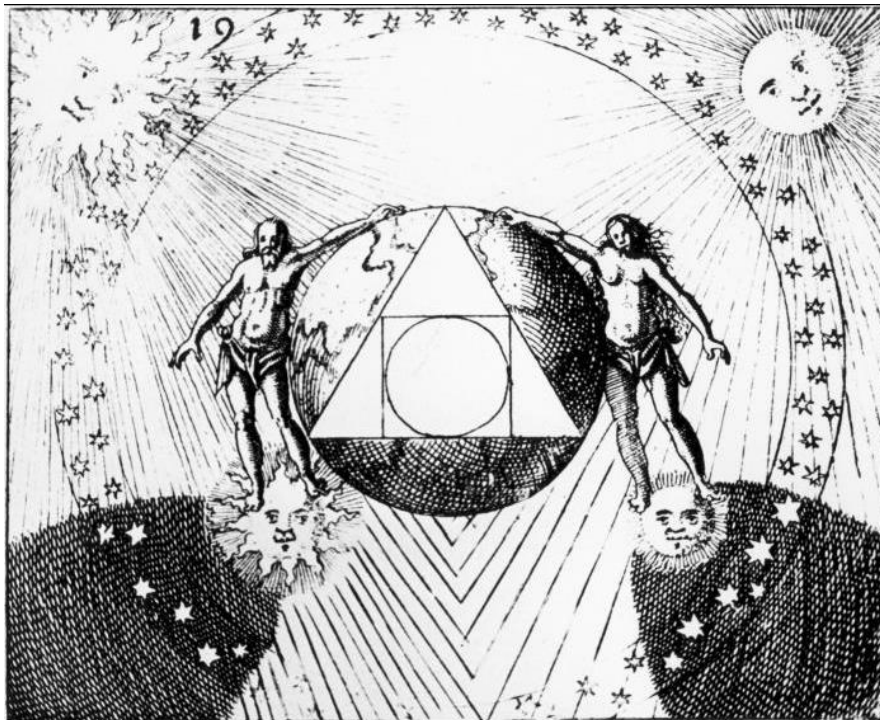


On the Nature of Change in the Four Elements

A Comparison of Classical and Jungian Thought



The alchemical Squaring of the Circle. Source: D. Stolcius von Stolcenberg. 1624. *Viridarium chymicum*. Frankfurt.

Ben Rovers

CANTERBURY CHRIST CHURCH UNIVERSITY

MA in Myth, Cosmology and the Sacred

MA-thesis

11th December 2015

ON ELEMENTS

The four elements are not a conception of much use to modern chemistry – that is, they are not the elements of nature. But (...) earth, air, water and fire are still the four elements of imaginative experience, and always will be.

(Canadian literary critic Northrop Frye, in: Ball 2002:11).

ON CHANGE

...all is in motion and mixture and transition and flux and generation, not "being," as we ignorantly affirm, but "becoming." This has been the doctrine, not of Protagoras only, but of all philosophers, with the single exception of Parmenides

(Plato, *Theaetetus*, 152e)

ON KNOWING ABOUT IT

There are some things which are as yet shut up in the treasure house of nature, namely those things which still have not attained to anyone's notice, regarding which there are certain things the capacity of human cognition does not suffice to comprehend; there are certain things which are able to be known, to the knowing of which, however, the soul of no man has yet attained.

(Alkindi, *De Radiis Stellicis* [On The Stellar Rays], 40).

Table of Contents

ABSTRACT	7
1. INTRODUCTION.....	9
2. PRELIMINARY QUESTIONS AND RUDIMENTARY ANSWERS	13
2.1 THE NATURE OF REALITY AND HOW WE CAN KNOW IT	13
2.2 ELEMENTS: THE BASIC ‘STUFF’ OF WHICH REALITY IS MADE	14
2.3 WHAT THE FUNDAMENTAL ELEMENTS ARE AND HOW MANY THERE ARE	16
2.4 PRIMARY QUALITIES ASSOCIATED WITH THE ELEMENTS	17
3. CLASSICAL PERSPECTIVES ON CHANGE IN ELEMENTS.....	19
3.1 PRE-EMPEDOCLEAN NOTIONS ON ELEMENTS AND CHANGE.....	19
3.2 EMPEDOCLES: LOVE AND STRIFE BETWEEN FOUR ELEMENTS.....	23
3.3 HIPPOCRATES: MODERATE BLENDING AND BALANCE OF HUMOURS	25
3.4 PLATO: SOUL AND GEOMETRY OF CHANGE	27
3.5 ARISTOTLE: MATTER, FORM AND PRIVATION.....	31
3.6 CONCLUSION	35
4. JUNG ON PSYCHIC FUNCTIONS AND CHANGE	37
4.1 PSYCHOLOGICAL TYPES AND ENANTIODROMIA	38
4.2 QUATERNITY AND THE CONIUNCTIO OPPOSITORUM	40
4.3 COMPARING PERSPECTIVES	43
4.4 CONCLUSION	47
5. CONCLUSION: CLASSICAL ELEMENTS AS THE GATES TO CONSCIOUSNESS	49
REFERENCES	53

Abstract

For many centuries astrologers worked with the classical elements of fire, air, water and earth in delineating horoscopes. Influenced by the depth psychology of Carl Gustav Jung, astrologers in the second half of the twentieth century started replacing these elements with Jung's psychic functions (intuition, thinking, feeling and sensation). According to these astrologers, intuition can be equated with fire, thinking with air, feeling with water and sensation with earth (e.g. Greene 1977, Hamaker-Zondag 1978). Other astrologers criticized this way of working, arguing that Jung's functions cannot be equated to the classical elements (Hand 1981, Banzhaf 1994). This thesis investigates the relation between Jung's four psychological types and the four classical elements. Can they be equated to each other? More specifically, how does Jung describe change from the dynamic between psychic functions, and does this theory converge with classical theories on elements? To answer these questions, classical Greek theories of elements are discussed, starting with the Milesian thinkers in the sixth century BCE and ending with Aristotle's systematized and refined model. These theories are then compared to Jung's ideas on psychological types and on the quaternity. The analysis shows that to fully understand Jung's ideas on elements, we have to look beyond his work on psychological types. His later work on alchemy and on the quaternity shows very close links to classical theories on elements. He translates the classical ideas into a theory of consciousness, replaces the classical elements with the four functions of psyche, and shows how these are all needed in a process to get from unconscious oneness to conscious oneness. In doing so, he closely follows classical insights, coming from authors such as Pythagoras, Heraclitus, Empedocles and Plato. His approach is definitely more platonic than aristotelian, which may explain why the basic opposites at work in his model deviate from the classical scheme as we know it from Aristotle.

1. Introduction

According to British academic Paul Strathern (200:255), the Aristotelian theory of the four elements which had survived for two thousand years, definitely succumbed after the French chemist Antoine de Lavoisier discovered that pure water, when boiled, does not turn into earth. The observation is only partly true; unquestionably the four elements are no longer the building blocks of modern physics and chemistry, but on a symbolic and imaginative level they seem more alive than ever.¹ The concept of (four) elements is omnipresent in ancient myth, cosmogonies and cosmological theories (Von Franz 1995:233-261).² Throughout history they have been applied to disciplines such as alchemy, astrology, medicine and psychology (Banzhaf 1994, Greenbaum 2005, Tobyn 2013).

In Astrology the concept is still widely used. It is not clear when astrologers started incorporating elements in their craft, but we may assume this already happened quite early on, since astrology has always been closely linked to disciplines such as natural philosophy, cosmology and medicine, in which elements are a crucial component of one sort or another (Greenbaum 2005:5-18, Tobyn 2013:161-201).

In the second half of the twentieth century astrologers started incorporating psychological concepts. Heavily influenced by the depth psychology of Carl Gustav Jung, a new branch of astrology developed in which psychological analysis of a person was combined with classical astrological delineation. In this branch of astrology a seemingly new idea on elements was introduced, inspired by Jung's psychic functions (intuition, thinking, feeling and sensing). These were linked to the four classical elements of fire, air, water and earth. Psychological

¹ The Wikipedia page https://en.wikipedia.org/wiki/Classical_elements_in_popular_culture shows a whole range of applications of the four elements in modern popular culture.

² The four 'classical' elements, fire, air, water and earth, are not the only elements in these early visions, but the four play a crucial role.

astrologers such as Liz Greene (1977:52-90 and Karen Hamer-Zondag (1978, 1979), started working with this new scheme which rapidly became popular in the astrological community. Other astrologers, such as Robert Hand (1981) and Hajo Banzhaf (1994), were critical of the way Jungian concepts entered astrology. Hand (1981: 241-246) sums up the problems; Jung wrote that his psychic functions are connected to the elements, but he never explained how the connection should be made. According to Hand (and others), the particular attribution of feeling to water and intuition to fire is - at the very least - confusing, as is Jung's idea that feeling is a 'rational' function.³ Another problem is that Jung seems to create new opposites: intuition versus sense (fire vs. earth) and thinking versus feeling (air vs. water). In early Greek theories of elements, certainly in Aristotle's model, these elements share qualities, respectively dryness and moistness. In this model fire and water, air and earth are the 'real' oppositions, because these elements do not share qualities. For example, fire is hot and dry, while water is cold and wet. Hand also argues that Jung's model can never fit into astrology, because he treats two opposing functions not only as opposites but as excluding characteristics as well. This contradicts the idea of elements in astrology: they can all exist next to each other.

When we take a step back from the astrological discourse, we can see that there are different ways of approaching Jung's psychic functions in relation to the classical Greek system of elements. So a basic question would be: are Jung's psychic functions congruent with the classical elements? And if so, why do some, like Hand, Banzhaf and others, fail to see the link? What are they missing? Are they right, and does Jung's theory deviate from the classical scheme of elements? If so, in what way? More specifically, what does this mean for the way elements create dynamic and change? This last question will be the focal point of this dissertation: how does the Jungian model of psychic functions describe change and dynamic in reality and can this model be seen as congruent with or deviating from the classical theories on elements?

³ Banzhaf (1994:199) argues that what Jung calls intuition is really feeling.

To answer these questions an analysis of both classical and Jungian thinking on elements is needed. In chapter 2, which serves as an introductory chapter to classical thinking, some basic issues concerning elements will be dealt with. Chapter 3 presents an analysis on the notion of change in classical Greek theories from the Milesian thinkers in the 6th century BCE to Aristotle's refined and systematized presentation of elements in the 4th century BCE. In chapter 4 Jung's ideas on elements are discussed, focussing on his psychological types and on the archetype of the quaternity. These ideas are then compared with the classical notions on (change in) elements. The fifth and last chapter draws conclusions from this comparison and discusses the results.

Theories on elements are vast. There a lot of angles that will not be tried in this dissertation. The discussion will be limited to the four elements of matter: fire, air, water and earth. Higher order elements will not be dealt with, neither will theories of elements originating in other cultures; the focus is on Western thinking. The description of the elements themselves, a major part of many theories, will also not get a lot of attention. Elements are part of many (ancient) disciplines and areas of life. The dominant perspective in this dissertation will be that of cosmology.

The cosmological notion of elements addresses life's deepest mystery; the nature of reality. This mystery may well be 'shut up in the treasure house of nature', as Alkindi puts it. We are by no means sure that our endeavour to unravel some part of it will succeed, but moving ourselves in the direction of the mystery may well prove worthwhile in its own right.

2. Preliminary questions and rudimentary answers

In this thesis attention is focused on the nature of change and dynamic in the various theories of elements. The question of change, however, is the last one in a row of fundamental philosophical and cosmological questions on issues such as the nature of reality and how it can be known, the basic 'stuff' reality is made of, what the fundamental elements of reality are and how many there are, what the primary qualities of these elements are, and – only finally - how these qualities work together or against each other to create change.

It is not possible to treat these preliminary questions here in full depth, but a primer to the answers will help clarify the various perspectives on change. It can also serve as a general introduction to the various theories.

2.1 The nature of reality and how we can know it

The poet and philosopher Lucretius (99-55 BCE) sketches the dilemma many philosophers before and after him have struggled with: everything in life seems to come and go, nothing seems permanent. Even a hard rock will eventually change under the influence of drops of water. Yet the seed of the oak tree that has perished, will create a new oak tree and this tree will grow on the soil that contains the remnants of the old one. So underneath all the change, there must be something of permanence, otherwise reality as we know it would end at a certain point (Lucretius, *On the Nature of Things*, 'Substance is eternal').⁴

Presocratic philosopher Parmenides (515-460 BCE) formulated an influential theory in which he claims that there is only one reality, the reality of eternal unmoving being: 'the one that it is, and it is not possible for it not to be' (Freeman 1948:42).⁵ The world of change is an

⁴ Nearly two thousand years later Nietzsche discussed this notion with regard to his thesis of 'eternal recurrence' (Couprie 2015: par.3).

⁵ Freeman's book contains a translation of all original pre-Socratic text fragments from Diels (1903). *Die Fragmente der Vorsokratiker*. <https://archive.org/details/diefragmenteder01dielgoog>.

illusion, because being cannot come from not being: 'being has no coming into being and no destruction' (Freeman 1948:43). In theories on elements we can see two different approaches to this matter. In one group of theories the world of change is considered in the light of a permanent world as Parmenides describes it. Some of the pre-Socratic philosophers, as did Plato, assume a primordial reality that is not ruled by the process of growth and decay. They see the world of change as an emanation of an eternal, infinite, undivided and unchanging world. Anaxagoras' (500-428 BCE) theory of mind (*Nous*) is an example of this: 'Before these things [the elements, BR] were separated off, all things were together', 'Mind is all alike... but nothing else is like anything else' (Freeman 1948:83,85). Other theories of elements may assume such a world as well, but focus more on the phenomena in the physical world of change. Aristotle's theory and many of the Stoic theories are examples of this (Partington 1970:69ff.,149ff.).

The distinguishing feature between the two approaches is not so much ontology as epistemology. For the latter group observation is the primary way to know about the world, hence the focus on physical, observable phenomena. For the philosophers in the first group observation is part of the world of becoming (change) and can therefore not produce valuable knowledge of reality. Anaxagoras, for example, is very clear on this: 'Through the weakness of the sense-perceptions, we cannot judge truth' (Freeman 1948:86). Atomist Democritus (460-370 BCE) puts it even stronger: 'There are two sorts of knowledge, one genuine, one bastard (or 'obscure'). To the latter belong all the following: sight, hearing, smell, taste, touch.' (Freeman 1948:93). Genuine knowledge can only be found in the mind, because that is where God can be found, as Empedocles puts it (Freeman 1948:67).

2.2 Elements: the basic 'stuff' of which reality is made

In most cosmological theories of antiquity elements in some form or another are considered the primary building blocks of the cosmos.⁶ There is no simple answer to the question of

⁶ From the earliest days there has also been a theoretical perspective that challenges this idea: atomic theory. This notion goes back to Leucippus (5th century BCE) and Democritus (460-370 BCE). The basic argument of these early atomists was that primary elements cannot have qualities such as hot and cold, because these

what elements are. According to most authors Plato or the atomists introduced the concept 'Stoicheion' which translates as element (Crowley 2005:367-8), but it is quite clear that Plato was referring to the same 'things' Empedocles called 'roots' (Freeman 1948:52). The terminology and etymology are for our purpose of less importance than the conceptual content. The core sense of stoicheion, as Crowley (2005:392) puts it, is that of a basic part of a whole. This still leaves open quite different interpretations. On the one hand elements can be viewed as primary matter, or the 'the great limbs of the world', as Lucretius calls them (Kahn 1960:122). On the other hand elements can be seen as principles of change. Aristotle points to the fact that the four elements of fire, air, water and earth cannot be seen as real elements (he speaks of 'so-called elements'), because they can be further divided into the more fundamental qualities of hot and cold, and dry and wet (Kahn 1960:124). These qualities do not represent substances but principles of change.

Elements are seen as belonging to different worlds. There are basically three positions. The first is that elements are only part of life on earth. This is Aristotle's 'sublunar thesis': beyond the sphere of the moon the cosmos is ruled by another element (Kahn 1960:149). The second position is that elements are the basic parts of all of the cosmos, including the sphere beyond the moon, but limited to the 'realm of change'. The third position is that elements are part of the world of change and the timeless and unmoved world. In the latter view the elements differ in their qualities depending on the world they are part of: in the timeless and unchanging world the elements are pure, ungenerated and they exist on their own. In the world of change, elements are perishable and they are not pure but 'diluted' (Plato, *Timeaus* 41d). Anaxagoras formulates the process of elements becoming impure as follows: 'It is not possible (for the elements once they are separated off from wholeness, BR) to exist apart, but all things contain a portion of everything' (Freeman 1948:84).

qualities create opposites and therefore belong to the world of the senses and thus the world of change. On a deeper level the elements are all of the same quality or they have no quality at all, as Furley (2006:117) summarizes this position. Atoms, in other words, are more fundamental than elements such as fire, air, water and earth. To explain plurality and changes in reality, atomists have come up with the concept of a void between atoms (Furley 2006:118). The atom perspective will not be explored here. See e.g. Furley (2006) for an exposition on early atomic theory.

This discourse varies with the ontological and epistemological assumptions: Aristotle describes the elements from observation (for example from weather patterns), this explains why he cannot see fire, air, water and earth as real elements, because further division into more homogenous parts is possible. For Plato this is not a problem, because the mixed elements of the material world are reflections of something pure and unchanging that can only be conceived in the mind and not by the senses (Cornford 1997:182).

2.3 What the fundamental elements are and how many there are

There are monist and pluralist perspectives on elements. In early Greek philosophy monism was dominant and different elements were considered primordial. For the Milesian philosopher Thales (620-546 BCE) this was water, for one of his pupils, Anaximander (610-546 BCE), it was Apeiron (the unlimited, the boundless), for his other pupil Anaximenes (d. 528 BCE) it was air, and for Heraclitus (fl. c. 500 BCE) it was fire (Partington 1970:6-10).⁷

Empedocles (492-432 BCE) introduced a pluralist scheme of four primordial elements (fire, air, water and earth) that became very influential.⁸ According to Kahn (1960:149,155) the big step for Empedocles was not one from monism to pluralism (because Anaximander before him had named the four elements already), but the fact that he placed these four elements not in the realm of the 'corruptible world bodies'. He saw them as part of the unperishable world. In fragment 12 Empedocles says: '...it is impossible for anything to come into being; and for being to perish completely is incapable of fulfilment and unthinkable; for it will always be there...' (Freeman 1948:52). In this idea the four elements are part of the uncreated world.

⁷ Furley (2006:34) does not agree that Heraclitus' first principle can be compared with the other three. According to him Heraclitus' cosmological model is fundamentally different from the Milesian philosophers (Thales, Anaximander and Anaximenes), not stressing a single principle that creates everything else, but focussing on perpetual interchange between elements.

⁸ It was Aristotle who first asserted that Empedocles introduced the standard doctrine of the four elements. According to Kahn (1960:121) we can't be sure because so much of the earlier material was already lost in Aristotle's time, while from Empedocles on, views on elements were 'abundantly documented'.

Empedocles did something else as well: he limited the number of elements ('roots') to four (Kahn 1960:153). Before and after him more and also other elements were designated (see e.g. Kahn 1960:150). For example, Plato's aether element and Anaximander's apeiron were considered (a fifth element) of a higher order than the four Empedoclean elements (Kahn 1960:119, Cornford 1997:220-221). Kahn (1960:150) shows that in older theories other elements than the 'canonical tetrad' are mentioned, such as stones, clouds, winds, iron, gold, et cetera. In this thesis we will focus on the 'Empedoclean four'.

2.4 Primary qualities associated with the elements

The four Empedoclean elements are considered to comprise qualities that create continuous change. In early Greek sources various qualities are mentioned, of which some are considered primary and others secondary (Lee 2011). Heraclitus is the first philosopher of whom text fragments have survived relating to these qualities. In fragment 126 he writes: 'cold things grow hot, hot things grow cold. The wet dries, the parched is moistened' (Freeman 1948:33). According to Diels (1899:15) these qualities (hot, cold, wet and dry) were the basis for most of the theories in antiquity. Yet we see other qualities mentioned as well. Anaxagoras, for example, mentions the qualities of dark and bright, dense and rare, and he specifically mentions the solidifying quality of earth (Freeman 1948:83,85).⁹ In the next chapter the qualities will be discussed in more detail, since these are the principal agents of change.

⁹ Herewith implicating the opposite process of solidifying: dissolving. Plato mentions the same pair of qualities in his *Timeaus* (Cornford 1997:157). There it is translated as compacting vs. rarefying.

3. Classical perspectives on change in elements

This chapter will discuss in some detail the notions of change in early Greek theories on elements, starting with the Milesian thinkers in the sixth century BCE and ending with Aristotle's systematization in the fourth century BCE. Of course theories of elements were further developed and discussed after Aristotle,¹⁰ but these three centuries are crucial in understanding classical Greek thought on elements. Firstly, because this period marks the transition from ancient mythology to modern science as we know it; the early theories contain an interesting mix of esoteric and exoteric knowledge. Secondly, Aristotle's ideas on elements became very dominant and have survived until the 17th century. After Aristotle theories on elements developed in two distinctive directions, that of alchemy and magic, and that of physics and chemistry (Partington 1970: xiff.). By and large these three centuries provide us with the main ingredients of the theories that followed later.¹¹

3.1 Pre-Empedoclean notions on elements and change

Although Empedocles is generally considered the founder of the four elements model of fire, air, water and earth, his notions on elements and change are built on his predecessors. A few of these early notions will be discussed here to put later theories into perspective.¹²

An important early notion is that everything in the universe is ensouled and it is soul that is (the cause of all) movement.¹³ Thales is considered to have attributed a soul to inanimate

¹⁰ See for example the extensive criticism of Neoplatonist philosopher Proclus on the Aristotelian theory of elements in late antiquity (Siorvanus 1986).

¹¹ This chapter will not treat in any detail the background of philosophers, currents of thought, discussions on translations, and the like. For more information on these broader issues, see e.g. Fairbanks (1898), Kirk & Raven (1957), Kahn (1960), Brunschwig & Lloyd (2003) and Furley (2006).

¹² As Kahn (1960:121) and many others have pointed out: the sources before Empedocles are scarce, the conceptions have to be reconstructed from partial and often indirect evidence. This will not affect our discussion in any serious way, because we will only deal with headlines here.

¹³ According to Furley (2006:18) the essence of the Milesian philosophers (Thales, Anaximander and Anaximenes) is the idea of hylozoism: the doctrine that everything in the universe is alive (ensouled), even inanimate objects. Ensoulment in whatever form creates the world as we know it, the world of change.

objects as well: since a magnet causes movement in iron, it must be ensouled. Hence his adage: 'everything is full of gods' (O'Grady 2015: ¶7).¹⁴

Thales' pupil Anaximander introduces the idea of generation and decay. The reality of things coming into existence and perishing originates in a boundless principle or reality: Apeiron (Freeman 1948: ch.12). Everything comes into being from this boundless principle and returns to it again. This first principle is characterized by unity and eternity, the reality of change is that of opposites separated from unity. The elements as we know them belong to the world of change, a world ruled by time (Fairbanks 1898:9-13).¹⁵

Anaximenes, the other pupil of Thales, saw moveable air as the primary principle, because this represents the soul. His only remaining fragment puts it thus: 'As our soul, being air, holds us together, so do breath and air surround the whole universe' (Freeman 1948: ¶13). Aristotle attributes to Anaximenes the idea of elements changing into each other based on their primary qualities: 'the air differs in rarity and in density as the nature of things is different; when very attenuated it becomes fire, when more condensed wind, and then cloud, and when still more condensed water and earth and stone, and all other things are composed of these; and he regards motion as eternal, and by this changes are produced' (Fairbanks 1898:19).¹⁶ Another doxographic source adds: 'So that generation [of elements changing into one another, BR] is controlled by the opposites, heat and cold (Fairbanks 1898:20). Kahn (1960:151) notes that the elements in Anaximenes theory are not fixed portions of the universe, but phases in a continual process of transformation, stages along the road up and down: 'fire is quenched, wind compressed, cloud condensed, and moisture solidified to earth and stones'.

Heraclitus also attributed important insights into the notion of change in elements. His idea of reality is that all is one, everything is constantly changing, opposite things are identical

¹⁴ According to Plato only good souls (because they are rational) can be called gods, for they are the source of every excellence (Fairbanks 1898:2, Jirsa 2008:250ff.).

¹⁵ Most of what is known about Anaximander's ideas is known through later sources (doxographies), only one original fragment survived. The information in this summary is given by more than one classical author (Fairbanks 1998: ch.2).

¹⁶ Anaximenes' ideas were based on observation of natural phenomena. A good example is his experiment of blowing air on one's hand: when blowing with the lips closed the air is cold, when blowing with open mouth the air is hot. This 'proved' that rarefaction of air produces heat and density coldness (Graham 2015b: ¶2).

and everything is and is not at the same time (Graham 2015a: ¶13). He integrates the worlds of the one and the many, while preserving the notion of pluralism and change. According to later authors this leads to logical incoherence (Graham 2015a: ¶13). However if we focus on his notions of change, we can discover some interesting viewpoints that had a profound effect on later thinkers, including Jung.

The first is that strife is necessary for things to come into being (fr. 80; all original fragments from Freeman 1948: ch. 22), so conflicts between opposites do not interfere with life, on the contrary they create it (Graham 2015a: ¶15). Anaxagoras, who was a generation younger than Heraclitus, illustrates this idea in his theory of sense and perception. The basic premise is that sensation requires an encounter with an opposite. A cold hand on a hot object will give the experience of hot. A hot hand on a hot object cannot create (this) experience. Therefore, the change brought about by opposites who 'meet' (cold and hot in this example) creates sensation and more generally experience as such (Patzia 2015: ¶15).

According to Heraclitus, harmony is the result of oppositions (fr. 8), opposing tensions create a balance (fr. 51), and this process goes on forever, with one opposite changing into another (fr. 88). 'Cold things grow hot, hot things grow cold, the wet dries, the parched is moistened' (fr. 126). Fire dies in air, air dies in water, water in earth and earth in fire (and the other way around; fr. 60, 76). We may say that the only thing that stays the same is constant change, with the processes of scattering and again combining, and approaching and separating continuously going on (fr. 91). Therefore, it is not possible to step into the same river twice (fr. 91). The image of the circle in fragment 103 describes the permanence of the process: 'beginning and end are general in the circumference of the circle'.

Following up on the discussion of the two realities, who became one in Heraclitus' vision, Parmenides also proposed a theory of one reality, but contrary to Heraclitus, there is no room for change and flux in this theory. According to Parmenides, motion and change are all illusion because there is only being; 'the one that it is, and it is not possible for it not to be' (fr. 2; all original fragments are from Freeman 1948: ch.28). 'Therefore being has no coming into being and no destruction, for it is whole of limb, without motion, and without end' (fr. 7,8). In Parmenides' vision being -reality- is not only ungenerated and indestructible, it is also one and indivisible, motionless and unchanging and complete and perfect (Furley 2006:38).

This theory had a great influence on later theorists such as Empedocles, because they had to 'find a solution' to the Eliatic challenge, as it is often called, that there is only one undivided reality and pluralism and change are illusions (Sedley 1998).¹⁷

Nonetheless, Parmenides shares with us some ideas on this illusory world of change. He says that mortals out of the oneness have created two forms and have distinguished them as opposites. One of these opposites is 'the flaming fire in the heavens', which is mild and very light, the other 'dark night, a dense and heavy body', in which we may respectively recognize fire/the sun and the earth (fr. 8). Light and night are considered basic powers, and they are equally in everything (fr. 9). In the centre is the goddess who guides everything, she makes the male mate with the female (fr. 12) and the first thing she devised was love (fr. 13).

The last philosopher who will be discussed here, is Anaxagoras. Although he might have been a contemporary of Empedocles, we will treat him as a pre-Empedoclean.¹⁸ In his theory we can find a response to the Eliatic challenge of Parmenides. In fragment 17 he asserts that no thing comes into being or passes away, but everything is mixed together or separated from existing things (all original fragments from Freeman 1948: ch. 59). He conceives of an original unified reality (*nous* or mind), which is infinite and self-ruling and mixed with no thing (fr.12). Mind rules all things that have life. Air and aether are considered part of this infinite oneness and the first elements to be separated off (fr. 1,2). In mind motion began, and started a process of separating off of everything that was being moved, and the revolution (of cosmic bodies, BR) greatly increased this separation (fr. 13). The separated parts cannot exist apart, they mingle with all other parts, so that everything contains a portion of everything fr. 6). This latter statement, combined with the idea of mixing and separating of existing things, must be considered Anaxagoras' answer to Parmenides. The

¹⁷ There seems to be something of a Liar's paradox present in Parmenides' writings: the non-being obtains some kind of ontological status as soon as he starts speaking of it. This happens in his poem as well: on the one hand he asserts that it is impossible to speak of a reality that comes into being and perishes (the world of the senses), for that will mean that some-thing comes out of no-thing (fr. 7,8), yet on the other hand, he moves on to speak of this impossible world, which he calls 'the way of Opinion' (as opposed to 'the way of Truth'). Insofar Parmenides allows himself to speak of this as a reality, we may assume that he considers this in principle to be a reality of illusion.

¹⁸ There is discussion on when exactly Anaxagoras lived (Patzia 2015: ¶11), and whether or not he criticized Empedocles in his writings. I follow Furley (2006:61) and others in that he preceded Empedocles.

notion that everything contains a portion of everything raises the question how we can distinguish between things in the universe. Anaxagoras' solution is found in fragment 12: 'but nothing else is like anything else, but each individual thing is and was most obviously that of which it contains most'. Elsewhere he adds: 'and there was a great quantity of earth in the mixture' (fr. 4).

What is being mixed and separated are the moist and the dry, the hot and the cold, the bright and the dark, and the dense and the rare (fr. 4, 12). The notion of mixing and separating replaces the notion of coming into being and perishing. We also see this idea in Empedocles' theory, to which we will now turn.

3.2 Empedocles: love and strife between four elements

Empedocles introduces the 'four roots of things: bright Zeus, life-bearing Hera, Aidôneus and Nêstis, who causes a mortal spring of moisture to flow with her tears' (fr. 6; all original fragments from Freeman 1948: ch.31). These gods stand for fire, air, water and earth, but which god stands for which root or element is still a much debated issue (Kingsley 1994). The elements are not created, because there is no such thing as creation or death, there is only a mixing and exchanging of what has been mixed, and mankind has applied the name 'substance' to it (fr. 7-12). The recurrent process of life and death is no more than a changing of the mix of the four elements. Nothing exists next to these elements, and there can be no reality without them: 'these things alone exist, and running through one another, they become different things at different times, and are ever continuously the same'. (fr. 17).

The process of mixing and exchanging is guided by two basic powers: love and strife. Under the influence of love 'all become one', under the influence of strife, the 'one grows apart and many are formed' (fr. 17). 'Execrable' strife is considered the force that created the four elements out of the one, love is the force that brings the parts back to unity. These two processes, if viewed separately, can give us the impression of things coming into being and having no stable life, but as both processes are continuous, there is an underlying 'unmoved' or 'unaltered' reality (fr. 17). This continuous process –of becoming one and growing apart,

is part of a revolving cycle (fr. 17, 26).¹⁹ Empedocles describes this as a whirl (and circle), in which the unifying power of love tends to the middle, and strife to the edges (fr. 35). The power of love and uniting is attributed to Aphrodite (fr. 17), it is unclear to which god(s) strife is attributed.²⁰

Empedocles uses the metaphor of a painter to illustrate the notion that harmony between the elements can come from mixing a limited number of colours in very different ways, 'taking more of some and less of others' (fr. 23). Harmony, in other words, is not the same as having equal portions of every element.

A further description of the separate elements and their dynamic is given: the sun (fire, BR) is bright and hot, the immortal things (heaven/air? BR) drenched with heat and brilliant light, the rain (water, BR) is dark and chill, and the earth is soil and solid (fr. 21).²¹ About the dynamic between these elements, Empedocles remarks in fragment 22: 'all those things which are more suitable for mixture are made like one another and united in affection by Aphrodite. But those things which differ from one another in origin and mixture and the forms in which they are moulded, are completely unaccustomed to combine (...), in that strife has wrought their origin.' Only like attracts like and these will join (see also fragment 90). From the previous description fire and water can be seen as most different in origin and mixture: bright and hot versus dark and chill.

In his cosmogony Empedocles describes mankind as fallen souls who journey from life to life, far away from the 'company of the blessed', the elements pushing them around: 'mighty air chases them into the sea (...), the sea spews them forth on to the dry land, and the earth

¹⁹ It is very likely that in fragment 28 Empedocles equates god to a rounded sphere, 'enjoying a circular solitude'.

²⁰ In fragment 128 Empedocles places five gods, Ares, Battle-Din, Zeus, Cronos and Poseidon, opposite from Cypris (Aphrodite). Some conclude from this that Empedocles considered all five associated with war and strife (Parry 2012: ¶12).

²¹ Since Empedocles refers to these as the four elements, the immortal beings are somehow connected to the element of air, but this fragment is corrupt; in other translations any reference to a fourth element is absent. In fragment 22 he calls this element 'heaven'. Elsewhere he speaks of aether. There is discussion on what this is: air, brighter upper air, fire, or a fifth element. (Kirk & Raven 1957:333, Kingsley 1995, Furley 2006:88).

drives them toward the rays of the blazing sun; and the sun hurls them into the eddies of the aether' (fr. 115).²² Every element prevails in turn in the course of time (fr. 17).

The fragments of Empedocles have raised many questions, partly because they are incomplete, partly because they leave open the possibility of very different interpretations (Kirk & Raven 1957:322ff.). The answers Empedocles provides have kept many generations puzzling (Kingsley 1994). Maybe because our 'mortal intellect' has a limited capacity to attain the divine laws, as Empedocles puts it in fragments 2 and 3.

3.3 Hippocrates: moderate blending and balance of humours

Although Hippocrates is an historical figure, most of the work that carries his name is not from his hand, but ascribed to him. The oldest works probably date back to 450-350 BCE and were edited around 200 BCE. The Hippocratic Corpus comprises about 70 medical treatises of sometimes very different nature and vision. In the treatise on the *Nature of Man*, for example, the four elements theory of Empedocles is pursued and translated into four humours in the human body, in the treatise *On Ancient Medicine*, on the other hand, this approach is attacked, arguing that the four qualities (hot, cold, wet and dry) cannot explain all diseases, and that medicine does not need a link with Empedoclean or any other cosmology to advance (Hippocrates, *On Ancient Medicine*: ch. 1,20, Partington 1970:28-29, Brunschwig & Lloyd 2003:127,133).²³

In the treatise on the *Nature of Man*, Hippocrates explains how a body cannot be considered a unity, for in that case it could not experience pain.²⁴ The body is made out of four humours that are different in essential form and power: blood, phlegm, yellow bile and black bile. These humours, just like the Empedoclean elements, always remain the same and are all

²² Throughout history Empedocles' poems on physics ('On Nature') and metaphysics ('Purifications') have been regarded as contradictory in nature (Kirk & Raven 1957:322-323). Recent rediscoveries of original fragments, the so called 'Strasbourg fragments', show that some of the metaphysical notions were already introduced in his poem on physics (Campbel 2015: ¶1-2). For this reason I make no distinction between these two perspectives: I am using fragments from both poems to describe Empedocles' ideas on elements.

²³ For a further discussion on the attribution of works to Hippocrates, see Lloyd (1975).

²⁴ This treatise is actually written by Hippocrates son-in-law Polybius (Brunschwig & Lloyd 2003:132).

necessary for the sustainability of the body. Perfect health is attained when these four elements are 'duly proportioned to one another in respect of compounding, power and bulk, resulting in a perfect integration. Pain is felt if one of these elements is in defect or excess, or is isolated in the body without being compounded with all the others. (...) For they are not equally warm, not cold, nor dry nor moist' (Hippocrates, *Nature of Man*: I,II,IV,V).

The level of the four humours in the body varies with the seasons: phlegm, being cold and wet, will increase in winter. Blood, being wet and hot, will increase in spring. The humours will decrease in the season that is opposite their own character. For example, in summer levels of phlegm will be at their lowest, because this season is contrary to its nature. This has implications for the dynamic of disease: 'When diseases arise in spring, expect their departure in autumn' (Hippocrates, *Nature of Man*: VIII).²⁵

Medical treatment of disease is based on working with opposite powers: 'diseases due to repletion are cured by evacuation, and those due to evacuation are cured by repletion. Those due to exercise are cured by rest, and those due to idleness are cured by exercise' (Hippocrates, *Nature of Man*: IX).

Hippocrates' use of the elements in the field of medicine is one of the earliest and certainly one of the most important applications of elements outside the realm of cosmology.²⁶ In comparison with the Empedoclean fragments, the Hippocratic model of elements seems more developed. The primordial qualities, for example, are limited to hot-cold and dry-wet, and they are combined in the four humours. Another development concerns the notions of moderate blending and balance between the humours (elements). Although Hippocrates' work can be regarded as an important step towards a more materialised approach of elements, the model itself is not materialistic at all: at least two of the humours, phlegm and black bile, are not physical substances (Richet 1910).

²⁵ Hippocrates recognizes that not all diseases will disappear within this time.

²⁶ Important ideas in the treatise on the *Nature of Man* can already be found in Alcmaeon's work, about two centuries earlier (Kahn 1960:159).

3.4 Plato: soul and geometry of change

Plato's theory on elements is mainly found in *Timeaus*, which contains his cosmogony. God made the universe first of fire (light) and earth (corporeal: tangibility, solidity). Then a third element was needed to bind these two together. Because the world is a solid, it has not one but two means; these are water and air, and they are proportionally placed between fire and earth.²⁷ Their basic quality is connecting the other two elements. From these four elements the visible and tangible world is formed (Plato, *Timeaus* 31b-32c). Plato uses an 'unaccustomed argument' to show the nature of elements and how they generate and change into one another (Plato, *Timeaus* 53c). This argument is based on geometry and arithmetic. According to Cornford (1997:3), much of the dialogue is undoubtedly Pythagorean, but Plato also 'borrowed something from every pre-Socratic philosopher of importance'.

Plato explains that fire, air, water and earth are bodies, and bodies possess solidity. Every solid is necessarily contained in a plane, and every plane is a rectilinear figure composed of triangles. These triangles are 'the original elements of fire and the other bodies'. Then he sets off to find the four most beautiful bodies, 'which are unlike one another, and some of which are capable of resolution into one another' (Plato, *Timeaus* 53c-e). The most beautiful bodies resemble, represent or approach the harmony of the uncreated and indestructible world of Mind. It is then shown that there are two sorts of triangles: the isosceles, which has only one form, and the scalene, which has infinite forms. Of these infinite forms the most beautiful should be selected. He concludes that this must be the triangle of which the double forms a new, third triangle, which is equilateral ('the reason of this would be long to tell'; Plato, *Timeaus* 54a-b). The two triangles which are chosen to describe the elements are therefore the isosceles (b) and the triangle in which the square of the longer side is three times the square of the lesser side (a). The double of the latter triangle forms a perfect equilateral triangle (see figure 1).

²⁷ Plato uses arithmetic to describe the relative positions of the elements relative to each other.

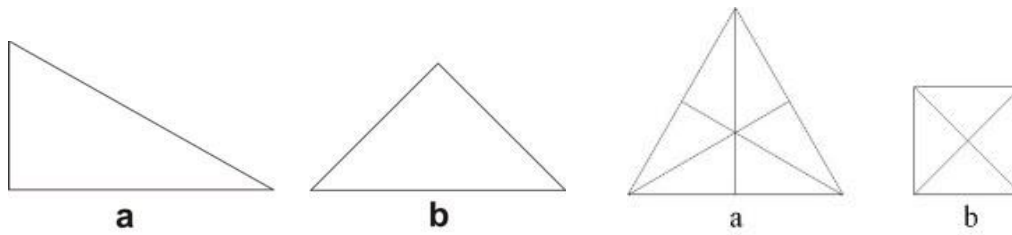


Figure 1: (a) Scalene triangle (left single, right double); and (b) isosceles triangle (left single, right fourfold, forming a square) (Source: Restrepo & Villaveces 2012)²⁸

The doubled scalene triangle can form three solids that have perfect regularity, i.e. all the faces of the solid are regular polygons; all faces are the same (congruent), and all corners are the same, i.e. the same number of faces meet at each vertex (see figure 2). The simplest solid is the tetrahedron, which has four faces, then follows the octahedron which has eight faces, and the icosahedron, which has twenty faces. More perfectly regular solids cannot be formed with this triangle. Four isosceles form an equilateral quadrangle. From this only one perfectly regular solid can be formed: the hexahedron or cube.²⁹ Plato also mentions a fifth perfectly regular solid, formed from twelve pentagons, the dodecahedron. This solid was used by God ‘in the delineation of the universe’ (Plato, *Timeaus* 55c).

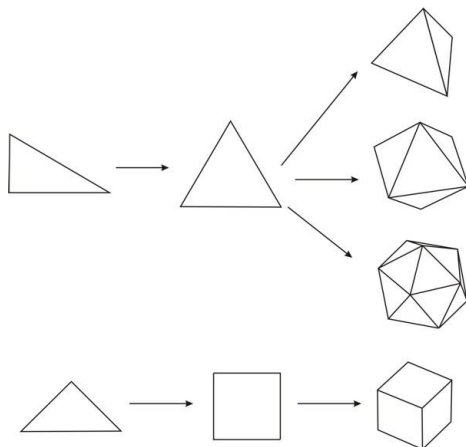


Figure 2 The four Platonic solids formed from the two triangles, from top to bottom: tetrahedron (fire), octahedron (air), icosahedron (water) and hexahedron/cube (earth) (source: Restrepo & Villaveces 2012)

²⁸ The double scalene triangle gives three possible ways of dividing it in two, possibly corresponding to six directions: left-right, backward-forward and up-down, the quadruple isosecles corresponds only to four directions. In *Timeaus* 43a Plato elaborates on direction of motion.

²⁹ For a visual clarification on how the solids are formed, see the videos of the Visual Geometry Project on <https://www.youtube.com/watch?v=voUVDagFtho> and <https://www.youtube.com/watch?v=BsaOP5NMCM>.

These solids are the most regular geometrical bodies one can think of, no other solids with this level of regularity can be formed. He assigned each of them to an element: the cube to earth, because of its stability and immovability, the icosahedron, (the least moveable of the other three), to water, and the tetrahedron, the most moveable and the lightest solid (because it has the least faces), to fire. The intermediate body was assigned to air (octahedron; Plato, *Timeaus* 55e, 56a-c).

In Plato's view elements are not physical things, but the nature of these: a golden ring can be melted and changed into a necklace, but the different forms share their nature: the element of gold. There are three natures in elements: that which is in process of generation (the father principle), that in which the generation takes place (the mother principle), and that of which the thing generated is a resemblance (the child) The three natures in the four elements constitute matter and this matter is invisible and formless (Plato, *Timeaus* 50c-51c).³⁰ It is 'intelligible essence'.

It is described how the various elements can change into one another in a downward and upward fashion (from fire going down, from earth going up). Earth takes up a special position in this, because this element is geometrically of a different nature, and therefore earth particles will always remain earth particles in whatever combination they appear. Mixing of elements is a process in which the different particles (triangles, squares) are separated, reshuffled and built up in a new form. The ultimate properties of the bodies that are formed depend on the different sizes of the triangles involved, the different mixture-ratios of the elements, and on the different combinations of opposites (hot and cold, dense, rare, etc.; Partington 1970:58-59). The dominant element will always win over the subordinate element, so if there is more fire than water, the water will evaporate, and become air and fire. If water is dominant, the fire will be extinguished and become air and water. This process of mixing takes place in a circle and is therefore continuous. Movement/change is caused by a lack of uniformity, because if there is uniformity there would be no movement. The fact that movement is always present and never stops (when

³⁰ Plato (*Timeaus* 51a) himself calls this 'mysterious' and 'most incomprehensible'.

like has found like) is explained by the four elements, they keep the process of change going, a permanent 'want for uniformity' (Plato, *Timeaus* 56c-58c).

Although the elements are part of the created and physical world, they are also imitations of immortal principles (Plato, *Timeaus* 42-43a). Plato considers the dynamic of the physical elements and how they create change as 'secondary causes': 'They are thought by most men not to be the second, but the prime causes of all things, because they freeze and heat, and contract and dilate, and the like. But they are not so, for they are incapable of reason or intellect; the only being which can properly have mind is the invisible soul, whereas fire and water, and earth and air, are all of them visible bodies'. In physical nature we can see the causes of 'necessity', in soul we look for 'divine causes' (Plato, *Timeaus* 46d, 68e). This is an important aspect of Plato's cosmology: the qualities of hot, cold, et cetera are not primordial in explaining the dynamic between elements. Firstly, because underlying these qualities are geometrical aspects which cause these processes to occur (Plato, *Timeaus* 61d-62a). Secondly, because the physical dynamic is caused by an invisible agent present in all physical matter: soul: the creator 'put intelligence in soul and soul in body' (Plato, *Timeaus* 30b).

There are good reasons to presume that Plato's conception of the soul is linked with the elements of fire, air and water.³¹ These three elements are, as shown in his geometry, fundamentally different from earth. The Soul can be distinguished from the (earthy) body because of its ability to move itself (e.g. Plato, *Timeaus* 36e, 37a-b). Fire is considered the most moveable element by Plato, water the least, earth is immobile. A tripartite conception of the soul can be found in many places in Plato's work, for example in his 'chariot allegory' (Plato, *Phaedrus* 246), where the soul is described by two horses (one going upward, one going downward, and a charioteer managing these two powers). In the *Republic* the soul is described as spirit, reason and desire (Plato, *Republic* 440-443). In *Timeaus* Plato discusses the three 'elements' of the soul: 'the same, the other and the essence' (Plato, *Timeaus* 30b), to describe the soul as being part of two worlds (the world of being and the world of

³¹ In *Timeaus* (46d) Plato contrasts the invisible soul with the visible bodies of the four elements. This seems to contradict the idea of the soul having qualities of fire, air and water. However, the invisible qualities of the elements (the intelligible essence) do not come from the generated world, but from the formless world of being, just like the soul itself, they existed before creation (Plato, *Timeaus* 48b).

generation), the third element mediating between these two. All this seems to imply that fire is the part of the soul that belongs to the world of being, water the part that belongs to the generated world, with air being the seat of reason. In *Timeaus* 37b-c Plato describes that reason has two very different qualities, it is either rational or non-rational. In terms of elements this can be described as follows: the latter quality comes from sense experience (earth) leaving an imprint on the soul (water), from which opinions and beliefs (air) arise. Because these are coming from the generated world, they change all the time and therefore cannot be considered very valuable (Plato, *Timeaus* 51-52). The rational quality of reason can only be attained by connecting the soul to the world of being (by way of contemplation), i.e. connecting air to fire, the only power that goes upwards to the gods. In *Phaedo* a similar discourse can be found: Socrates warns that the soul should not connect herself too much to the changeable world (through the senses), but return into herself and pass into the other world, that of purity, eternity, immortality and unchangeableness (Plato, *Phaedo* 79ff.). It therefore appears that water is considered the lower part of the soul (impressions from sense), fire the higher part (connection to the world of being), and air the pivotal power in charge of steering the other two.

3.5 Aristotle: matter, form and privation

Aristotle's ideas on elements and change are very extensive and spread out over many of his works.³² According to Guthrie (1981:243) 'Aristotle's philosophy was rooted in nature, especially living nature, and the characteristic of natural beings which called above all for explanation, and offered the greatest challenge to the philosopher, was that they moved about, changed, were born and died.' His work is distinctively empirical, leaning heavily on observation and the direct evidence of the senses (Aristotle, *On the Generation of Animals*, iii, 10, 760b). He was also very critical of his predecessors, claiming that Plato, Empedocles and others were not able to adequately explain how generation, growth and decay occur,

³² The main works in which Aristotle's views on these topics can be found are *On-Coming-to-be and passing-away*, *Physics*, *De Caelo (On the Heavens)*, *Meteorologica* and *Metaphysics* (see Aristotle, 2015). This paragraph is mostly based on the first work. For an extensive summary of this work, see for example Guthrie (1981: ch. XII, XI-XIII) and Partington (1970:69-122).

and more generally how motion and change take place (Aristotle, *On-coming-to-be and passing-away*, i, 2, 315a-b). Because of the vastness of his work, we will limit our discussion to those parts that are most relevant to the matter at hand.

Like many of his predecessors, Aristotle tried to solve Parmenides problem of the illusory reality of change. His solution is that substances comprise of matter and form. Matter is the unchanging and imperishable quality of substance, form is its changing realisation. Or as Cohen (1994:151) puts it: matter creates stability or *stasis*, form creates change. According to Aristotle matter can be seen as the potential, form as the actualisation. He introduces the concept of privation to explain that the opposite, unrealised quality of matter is always present in a substance. So matter is considered a duality of which one pole is realised in form and the other stays latent. The latent quality however is implied by the realised quality. Though these two qualities are unchangeable and imperishable, their dynamic creates a constant change in form (Partington 1970:79-81).

Aristotle distinguished between two basic pairs of qualities in matter. First there is the duality of heating and cooling. He saw this as the active principle. As a derivative these two qualities create a second pair: drying and moistening (the passive principle). When a substance has a dry quality, it has a determinate form, when it has a moist quality the form will be indeterminate (it takes the form of whatever vessel it is in).³³ These two pairs of qualities are immaterial and cannot be mixed. They are constantly in contact with each other, which creates the dynamic of change in form. Other qualities of matter, such as solidity and fluidity, are considered derivatives of these two basic pairs (Partington 1970:86-90).

The elements fire, air, water and earth are considered composite bodies, because every element consists of a combination of the aforementioned qualities: fire is hot and dry, air is hot and moist, water is cold and moist and earth is cold and dry.³⁴ Aristotle called them simple bodies. They are not to be equated with natural phenomena: fire as a natural

³³ Liquid bodies (moist elements air and water, BR) 'are the most combinable of all bodies' (Aristotle, *On-coming-to-be and passing-away*, i, 10, 328b).

³⁴ This makes it easy to see why Aristotle called them the 'so-called elements', because in his eyes they were not elementary, like the four qualities of matter (Aristotle, *Physics*, iii, 4-5).

phenomenon is ‘like fire’ (the simple body consisting of heat and dryness), but in nature as we know it, it is always a blend in which the other elements are also present (Aristotle, *On-coming-to-be and passing-away*, ii, 4, 331a). In every element one of the qualities is dominant. Fire is mainly hot, earth is mainly dry, air is mainly moist and water is mainly cold.³⁵

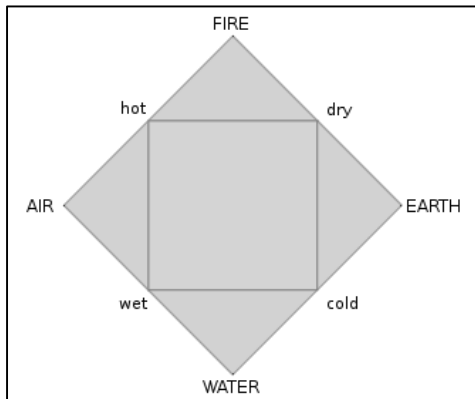


Figure 3: The four qualities in the elements according to Aristotle

Elements can be different and the same at once, i.e. substances can be different, while matter is (partly) the same: fire and air are different elements, because one element is dry and the other is moist, but they share the quality of heat, the same goes for the other elements (see figure 3). Because the elements all share one (manifested) quality with another element, they can easily change into one another. This is described as a cyclical process (see figure 3): fire changes into air when ‘the dry is overpowered by the moist’, air changes into water when ‘the hot is overpowered by the cold’, et cetera (Aristotle, *On-coming-to-be and passing-away*, ii, 4, 331a). When adjacent elements are mixing in this way, they cannot change into a third element. So earth and water, both cold, cannot turn into air or fire (both hot). The nonadjacent elements (fire vs. water and air vs. earth) don’t share (manifested) qualities. Fire, for example, is hot and dry, while water is cold and moist. This does not mean these elements cannot change into one another: because cold is the privation of hot (and vice versa) and moist is the privation of dry (and vice versa), the underlying matter of these elements is still the same, however, the process of change will be

³⁵ Partington (1970:88) point to the fact that Aristotle is not consistent in the way he attributes the dominant qualities. He also mentions moist as the dominant quality of water.

more difficult and will have less speed, because two qualities instead of one have to be transformed. It is also possible that the mixing of two nonadjacent elements, such as fire and water, will result in the appearance of a new element, in this case air or earth (depending on the qualities that will 'win' in the mix). This is also true for the mixing of air and earth: this can result in fire or water (Aristotle, *On-coming-to-be and passing-away*, ii, 3-4, 331a).

In Aristotle's description change is a consequence of the essential nature of elements. All evolution and change can be seen as transitions from ever present potential to actualisation in the here and now. Change, to be more precise, is the process by which matter (the stable reality – stasis) takes on different forms by way of opposing qualities creating each other (antiperistasis; Partington 1970:90-91).

Aristotle discusses four mechanisms of change: change in quantity, change in quality, change in place and change in substance (Aristotle, *On-coming-to-be and passing-away*, i, 4, 319b). The first one, change in quantity, happens when the change from one opposite to the other is quantitative. This will create phenomena of growth and diminution. The second one, change in quality, creates alteration. For example when a sculptor creates a statue from a block of marble (the substance stays the same). The third mechanism, change in place, creates motion. This is the result of the natural movement of elements. In *De Caelo* (i.,2, 269a) Aristotle discusses the notion that fire and air have a natural tendency to move upward, while water and earth move downward towards the centre (of the universe: the earth, BR). Together these linear movements create a circular motion in which every element has its own stable place, according to its natural tendency; fire is the highest element, earth the lowest (as seen from the earth), with air and water taking in between positions (air being above water). When elements are mixed and, for example, air is added to water, this watery substance becomes more airy and will move upward to its natural place, where it will be at rest. When earth is added to whatever substance, this substance will become heavier and show a tendency to move towards the centre. The natural order of the elements resulting from this, from fire via air and water down to earth, is characteristic of classical Greek thinking.

The fourth and last mechanism by which change can take place, is change in substance, for example when the acorn becomes an oak tree or when water becomes air. This accounts for

coming-to-be and passing-away, which are considered two sides of the same coin (due to the mechanism of antiperistasis). Aristotle stressed the importance of these phenomena and their fundamental difference from the process of alteration (where substance stays the same, but only qualities change). Why substances take on a specific form (a man or a horse) is explained by the notion of the final cause: there is a purpose to it (Partington 1970:85).³⁶

Aristotle's main contribution to the theory of elements is not only that he systematized the available knowledge, he also added much more detailed accounts of how processes of change (in elements) take place. It is not hard to see why his thorough views stayed popular for many centuries. With the heavy focus on observation his work can also be seen as an important onset for a more materialistic approach to elements. Later developments in physics and chemistry lean heavily on his work (Partington 1970, Cobb & Goldwhite 1995, Ball 2002).

3.6 Conclusion

This chapter has shown how theories on elements have evolved from the first notions of the Milesians in the sixth century to the elaborated and refined model of Aristotle. As we have discussed in the previous chapter, these theories differ in many important respects: ontological and epistemological assumptions, definitions of what elements are, how change occurs, et cetera. But we can also observe some common threads. What these theories share is that they employ –on any level- a pluralistic perspective on fundamental matter. It is this pluralism that creates dynamic and change in the universe, because the four elements have qualities of which some are shared more or less with other elements, and others are more or less of an opposing nature. This creates a dynamic of change. Aristotle has defined the basic qualities as hot and cold, and dry and moist, but we have seen other qualities as well. These qualities, however conceptualized, create orderliness, in which fire is considered

³⁶ This ultimately brings Aristotle to his God-concept: the unmoved mover, that which moves but is not moved itself (Partington 1970:83).

the lightest, rarest, and highest element, and earth the heaviest, densest and lowest element (seen from the centre of the universe), the other two elements, air and water, lie in between and connect fire and earth. From an Aristotelian point of view, fire and water, air and earth are considered the most contrary, because these elements do not share (manifested) qualities. At the same time we see in his work, as well as in other classical theories, a fundamental contrariety between fire and earth on the one hand and air and water on the other, the first two being the fundamental or primary forces in the universe, the latter two mediating between these two. The mechanisms of change vary between the different theories, from the mechanisms of love and strife in Empedocles to the geometry of Plato and the detailed accounts of Aristotle on form and privation as manifestations of matter. Many Greek philosophers and cosmologists have described this dynamic as a battle in which the strongest of the opposites wins and subordinates the other (Kahn 1960:130).

4. Jung on psychic functions and change

In comparing Jung's theory on psychological types with the classical views on elements presented in the previous chapter, we need to take into account that this theory was never explicitly linked to the concept of elements.³⁷ In his original book on psychological types (from 1921) there is no reference to elements at all. In later lectures on this typology, Jung refers to the four elements and to the closely related concept of the four temperaments, but only to point out that these kind of typologies are timeless (Jung 1971: ¶933).³⁸ Occasionally he is even quite critical of the ancient approach of temperaments, saying that 'our scientific conscience does not permit us to revert to these old, intuitive ways of thinking' (Jung 1971: ¶934). He mentions how the physiological theory underlying Galen's theory of temperaments, has long since been superseded, and he criticizes the fact that this typology is based on a limited aspect of the human psyche, namely emotional behaviour or affect (Jung 1971: ¶883ff.). All in all, it is safe to say that Jung did not explicitly intend his psychological types to equate with the four elements from antiquity. Moreover, we find various indications that he wanted to deviate from the idea of temperaments, a concept closely linked with the classical elements.³⁹

Later in life Jung became fascinated with the archetype of the quaternity (totality in fourness). In his books *Psychology and Religion* (originally published in 1937), *Psychology and Alchemy* (1944/5), *Aion* (1950) and *Mysterium Coniunctionis* (1956) he discusses this archetype and also relates it to the four elements and the four psychic functions. It is

³⁷ A psychological type is the psychic function that is dominant in a person (e.g. intuition). In this thesis the terms psychic function and psychological type are used side by side.

³⁸ These lectures are added to the book *Psychological Types* in the Collected Works (Jung 1971).

³⁹ Jung considers his typology as one out of many possible ones. For him the main advantage of his own typology over others, is its practical use: 'no other typology possesses so great a practical significance' (Jung 1971: ¶914).

necessary for us to take a closer look at this work, because it will help us gain a deeper understanding of Jung's views on elements.

Jung's notions on change in elements will be discussed in the light of these two perspectives; psychic functions in paragraph 4.1 and quaternity in 4.2. In paragraph 4.3, we will compare his ideas to the classical views.

4.1 Psychological types and enantiodromia

People can be ordered according to their dominant psychic function. Jung defines four such functions: thinking and feeling, sensation and intuition (Jung 1971: ¶1731). The latter two are seen as a priori phenomena related to pure perception. Jung calls sensation 'conscious perception' (the perception of physical stimuli), and intuition, 'unconscious perception' (perception of psychic data). Because there is no evaluation or reflection involved these functions are considered irrational. This does not mean without reason, but *beyond* reason (Jung 1971: ¶1774). Thinking and feeling are considered rational functions, because they reflect on perception, there is judgement involved. Thinking does so by conceptualizing and connecting perceptions, feeling values perception in terms of acceptance or rejection (like and dislike; Jung 1971: ¶1787). The four functions are further divided by the movement of energy, either outwardly oriented (extraversion) or inwardly (introversion). There is no relation between psychic functions and direction of energy. Jung consequently distinguishes eight basic psychological types, based on the dominant psychic function-thinking, feeling, intuition or sensation, and the dominant direction of energy -extraversion or introversion (Jung 1971: ¶1835, 914).

Thinking vs. feeling, intuition vs. sensation, and extraversion vs. introversion all operate on a continuum of opposites. If one side is manifested on a conscious level, the opposite side is present in the unconscious (Jung 1971: ¶1694ff.).⁴⁰ The law of enantiodromia creates the basic dynamic between these opposites: everything that exists turns into its opposite.⁴¹ The

⁴⁰ The conscious and the unconscious are an opposition as well (Jung 1971: ¶1910).

⁴¹ This idea is based on Heraclitus' concept of change (Jung 197: ¶1708).

idea is that change in a person is the consequence of a dynamic in which psychic contents (the four psychic functions) become conscious and differentiated, thereby 'pushing' the opposite functions into the unconscious.⁴² As a ball that is held under water, these unconscious psychic contents want to surface and become conscious as well. When people are clinging to the conscious function—as ego identifies with it,⁴³ the opposite function will disturb this orientation, because the psyche seeks resolution from the tension of opposites. This tension is solved by what Jung calls the transcendent function, which 'facilitates a transition from one attitude to another' (Jung 10971: ¶1828). This function ensures that the process of enantiodromia is not only a process of dissolution and constant conflict, but one of construction as well. Elsewhere Jung equates this transcendent function with the notion of self (Jung 1971: ¶1789). Self represents man as a psychic totality, whereas ego is the part of the psyche that identifies with the conscious parts. In short, one might say that ego helps to differentiate the psychic functions, with the enantiodromian 'push' as accompanying phenomenon, while self plays a role in reuniting the opposites.⁴⁴

According to Jung, all psychic functions are equally needed to come to a complete orientation, but in reality these functions are not equally at our disposal. He thinks that only one of the four functions 'is fully conscious and differentiated enough to be freely manipulable by the will, the others remaining partially or wholly unconscious' (Jung 1971: ¶1905). The function that is most developed and used on a conscious level is called the superior function, the opposite function becomes the inferior function that stays undifferentiated in the unconscious. If, for example, somebody is a thinking type, i.e. thinking is the function most commonly used on a conscious level (the superior function), the opposite and inferior feeling function will start compensating the one-sidedness of consciousness by creating an unconscious counterforce of primitive feeling. The stronger a

⁴² Consciousness, in Jung's vision, works as a selection device: it selects contents from the psyche and directs them in a certain direction, therewith excluding all other psychic contents. These stay unconscious and undifferentiated, i.e. they are not separated from the other functions (Jung 1971: ¶1694, ¶1705).

⁴³ Ego is a complex of ideas that constitutes the centre of consciousness. It possesses a high degree of continuity and identity (Jung 1971: ¶1706).

⁴⁴ Jungian analyst Edward Edinger (1995: 321) describes how children start separating the opposites in the psyche and—as a consequence—develop their ego (and the shadow of it in the unconscious). In the second half of their lives, they have to integrate the shadow and unite the opposites again.

person identifies with thinking, the stronger the unconscious feelings will break through the barriers of conscious control (Jung 1971: ¶708). About the function that becomes superior, Jung writes: 'The demands of society compel a man to apply himself first and foremost to the differentiation of the function with which he is best equipped by nature, or which will secure him the greatest social success. Very frequently, indeed as a general rule, a man identifies more or less completely with the most favoured and hence the most developed function' (Jung 1971: ¶763).⁴⁵

The following quote, taken from *Psychological Types*, summarizes how Jung judged the possibility of change (Jung 1971: ¶911):

The alteration of the conscious attitude is no light matter, because any habitual attitude is essentially a more or less conscious ideal, sanctified by custom and historical tradition, and founded on the bedrock of one's innate temperament. The conscious attitude is always in the nature of a Weltanschauung, if it is not explicitly a religion. It is this that makes the type problem so important. The opposition between the types is not merely an external conflict between men, it is the source of endless inner conflicts; the cause not only of external disputes and dislikes, but of nervous ills and psychic suffering.

4.2 Quaternity and the coniunctio oppositorum

In *Psychology and Religion* Jung discusses whether a unity comes from three (the trinity) or from four (the quaternity). Referring to Plato's geometrical theory of the cosmos in *Timeaus*, he concludes that the trinity does indeed create a unity, but one that only exists in the mind.⁴⁶ Jung sees this as a defective quaternity (Jung 1959: ¶351). To establish totality in

⁴⁵ Jung calls the part of the personality (soul) that is oriented toward the outer (conscious) world the persona. The part that is related to inner psychic (unconscious) processes is called the anima (in a man) or animus (in a woman). Persona and anima/us, representing the conscious vs. unconscious dimension of soul/personality, also behave in a complementary way (Jung 1971: ¶797ff.).

⁴⁶ Amongst other things, Jung refers to Plato's three principles in elements: the father-, mother- and child principle (see paragraph 3.4).

physical reality, a fourth element is needed (Jung 1958: ¶183-184). In his view any whole judgement consists of four, like the four directions, the four elements or the four psychic functions discussed in the previous paragraph. Now this fourth element is of a different nature than the other three, which form a unity of their own (the trinity). According to Jung, three elements are available to consciousness, the fourth is not (Jung 1958: ¶245). He relates this fourth, 'unwilling' element to the inferior function or the shadow, 'the darkest and the most unconscious' of all elements (Jung 1977: ¶276).

Jung's discussions on the quaternity are closely linked to alchemy and therefore to the notion of change. He basically follows a line of reasoning that can be traced back to the tetraktys of Pythagoras (see figure 4; Jung 1958: ¶61ff.).

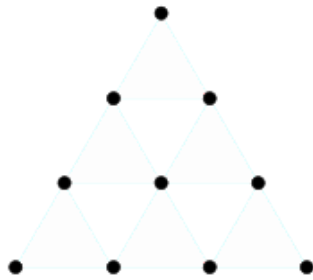


Figure 4: The Pythagorean tetraktys

Dietzelbinger (2005:31-35) summarizes the four principles of the tetraktys as follows: one is oneness and eternity, also the father- or spirit principle. Two is the one divided into two halves, the creation of polarities from energy going in different directions, also the mother, or energy matter principle. Three is the result of combining or integrating the polarities, from which the creation of consciousness comes, also the son, our soul principle. Four is the realisation of consciousness in the physical world, the soul being the connecting principle between spirit and energy matter on the one hand and physical matter on the other.

Jung translates this process into psychological terms. The tetraktys describes a two-way process in which consciousness is created. It starts with unconscious wholeness (the one). On the way down (the descent from one to four) this wholeness is split up into four parts. This splitting up is necessary for the psyche to be able to discriminate and become

conscious. After the splitting up, the parts are combined again and ascend back to unity.⁴⁷ Unconscious wholeness is now replaced by conscious wholeness (Jung 1959: ¶408ff., 1977: ¶1294). Alchemically this process is depicted as 'squaring the circle'. Figure 5 shows the components: the square representing the four elements, the triangle, the synthesizing of the elements by means of fire acting upon air (creating sulphur), air acting upon water (creating mercury), water acting upon earth (creating salt), and earth -having nothing to act upon- functioning as a womb in which the other processes take place. The outer circle depicts the rotational, unifying and eternal character of the process.⁴⁸ The inner circle with the male and female represent the importance of uniting the 'supreme and essential opposition' (Jung 1977: ¶1655).

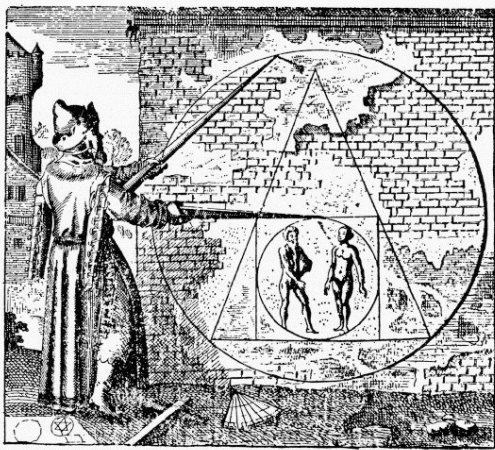


Figure 5: Geometrical representation of the process of transformation (Emblema XXI of Michael Maier's *Atalanta Fugiens*, 1618)

Jung considers the *Coniunctio Oppositorum* as the end result of psychological alchemy, because from the uniting of opposites, consciousness is created. The process itself transcends consciousness, it is 'transconscious' (Jung 1977: ¶14). This means that the ego, which is highly functional in the descending process of discrimination, cannot play a role in the ascending process of reuniting the opposites, because by nature it will cling to one side,

⁴⁷ In his *Mysterium Lectures (Mysterium Coniunctionis)* Jung extensively dwells on the steps in this process (Jung 1977).

⁴⁸ According to Jung the roundness of the circle represents rotation and wholeness at the same time (Jung 1959: ¶1388).

the conscious side. Jung suggests that the *Coniunctio Oppositorum* can only be reached by gaining knowledge of self, the psychic totality that underlies and synthesizes the opposites. Piety is an essential condition to do this (Jung 1977: ¶1657).⁴⁹

From this a very classic picture of elements emerges in which fire is considered the highest element in the tetraktys, representing oneness, and earth the lowest, representing fourness. In Jung's words: 'Fire comes at the beginning and is acted on by nothing, and earth at the end acts on nothing. Between fire and earth there is no interaction; hence the four elements do not constitute a circle, i.e. a totality. This is produced only by the synthesis of male and female' (Jung 1977: ¶1656). Only the soul can connect spirit and matter. Jung does not explicitly translate this process in terms of the other two elements, but it is not hard to see that in this scheme air represents the function of gaining consciousness by creating opposites (the second level in the tetraktys) and water equates with the third level, the soul principle of reuniting the opposites and relating them to the fourth element of earth.

4.3 Comparing perspectives

Jung's theory of psychological types was developed from years of professional experience. He then surveyed the history of psychological typologies and concluded that he needed to take a different approach. Hence we do not find an explicit connection between his types and the four elements, except for the observation that both comprise four basic functions.⁵⁰ In his later work on alchemy and the quaternity, the classical elements enter the picture more and more. Here they are also explicitly linked to psychic functions. For example, in his *Mysterium Coniunctionis* Jung writes 'Psychologically the four [elements] are the four orienting functions of consciousness, two of them perceptive (irrational), and two

⁴⁹ In practice this means that man should allow enough space for unconscious contents to enter consciousness. For example, by doing dreamwork, practising active imagination, using information from the outside world (projected unconscious contents), et cetera.

⁵⁰ The addition of direction of energy (introversion and extraversion) to these four functions is a clear deviation from the classical model, in which the cold elements (water and earth) are associated with an inward movement of energy, and fire and air with an outward movement of energy. According to Jung psychic functions and direction of energy are not related (Jung 1971: ¶1835-836).

discriminative (rational). We could say that all mythological figures who are marked by a quaternity have ultimately to do with the structure of consciousness (Jung 1977: ¶1557).

A possibly complicating factor in the comparison is that Jung might have changed his views over time. An example of this is the way he deals with superior and inferior functions. In *Psychological Types*, he discusses how only one function can become fully conscious (Jung 1971: ¶1905). In *Psychology and Religion*, the focus is on the one element that stays unconscious, the other three being available to consciousness (Jung 1958: ¶1245). The latter analysis is more 'classic'. The idea of the quaternity as consisting of a trinity plus a fourth element that is different, unwilling, or in Jung's terms inferior, is not only present in Plato's *Timeaus*, but in many other classical works as well. In most versions earth is the dark, fourth element, the other three being the 'volatilia of spirit' (Jung 1958: ¶107, 264, 290).

By and large the similarities between Jung's psychic functions and the classical elements are most striking. Generally, Jung's work is fully built on the heritage of classical thinking. First of all, there is the crucial importance of the number four in both Jung's work and the classical texts.

Secondly, Jung's distinction between irrational and rational functions reflects the classical idea of two given elements and two derived elements. In Parmenides we read that fire and a dark heavy body were created from oneness; at its centre the goddess who makes the male mate with the female (Freeman 1948: fr. 8,9,12). Plato's cosmogony starts in the same fashion: first there is fire and earth, then a third element is needed to mediate between these two. Because the world is a solid, the mediating is 'done' by two elements: air and water (Plato, *Timeaus* 31b-32c). In antiquity fire and earth were commonly regarded as the two extreme elements. Air and water were the intermediate elements (Cornford 1997:45). Jung's conception of the four functions follows a similar pattern. The 'given' pair of intuition and sensation is complemented with the 'derived' or 'produced' pair of thinking and feeling. The former pair of functions being primary, the latter pair secondary (Jung 1971: ¶770, 772).

Jung's principle of rationality has stirred up many questions, but if we consider his model in the light of these classical theories, it seems quite obvious that it basically deals with the mediating principle, the moist quality in classical elements. The two given realities that can be perceived by either intuition or sensation can only be brought together by the mediating

and judging functions of thinking and feeling. It implies that Jung's intuition and sensation equate with the elements of fire and earth, and thinking and feeling with air and water.⁵¹ The equation of feeling with water and intuition with fire also neatly fits Plato's idea of the soul, in which the lower part, depicted by the water element, is connected to the world of matter, and the higher part, represented by fire, is connected to a world outside the material realm.⁵² The criticism of astrologers (like Hand 1981:242ff.), that feeling can hardly be called a rational, reflective function, is only true if we assign a modern meaning to rationality.

Thirdly, both the dynamic between Jung's psychic functions and the classical elements is characterized by the working of opposites, by the splitting and (re-)uniting of these opposites (strife and love in Empedocles, 'ego' and 'self' in Jung) and by the notion of manifest and latent qualities (form and privation in Aristotle, conscious and unconscious functions in Jung). Furthermore, Jung's suggestion of a superior element looks very much like the argument in many classical texts - that the dominant element will always win over the subordinate element. Jung's general description of the dynamic between psychic functions is particularly Heraclitean; we already saw this in his use of the concept of enantiodromia.

Jung defines intuition versus sensation (fire/earth) and thinking versus feeling (air/water) as the basic opposites. Here he clearly deviates from the Aristotelian model in which cold and moist water is opposite from hot and dry fire, and hot and moist air is opposite from cold and dry earth (see figure 3 in paragraph 3.5). This is a very fascinating feature, because in many places in his work Jung shows that he is aware of this classical model of opposites and also uses it⁵³

⁵¹ Jung: 'Feeling allies itself with (...) sensation' (1971: ¶725), 'Thinking brings the contents of ideation into conceptual connection with one another' (1971: ¶830).

⁵² Jung equates fire with the collective unconscious (Jung 1971: ¶773)

⁵³ Already in *Psychological Types* Jung uses the classical air-earth and fire-water oppositions: 'A man of pronounced sanguine temperament will tell you that at bottom he is deeply melancholic; a choleric, that his only fault consists in his having always been too phlegmatic (Jung 1971: ¶888). A few other examples where he shows the classical oppositions of elements can be found in Jung (1968: ¶336,338,433; 1977: ¶2,37,330).

It is important to note that in Aristotle’s work, as in Jung’s theory, we find the crucial distinction between fire and earth, which ‘are extremes and very pure, while water and air are intermediates and more mixed’ (Aristotle, *On-coming-to-be and passing-away*, ii,3, 330b-331a). So it is clear that both Aristotle and Jung rank the elements in the same, classical way, with fire on top and earth at the bottom as fixed entities, and air and water in between as male and female connecting mechanisms. From that point Jung and Aristotle differ in the way they assign the basic pairs of opposites; Aristotle defines them *between* the pairs of elements (fire/earth vs. water/air), Jung defines them *within* these pairs.

Figure 6 presents the four classical elements and Jung’s psychic functions, as well as their basic oppositions. Aristotle’s model shows the opposites as non-adjacent steps in a developmental process: we cannot go from fire to water without the moistening effect of air, or vice versa: we cannot go from water to fire without the heating of air.⁵⁴ The oppositions in Jung’s model mirror a cosmology of two very different worlds, of which one can be perceived by sense, the other by intuition. The two intermediate elements describe an active principle (air), which brings fire or spirit into matter (or the body), and a passive principle, which brings matter (or bodily sensations) into spirit. By distinguishing between perception and judgement, Jung makes it clear that within these pairs of elements there are also fundamental oppositions at work. He gives these oppositions primacy over the Aristotelian ones.

Level in Tetraktys	<i>Element</i>	<i>Primary (and secondary) qualities in Aristotle</i>	<i>Psychic functions in Jung</i>
1	Fire	Heating (drying)	Intuition
2	Air	Moistening (heating)	Thinking
3	Water	Cooling (moistening)	Feeling
4	Earth	Drying (cooling)	Sensation

Figure 6 Elements, psychic functions and primary opposites (shaded planes)

⁵⁴ The primary qualities describe the effect the elements have when working in a downward direction (from 1 to 4), the secondary qualities describe the effect in an upward direction (from 4 to 1). As an example: water cools air, but moistens earth. This shows that the specific working of elements is dependent on the elements they act upon.

4.4 Conclusion

To judge Jung's classification of psychic functions in relation to those of the classical elements, we need to look further than his work on psychological types. His later work is full of references to the classical elements. Although quite implicit in many respects, it is clear that for Jung, psychological types are related to the four elements. He has translated them into four functions of consciousness, and stresses the fact that all these functions are needed to reach wholeness. The way he describes the mechanisms by which the functions interact with one another leans heavily on the heritage of Pythagorean, Empedoclean and Platonic thinking. The fact that his basic pair of opposites deviates from the Aristotelian model, is definitely not a sign of modernism; Jung's approach is deeply rooted in philosophical and alchemical traditions going back to Pythagoras.

5. Conclusion: Classical elements as the gates to consciousness

The answer to the question, whether Jung's theory of psychic functions can be seen as congruent with classical theories on elements, is undoubtedly affirmative. To see the parallels, we have to look beyond his writings on psychological types. In his later work on the quaternity and on alchemy, the four psychic functions take the place of the four elements of antiquity. The description of the dynamic between these functions and the way change takes place, is also deeply rooted in classical thinking. Jung argues that the real transformation (alchemy) takes place in psyche and not in matter (Jung 1959: ¶256, 1968: ¶564).

The psychic functions are arranged in the same way as the classical elements, with fire/intuition and earth/sensation as given realities or perceptive functions, the first located up high, the second down below. Air/thinking and water/feeling are derived realities or apperceptive functions, mediating between the other two elements/functions. This follows the classical descriptions of elements in Parmenides, Plato and Aristotle. In Jung's view dynamic and change is the result of a process in which a unity is divided into (two pairs of) opposites, an idea already formulated by Anaximander and Parmenides (Fairbank 1898:9-13, Parmenides: fr.8-13).⁵⁵ Conversely, the idea that opposites reflect an underlying unity, was already articulated by Heraclitus, arguing that opposite things are identical, two realities are one and everything is and is not at the same time (Graham 2015a: ¶13). Jung's ideas on conscious and unconscious parts of the psyche and the division of superior and inferior function, are fully in line with this way of thinking.⁵⁶ The basic mechanisms creating the dynamic between opposites, are classical as well. Jung opens *Mysterium Coniunctionis* with the following sentence: 'The factors which come together in the coniunctio are conceived as

⁵⁵ All original fragments in this chapter are from Freeman (1948).

⁵⁶ In *Psychology and Alchemy*, Jung (1968: ¶398) discusses why consciousness cannot comprehend the fact that in the unconscious opposites are identical and present at the same time (because on that level functions are not differentiated). Consciousness can only deal with directional contents of psyche, one side of the opposite. This might explain why later authors saw a logical incoherence in Heraclitus' notions on opposites, on which Jung based his model (Graham 2015a: ¶13).

opposites, either confronting one another in enmity or attracting one another in love' (Jung 1977: ¶11). This sentence could have come directly from Empedocles' poems (e.g. fr.17).

It would be easy to add many more examples to illustrate the strong classical lineage in Jung's work. However, it is important to note that his approach is particularly platonic. Reality is not in the first place found in the observation of physical phenomena, but in the realm of the unconscious, Jung's version of Plato's forms. Only by integrating this larger reality into (ego-)consciousness, man is able to learn from experience (Jung 1968: ¶563). This is why his work is mostly build on (neo-)platonic sources, including the ones *avant la lettre*, like Pythagoras, Heraclitus and Empedocles.

The platonic outlook may also explain why Jung's basic pairs of opposites are different from those of Aristotle. The work on the quaternity can be seen as a response to the Parmenidean problem of change and the discussions on monism and pluralism in antiquity. In Jung's view, the world of creation and change is a necessary feature of totality, because the four elements, the instruments of creation and change, are needed to transform unconscious oneness into conscious oneness. Fourness does therefore not oppose oneness, they are part of the same reality, the holy quaternity. Though the elements are the agents of creation and change, their reality is not limited to the material world. Jung's oppositions and the dynamic between them, are described in a cosmological frame that explicitly comprises a reality that lies outside the material realm. For instance, in *Psychology and Alchemy* he refers to an ancient theory of soul, that describes how only one part of it is confined to the body, and he uses this theory to show that we can only learn about the full reality if we do not confine ourselves to empirical truths (Jung 1968: ¶399). In terms of the Pythagorean tetraktys, Jung's elements and opposites very likely refer to all four levels.

Aristotle, on the other hand, although he was aware of the fact that elements are not limited to substances, relies heavily on observation of physical phenomena in describing elemental dynamic. By doing this he may have limited himself to the fourth layer of the tetraktys. Possibly this theory describes the dynamic between elements on a horizontal axis, the physical reality, while Jung's perspective is evidently vertical. If this analysis proves valid, Jung's model of opposites describes a different process, a higher order process one might say, in which the horizontal dynamic of elements is of secondary importance. This can also

explain why Jung uses the Aristotelian opposites next to his own; apparently the two models refer to different dimensions of reality.

This analysis obliges us to reject the criticism of astrologers against Jung's psychological types as not corresponding with the classical elements. Hand (1981:243) argues that Jung's idea of opposing functions is different from classical elements, because in the latter model elements can exist next to each other, while in Jung's model they exclude each other.

However, Jung only argues that psychic functions cannot manifest themselves at the same time *on a conscious level*. He uses the very classical idea that one end of the opposition is manifested, while the other stays latent. Besides, the latent function does manifest itself, but on an unconscious level and in a way that is compensatory to conscious manifestation.

Hand (1981:243) also argues that Jung's psychic functions are limited to cognitive modes and that classical elements refer to other aspects of life as well. However, these functions cover a much broader range of phenomena than cognitive modes. For Jung it works the other way around: all phenomena in reality can be understood in terms of the structure of consciousness (Jung 1977: ¶1557). Jung's concept of psychic functions deals not only with specific phenomena in individuals, but with reality as a whole.

Finally, Hand (1981:243-245) argues that the attribution of intuition to fire and feeling to water does not especially fit the classical interpretation of these elements. He underpins this with the argument that Jung assigns paranormal experiences to fire, while in his view these belong to water, because they refer to existing instead of non-existing realities.⁵⁷ Water is, in his view, as intuitive as fire, and certainly not rational. Concerning the latter point, Jung uses the term 'rational' in a way that is clearly different from modern use; the rationality of feeling should be understood in terms of apperception, as opposed to perception. Rational equates with the moist quality of elements in antiquity. Furthermore, Jung treats intuition and feeling very much like the classics treated fire and water. Intuition provides a direct connection to the world of the gods, in Jung's vocabulary the collective unconscious, while feeling does so through past personal experiences in the body, or as Jung puts it, through the

⁵⁷ According to Hand (1981:244), non-existing realities are classically related to fire.

personal unconscious. Therefore, feeling provides an indirect connection to the collective unconscious. The same idea was formulated in antiquity, concerning fire and water. Plato, for example, equated fire with the world of forms and saw water as the reflective function of fire (Cornford 1937:28), just as the moon (water) reflects and passes on the light of the sun (fire).

The comparison of Jung's theory with the classical views has provided us with some answers, but it has also raised many new questions that we cannot answer here. The issue of which element becomes superior or inferior, is one of them. From a Platonic view, earth or sensation would definitely qualify for the inferior element, but Jung does not seem to follow this conclusion. Another issue that needs further investigation concerns Jung's idea that all functions are equally needed to come to a complete orientation. We see this idea in Hippocratic medicine as well: perfect health is attained when the four elements are 'duly proportioned to one another in respect of compounding, power and bulk, resulting in a perfect integration' (Hippocrates, *Nature of Man* IV). However, Empedocles, in his metaphor of the painter, claims that harmony can be reached by combining a limited number of colours (fr.23).

Finally, we must realise our limitations in understanding the elements and what they are about. Jung describes how many medieval alchemists struggled with this, until it dawned on them that their work was somehow connected with the human psyche. The 'secret lies hidden in the human mind', says Jung (Jung 1968: ¶1361ff.). This secret may only be revealed when we allow the unconscious a place at the table. In conclusion I would like to add, that this might take a while, but the journey definitely proves worthwhile in its own right.

References

- Alkindi 1975. *De Radiis Stellaris [On the Stellar Rays]*. Translated by Robert Zoller, www.new-library.com.
- Aristotle 1922. *De Caelo (by J.L. Stocks)*, London [etc.], Oxford University Press.
- Aristotle 1952. *Meteorologica (translated by H.D.P. Lee)*, Cambridge MA, London, Harvard University Press/William Heinemann.
- Aristotle 1955. On-Coming-To-Be and Passing-Away. In: Forster, E. S. & Furley, D. J. (eds.) *Aristotle - On Sophistical Refutations - On-Coming-To-Be and Passing-Away - On the Cosmos*. Cambridge, MA: Harvard University Press.
- Aristotle. 2015. *Aristotle - Works [Translated under the editorship of W. D. Ross]* [Online]. Available: <http://www.constitution.org/ari/aristotle-organon+physics.pdf> [Accessed 27 october 2015].
- Aristotle. 2015. *On the Generation of Animals* [Online]. Available: <http://www.constitution.org/ari/aristotle-organon+physics.pdf> [Accessed 27 october 2015].
- Aristotle. 2015. *Physics* [Online]. Available: <http://www.constitution.org/ari/aristotle-organon+physics.pdf> [Accessed 27 october 2015].
- Ball, P. 2002. *The Elements. A Very Short Introduction*, Oxford [etc.].
- Banzhaf, H. 1994. *Die Vier Elemente in Astrologie und Tarot [The Four Elements in Astrology and Tarot]*, München, Goldman Verlag.
- Brunschwig, J. & Lloyd, G. E. R. (eds.) 2003. *A Guide to Greek Thought: Major Figures and Trends [translated under direction of Catherine Porter]*, Cambridge MA, London UK: The Belknap Press of Harvard University Press.
- Campbell, G. 2015. *Empedocles (c. 492-432 B.C.E.)* [Online]. Internet Encyclopedia of Philosophy; a Peer-Reviewed Academic Resource. Available: <http://www.iep.utm.edu/anaximan/> [Accessed August, 8th 2015].
- Cobb, C. & Goldwhite, H. 1995. *Creations of Fire. Chemistry's Lively History from Alchemy to the Atomic Age*, New York, Basic Books.
- Cohen, S. M. 1994. Aristotle on Elemental Motion. *Phronesis*, 39, 150-159.

- Cornford, F. M. 1997. *Plato's Cosmology; The Timaeus of Plato*, Indianapolis/Cambridge, Hackett PC.
- Couprie, D. L. 2015. *Anaximander (c. 610—546 B.C.E.)* [Online]. Internet Encyclopedia of Philosophy; a Peer-Reviewed Academic Resource. Available: <http://www.iep.utm.edu/anaximan/> [Accessed August, 8th 2015].
- Crowley, T. J. 2005. *On the Use of Stoicheion in the Sense of 'Element'* [Online]. Academia.edu. Available: [http://www.academia.edu/3742201/On the Use of stoicheion in the Sense of Element](http://www.academia.edu/3742201/On_the_Use_of_stoicheion_in_the_Sense_of_Element) [Accessed August, 8th 2015].
- Diels, H. 1899. *Elementum: Einem vorarbeit zum Griechischen und Lateinischen thesaurus [Elemental: A Preliminary Work to Greek an Latin Thesaurus]*, Leipzig, B.G. Teubner.
- Dietzfelbinger, K. 2005. *Pythagoras. Wissenschaft und Spiritualität [Pythagoras. Science and Spirituality]*, Königsdorf, Königsdorfer Verlag.
- Edinger, E. F. 1995. *The Mysterium Lectures. A Journey through C.G. Jung's Mysterium Coniunctionis*, Toronto, Inner City Books.
- Fairbanks, A. 1898. *The First Philosophers of Greece. An Edition and Translation of the Remaining Fragments of the pre-Socratic Philosophers, together with a Translation of the More Important Accounts on Their Opinions Contained in the Early Epitomes of Their Works*, London, Kegan paul, Trench, Trubner & co.
- Franz, M.-L. V. 1995. *Creation Myths*, Boston/London, Shambhala Publications.
- Freeman, K. 1948. *Ancilla to the Pre-Socratic Philosophers. A Complete Translation of the Fragments in Diels, Fragmente der Vorsokratiker* [Online]. Harvard University Press Available: <http://www.sacred-texts.com/cla/app/> [Accessed August, 8th 2015].
- Furley, D. 2006. *The Greek Cosmologists -Volume I: The formation of the atomic theory and its earliest critics*, Cambridge University Press.
- Gieseler-Greenbaum, D. 2005. *Temperament. Astrology's Forgotten Key*, Bournemouth, UK, The Wessex's Astrologer.
- Graham, D. W. 2015a. *Heraclitus (fl. c. 500 B.C.E.)* [Online]. Internet Encyclopedia of Philosophy; a Peer-Reviewed Academic Resource. Available: <http://www.iep.utm.edu/anaximan/> [Accessed August, 8th 2015].

- Graham, D. W. 2015b. *Anaximenes (d. 528 B.C.E.)* [Online]. Internet Encyclopedia of Philosophy; a Peer-Reviewed Academic Resource. Available: <http://www.iep.utm.edu/anaximan/> [Accessed August, 8th 2015].
- Greene, L. 1977. *An Astrological Guide to Living with Others on a Small Planet*, York Beach (Maine), Samuel Weiser.
- Guthrie, W. K. C. 1981. *A History of Greek Philosophy: Volume 6, Aristotle: An Encounter*, Cambridge UK [etc.], Cambridge University Press.
- Hamaker-Zondag, K. 1978. *Psyche en Astrologisch Symbool. Een Astrologische beschouwing over Psychische Energieën [Psyche and Astrological Symbol. An Astrological Contemplation on Psychological Energies]*, Amsterdam, Schors.
- Hamaker-Zondag, K. 1979. *Elementen en kruizen als basis van de horoscoop [Elements and Modes as basis of the Horoscope]*, Amsterdam, Schors.
- Hand, R. 1981. *Horoscoop Symbolen. Punten op de i in astrologie [translated from Horoscope Symbols]*, Amsterdam, Schors.
- Hippocrates 1959. Nature of Man. In: Jones, W. H. S. (ed.) *Hippocrates Vol IV, Heracleitus in the Universe*. London, Cambridge MA: William Heineman, Harvard University Press.
- Hippocrates. 2015. *On Ancient Medicine (Translated by Francis Adams)* [Online]. Available: <http://classics.mit.edu//Hippocrates/ancimed.html> [Accessed August, 17th 2015].
- Jirsa, J. 2008. Plato on Characteristics of God: Laws X. 887c5-899d3. *Rhizai*, V.2, 239-259.
- Jung, C. G. 1958. *Psychology and Religion: West and East (Collected Works, Vol. 11)*, New York, Pantheon Books.
- Jung, C. G. 1959. *Aion. Researches into the Phenomenology of Self (Collected Work, Vol. 9)*, Princeton NJ, Princeton University Press.
- Jung, C. G. 1968. *Psychology and Alchemy (Collected Works, Vol. 12)*, London, Routledge.
- Jung, C. G. 1971. *Psychological Types (Collected Works, Vol. 6)*, London, Routledge.
- Jung, C. G. 1977. *Mysterium Coniunctionis. An Inquiry into the Separation and Synthesis of Psychic Opposites in Alchemy (Collected Works, Vol. 14)*, Princeton, NJ, Princeton University Press.
- Kahn, C. H. 1960. *Anaximander and the Origins of Greek Cosmology*, New York, Columbia University Press.
- Kingsley, P. 1994. Empedocles and His Interpreters: The Four-Element Doxography. *Phronesis*, 39, 235-254.

- Kingsley, P. 1995. Notes on Air: Four Questions of Meaning in Empedocles and Anaxagoras. *The Classical Quarterly, New Series*, 45, 26-29.
- Kirk, G. S. & Raven, J. E. 1957. *The Pre-Socratic Philosophers; A Critical History with a Selection of Texts*, London/New York, Cambridge University Press.
- Lee, M.-K. 2011. The Distinction between Primary and Secondary Qualities in Ancient Greek Philosophy. In: Nolan, L. (ed.) *Primary and Secondary Qualities: The Historical and Ongoing Debate*. Oxford: Oxford University Press.
- Lloyd, G. E. R. 1975. The Hippocratic Question. *The Classical Quarterly, New Series*, 25, 171-192.
- Lucretius. 2008. *Of the Nature of Things [Translation by William Ellery Leonard]* [Online]. The Project Gutenberg. Available: http://www.gutenberg.org/files/785/785-h/785-h.htm#link2H_4_0002 [Accessed August, 8th 2015].
- O'grady, P. 2015. *Thales of Miletus (c. 620 B.C.E. - c. 546 B.C.E.)* [Online]. Internet Encyclopedia of Philosophy; a Peer-Reviewed Academic Resource. Available: <http://www.iep.utm.edu/anaximan/> [Accessed August, 8th 2015].
- Parry, R. 2012. *Empedocles* [Online]. The Stanford Encyclopedia of Philosophy (Fall 2012 Edition). Available: <http://plato.stanford.edu/entries/empedocles/> [Accessed august, 15th 2015].
- Partington, J. R. 1970. *A History of Chemistry. Volume One, Part I: Theoretical Background*, London/New York.
- Patzia, M. 2015. *Anaxagoras (c. 500 - 428 B.C.E.)* [Online]. Internet Encyclopedia of Philosophy; a Peer-Reviewed Academic Resource. Available: <http://www.iep.utm.edu/anaximan/> [Accessed August, 8th 2015].
- Plato 1892. Phaedo. In: Jowett, B. (ed.) *The Dialogues of Plato translated into English with Analyses and Introductions, Vol. II*. Oxford/London: Oxford University Press/Humfrey Milford.
- Plato 1892. Phaedrus. In: Jowett, B. (ed.) *The Dialogues of Plato translated into English with Analyses and Introductions, Vol. I*. Oxford/London: Oxford University Press/Humfrey Milford.
- Plato 1892. Republic. In: Jowett, B. (ed.) *The Dialogues of Plato translated into English with Analyses and Introductions, Vol. III*. Oxford/London: Oxford University Press/Humfrey Milford.

- Plato 1892. Theaetetus. In: Jowett, B. (ed.) *The Dialogues of Plato translated into English with Analyses and Introductions, Vol. IV.* Oxford/London: Oxford University Press/Humphrey Milford.
- Plato 1892. Timeaus. In: Jowett, B. (ed.) *The Dialogues of Plato translated into English with Analyses and Introductions, Vol. III.* Oxford/London: Oxford University Press/Humphrey Milford.
- Restrepo, G. & Villaveces, J. L. 2012. Mathematical Thinking in Chemistry. *HYLE - International Journal for Philosophy of Chemistry*, 18, 3-22.
- Richet, C. 1910. An Address on Ancient Humorism and Modern Humorism. *The British Medical Journal*, 2, 921-926.
- Sedley, D. 1998. *Parmenides* [Online]. Available: <https://www.rep.routledge.com/articles/parmenides-early-to-mid-5th-century-bc> [Accessed August 8th 2015].
- Siorvanes, L. 1986. *Proclus on the Elements and the Celestial Bodies: Physical Thought in late Neoplatonism*. PhD, University College London.
- Strathern, P. 2000. *Mendeleev's Dream. The Quest for the Elements*, New York, St. Martin's Press.
- Tobyn, G. 2013. *Culpeper's Medicine. A Practice of Western Holistic Medicine*, London/Philadelphia, Singing Dragon.

