a back and forth, there is no inherent direction to it; it looks the same forward or backward.⁴⁷ Although this progression is extended in both time and space,⁴⁸ actual forward direction comes with the Triad.⁴⁹

Von Franz tells us that the Dyad creates a tension between the opposites that demands release;⁵⁰ “duality seeks resolution in the third,”⁵¹ for the oscillation between the opposites is not pointless, but is seeking a synthesis.⁵² It is the confrontation of the conscious Dyad with the originally unconscious Monad that gives birth to the Triad, which brings the needed resolution.⁵³

Triad

According to von Franz, the Triad is a manifestation of the Ineffable One as a knowable unit, which would have been impossible without the polarity of the Dyad,⁵⁴ for the tension of the opposites restores the unity in a knowable form.⁵⁵ Enduring the conflict inherent in the Dyad precipitates a synthesis of the opposed elements, which is a step toward a “cohesive and non-split personality.” When the ego takes responsibility for the tension of the opposites, a resolution

⁴⁰ εὐπορίας καὶ χύσεως οὐσι πηγῇ (*TA* 8.21–9.1); Waterfield (1988) 42.

⁴¹ *TA* 13.15–17.

⁴² *TA* 14.7–9.

⁴³ LSJ s.v. ῥυθμός.

⁴⁴ *TA* 12.17–23.

⁴⁵ von Franz (1974) 74.

⁴⁶ von Franz (1974) 94.

⁴⁷ von Franz (1974) 96.

⁴⁸ Sparks (2010) 70; von Franz (1974) 97.

⁴⁹ von Franz (1974) 96–7.

⁵⁰ von Franz (1974) 98.

⁵¹ Sparks (2010) 70.

⁵² Sparks (2010) 56–7, 70–1, 88.

⁵³ von Franz (1974) 64, 96.

⁵⁴ von Franz (1974) 98.

⁵⁵ Sparks (2010) 87.

arises from the unconscious; it is given to us, not consciously crafted.⁵⁶ Therefore the Triad restores the lost unity,⁵⁷ and the *Theologumena* calls it *Harmonia* because it unifies the opposites.⁵⁸

The *Theologumena* also says that the Triad is the first number to actualize the potential of the Monad⁵⁹ and the first to signify totality, because it comprises beginning, middle, and end;⁶⁰ therefore it is the form of completion (*telesiourgias*).⁶¹ It also calls the Triad the manifestation of plurality and the first *actual* number because it is the first to be a system of units, the Monad and Dyad being roots or principles, not numbers.⁶² Von Franz agrees, saying “The number series thus begins with three.”⁶³

Von Franz also agrees with the Pythagoreans in seeing two series of numbers emanating from the Monad.⁶⁴ The odd numbers exhibit a centered structure, which focuses on a middle, and the even numbers have bilateral symmetry, which emphasizes polarity and opposition. She says that when the Dyad is recognized on the background of the primordial Monad, the axis of symmetry becomes salient and becomes the third that reveals the Triad.⁶⁵ Likewise, the *Theologumena* calls the Triad a *mean* because of its symmetrical relationship to opposed extremes of the same species.⁶⁶ Sparks says the Triad centers the opposed symmetries in the psyche and initiates a progression to a re-centered and stable personality.⁶⁷

Von Franz observes that the Triad is often associated with time.⁶⁸ Similarly, the *Theologumena* mentions the three parts of time: past, present, and future,⁶⁹ and says that every process partakes of the Triad in that it has three boundaries: beginning, peak, and end (*arkhên akmên teleuten*).⁷⁰ In contrast to the oscillation of the Dyad, which is reversible and has no inherent direction, the triadic process has a direction; increase followed by decrease is different from decrease followed by increase. Therefore the Triad imparts direction to the process initiated by the Dyad, for it is oriented in the past, present, and future.⁷¹

⁵⁶ Sparks (2010) 55, 57, 73, 87–8.

⁵⁷ von Franz (1974) 98.

⁵⁸ *TA* 19.18.

⁵⁹ *TA* 14.15–16, 16.8–9.

⁶⁰ *TA* 17.5.

⁶¹ *TA* 17.19.

⁶² *TA* 17.15–17.

⁶³ von Franz (1974) 103.

⁶⁴ von Franz (1974) 78–9.

⁶⁵ von Franz (1974) 64.

⁶⁶ *TA* 15.5–10.

⁶⁷ Sparks (2010) 56.

⁶⁸ von Franz (1974) 125.

⁶⁹ *TA* 17.10.

⁷⁰ *TA* 16.15.

⁷¹ *TA* 16.15, 17.10.

Von Franz says the Triad symbolizes the psychodynamical process by which a “totality symbol” emerges “in a temporal succession so that it does not congeal into a static symmetry or harmony.”⁷² She adds that “three signifies a unity which dynamically engenders self-expanding linear irreversible processes in matter and in our consciousness.”⁷³ Likewise Sparks says, “The three is the dynamism of development inherent in our conflicting pieces, but it is not activated ... until we begin investigating what and who those pieces in us are.”⁷⁴

Psychologically, as a resolution of the dualistic conflicts, the real Self can emerge, “the birth of true coherence, substance, and individuality,”⁷⁵ according to Sparks. However this realization, which arose from the unconscious, has in von Franz’ words, “been reconstructed through discursive thought processes, and, in this process, became temporally conditioned.”⁷⁶ Thus, timeless truths are understood discursively.⁷⁷

According to Jung, this flow of psychic energy is often associated with triadic underworld beings, indicating a connection to time and fate,⁷⁸ and the *Theologumena* associates the Triad with the Three Fates.⁷⁹ Psychologically, fate manifests in a correspondence of inner and outer events, dual realities coordinated by the Triad,⁸⁰ and the *Theologumena* similarly tells us that the Triad unifies and harmonizes opposites, in particular the heavenly and earthly worlds.⁸¹ Therefore the triadic stage of the psychological process is often characterized by synchronicities, that is, by meaningful coincidences between the inner and outer worlds.⁸²

Tetrad

We come now to the Tetrad. Von Franz says, “Jung devoted practically the whole of his life’s work to demonstrating the vast psychological significance of the number four.”⁸³ In Jungian psychology as in the *Theologumena* the Tetrad represents wholeness and embodiment.⁸⁴

The *Theologumena* says that there are four basic numerical qualities: sameness in the monad, difference in the dyad, surface in the triad, and solidity in the tetrad.⁸⁵ Likewise, at the

⁷² von Franz (1974) 109. See also Sparks (2010) 56, 88, 95; von Franz (1974) 104.

⁷³ von Franz (1974) 106.

⁷⁴ Sparks (2010) 95.

⁷⁵ Sparks (2010) 88.

⁷⁶ von Franz (1974) 125.

⁷⁷ von Franz (1974) 125–6.

⁷⁸ von Franz (1974) 104.

⁷⁹ ITA 52–3; TA 19.7–8; see also von Franz (1974) 104n12.

⁸⁰ Sparks (2010) 89–90.

⁸¹ TA 19.5–11.

⁸² Sparks (2010) 88–9.

⁸³ von Franz (1974) 115.

⁸⁴ Sparks (2010) 57.

⁸⁵ TA 25.14–16.

fourth psychological stage the Triad enters material reality and interacts with it.⁸⁶ The *Theologumena* says, “The tetrad is the first to encompass minimal and most seminal embodiment” (*sômatôsis elakistê kai spermatikôtatê*).⁸⁷ This is because the most elementary body is fire, which is shaped like a tetrahedron, which has four sides and four corners.⁸⁸

The Tetrad represents a new level of psychological integrity for, as the *Theologumena* tells us, the tetrahedron is “hard to dissolve” (*dusdialuton*);⁸⁹ it “binds everything in a pyramidal manner.”⁹⁰ The psychological goal is to integrate the multiplicity of the psyche into a new unity, in Sparks’s words, “a re-centered and stable personality.”⁹¹ As von Franz says, “the four acts as a stabilizer by turning back to the one.”⁹² Likewise, the *Theologumena* associates the Tetrad with Heracles because he is steadfast.⁹³

Von Franz says that the “difficult step” from the Triad to the Tetrad is “the progression from the infinitely conceivable to finite reality,”⁹⁴ because the Triad represents the fated pattern of one’s life, which has been made conscious, but the Tetrad seeks to actualize it in material reality, in one’s actual embodied life.⁹⁵ According to Sparks, the Tetrad represents a genuine selfhood that is accessible and open to outside influences, emotionally available, and humane.⁹⁶

To some extent, the psychological difference between the Triad and the Tetrad is the difference between the generic and the individual. The triadic stage involved the conscious recognition of universal truths from the collective unconscious, but at the tetradic stage we realize that they are necessarily grasped by finite, embodied, historical human beings. The insights and inspirations arising from the unconscious must be interpreted and explained using the time-bound discursive process of conscious thought.⁹⁷ In this way, according to Sparks, “we can both have and detach from our own ‘divine truth’, *and* enter into open conversation and productive self-reflection.”⁹⁸

The tetradic level of consciousness recognizes that although the triadic insights come as divine revelations, they are modified by individual conscious interpretation. Sparks says that the previously personal revelation is “accordingly reshaped, modified, humanized, relativized.” The ego therefore becomes the interpreter⁹⁹ and assumes the role of Hermes, whom the

⁸⁶ Sparks (2010) 96.

⁸⁷ Waterfield (1988) 57; *TA* 23.11–12.

⁸⁸ *TA* 23.12–16.

⁸⁹ *TA* 26.6.

⁹⁰ Waterfield (1988) 61.

⁹¹ Sparks (2010) 56.

⁹² von Franz (1974) 74.

⁹³ *TA* 28.1–2, 18–20.

⁹⁴ von Franz (1974) 122.

⁹⁵ Sparks (2010) 101–2.

⁹⁶ Sparks (2010) 98–9.

⁹⁷ von Franz (1974) 125–6.

⁹⁸ Sparks (2010) 108, emphasis in original.

⁹⁹ Sparks (2010) 106.

Theologumena identifies with the Tetrad, for he was commonly represented on four-sided herms¹⁰⁰ and was born on the fourth day of the fourth month.¹⁰¹

Although the triadic truths are timeless, they are reconstructed in a temporal context by time-bound discursive thought.¹⁰² At the triadic level we were certain of the universality of the triadic synthesis, but at the tetradic level we understand that these truths have to be relativized to *our* time and place.¹⁰³ We learn to separate their apparent absolute validity from our unavoidably subjective interpretation; Truth with a capital “T” is replaced by “my truth.”¹⁰⁴

Nevertheless, since our subjective conscious interpretation is faced with an objective unconscious, we must engage it through means such as dream interpretation and active imagination;¹⁰⁵ that is, theurgy.

The double opposition of the square immediately brings its center to our attention, and the centered square or quincunx has a special meaning, for it shows the Tetrad both as emergent from the Monad and as an articulated Monad.¹⁰⁶ Jung points to the Western alchemical tradition in which the centered square represents the quintessence in the center of the elemental square.¹⁰⁷ Von Franz says the *quinta essentia* “represents the most refined, spiritually imaginable unity of the four elements.”¹⁰⁸ The quincunx and the quintessence both point us toward the Pentad, but that is beyond the scope of this paper.

Conclusions

In conclusion, I’ve argued that numbers are not mere quantities and that the first four numbers, in particular, have rich qualitative structures; they are psychologically potent and numinous. Jung and the Jungians have explored these archetypal numbers, which have psychodynamical properties common to all people, for they are rooted in the human brain. These properties agree with many of the qualities of the archetypal numbers described in the *Theologumena Arithmeticae* and other traditional numerological sources. Therefore a complete Platonic philosophy of mathematics should include the interior, psychodynamical qualitative structure of the numbers as well as their external, formal quantitative structure. The numbers objectively exist, independent of our conscious construction, as potent forces in our psyches and as governors of our lives.

¹⁰⁰ *TA* 28.2–4.

¹⁰¹ That is, the month Hermaios in Argos. Kerényi (1995) 56–7.

¹⁰² von Franz (1974) 125.

¹⁰³ Sparks (2010) 104, 106.

¹⁰⁴ Sparks (2010) 102–3; von Franz (1974) 126.

¹⁰⁵ Sparks (2010) 103–4.

¹⁰⁶ von Franz (1974) 120–1, 124.

¹⁰⁷ von Franz (1974) 120–1.

¹⁰⁸ von Franz (1974) 120–1.

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