The Psychodynamics of the Numbers

Bruce MacLennan

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Introduction

Mathematical objects — numbers and geometric figures — pervade the Platonic tradition, from its Pythagorean roots through Plato himself and continuing on into Renaissance Neoplatonism.[1] Indeed, mathematical objects are paradigms of the Platonic Forms and mathematics provides the ladder for ascending to them.[2] Moreover, number has a spiritual dimension in Platonism, especially in its more Pythagorean manifestations. According to Syrianus and Iamblichus, Pythagoras said that number is the cause of gods, daimons, and divine things and is the root of their permanence (*diamonas*).[3] The spiritual dimension of numbers is not peculiar to the Platonic tradition, of course, for it is found in many cultures and spiritual traditions.[4]

In this paper I argue that certain archetypal numbers are rooted in human psychology and neurophysiology, and therefore that they have an objective psychological reality. This is not a new observation, but this paper provides a detailed comparison between the arithmology in a particular Neoplatonic text and the psychodynamical aspects of the numbers revealed by Jungian analytical psychology. The text in question is the anonymous *Theologumena arithmeticae* (*Theology of Arithmetic*),[5] which is dated to the mid-fourth century CE.[6] It was sometimes attributed (incorrectly) to Iamblichus, but is in fact a compilation of extracts from Nicomachus' *Theologumena*

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[1] E.g., *Timaeus*, *Republic*, *Laws*, *Meno*, *Critias*.

[2] Ascending from *dianoia* to *noêsis* in *Rep*. bks. 6, 7. Only dialectic can reach the first principle, but the eye of the soul must first be opened by her handmaids, the mathematical sciences (*R*. 7.533a,c–d).

[3] Laks & Most (2016) 18R46.

[4] E.g., Feuerstein (1994), Schimmel (1993). Von Franz (1974) discusses the numerical archetypes with evidence from several cultures.

[5] 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.

[6] Waterfield (1988) 23.

arithmeticae, otherwise surviving only as a summary in Photius' *Biblioteca* 187, and of extracts from Anatolius' *De decade*, as well as other material.[7]

In this paper I will argue that certain mathematical objects, in addition to their mathematical existence, have an objective *psychological* reality, for they are rooted in the neuropsychology of the brain and structure human psychodynamics. These are the mathematical objects that are potent and numinous in human experience and 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 further that the archetypal numbers, as innate, unconscious psychodynamical Forms inherent in the human psyche, have qualitative psychological properties in addition to the quantitative properties studied in mathematics. Indeed, this is the valid core of Pythagorean arithmology, as found in the *Theologumena* and similar texts. Therefore, a complete contemporary Platonic philosophy of mathematics should comprehend the inherent qualitative properties of the archetypal numbers in addition to their more familiar quantitative properties.

The connection between psychology and the spiritual aspects of mathematics is provided by the archetypes of the collective unconscious, which C. G. Jung investigated. He observed that below our personal unconscious minds, with its content derived largely from individual experience, our unconscious minds have a common collective level, with content derived from our evolution as a species. Jung borrowed the term "archetype" from Neoplatonism[8] and connected the archetypes with the Platonic Forms insofar as they have psychological effects. He said, for example, "'Archetype' is an explanatory paraphrase of the Platonic εἶδος,"[9] and he defined the archetypes as "active living dispositions, ideas in the Platonic sense, that preform and continually influence our thoughts and feelings and actions."[10]

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[7] Waterfield (1988) 23; O'Meara (1989) 15n24.

[8] Jung (*CW* 9, pt. 1) ¶5 cites its use by Plotinus, Philo Judaeus, Irenaeus, pseudo-Dionysius, and the *Corpus Hermeticum*. Citations to Jung's *Collected Works* (*CW*) are by paragraph number.

[9] Jung (*CW* 9, pt. 1) ¶5.

[10] Jung (*CW* 8) ¶154.

In his later writings, Jung stressed that the archetypes are not innate images, but unconscious dynamical forms that regulate cognition and behavior. As innate structures in the psyche, Jung compared the archetypes with the instincts, which may be defined as inherited patterns of behavior and cognition: "To the extent that the archetypes intervene in the shaping of conscious contents by regulating, modifying, and motivating them, they act like the instincts."[11] Anthony Stevens, a Jungian analyst, has explored at length the archetypes as the unconscious psychical aspects of the instincts.[12] When activated by an associated *releasing stimulus* (which might be internal), the archetype begins to regulate conscious perception, motivation, affect, and cognition in order to fulfill its biological function. These releasing stimuli, which may be either innate or learned, are experienced as numinous symbols on account of their ability to activate an archetype. The archetype itself is unconscious, but can be investigated through its effects on conscious experience.

"The concept of the archetype," according to Jung, "is derived from the repeated observation that, for instance, the myths and fairytales of world literature contain definite motifs which crop up everywhere."[13] As universal aspects of human psychology, the archetypes are the wellspring from which arise the pantheons of the world's religions.[14] Indeed, through its influence on conscious perception, motivation, affect, and cognition, an activated archetype can quite literally possess a person, disposing them to behave in accord with the archetype's biological function, that is, to achieve its ends.[15] The Jungian practice of *active imagination* and Neoplatonic theurgy both use symbols to activate archetypal figures, which behave as independent personalities, permitting the practitioner to interact with them.[16] The *Chaldean Oracles* and Jung's *Red Book* are comparable products of these theurgical practices.[17] When archetypal images and themes appear in

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[11] Jung (*CW* 8) ¶404.

[12] Stevens (2003). See also Sabini (2000).

[13] Jung (*CW* 10) ¶847.

[14] MacLennan (2003).

[15] von Franz (1980), MacLennan (2006a).

[16] Jung (1997), MacLennan (2005, 2006b).

[17] Jung (2009). Kingsley (2018) emphasizes the prophetic character of the *Red Book* and of its production, observations that strengthen the comparison with the *Chaldean Oracles*.

dreams or in active imagination, they may be *amplified* by association and by comparison with myths and symbols from various cultures, which provides evidence for their archetypal character and significance.[18]

As innate aspects of the human psyche, the archetypes are rooted in our neurophysiology. Jung says, "the biological instinctual psyche, gradually passes over into the physiology of the organism and thus merges with its chemical and physical conditions."[19] This does not make the archetypes any less real; on the contrary, they are phenomenologically objective, that is, publicly verifiable stable phenomena of human experience.[20] They can be investigated through *neurophenomenology*, that is, through a combination of experimental phenomenology and neuroscience.[21] To date, the archetypes have been investigated primarily through phenomenology and psychoanalysis, including dream analysis, active imagination, and amplification, but progress in neuroscience may allow us to discover the neurophysiological processes underlying the archetypes.

Numbers as Archetypes

To understand the universal qualitative aspects of the archetypal numbers, it is necessary to make a short digression through the neuropsychology of number. 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.[22] For humans this is limited to six or seven objects unless the objects are arranged in a regular pattern. We can also perceive numerosity in sound or light sequences up to three or four.[23] In general, our number perception is correct up to four, and its accuracy decreases linearly up to about eight; reaction time is

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[18] Jung (1983) 413.

[19] Jung (*CW* 8) ¶420.

[20] MacLennan (2003).

[21] MacLennan (2019).

[22] 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 with different pagination. For a dissenting view, see Núñez (2017) and a reply by Nieder (2107).

[23] Lakoff and Núñez (2000) 16, 21–22.

about 600 milliseconds up to four objects and increases linearly to 800 milliseconds for about seven objects.[24] These are not learned skills, for infants from four days to a few months old already exhibit number perception;[25] they also exhibit *innate arithmetic*, that is, the ability to recognize sums and differences, for numbers up to three or four.[26]

Recent neuroimaging studies have identified a region in the brain, in the right posterior parietal cortex, in which small numbers are represented.[27] It is approximately rectangular, 2×3 cm in size, with the areas that respond to the numbers one to seven arranged in order; more area is devoted to the smaller numbers, which are represented with greater accuracy. Similar regions have been found in non-human primates and crows, which also exhibit number perception.[28] It has been established that these neurons are responding to the *number* of objects in a group, and not to other characteristics, such as their individual size, spatial extent, density, arrangement, shape, or total area.[29]

In addition to this innate direct perception of *numerosity*, the number of objects in a group, we can also perceive *equinumerosity*, the one-to-one correspondence between the objects in two groups, up to about sixteen.[30] In addition, by the age of fifteen months, infants understand numerical order.[31]

Our innate qualitative understanding of number also involves our direct perception of symmetry, which is exhibited by infants and some non-human animals.[32] The most salient symmetry is *reflection* or *mirror symmetry*, which can be recognized in 100 milliseconds.[33] A

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[24] Lakoff and Núñez (2000) 19–20.

[25] Lakoff and Núñez (2000) 16.

[26] Lakoff and Núñez (2000) 15–18.

[27] 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.

[28] Wagener, Loconsole, Ditz, and Nieder (2018).

[29] Harvey, Klein, Petridou, and Dumoulin (2013).

[30] Crossley (2007) 82.

[31] Lakoff and Núñez (2000) 18.

[32] Tyler (2002) 25.

[33] Tyler (2002) 14, 26.

possible evolutionary explanation of its salience is that it often betrays the presence of an animal, for animals have external bilateral symmetry to facilitate motion and perception on the surface of the earth.[34] Moreover, perceiving a mirror symmetry, such as paired eyes, can indicate that you are the focus of attention of another animal, which is important for survival.[35] Vertical axes of symmetry are the easiest to perceive, but reflections across other axes are also easily perceived in context.[36] In addition we are able to perceive directly other kinds of symmetry, such as *translation symmetry*, in which an object is repeated one or more times, and *rotational symmetry*.[37]

So far, we have considered our innate ability to *perceive* certain small numbers and symmetries, but we also have the ability to *imagine* them. For example, we can easily imagine regular arrangements of small numbers of objects. We find these in the Pythagorean *figurate numbers*, in which some number of dots are arranged in a triangle, square, rectangle, pentagon, or other shape; they exhibit mirror, rotation, and translation symmetry. I believe we can easily visualize figurate numbers up to about nine, and higher numbers in a few special cases such as twelve, sixteen, and twenty. Other common ways of imagining numbers are as regular convex polygons, such as pentagons and hexagons, and regular star polygons, such as pentagrams and hexagrams. I think these are easily visualized up to about eight. These natural and probably innate ways of visualizing numbers are their archetypal images.

In summary, we have neuropsychological evidence for an innate rudimentary unconscious understanding of small numbers and of arithmetical relations among them. Therefore we have an immediate grasp of these relations, which structures the corresponding numerical archetypes. At this time, however, neuropsychology is limited in what it can tell us about these archetypes, and much of what we know comes from Jungian psychoanalytic techniques, which will be our focus.

Psychologically, besides the passive aspects that we have considered so far, the archetypal numbers have active aspects. In their passive aspect, numbers appear as archetypal images in perception and

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[34] Tyler (2002) 4–6.

[35] Tyler (2002) 8.

[36] Tyler (2002) 31, 44.

[37] Tyler (2002) 12, 26–28.

imagination, but like other archetypes, the numbers are fundamentally subconscious dynamical forms that regulate perception, affect, motivation, and behavior. That is, the archetypal numbers are psychodynamically active, which will be a central topic in this article.

How far can we extend this account of the archetypal numbers? Some people argue that the archetypal numbers do not extend beyond the Tetrad.[38] Based, however, on neuropsychological evidence and the numerological tradition, I'm inclined to think they extend a bit larger, but are likely encompassed in the Decad, or perhaps the Dodecad.

Jung considered the archetypal numbers to be fundamental to depth psychology, remarking that number "may well be the most primitive element of order in the human mind."[39] He assigned their investigation to Marie-Louise von Franz, and in her book *Number and Time* she explains that numbers are not mere quantities, but have four principal aspects:[40]

I. Quantitative
II. Geometric
III. Algebraic
IV. Qualitative

Qualitatively, each of the archetypal numbers has an individual character.[41] She quotes Henri Poincaré, who said, "Every whole number is detached from the others, it possesses its own individuality, so to speak."[42] The first four numbers in particular stand out for their rich archetypal structure. Karl Menninger claims that in all languages the words for one to four are etymologically adjectives, implying that they are qualities, but the words for larger numbers are not adjectives.[43] Likewise, von Franz claims, Plato recognized the archetypal character of these numbers by using substantives in -ας such as *monas*, *duas*, *trias*, *tetras*.[44] Theon of Smyrna says these words name the intelligible principles of the sensible numbers, the latter

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[38] Crossley (2007) 82.

[39] Jung (*CW* 8) ¶870.

[40] von Franz (1974) 75–76.

[41] von Franz (1974) 60–61, 101n1.

[42] von Franz (1974) 60.

[43] Menninger (1992) 18–32. See also von Franz (1974) 114–115.

[44] von Franz (1974) 67n19; *Phaedo* 101C3–4, 105C10.

denoted by adjectives such as *hen*, *duo*, *tria*, and *tettares*.[45] The difference is between essence and quantity.

There is no explicit ontology of numbers in the *Theologumena*, but some relevant aspects of it can be inferred from Nicomachus and Iamblichus.[46] Ordinary "scientific" (*epistêmonikos*) mathematics was discussed in the "minor arithmetics," such as Nicomachus' surviving *Introduction to Arithmetic*, Iamblichus' *On Pythagoreanism* IV, and Anatolius' *Arithmetical Introductions* (surviving only in fragments). These dealt with mathematics as intermediate between the sensibles and the Forms and reflect mathematics as a ladder to draw the inner eye up to pure being. However, Nicomachus seems to have taken the Numbers themselves as prior to the Forms and indeed as their principles, the highest form of being. The Forms then are properties or characteristics of the Numbers and subordinate to them. These divine Numbers (transcending the intelligible, ideal numbers) were treated in the "major arithmetics," such as his *Theologumena*, Anatolius' *De decade*, the Pythagorean *Sacred Discourse*, Iamblichus' *On Pythagoreanism* VII,[47] and our anonymous text, where the numbers are assimilated to gods and apprehended through "higher insight" (*kata kreittous ennoias*).[48] As a consequence, the higher arithmetic serves the role of dialectic in Plato's *Republic*.

Von Franz says that, like other archetypes, the numbers manifest distinctly in consciousness, but that they interconnect and interpenetrate each other in the unconscious. She calls each a *hen-to-pan* to signify that each number is an aspect of the numbers as a whole; they are all differentiated aspects of the *One-continuum*.[49] The natural numbers are genuine symbols, pregnant with meaning, capable of activating the archetypes from which they emanate.[50] They have inherent dynamism for, like all archetypes, they are innate forms of activity.[51] Likewise, they are autonomous, for the archetypes can

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[45] Theon Smyrnaeus, *Exp. rerum math.* (Hiller) 20, 5–11. See also Kalvesmaki (2006) 286, 290.

[46] Here I follow O'Meara (1989) 16–22, 76–85.

[47] O'Meara (1989) 76–85.

[48] O'Meara (1989) 228–229, quoting Iamblichus in Psellus.

[49] von Franz (1974) 62, 65–66.

[50] von Franz (1974) 73–74.

[51] von Franz (1974) 73–74.

behave like independent beings,[52] and thus it is not unreasonable that the *Theologumena* identifies numbers with gods, or that gods descend from the *henads*. Therefore, von Franz says, "each number must be thought of as containing a specific activity that stands forth like a field of force."[53]

Each of the archetypal numbers has an individual character, but the first four numbers are preeminent for their rich psychological structure. Psychologically, according to von Franz, "One comprises wholeness, two divides, repeats, and engenders symmetries, three centers the symmetries and initiates linear succession, four acts as a stabilizer by turning back to the one as well as bringing forth observables by creating boundaries."[54] In this article I will address them in order, comparing their psychodynamical structure as archetypal numbers with their descriptions in the *Theologumena*. Certainly, some of the associations in this text are based on false etymologies and simple numerical relationships, but we will see there is a core of insight into the archetypal numbers.

It is reasonable to ask whether any similarities between Jungian descriptions of the archetypal numbers and their symbolic meanings as presented in the *Theologumena* and related texts is a consequence of Jung's and von Franz's familiarity with these sources. Although it is reasonable to suppose that Jung was acquainted with them, there are no direct references to the *Theologumena* in the twenty volumes of Jung's *Collected Works*, nor are there references to Theon Smyrnaeus, to Anatolius, or to Nicomachus' *Arithmetic*.[55] Likewise, von Franz does not cite these works. There are indeed numerous references in both authors to Pythagoras and to Pythagorean and neo-Pythagorean ideas from other sources. These, along with arithmological parallels from non-European cultures, provide material for Jungian amplification, that is, for exploring the archetypal structure of the numbers revealed by analysis.

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[52] von Franz (1974) 74.

[53] von Franz (1974) 75.

[54] von Franz (1974) 74.

[55] In the context of discussing hermaphroditic deities from several cultures, Jung (*CW* 12) ¶436n41 does cite Zeller on Nicomachus' statement that God is odd-even and thus male-female (see the discussion of the Monad below).

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.[56] This paradoxical character is consistent with the Neoplatonic Ineffable One, but also with the Jungian Self, which is "the central core of the personality"; that is, "our inborn individuality *and* the process by which that individuality seeks to be realized in our life."[57] 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*."[58] Moreover the Self is an *unconscious* unity, a wholeness without reflection.[59]

Since, according to the *Theologumena*, the Monad contains everything potentially, including all the things that are opposed in actuality,[60] it even produces the Dyad.[61] In particular, the *Theologumena* says the Monad is called "Androgyne" (*arsenothêlun*), for it is considered neither odd, that is, male, nor even, that is, female.[62] As the seed of all the numbers, it is neither male nor female, because the seed precedes differentiation of the sexes.[63] The Monad is thus both father and mother and as such it is also the principle of both the form and the matter in everything.[64] Depth psychologists likewise say the Self is hermaphroditic and compare it to the spherical original humans in Aristophanes' myth in the *Symposium*.[65]

The *Theologumena* calls the Monad dark and obscure,[66] which is appropriate to both the Ineffable One and the paradoxical Self. It says the Monad is like the creative Chaos in Hesiod, in which all the

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[56] *TA* 3, 1–11.

[57] Sparks (2010) 54n46.

[58] Jung (*CW* 12) ¶22.

[59] Sparks (2010) 60, 94, 105.

[60] *TA* 3, 2–5.

[61] *TA* 5, 14.

[62] *TA* 3, 21 – 4, 1; 4, 17 – 5, 2.

[63] *TA* 5, 5–10. See Waterfield (1988) for an emendation of de Falco's text here.

[64] *TA* 5, 2–5.

[65] Stevens (2003) 113, 226.

[66] *TA* 5, 18.

unarticulated contraries are mixed in dark obscurity.[67] Because the Monad contains everything, it can be called the receptacle of all (*pandokheus*), and therefore the matrix (*gonê*).[68] Thus it is also called matter (*hulê*) because it is the source of the Dyad, which is more properly called matter.[69] Psychologically, the Monad represents a state of uncritical unconsciousness in which a person submits naively to circumstances.[70] Nevertheless, this state is fertile; it wants to differentiate and develop.[71] According to the *Theologumena* the Monad generates both itself and everything else out of itself,[72] for it is self-producing and self-sufficient.[73] It adds that the Monad contains everything in potential form,[74] and therefore the Pythagoreans call it "Proteus," since he could assume any form.[75] Likewise the Self "embraces both consciousness and unconscious,"[76] including all the archetypes. No matter how much of the Self is brought to consciousness, "there will always exist an indeterminate and indeterminable amount of unconscious material."[77]

Psychologically, as the beginning of the natural number series, the Monad is a metaphor for the beginning of anything.[78] The *Theologumena* compares it to the principle of the universe (*kosmikos logos*)[79] and to God as the source and regulator of everything.[80] It is like Providence because it preserves all things.[81] So also the unconscious Self, which Jung calls the God-image within,[82] regulates our psyches and guides our psychological development. "The self is

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[67] *TA* 5, 16–19.
[68] *TA* 5, 13, 20.
[69] *TA* 5, 16–19.
[70] Sparks (2010) 105; von Franz (1974) 124.
[71] Sparks (2010) 112.
[72] *TA* 2, 15–17.
[73] *TA* 3, 17–18.
[74] *TA* 1, 8–10; 3, 3–5.
[75] *TA* 7, 10–13.
[76] Jung (*CW* 12) ¶44.
[77] Jung (*CW* 7) ¶274.
[78] Lakoff and Núñez (2000) 75.
[79] *TA* 2, 17.
[80] *TA* 2, 17–22.
[81] *TA* 2, 20.
[82] Jung (*CW* 11) ¶¶282, 757.

our life's goal," according to Jung, "for it is the completest expression of that fateful combination we call individuality."[83] Thus J. Gary Sparks, a student of von Franz, says, "number is a prime representation of the spirit,"[84] which is the dynamical aspect of the Self that "is pulling us forward through the various stages of our life until we fill our potential."[85]

The *Theologumena* explains that, as the form of forms (*eîdos eidôn*), the Monad is called Creation (*tekhnê*) on account of its creativity and is called Intellect (*noêsis*) on account of its intelligence (*noêtikos*).[86] As a creative principle, the Monad contains everything, but it does not deviate from its own principle, and so it is called "Atropos" after the Fate whose name means "the one who cannot be turned."[87] Similarly it is called Prometheus — commonly interpreted as Forethought — on the basis of an alternative etymology meaning that it does not outrun its principle.[88]

The *Theologumena* calls the Monad *Nous* because it contains all the ideas that govern the cosmos[89] and therefore encompasses everything conceptually within itself.[90] It imparts sameness and constancy to the knowledge in the Nous.[91] The *Theologumena* also identifies the Monad with moral wisdom (*phronêsei*), because what is correct is one.[92] Anatolius remarks that the Pythagoreans call the Monad *Nous* and liken it to The One itself (*tô heni autên*), the intelligible god (*tô noêtô theô*), the uncreated (*tô agennêtô*), Beauty itself (*autokalô*), the Good itself (*autoagathô*), and—among the virtues—the wisdom (*phronêsei*) of The One.[93] Psychologically, the ideas in the Nous are the transpersonal archetypes in the collective unconscious, which govern our psyches and are aspects of the Self.

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[83] Jung (CW 7) ¶404.

[84] Sparks (2010) 50.

[85] Sparks (2010) 119.

[86] *TA* 2, 22–4.

[87] *TA* 4, 8–9.

[88] *TA* 4, 12–15.

[89] *TA* 3, 21–4.2.

[90] *TA* 4, 4–7.

[91] *TA* 4, 3–4.

[92] *TA* 6, 5–6.

[93] Anatolius, *De decade* (Heiberg) 29, 19–22. Cf. *TA* 6, 3–6.

The Self is the integrative center of the psyche.[94] The *Theologumena* says that by virtue of its unity the Monad imparts coherence and harmony, and that it is in this respect like God; as a ruling principle, it is sun-like.[95] The Pythagoreans placed the Monad in the center of the cosmos, like the hearth, as a principle of equilibration,[96] and said it is called *Monas* because it is stable and remains (*menein*).[97] Psychologically, the number one symbolizes wholeness and integrity.[98]

Von Franz explains that the Monad has two aspects, one as the all-inclusive *hen-to-pan*, the other as a unit in a multiplicity.[99] The Monad is unitary, but it becomes many through a kind of *kenôsis* (emptying), by which it becomes the units constituting a multitude.[100] From an all-comprehending wholeness emerge empty units; the Monad gives up its individual quality to become quantity. The *Theologumena* says that there is one Monad with respect to form (*eidei*), but it produces many monads with respect to quantity (*megethei*).[101] Similarly, the Gnostic Marcus refers to the All-one as *Monotês* and the numerical unit has *Henotês*,[102] and Theon of Smyrna said the difference between the Monad and One was similar to that between number (*arithmos*) as intelligible form and numerable thing (*arithmêton*) as sensible unit.[103] Martianus Capella and Favonius Eulogius likewise distinguished the Monad either as *numerus* or as *numerabile*.[104] (Nevertheless, *monas* and *hen* were often used variably and inconsistently in the Platonic tradition.[105])

Psychologically, this double aspect of the Monad implies that it is the Dyad *in potentia*,[106] but that the Indefinite Dyad is required to split or

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[94] Jacobi (1967) 31. Jung (*CW* 12) ¶44 calls it both center and circumference.

[95] *TA* 3, 13–17.

[96] *TA* 6, 16–18.

[97] *TA* 1, 4–5.

[98] Lakoff and Núñez (2000) 75.

[99] von Franz (1974) 62.

[100] von Franz (1974) 62.

[101] *TA* 2, 15–17.

[102] von Franz (1974) 62–63n7, 90n18.

[103] Theon Smyrnaeus, *Exp. rerum math.* (Hiller) 19, 14. See also Kalvesmaki (2006) 285.

[104] Robbins (1921) 120n2.

[105] Kalvesmaki (2006) Excursus B.1.

[106] von Franz (1974) 90n18.

double the Monad and to create the units.[107] This is why the Triad is the first odd number, for the Monad is, properly speaking, prior to the numbers.

Dyad

According to von Franz, the effect of the Dyad is to divide, to repeat, and to engender symmetries;[108] we will consider each.

To begin, the *Theologumena* calls the Dyad "division" and says it is the source of difference and inequality.[109] Similarly, according to von Franz, as a preconscious dynamism, the archetypal Dyad underlies division.[110] Indeed she cites Plato and the Pythagoreans in describing the Indefinite Dyad as the active principle that divides or doubles the Monad and creates a definite Dyad.[111] As the *Theologumena*[112] says, "when the Monad manifests unification, the Dyad steals in and manifests separation."[113] Karl Menninger likewise observes that polarities, such as male/female, right/left, and day/night, retain a strong element of underlying unity; therefore, opposition and unity are bound together in the Dyad.[114]

The *Theologumena* compares the Dyad to daring (*tolman*) and impulse (*hormên*) because it has advanced into action;[115] it is the first to separate from the Monad[116] and is called movement and change.[117] According to von Franz, as a "dynamic pattern of human thought," the Dyad creates and symbolizes the many polarities of life.[118] Similarly, the *Theologumena* calls the Dyad "opinion" (*doxa*) because it contains both truth and falsity.[119] Psychologically the Dyad represents "the

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[107] von Franz (1974) 97.

[108] von Franz (1974) 74.

[109] *TA* 8, 3; 11, 19–20.

[110] von Franz (1974) 88.

[111] von Franz (1974) 63.

[112] *TA* 11, 19–20.

[113] *TA* 9, 6–7.

[114] Menninger (1992) 13; see also von Franz (1974) 93–94n33.

[115] Waterfield (1988) 42; *TA* 9.6–7.

[116] *TA* 7, 20 – 8, 1.

[117] *TA* 8, 2–3.

[118] von Franz (1974) 89.

[119] *TA* 8, 1–2.

process of facing and enduring conflict."[120] This is a fundamental human experience, and the basal ganglia deep in the brain seem to be where alternative actions are subconsciously weighed and ultimately chosen.[121] When on the horns of a dilemma, that uncomfortable feeling of suspense is part of the psychological experience of the Dyad. By means of the Dyad, unconscious conflict, which is devoid of definite quality, becomes manifest in consciousness, which gives the conflict reality;[122] therefore the Dyad also represents the transition to consciousness.[123] According to Jung, "Conscious perception means discrimination,"[124] and von Franz says, "Whenever a latent unconscious content pushes up into consciousness, it appears first as a twofold oneness."[125]

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.[126] Both literally and metaphorically, figures emerge from the background by means of the Dyad. The *Theologumena* calls the Indefinite Dyad "matter," because it is "the source and foundation of the diversity of numbers."[127] As an active principle it is devoid of qualities, but it obtains definition from the Monad, and so the Dyad is called "Erato" because she attracts the Monad as *form* to her *matter*, thus generating all the results (*apotelesmata*) beginning with the Triad and Tetrad.[128] The *Theologumena* also calls the Dyad "the fount of flowing and liquidity,"[129] common metaphors for the flux of material reality,[130] and it says the Pythagoreans name it "Nature" because it has advanced into being from a seed principle (*logou spermatikou*).[131] Thus the Dyad is

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[120] Sparks (2010) 57.

[121] O'Reilly, Munakata, Frank, Hazy, et al. (2014) ch. 7.

[122] Sparks (2010) 67, 87.

[123] Sparks (2010) 63.

[124] Translated at von Franz (1974) 92.

[125] von Franz (1974) 93; see also 91–93.

[126] von Franz (1974) 94.

[127] Waterfield (1988) 41, 45.

[128] *TA* 13, 6–17.

[129] εὐπορίας καὶ χύσεως οὔσῃ πηγῇ (*TA* 8, 21 – 9, 1); Waterfield (1988) 42.

[130] E.g., Porphyry (1991) 30, 34–36, 55–56.

[131] *TA* 13, 14–17.

named "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,[132] for *rhuthmos* derives from *rheô* (to flow).[133]

The *Theologumena* says the Dyad is the first to separate from the Monad, and therefore it is the principle of linear extension and progression.[134] As the principle of difference, the Dyad is also called "infinity" (*apeiron*) since it begins the unending series that arises in its separation from the Monad.[135] According to von Franz, the Dyad *repeats*, that is, it generates a translational or repetitive symmetry;[136] it is the principle of duplication and reflection, leading to mirror symmetry, which is how the Dyad often manifests in visions, dreams, and art.[137] Likewise, Pythagoreans call it "Equal" (*isa*).[138]

Von Franz says, "Considered as a rhythm of movement, the number two represents a repetition, in the form of an oscillation."[139] 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.[140] There is no answer to the Orphic enigma, "Which came first, the chicken or the egg?" Although this progression is extended in both time and space,[141] actual forward direction comes with the Triad, which is nevertheless implicit in the extension of the Dyad.[142]

Von Franz tells us that the Dyad creates a tension between the opposites that demands release;[143] "duality seeks resolution in the third,"[144] for the oscillation between the opposites is not pointless, but is seeking a synthesis.[145] It is the confrontation of the conscious Dyad

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[132] *TA* 14, 7–9.

[133] LSJ s.v. ῥυθμός.

[134] *TA* 12, 17 – 13, 1; 13, 6–11.

[135] *TA* 12, 17–23.

[136] von Franz (1974) 74.

[137] von Franz (1974) 88.

[138] *TA* 11, 1.

[139] von Franz (1974) 94.

[140] von Franz (1974) 96.

[141] Sparks (2010) 70; von Franz (1974) 97.

[142] von Franz (1974) 96–97.

[143] von Franz (1974) 98.

[144] Sparks (2010) 70.

[145] Sparks (2010) 56–57, 70–71, 88.

with the originally unconscious Monad that gives birth to the Triad, which brings the needed resolution.[146] Thus psychologically the Triad emerges through consciousness of the Dyad, that is, the Triad arises from consciousness of duality as a whole.[147]

Triad

According to Jung and von Franz, the Triad is a manifestation of the One as a knowable unit, which would have been impossible without the polarity of the Dyad, for the tension of the opposites restores the unity but in a knowable form.[148] Enduring the conflict inherent in the Dyad precipitates a synthesis of the opposed elements, which is a step toward a coherent and non-split personality. When the ego takes responsibility for the tension of the opposites, a resolution arises from the unconscious; it is given to us, not consciously crafted.[149] Therefore the Triad restores the lost unity,[150] and the *Theologumena* calls it *Harmonia* because it unifies the opposites.[151]

The *Theologumena* says that the Triad is the first number to actualize the potential of the Monad[152] and the first to signify totality, because it comprises beginning, middle, and end;[153] therefore it is the form of completion (*telesiourgias*).[154] Ibn Gabirol says that the Triad is the root of the whole, for the Monad is form and the Dyad is matter, but the whole comprises both form and matter.[155] Therefore the *Theologumena* says the Triad is unique in being equal to the numbers that precede it, that is, 3 = 2 + 1, and so it synthesizes its predecessors.[156]

The *Theologumena* calls the Triad the manifestation of plurality and the first *actual* number because it is the first to be a system of units, the

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[146] von Franz (1974) 96.

[147] von Franz (1974) 64, 96.

[148] Jung (*CW* 11) ¶180; von Franz (1974) 98; Sparks (2010) 87.

[149] Sparks (2010) 55, 57, 73, 87–88.

[150] von Franz (1974) 98.

[151] *TA* 19, 18.

[152] *TA* 14, 15–16; 16, 8–9.

[153] *TA* 17, 5.

[154] *TA* 17, 19.

[155] Quoted at von Franz (1974) 104n9.

[156] *TA* 14, 20; 15, 2–5, 15–16; 17, 17; 18, 4–5.

Monad and Dyad being roots or principles, not numbers.[157] Von Franz agrees, saying "The number series thus begins with three."[158] Both von Franz and the *Theologumena* cite the existence of singular, dual, and plural grammatical numbers in Greek and some other languages as evidence that the Triad is the first actual plurality.[159]

Von Franz agrees with the Pythagoreans in seeing two series of numbers emanating from the Monad.[160] The odd numbers exhibit a centered structure, which focuses on a middle, and the even numbers have bilateral symmetry, which emphasizes polarity and opposition. Further, the Triad centers bilateral symmetries and initiates linear succession.[161] 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.[162] Likewise, the *Theologumena* calls the Triad a *mean* because of its symmetrical relationship to opposed extremes of the same species.[163] So also virtues are considered means between opposed extremes, which are excesses and vices. The vices are assigned to the Dyad, for they are indefinite and unknowable, but the golden mean is the actualized Monad, for it is definite and knowable.[164] Psychologically, the Triad centers the symmetric oppositions in the psyche and initiates a progression to a re-centered and stable personality.[165]

Von Franz observes that the Triad is often associated with time.[166] Similarly, the *Theologumena* mentions the three parts of time: past, present, and future,[167] and says that every process partakes of the Triad in that it has three boundaries: beginning, peak, and end (*arkhên akmên teleuten*).[168] These three boundaries divide the process into two phases: increase and decrease (*auxêsin kai phthisin*), and therefore

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[157] *TA* 17, 15–17.

[158] von Franz (1974) 103.

[159] von Franz (1974) 106–107; *TA* 18, 11–13.

[160] von Franz (1974) 78–79.

[161] von Franz (1974) 74.

[162] von Franz (1974) 64.

[163] *TA* 15, 5–10.

[164] *TA* 19, 11–17.

[165] Sparks (2010) 56.

[166] von Franz (1974) 125.

[167] *TA* 17, 10.

[168] *TA* 16, 15.

implicate the Dyad.[169] 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.[170] Since the Triad has a direction, it progresses psychologically in space as well as time.[171] Thus in the *Theologumena* the Triad is also associated with the three dimensions of space.[172]

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."[173] She adds that "three signifies a unity which dynamically engenders self-expanding linear irreversible processes in matter and in our consciousness."[174] Likewise Sparks says, "The three is the dynamism of development inherent in our conflicting pieces, but it is not activated (i.e., is latent)… until we begin investigating what and who those pieces in us are."[175]

According to Jung, this flow of psychic energy is often associated with threefold underworld beings, indicating a connection to time and fate,[176] and the *Theologumena* associates the Triad with the Three Fates, who govern emission, receiving, and requital (*proeseôs*, *hupodokhês*, *antapodoseôs*).[177] Psychologically, fate manifests in a correspondence of inner and outer events, dual realities coordinated by a third that bridges them,[178] and the *Theologumena* similarly tells us that the Triad unifies and harmonizes opposites, in particular the heavenly and earthly worlds.[179] Therefore the triadic stage of the psychological process is often characterized by synchronicities, that is,

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[169] *TA* 16, 16.

[170] *TA* 16, 18–22.

[171] von Franz (1974) 104.

[172] *TA* 16, 15; 17, 10.

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

[174] von Franz (1974) 106.

[175] Sparks (2010) 95.

[176] von Franz (1974) 104.

[177] *TA* 19, 7–8; see also von Franz (1974) 104n12.

[178] Sparks (2010) 89–90.

[179] *TA* 19, 5–11.

by meaningful coincidences between the inner and outer worlds.[180] We must be sensitive to *kairos*, for fate presents opportunities but we must respond at the right time.[181] Von Franz says that in myths, the hero may encounter a trio of challenges before arriving at a fourth, which signals the climax of development.[182]

The *Theologumena* says the Triad is called Prudence and Wisdom because it looks to the past, present, and future.[183] Psychologically, as a resolution of the dualistic conflicts, the real Self can emerge, "the birth of true coherence, substance, and individuality,"[184] according to Sparks. However this realization, which arose from the unconscious, was in von Franz' words, "reconstructed through discursive thought processes, and, in this process, became temporally conditioned."[185] Thus, timeless truths are understood discursively, but this is not consciously recognized until the fourth stage.[186]

Tetrad

We come now to the Tetrad, which Von Franz says "acts as a stabilizer by turning back to the one as well as by bringing forth observables by creating boundaries."[187]

In Jungian psychology as in the *Theologumena* the Tetrad represents wholeness and full completion (*apotelesma*).[188] Pythagoreans call the Tetrad the begetter of the Decad (*decados gennêtikên*), for the Decad is consummated by the Tetrad and its predecessors, that is: 10 = 4 + 3 + 2 + 1.[189] This is of course the Tetractys, which contains, according to the Pythagorean oath, "the fount that holds the roots of ever-flowing Nature."[190] The *Theologumena* tells us that these roots are the first four numbers: "the Monad of sameness which is regarded as absolute,

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[180] Sparks (2010) 88–89.
[181] Sparks (2010) 90.
[182] von Franz (1974) 104.
[183] *TA* 16, 18–22.
[184] Sparks (2010) 88.
[185] von Franz (1974) 125.
[186] von Franz (1974) 125–126.
[187] von Franz (1974) 74.
[188] Sparks (2010) 96; *TA* 20, 5, 11.
[189] *TA* 20, 5–7; 29, 5–6.
[190] *TA* 22, 21–22.

the Dyad of difference and what is already relative, the Triad of particularity and of actual oddness, the Tetrad of actual evenness."[191]

According to von Franz, "Jung devoted practically the whole of his life's work to demonstrating the vast psychological significance of the number four."[192] The significance of the Tetrad is that it a symbol of psychological wholeness and integration.[193] One reason, as Jung explains, is that once unconscious content emerges into consciousness, it becomes subject to the four functions of consciousness: perception, thought, feeling, and intuition.[194] Advancing from the Triad to the Tetrad requires acknowledging and integrating all four functions. At the triadic level, we are comfortable relying on our dominant function and its two auxiliary functions, but at the tetradic level we must recognize and integrate our inferior function, and accept the gifts it has to offer.[195] As Alain Negre says, "Its integration into consciousness corresponds to the passage from Three to Four, allowing a return to the One, not through a regression to the fusional state but in a fully differentiated plane of consciousness."[196] In particular, the fourth level requires that we embrace our Shadows, personal and collective, so we may recognize their intervention in our lives and recruit them to fulfill our destinies.[197]

In Jungian psychology as in the *Theologumena* the Tetrad represents wholeness and embodiment. Therefore the Tetrad leads back to the Monad, not as an unconscious undifferentiated plenum, but as a consciously articulated whole.[198] In this connection Jungians quote the alchemical Axiom of Maria Prophetissa: "Out of the One comes Two,

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[191] *TA* 23, 4–9.

[192] von Franz (1974) 115.

[193] Sparks (2010) 57.

[194] von Franz (1974) 121; Jung (*CW* 10) ¶774.

[195] von Franz (1974) 127–129. Out of the four functions (thinking, sensation, feeling, intuition), a person's dominant function is the one that is most developed and on which he or she habitually relies. The inferior function is its opposite (thinking and feeling are opposites, as are sensation and intuition). The other two functions are auxiliary.

[196] Negre (2018) 67.

[197] von Franz (1974) 128, 133–134; Sparks (2010) 107–108.

[198] Sparks (2010) 60.

out of Two comes Three, and from the Third comes the One as the Fourth."[199]

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.[200] Likewise, at the fourth psychological stage the Triad enters material reality and interacts with it; the previously personal revelation "is accordingly reshaped, modified, humanized, relativized."[201] The *Theologumena* says, "The tetrad is the first to encompass minimal and most seminal embodiment" (*sômatôsis elakistê kai spermatikôtatê*),[202] because the most elementary body is fire, which is shaped like a tetrahedron, which has four sides and four corners.[203] The fourth unit, which created the tetrahedron from the triangle and stands above it, can symbolize the more objective perspective that the Tetrad will bring to the triadic resolution.[204] The 1 + 3 structure of the Tetrad is symbolized by the fact that it is the sum of the first two triangular numbers, the Monad and the Triad.[205]

The Tetrad represents a new level of psychological integrity for, as the *Theologumena* tells us, the tetrahedron is "hard to dissolve" (*dusdialuton*);[206] it "binds everything in a pyramidal manner."[207] The psychological goal is to integrate the multiplicity of the psyche into a new unity, in Spark's words, "a re-centered and stable personality."[208] Recalling the Axiom of Maria, he says, "The four is the same as the one—a singular, solid, and unique individual who is open,"[209] and von Franz says, "the four acts as a stabilizer by turning back to the one."[210] Likewise, the *Theologumena* associates the Tetrad with Heracles

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[199] von Franz (1974) 65; Jung (*CW* 12) ¶26.

[200] *TA* 25, 14–16.

[201] Sparks (2010) 96.

[202] Waterfield (1988) 57; *TA* 23.11–12.

[203] *TA* 23, 12–16.

[204] Cf. Sparks (2010) 98.

[205] von Franz (1974) 113–114.

[206] *TA* 26, 6.

[207] Waterfield (1988) 61.

[208] Sparks (2010) 56.

[209] Sparks (2010) 108n93.

[210] von Franz (1974) 74.

because he was considered steadfast and a moral hero.[211] Moreover, it calls the Tetrad Justice because a square based on four is the only square whose area and perimeter are equal.[212]

The Tetrad is the first evenly even number and the first properly square number, which also symbolizes its stability and security.[213] The Pythagoreans say the Tetrad is called "the enduring one" (*tetlada*),[214] because its square root, the Dyad, was the first to endure separation from the Monad, and because the Tetrad is the cause of the three spatial dimensions.[215] The *Theologumena* also associates the Tetrad with four measures of change: eternity, time, critical time, and passing time (*aiôn*, *khronos*, *kairos*, *hôra*),[216] therefore it brings the transcendent Triad into time and space.

Von Franz says that the "difficult step" from the Triad to the Tetrad is "the progression from the infinitely conceivable to finite reality,"[217] because the Triad represents the fated pattern of one's life, "genuine possibility," the "transcendental continuum," which has been made conscious, but the Tetrad seeks to actualize it in material reality, in one's actual embodied life.[218] According to Sparks, the Tetrad represents a genuine selfhood that is accessible and open to outside influences, emotionally available, and humane.[219]

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

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[211] *TA* 28, 1–2, 18–20.

[212] *TA* 29, 6–8. A square with side 4 has perimeter 16 and area 16. A square with side 3 has perimeter 12, which is greater than its area 9, whereas a square with side 5 has perimeter 20, which is less than its area 25.

[213] *TA* 28, 2–4.

[214] *TA* 29, 2.

[215] *TA* 29, 4–5. One point has no dimension, two points define a line, three define a plane, and four a volume.

[216] *TA* 24, 12–18.

[217] von Franz (1974) 122.

[218] Sparks (2010) 101–102.

[219] Sparks (2010) 98–99.

beings. Therefore the first four archetypal numbers define four corresponding levels of consciousness:[220]

I. Uncritical unconsciousness
II. Dualistic: tension, doubt, criticism
III. Gnosis: unity in higher world
IV. Ego as herald of universal truths

The insights and inspirations arising from the unconscious in the third stage must be interpreted and explained using the time-bound discursive process of conscious thought; this is the fourth level.[221] 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."[222] The tetradic level of consciousness recognizes that although the triadic insights come as divine revelations, they are modified by individual conscious interpretation. The ego therefore becomes the interpreter[223] and assumes the role of Hermes, messenger of the gods. The *Theologumena* identifies Hermes with the Tetrad, for Hermes was commonly represented on four-sided herms[224] and was born on the fourth day of the fourth month, according to tradition.[225]

Although the triadic truths are timeless, they are reconstructed in a temporal context by time-bound discursive thought.[226] 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.[227] We learn to separate their apparent absolute validity from our unavoidably subjective interpretation; Truth with a capital "T" is replaced by "my truth."[228] Nevertheless, since our subjective conscious interpretation is faced with an objective

[220] Sparks (2010) 105–106; von Franz (1974) 124–125.
[221] von Franz (1974) 125–126.
[222] Sparks (2010) 108, emphasis in original.
[223] Sparks (2010) 106.
[224] *TA* 28, 2–4.
[225] That is, the month Hermaios in Argos; see Kerényi (1995) 56–57.
[226] von Franz (1974) 125.
[227] Sparks (2010) 104, 106.
[228] Sparks (2010) 102–103; von Franz (1974) 126.

unconscious, we must engage it through means such as dream interpretation and active imagination[229] (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.[230] Jung points to the Western alchemical tradition in which the centered square represents the quintessence in the center of the elemental square.[231] Von Franz says the *quinta essentia* "represents the most refined, spiritually imaginable unity of the four elements."[232] The quincunx and the quintessence both point us toward the Pentad, but it and the rest of the Decad lie outside the scope of this paper.

Conclusions

In conclusion, I have 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; like all archetypes, they are rooted in human neurophysiology. These properties agree with many of the qualities of the archetypal numbers described in the *Theologumena Arithmeticae* and other traditional arithmological 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 archetypal numbers are psychologically objective, independent of our conscious construction, and exist as potent forces in our psyches and as governors of our lives.

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[229] Sparks (2010) 103–104.

[230] von Franz (1974) 120–121, 124.

[231] Jung (*CW* 10) ¶774; von Franz (1974) 120–121.

[232] von Franz (1974) 120–121.

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