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Translations of Kepler's Astrological Writings

Part II. Kepler on the New Star: *De stella nova*, Chapters 7-9

Astrology on Trial: Kepler, Pico and the Preservation of the Aspects

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Translated and annotated by Patrick J. Boner

Translator's Note. The following three chapters are from Johannes Kepler's magisterial study of the 'new star' of 1604, *De stella nova in pede Serpentarii* (1606). Known today as Kepler's supernova, the new luminary presented Kepler with a dazzling opportunity to decipher celestial change from his revolutionary view of the heavens. Staunchly Copernican while passionately committed to the reform of astrology, Kepler sought to restore the science of the stars to its true metaphysical foundations.

Kepler's Star appeared in October 1604 under extraordinary circumstances. It began brightly near the conjunction of Mars, Jupiter and Saturn, as Kepler recalled, 'in the first year of the astrological period of 800 years indicated by the beginning of the Fiery Trigon, the eighth [such period] since the creation of the world'. Compelled by more than coincidence, Kepler dedicated six chapters of *De stella nova* to astrology, one of many dragons he set out to slay in his multidisciplinary study. As the main target of this exposition, Kepler turned to Giovanni Pico della Mirandola (1463–1494), whose comprehensive critique of astrology provided a convenient backdrop for his own critical account. Kepler was encouraged by Pico's writing to reject all of astrology except for the planetary aspects.

In the following three chapters, Kepler recalls the criticism of his predecessor as he explains why Pico wrongly rejected the aspects. Kepler's defence of astrology offers us precious insight into his

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archetypal vision, attributing the same geometrical principles to the aspects that he also assigns to his theory of harmony. Although Kepler would later look to these principles as a way of distinguishing music and astrology, their common origin in his geometrical cosmology would never come under question.

[*GW* 1, p. 180]

What Natural Cause Joins Together Signs of the Zodiac Separated by Third Parts of the Circle into a Single Triplicity?[1]

Chapter Seven

Thus far, we have identified the Fiery Trigon according to the astrological notion, namely that there are three twelfth-parts of the zodiac distributed in the form of a triangle and designated by fire.[2] However, since I attributed to sheer convention the division of the zodiac into twelve parts and the designation of those parts according to gender, animals and the elements while detaching it from the nature of things,[3]

[1] This translation was made from the modern edition in Kepler's *Gesammelte Werke* (hereafter referred to as *GW*), ed. by the Bayerische Akademie der Wissenschaften (Munich, 1937-2009), 1, pp. 147-390, in consultation with an original copy held by the Department of Rare Books and Manuscripts, Milton S. Eisenhower Library, Johns Hopkins University. I wish to thank Miguel A. Granada for greatly improving the accuracy of this translation. I also wish to thank Dorian G. Greenbaum and Robert A. Hatch for their editorial insight. The recent German translation by Otto and Eva Schönberger, *Über den Neuen Stern im Fuss des Schlangenträgers* (Würzburg, 2006), often served as a source of reference.

[2] Girolamo Cardano (1501–1576) defined the Fiery Trigon as 'the first of the trigons, formed by Aries, Leo and Sagittarius, the three masculine signs that are also the houses of the Sun, Mars and Jupiter. The Fiery Trigon is ruled by the Sun and Jupiter, since Mars was excluded by another relation. The Sun has supreme rule during the day, Jupiter at night'. See Girolamo Cardano, *Opera omnia* (Stuttgart, 1966), vol. 5, p. 153.

[3] In Chapter 4 of *De stella nova*, Kepler concludes that all possible causes for the division of the zodiac into twelve equal parts 'did not provide human judgment with an occasion for embracing such a form of division. These causes do not derive from the nature of a divided thing, nor do they express a division that is natural, but merely geometrical or arithmetical. Go ahead, astrologer, and look for other causes'. See *GW* 1, p. 172.19-22. In his study of the association of the

you may well further ask whether there is any sufficient natural reason whereby three signs should join together in the form of a triangle.

[*GW* 1, p. 181] And as we said above on the division of the zodiac, nature herself does not actually divide the zodiac into twelve precise parts, but provides occasions for carrying out this division when the Moon conjoins with the Sun in twelve places on the zodiac in any given year.[4] In this way, the nature of the celestial motions does not describe the Fiery Trigons as precisely as they are established by the experts, but supplies opportunities for keeping track of these trigons. In fact, Saturn and Jupiter, the two most distant planets, record their two most recent conjunctions in such a way that they occur about one-third of the zodiac apart. For this reason, it happens that in any given period three signs of the zodiac are assigned by authors to a single trigon and acquire a particular power for stirring (I do not say compelling) the nature of sublunar things by the conjunctions of the superior planets. Giovanni Pico della Mirandola has still not snatched this part of astrology away from me, although I subscribe to many other things that he argued in his twelve books against astrologers [*Disputationes contra astrologiam divinatricem* (1494)], which I appreciate for the value of the arguments he soberly seized upon.

Indeed, the motion of the Moon in comparison with the motion of the Sun suggests such a division [of the zodiac]. When positioned in Aries, the Moon naturally occupies Leo after the revolution of a year, then Sagittarius or the beginning of Capricorn the following year.

What the Fiery Trigon is.

And so now it is time for me to explain another sense of the term 'Fiery Trigon,' which is certainly appropriate at this point. Astrologers refer to the Fiery Trigon as the period around 200 years in length in which the conjunctions of the superior planets Jupiter and Saturn appear only in the signs of the Fiery Trigon, occupying according to us earth dwellers Aries, Leo and Sagittarius. It often happens that, before those two slow planets

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signs of the zodiac with the elements in Chapter 6, Kepler suggests that, 'after weighing the causes thoroughly, the denomination of the signs of the zodiac according to the elements appears to derive merely from the decision of the inventors'. See ibid., p. 180.9-10.

[4] As Kepler observes in Chapter 4, 'the zodiac is divided as closely as possible into twelve equal parts by twelve conjunctions of the Moon with the Sun'. See *GW* 1, p. 169.1-2. On Kepler's critical view of these conjunctions as a natural cause for the division of the zodiac, see ref. 3 above.

leave these signs, all of the other planets follow suit and conjoin with them in the confines of these signs.

How it may come about that the conjunctions of the superior planets occur only in the signs of a single triplicity, however, can be shown as follows. Saturn traverses the zodiac in 30 years, Jupiter in 12. Thus, the annual path of Saturn is $^1/_{30}$ of the total journey, that of Jupiter $^1/_{12}$. Subtract $^1/_{30}$ from $^1/_{12}$ and $^1/_{20}$ remains. Thus, Jupiter outruns Saturn every year by $^1/_{20}$ of the total journey, and so overtakes Saturn once every 20 years. Jupiter traverses a single sign every year, which amounts to $^1/_{12}$ of the zodiac; as a result, in 20 years it travels over 20 signs, that is, an entire circle and 8 additional signs. Let the conjunction of Saturn and Jupiter be in Sagittarius in the year 1603. In exactly 12 years, Jupiter returns to Sagittarius while Saturn now stands in Taurus. After 8 years, Saturn has moved forward from Taurus to Leo and Jupiter from Sagittarius likewise to Leo, where it overtakes Saturn. After another 20 years, the same thing occurs in Aries. Here, you see how a triangle forms between Sagittarius, Leo and Aries.

See figure on folio 25 [**Fig. 1**]

How long the Fiery Trigon lasts.

[*GW* 1, p. 182] By the same reasoning, it will also be shown how it comes about that these conjunctions cross over from one trigon to the next after 200 years. For those that have been referred to about $^1/_{30}$ and $^1/_{12}$ parts of the [annual] journey do not possess precisely these measurements, nor does Jupiter cover precisely one sign in a single year. And so it happens that two conjunctions do not differ in distance precisely by the share of $^1/_3$, but rather about 3º less. 3º multiplied by 10 amounts to an entire sign, so 10 conjunctions beginning at the start of a sign fall back to the end of the sign, and with the eleventh recurrence cross over to the start of the following sign, which initiates a new triplicity. Thus, there are four triplicities that make up the zodiac, each measuring 200 years. Together, they constitute a period of slightly less than 800 years. In this space of time, the whole zodiac is divided by 40 conjunctions in the same number of almost exactly equal parts. After completing this period, it starts all over again. Thus, I can say that the closest conjunction of Saturn and Jupiter in place and time to the one that occurred in the year 1544 in 30º Scorpio was that which took place in December of the year 1603 in 8º Sagittarius. Nothing in 800 years will come closer to 30º Scorpio.

How often the Fiery Trigon has recurred.

Thus, the sequence of trigons and the recurrence of the Fiery Trigon become clear from what has been

said and by comparison with the age of the world. Since the years from the beginning [of the world] number more or less 5,600 years, when they are divided by 800 they give us seven great periods, each marking the return of the Fiery Trigon.

The utility of the doctrine of trigons in the history of the age of the world.

It is truly remarkable that the most significant epochs occur in nearly these same periods of time. For this reason, I delight most in that sequence of trigons and some, as it were, compendium of the times [that is] highly useful for aiding the memory. I also think that [this compendium] will be extremely welcome to many people in our age, since in it our present era coincides with one of its periods.

The Fiery heads the family [of trigons], since I spoke of the epochs on the basis of it. It is also [in this position] because it shares its beginning with the start of Aries, chief among the cardinal signs. Note in the table, in rounded, highly imprecise numbers, the periods [of time] in which the Fiery Trigon has begun.

How the start of the Fiery Triplicity must be determined.

Once advanced up to this point, uncertainty plagues [us] concerning the actual beginning of the current Fiery Trigon. For if we observe the mean motions, the mean conjunction, or that contrived by Cardano,[5] is repositioned to the year 1583 at the very edge of Aries. And it certainly is a fine thing to attribute the beginning of a trigon to a conjunction that is neighbouring a cardinal point, each one of which is in a different triplicity. However, the mean motions according to calculations made from the *Prutenic Tables* come out differently, showing the conjunction in 28º14′ Pisces, not at all at the very beginning of Aries. In fact, the true conjunction in 1583 falls even further back from [this point], namely 21º Pisces.

[5] In his commentary on Ptolemy's *Tetrabiblos*, Cardano claimed that the start of the Fiery Trigon in the sign of Aries saw 'worldly empires and monarchies emerge under the rule of the Sun and Jupiter, which signify peace in the world'. This could not happen, Cardano claimed, unless a single individual became 'the ruler of all'. Cardano suggested that this would happen in 1583, when the next great conjunction would take place at the edge of Aries. At that time, all things would surrender to 'the rule of a single authority down to the middle of the year 1782'. See Cardano, *Opera omnia*, vol. 5, pp. 173-74. On this passage and 'the quintessentially un-Ptolemaic style' of Cardano's astrology, see Anthony Grafton, *Cardano's Cosmos: The Worlds and Works of a Renaissance Astrologer* (Cambridge, MA, 1999), pp. 150-51.

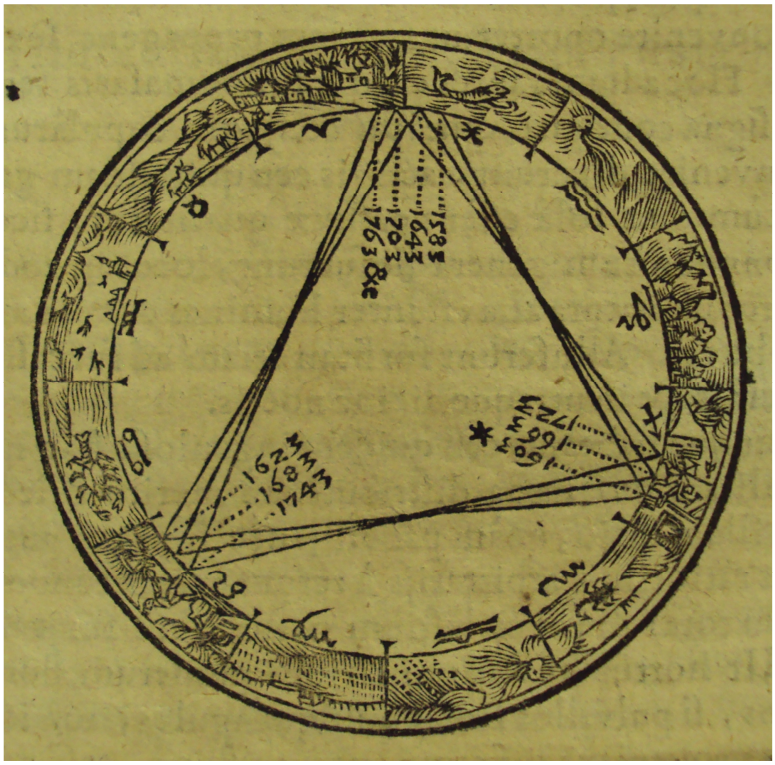
[*GW*, p. 183]

Period	**Years before Christ.**	**Years from the beginning of the world.**	**Persons of renown.**	**Coinciding occurrences: beware, reader, that you do not call them the *effects* of the trigons.**
1	4,000	0	Adam.	The creation of the world.
2	3,200	800	Enoch.	Robberies, cities, the arts and tyranny.
3	2,400	1,600	Noah.	Deluge.
4	1,600	2,400	Moses.	Exodus from Egypt; law.
5	800	3,200	Isaiah.	The age of the Babylonians, Greeks and Romans.
6	Years after Christ.	4,000	Christ our Lord.	The Roman monarchy and the reformation of the world.
7	800	4,800	Charlemagne.	The Empire of the West and that of the Muslims.
8	1,600	5,600	Rudolf II.	Life, fate and our prayers; we who look after these things.
9	2,400	6,400		What will become of us, and what will become of our most prosperous Germany? And who will be our successors? And will they remember us? Assuming that the world will last this long.

The conjunction that occurred in the year 1603, however, marked the mean motions [of Jupiter and Saturn] at 1º7′ Sagittarius and their true motions at 8º Sagittarius. In either case, this [conjunction] was the first in the fiery signs.

Yet the issue has still not been fully resolved. This period of time is also said to belong to the Fiery Trigon in such a way that no conjunctions of the superior planets occur outside of the fiery [signs]. However, although this holds for the years 1603 and 1623, it is not the case for the year 1643. At that time, the mean conjunction occurs in Aries while the actual one occurs in 26º Pisces, with retrogradation pulling the planets backwards. In this way, and as a result of the physical and optical causes of their motions (which the ancients referred to as the 'equant' and the 'eccentric'), Saturn [moves] from Sagittarius to Pisces and Jupiter from Libra to Pisces, and they slow down and have subtractive equations. All such things should be understood in this broad way. For if the truth of the motions may be considered clearly, there will not even be a triangle among the two most recent conjunctions. Indeed, in the year 1583 the conjunction occurred in 21º Pisces, and in the year 1603 it occurred in 8º Sagittarius. Thus, there are neither 120º **[*GW* 1, p. 184]** in between [the two], which amounts to a perfect triangle, nor 117º, which ordinarily occurs between two mean conjunctions, but 102º, closer to a square than to a triangle, as you see in the figure [see **Figure 1**, overleaf].

Figure 1. Locations of the great conjunctions in the zodiac, 1583-1763. Johannes Kepler, *De stella nova in pede Serpentarii* (Prague: Paulus Sessius, 1606), folio 25. Courtesy of the Department of Rare Books and Manuscripts, Milton S. Eisenhower Library, Johns Hopkins University.



On the Natural Powers of the Fiery Triplicity: Principally on the Efficacy of Conjunctions, in Opposition to Giovanni Pico della Mirandola

Chapter Eight

Thus far, I have said that neither the distribution of the zodiac into twelve signs is natural nor is the distinction into four triplicities that is made by the motions of the superior [planets] and the relation of three [more] distant planets lasting or accurate. Indeed, we have said that none of the

properties of those animals [have any relation] to the signs, nor do any qualities of the elements by which the triplicities of the signs are designated have anything to do with them. Since Giovanni Pico, Count of Mirandola, taught all of these things more than 100 years before me, I may correctly appear to concede fully to his conviction concerning the foolishness of astrology.[6]

Bk. 6, Ch. 4.
Bk. 6, Ch. 15.

And so that I may cut my words short, Pico rejected in entirety in Book 5, Chapter 5 the effects of the great conjunctions; he rejected completely in Book 6, Chapters 5, 6 and 7 all of the aspects; in Book 6, Chapter 15 he refuted any power pertaining to the trigons, in which direction some things can also be inferred from Book 6, Chapter 4. Since I feel differently from Pico on these chapters, among others, I shall consider his causes before I explain my own convictions, as this will prove useful for our present plan.

The source of effects, which experience attributes to the conjunctions of the planets.

In Book 5, Chapter 5 Pico asks why one should believe that Saturn and Jupiter bring about greater things when they are together than when they are apart.[7] I shall respond according to my own conviction and not according to that of the astrologers: the work that we attribute to the superior planets when they are joined, which is absent when they are apart, by no means comes from the planets themselves (save for their illumination and calefaction alone), but from sublunar nature (*natura sublunaris*) itself. Yet if the same work is

[6]Here, Kepler refers to Pico's rejection of the twelve signs as 'the fabrication of mathematicians for the facilitation of calculation'. Since their origin, Pico suggested, 'these signs have led astrologers astray in many ways'. Pico would later go on to refute the trigons, for which he found 'no reason'. See Giovanni Pico della Mirandola, *Disputationes adversus astrologiam divinatricem*, ed. Eugenio Garin (Florence, 1946-1952), vol. 2, pp. 36-46, 110-122.

[7] Pico claimed that these planets 'cannot be greater when they are together in the great conjunctions than when they are apart'. Pico also argued that the high regard for the great conjunctions was 'a recent invention, born from a misunderstanding of Ptolemy'. Pico saw their significance as nothing more than 'a fiction formed by the false understanding of a single author', an artificial basis for suggesting that 'all of religion is bound to the stars' and subjecting 'the most sacred laws, the appearances of the prophets, and the divine miracles to the powers and precepts of the stars'. See Pico, *Disputationes*, vol. 1, pp. 544, 558.

attributed to the planets themselves, one could respond that it occurs by [their becoming] more powerful through a united virtue [*virtus unita*]. However, although they do move sublunar nature, they do not do so as natural agents, pouring out some virtue on account of the presence of a passive object. Rather, they move nature as objects move the senses, light the eyes, sound hearing, and heat the sense of touch. None of these is made the more feeble the more the senses have been exposed to receiving [such things], but we have attributed to all of them a certain natural and material emanation (*effluxus quidam naturalis et immateriatus*) of the quality **[*GW* 1, p. 185]** they possess and whose *species* strikes the senses to the fullest extent without exhaustion from its origin.[8] Here, any philosopher anticipates that I may apply in the case of the stars to their illumination what I have claimed in examples concerning the various qualities of things; thus, the philosopher will say that he already knows in advance what he reckons I shall add here, namely that Pico's reason argues against me, since the conjunction of two planets never produces any more light than the two of them alone. To be sure, they possessed as much light apart as they convey together.

The conjunctions of the planets, insofar as they are relations, behave with respect to vegetative nature (*natura vegetabilis*) in the same way an object behaves with respect to the senses.

Nevertheless, I am not talking at all now about light, whose heat and brightness are clearly according to the measure of body, nor according to the mutual propinquity of the two, since one is not the cause of light for the other. Rather, I make use of the similitude of light and other sensible things for the explication of an obscure matter. To be sure, in the conjunction of two planets not only light but this relation, this site that we call a 'conjunction', acts as an object. Therefore, the sense in sublunar nature is like the object. This object belongs to the class of relations, and so it is necessary that sublunar nature be provided with the power to perceive such relations. And if I may state the matter in a word, certain philosophers measure sublunar nature with a short stick, supposing there to be neither sense nor perception of intelligible things

[8] In her study of the significance of *species* in Kepler's *Tertius interveniens* (1610), Sheila Rabin claims that Kepler 'considered the *species* to be material', expressing the same concept colloquially known as a 'material emanation' (*materialischer Außfluß*). See Sheila Rabin, 'Was Kepler's *Species Immateriata* Substantial?', *Journal for the History of Astronomy* (2005), vol. 36, pp. 49-56, esp. p. 52. I am reluctant to adopt this view, however, since Kepler suggests the *species* should arrive at the senses 'without exhaustion from its origin'.

beyond those faculties that man possesses. From this persuasion, there arises a rashness for attacking the most obvious things.

Tell me, Pico, with what sense does a dog perceive the traces of his master—by smell? And yet the sense of smell of man is certainly not so sharp. Thus, you learn there is something in the [case of the] dog that you had not discovered in man. Nor would you have believed those who speak of the dog unless you had more often approached the matter up-close yourself.

What is more, tell me how the roots and bulbs of plants take up other colours from saffron and Brazilian wood that are poured on [them], in such a way that they then convey these to the flower? You will say that the juice they draw up has been dyed. But you did not satisfy me: how small an amount is it that is poured on to the roots of pinks? How many flowers, on the contrary, are produced from the stem? Where is the proportion? Why, when the colours soaked up are diluted with the clear fluid of the bulb and the moisture of the earth, is the colour not also diluted in the flower? How do coloured drops appear scattered on the flower by one artifice, while the entire flower is imbued by another? Finally, why is the coloured juice not digested, so that, deprived of its properties, it accrues to the body of the plant, as you see happen with other properties of the nutrient? Admit, then, that some power of impression exists in [the form of] a certain spiritual formative faculty (*spiritalis facultas formatrix*), which others refer to as seminal reason (*ratio seminaria*).[9]

But why do I crawl humbly through plants? Observe the pregnant sheep of Jacob the Patriarch.[10] With the lamb having witnessed several [white-streaked] rods [of poplar, almond and plane] beneath the clear waters, it manifested the *species* in the offspring. How this *species* would come from the plant rod to the eye, I do not inquire, as it is common knowledge. But how [it would come] from the eye into the womb, into **[*GW* 1, p. 186]** the formative faculty, and on into the foetus, how, I say,

[9] Kepler's account of seminal reason recalls that of Marsilio Ficino (1433-1499), who identified it as the efficient principle of form for every living species. For more on these 'reason-principles' in Ficino's view of the vegetative power of the World Soul, see Hiro Hirai, 'Concepts of Seeds and Nature in the Work of Marsilio Ficino', in *Marsilio Ficino: His Theology, His Philosophy, His Legacy*, eds Michael J. B. Allen and Valery Rees (Leiden, 2002), pp. 257-84.

[10] Genesis 30:31-43.

from this plant rod by that angle—that requires explication; it requires, I say, a certain impression [that is] more than ordinary.

In this way, I suggest that the colours of the planets (in order that I may respond to Pico in passing about those things that he opposed elsewhere) and their conjunctions and configurations are impressed upon the natures or faculties of sublunar beings; and sublunar beings are roused by these influences to shape and move the bodies over whose motion they preside.

To be disputed in favour of experience, not in favour of the principles of astrologers.

Here, let no one burden me with so great a prejudice that I should seek anxiously a remedy to the deplored and already lost cause of the astrologers through artificial subtlety and wretched sophistries. I do not make astrology out to be so great a thing, and I have never avoided the hostility of the astrologers. Yet constant experience (as much as can be hoped for in natural things) taught me about the commotion of sublunar natures under the conjunctions and the aspects of the planets, and this overcame my resistance. Perhaps the fact that no astrologer has adduced this reason prevents me from proving persuasive. Do I alone teach the astrologers philosophy? (And who am I, where do I come from, and when was I born?)

To what extent experience in astrology may be right, to what extent it may be wrong.

In fact, I appeal to the philosophers and just appraisers of things, asking whether all recent discoveries, all changes made for the better in this way, as if by a fastened bolt, are not excluded from philosophy. I do not deny, Pico, that the experience of which the astrologers boast is a great foolishness, even concerning this point, but I do not concede that there has been no experience of anything.[11]

And so, as is the case with obscure matters, great errors have arisen from the variety of minds contemplating the causes. Let one example for us be the greatest inquiry of all: who, unless clearly depraved or corrupted by the school of

The example of God.

[11] In Book 11, Pico argued that 'if Hippocrates, the father of physicians, said that experience was deceptive in medicine, even the most ignorant would not deny that it is most deceptive in astrology'. Pico later rejected the assertion that 'astrology relies on the experience of the ancients'. If so many aspects of astrology were in doubt 'among the moderns', Pico wrote, 'they were even less evident to antiquity'. See Pico, *Disputationes*, vol. 2, pp. 472, 483-484.

Epicurus, will deny that God exists, when, as the Apostle Paul says, 'The whole of the human race opposes this'?[12] Nevertheless, how many falsities mingle themselves together daily with this experience, so long as anyone fashions a God for themselves, sensing thereby some sort of solace? From here comes every kind of impiety. Yet it does not follow that since there are infinite myriads of peoples deceived, there are also deceived today Christians, Turks and Jews, worshipping one God and groping for Him in the dark (*ψηλαφοῦντες*).

The example of the Sun.

And so it can happen in a matter of such great perplexity that all parties are deceived in part while still experiencing some general truth. As for the Sun, some believe that the day comes from it as if the most broadly extended mantle were cast round; others believe that the waters are drawn out by it from the earth; others that grapes are coloured by its illumination; others that nature is made fertile by its entry into Aries; and still others that the stars are expelled from the heavens by its arrival. Any philosopher assessing these particulars has found that all are in error concerning them, as the Sun does not account for them all adequately. And yet after assessing the matter rightly, since he sees all of these things occur when the Sun approaches and diminish when it departs, he infers out of it something general, namely that the Sun itself is the origin **[*GW* 1, p. 187]** of all light and heat alone. On account of these two things, adding the nature of sublunar things, all other things follow by natural consequence, and they can be hindered if some cause below the Moon is left wanting.

The example of the magnet.

This was once the case for the magnet, when a certain Jacobus Florentinus had found a pole in it that would apply to the pole of the world, attracting iron at one end while repelling it at the other. There appeared at once those who held out hope of extraordinary devices, of perpetual motion with iron rivets in wheels, of a sphere moving with the heavens without wheels or weights, of an alphabet, by which one could tell another what he wished at a precise moment and at a distance of more than one hundred miles. These things are taken from a treatise of Heinrich von Langenstein, as shown by a manuscript now in my possession written about 200 years ago. When [these opinions] arrived in the hands of Johannes Taisnierius, they were published again by him under the name

[12] Cf. Acts 17:15-34.

of a new invention, which actually reproduces the original words and figures almost exactly.[13]

There is experience of the efficacy of the conjunctions.

Along similar lines, I note what was observed by the ancients and is observed today, [namely] the utmost power of the conjunctions of the planets to stir the faculties of sublunar things. Since everyone attempted to extract his own conclusions from this universal principle, however, while striving after particular predictions, they fabricated a wide variety of aphorisms in such a way that [this variety] could reflect the variety of events, each one presenting the experience in favour of himself afterwards; blinded by a passion for predicting, they were deceived in such a way that they imbued themselves in so many superstitions.

But I return to Pico. He supposes that the work of the planets is impeded by the presence of counterbalancing planets and that they are made lesser than if they operated separately on their own.[14] First, I do not accept that one is impeded by the other, as they are actually mixed together like the rays of luminous bodies. Next, I recall Pico to the earlier response, that we are not considering here what the planets themselves do, but what the sublunar natures suffer from their conjunction, as if by an object. Here, experience precedes reason. Unless I reveal to the eye that the power of sublunar things is roused by the planetary conjunctions, I do not ask that it be believed by the reasons produced. Conversely, if there is something certain about the matter, counter-reasoning will not be able to achieve anything; but by the interposition of this principle of the sensory impression of the *species* from the conjunction on the faculties of sublunar things, it is rightly annulled.

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[13] Here, Kepler refers to Taisnierius's *De natura magnetis et eius effectibus* (1562), which reproduces almost entirely an earlier text by Petrus Peregrinus, *De magnete seu rota perpetui motus* (1558). It is not clear why Kepler attributes the original text to Heinrich von Langenstein rather than Peregrinus.

[14] In his criticism of the great conjunctions, Pico wrote that he wished 'to know why they should think that Jupiter and Saturn are more active together than when they are apart and perform their own powers'. If a pair of planets was 'of a contrary nature', as was the case with Jupiter and Saturn, then they would only act against one another. 'So long as they smother and suppress each other's powers', Pico argued, 'all we can expect from Jupiter and Saturn is something mediocre, just as all things break down by the mixture of extremes'. See Pico, *Disputationes*, vol. 1, pp. 544-546.

Mirandola goes on [to ask] why the conjunctions of the Sun and the Moon are not more influential than those of Saturn and Jupiter in directing the great alterations of the world.[15] I respond according to my own conviction and not that of the astrologers: no alteration of the world is effected or anticipated by any position of the stars. It is not the same as the sum of all sublunar natures, and thus the souls of humans as far as they are natural, being stirred up very vigorously and the condition of this world or of the human race being transformed from one form into another. Thus, for this incitation of natures, **[*GW* 1, p. 188]** conjunctions of the Sun and the Moon do indeed prove influential, but for a very different reason. For as far as the Sun and the Moon simply conjoin, this occurs monthly, and the conjunction does not last long because the Moon is extremely swift. Such a stimulus is therefore neither sharp nor unusual, nor does a great commotion then follow it. Moreover, why does Pico make the Sun and the Moon more universal than Saturn and Jupiter? They say that the heavens are everywhere above, and this holds for the Sun as well as Saturn. Yet did Pico perhaps mean that the powers of the luminaries are greater than those of the other wanderers? I confess this to be the case, but see how Pico refers again to the very work of the stars, each of which acts according to its own body and light. Yet we do not speak about this matter just yet. To be sure, I allowed earlier that this work is not strengthened by the conjunctions of those bodies. And since we are discussing the objective commotion of nature, what is granted on the very work of the stars [from the measure of body and light] must be denied. And so the commotion of nature is as great as the conjunction: if the conjunction is long-lasting, if it is rare, then the commotion will be extraordinary and unusual. Thus, the commotion from the conjunction of Saturn and Jupiter is greater than that [from the conjunction] of the Sun and the Moon.

Nevertheless, Pico says that the doctrine of conjunctions comes from neither all of the astrologers nor the best of them, and that it is therefore false. I say that no one among the astrologers has kept silent about the general subject of the conjunctions. Ptolemy omitted this series and, as it were, law of great conjunctions, however, in his predictions of universal

[15] In Book 5, Pico claimed that there were only 'two planets of universal efficacy, the Sun and the Moon'. The light of the Moon, he said, was 'none other than the light of the Sun, coming from it like a mirror and in this way, I would say, conveyed to the earth'. Considering the consequence of the two luminaries, Pico did not understand 'why nothing more should be expected from them [astrologically]'. See Pico, *Disputationes*, vol. 1, p. 548.

matters, and his Arab successors took over his silence. Let the astrologers, who boast they are capable of predicting the transformation of worldly affairs from the stars, quarrel among themselves over this [silence]. As for me, I do not explore with the help of the heavens the transformation of worldly affairs – which involves many particulars (*specialia*) – but only the commotion of natures, which is general and in its entirety.

Pico reproached Messahala for claiming that great things proceed from the slower planets.[16] Pico reckons that the swiftness of a star suggests its nobility, and thus efficacy attends to nobility in such a way that the swifter stars are more powerful. I say on behalf of my own opinion and not that of Messala that Pico ties together husks. In fact, quickness has nothing in common here with efficacy in and of itself, and this is not the place to speak about those things that result from some composition of accidentals, as it were. There is swiftness in the royal messenger, in the ruler rest and stability. What do you say to Copernicus, Pico, who teaches that the Sun stands still since it is the noblest of the planets? Nor is there any sound reasoning for those who make Saturn swifter than Jupiter on account of its larger course. For true astronomy makes Saturn all the more slower and sluggish, in fact, the more the space of its path is wider and longer than that of Jupiter. What Pico pronounces on the 50th aphorism of Ptolemy's *Centiloquium*[17] does not concern us, since we preserve and uphold as much of it here as Pico deduces from it.

In Book 5, Chapter 6 Pico objects to the astrologers who consider the mean conjunctions because they are fictions: [he says that] they should

[16] Pico, *Disputationes*, vol. 1, pp. 542-544: 'According to Albumasar . . . the greatest conjunction of all is between Jupiter and Saturn in Aries, which should occur after 960 years. Messala, who disagrees with this in his book, *De coniunctionibus*, says that the greatest conjunction is between Mars, Jupiter and Saturn. From this conjunction, Messala anticipates the alteration of religions, the transfer of political rule, and the appearance of prophets. He anticipates none of these things from the conjunction of Jupiter and Saturn, as the bulk of astrologers believe. In second place, he puts the conjunction of Jupiter and Saturn, in third place [the conjunction] of Saturn and Mars, and in fourth place [the conjunction] of Jupiter and Mars'.

[17] The 50th aphorism reminds the reader not to overlook the 119 conjunctions [of Jupiter and Saturn]. (Though Kepler considered it to be a genuine work of Ptolemy, the *Centiloquium* is spurious.)

rather regard the apparent ones.[18] I confess, **[*GW* 1, p. 189]** I am with Pico when I condemn as foolish and superstitious not only this but the entire art of determining the periods of religions and empires according to the conjunctions. And yet the experience of astrologers concerning the conjunctions does not amount to nothing. What, then, if an actual conjunction differs from a mean one while another actual conjunction closely approaches the mean? For although in the year 1583 the conjunction whose mean motion situated it at the start of Aries was actually at 21º Pisces and will only cover Aries for the first time in the year 1703, nevertheless the conjunction was apparent that year when it appeared as a mean [conjunction]. Thus, if something has happened in human affairs that was referred to the conjunction in Aries, the experimenter could certainly have been disappointed about the sign but not about the conjunction itself; and we consider these things here.

As you see in the figure on fol. 25. [See **Figure 1**]

I do not say these things in order to defend the suppositions of astrologers for predicting even the particulars, but rather to determine that there have been great commotions of the natures and of these very natural affections in humans around the time of the great conjunctions. I also set out to show that the astrologers have been deceived by these things, supposing that the very things that were produced by those commotions came from this celestial origin.

On the Efficacy of the Other Aspects, Particularly that of the Trigon, in Opposition to Giovanni Pico della Mirandola

Chapter Nine

In Book 6, Chapter 5 Pico first argues that some of the aspects cannot be favourable *per se*, others being evil and unfavourable like the square and

[18] Pico, *Disputationes*, vol. 1, pp. 558-560: 'First of all, they . . . do not refer to the real conjunctions but to the mean ones, that is, the false and imaginary . . . The planets are not carried around the zodiac at an equal rate, that is, they do not always pass through an equal part of it in an equal interval of time. Thus, those who wished to measure and calculate their motions came up with a motion for each planet that was uniform so that they would arrive more easily at the actual and unequal motion from this false and uniform one'.

opposition.[19] I agree with Pico on this point, for the aspects are distinguished by their degree of intensity alone. In fact, I affirm that all of them are equally capable of stirring the nature of sublunar things. And the cause of the evil nature of quadrature refers to a difference of gender, because one of the signs separated in quadrature is masculine and another feminine, but I have said that I judge all of this to be false. When Pico asks whether the aspects may be considered among the very bodies of the planets or with respect to the effects that follow on earth, I agree again with his opinion that the planets suffer nothing from one another in the heavens, nor can they know when two of them mutually concur in an aspect on earth, even if you should attribute rational souls to them. Finally, I agree that these aspects are among the rays descending to the earth and not in the least among the bodies of the planets themselves. All of these things, I say, I accept with Pico. In addition, what **[*GW* 1, p. 190]** experience tells us, [namely] that sublunar nature is moved by the aspects, since an aspect results from the position of the Earth with respect to two planets, this, I say, showed me the way to the truth, which I explain in the following way, namely that the principal cause lies in the Earth, not in the planets, and that such a commotion of nature should come rather from the Earth herself as a result of the impression of the aspects.[20] In this way, the animal that participates in sense [*sensus particeps animal*] may be aroused to a sense of external things. For what Pico stresses from Plotinus, namely that the

How the foundation for the efficacy of the aspects was found.

[19] There, Pico proclaimed that he had 'already proven wrong the opinion of the astrologers on the signs and the twelve parts of the zodiac'. All that remained, he wrote, was the third form of influence alleged by the astrologers, commonly known as the aspects. 'For if they reckon that the planets move one another, fostering friendly relations at one point . . . while waging war with the weapons of their rays at another, as if managing alliances and disputes, this will be opposed not only by the Prophet Job, from whom we read that 'God makes peace in the high heaven', but also by the entire peripatetic family along with Aristotle, among whom it is certain that the only change the superior bodies suffer is their variety of location, while neither those qualities below the Moon rise above nor do those celestial ones descend below'. See Pico, *Disputationes*, vol. 2, pp. 46-50.

[20] Lynn Thorndike referred to the causal role of the Earth as 'the essence of Kepler's 'terrestrial astrology''. See Lynn Thorndike, *History of Magic and Experimental Science* (New York, 1923-1958), vol. 4, pp. 4, 26.

rays coming from the heavens cannot join together on earth in such a way that a new virtue or form proceeds from them, this, in fact, I previously held, along with the notion that [the rays] that seem to be able to join together more closely and straighter are the ones that proceed from the more closely connected; [I even held that] the rays are always joining together, though not always in the figure of a triangle or a hexagon; finally, that in the very same natural body where the rays join together, coalescing in a single point, every figure [produced by them] disappears immediately. All of the above things I considered carefully. None of these lines of reasoning could disprove the clearest experience, however, which testified that every sort of meteorological condition was produced when the planets were configured in aspects and, on the contrary, the air was calm chiefly when there were no conjunctions or aspects. All of this occurred not only if the bodies [of the planets] drew near each other, but also if they did so according to the distance [of one of the sides] of a square or hexagon, right at the individual moments of the aspects; in the days immediately preceding or following, the effects ceased. Johannes Offucius, one of the most bitter opponents of the aspects except for conjunction and opposition, which he believed he had established as causes of earthly reverberation, has also observed this in the case of the square aspect. Here, he has acknowledged the weakness of his reasoning, accepting the experience of the square aspect.[21] And so on account of these things it had to be said that neither the stars nor their rays bring about such things on their own nor do the configurations themselves, which are mere relations, bring about such things any other way than under the relation (*sub ratione*) of the object. Further, it had to be said that for those passive things such as the vapours in the globe of the Earth, a certain faculty is present that may then be able to perceive and assess the figures of the rays and rouse its own body in such a way by a certain impetus, whether to move, if it were the motive faculty, or to produce

[21] Here, Kepler refers to Jofrancus Offusius's *De divina astrorum facultate in larvatam astrologiam* (1570). Offusius gave short shrift to the aspects, suggesting at one point that Ptolemy had made mention of them in the *Almagest* 'perhaps on account of their great popularity among judicial astrologers'. Offusius expressed his own view of astrological influence as a mathematical matrix of planetary distances and angular positions, together with their physical properties. See Johannes Offusius, *De divina astrorum facultate* (Paris, 1570), esp. 11v-14v. For more on this mysterious author, see Owen Gingerich, 'The Master of the 1550 Radices: Jofrancus Offusius', *Journal for the History of Astronomy* (1993), vol. 24, pp. 235-53, esp. 237-39.

heat and evaporate vapours, if it were provided with this function. On account of this cause, everything that Pico drew from philosophy against the aspects, and which we have recalled here, finds a resolution.

The nature of this faculty or faculties will become clearer through the following things. For by rousing controversy with the astrologers over the number of aspects, Pico also directs his arguments against the very heart of the matter. First, he refutes the causes that the astrologers deduce from some part of the circle. Here, I fully agree with Pico that this cause is insufficient, although it alludes to the truth. For I accept eight aspects, if conjunction [0º] is included, sextile [60º], quintile [72º], square [90º], trine [120º], biquintile [144º], sesquiquadrate [135º] and opposition [180º]. And although a twelfth-part, or 30º, is a divisible part of the circle, **[*GW* 1, p. 191]** it is nevertheless not an aspect. 144º or 135º, on the other hand, form an aspect not because they are a divisible part of the circle but because they divide further beyond that.

On the number of aspects: the arithmetical cause.

Ptolemy derives a second cause from geometry, expressing more or less the following opinion, [namely] that those configurations that are efficacious are constituted by an angle in which the line subtending the arc that measures the angle is equal either in length or in power to a certain part of the diameter of the complete circle. No doubt Ptolemy had an intuition that there were more deeply rooted reasons than those, derived from the nature of bodies and their points of contact.

The geometrical cause.

Here, Pico reproves Ptolemy according to Aristotle for 'treating physical things mathematically' and deducing the properties of natural things from geometrical figures.[22] Oh Pico, the reason why one does such a thing is so important! If you fashion the figures as architects, you act foolishly, but if you attribute an architect to a figure, then from these two causes, the one formal and the other efficient, what prevents the effect from existing in the appropriate material?

In the same way here, the natural faculty in the sublunar body is also an architect (*architectus*) who makes use of the figure formed by the

[22] Pico, *Disputationes*, vol. 2, p. 58: 'After all, the causes put forward by Ptolemy for the geometrical figures do not achieve their end, since the relations of these figures do not determine the various properties among natural things; and those who make use of the figures in this way run into the same error condemned by Aristotle, [namely] treating physical things mathematically'.

planetary rays as a model and provokes a motion in his body or spirits according to this figure. The cause that Ptolemy provides for this is inadequate, however. For there can be many subtensions of circular arcs, rational and irrational, which may be equal in power or in length to a certain part of the diameter without actually constituting an aspect. As for the cause of distinguishing between good and evil aspects, it has been judged false; and the reason given by Albumasar is just as Pico pronounces: 'from a thousand patches comes a single quilt'.[23] For he attests to opposition from the fullness of the Moon, the square from the position of the inferior planets, and trine from the position of the superior planets. Nevertheless, his explanation does not arrive at the particulars, nor is it a constant explanation of a constant thing with a constant measure.

The musical cause.

Finally, Pico favourably considers the cause assigned by modern scholars according to the musical consonances with the following words: 'These things are certainly wonderful and possess the appearance of probability among those who have hailed philosophy from the very threshold'.[24] I wish that Pico were still alive. First put forward by [Firmicus] Maternus and then Ptolemy and deduced to the deepest parts of philosophy, this cause may not exhibit the appearance of truth but it certainly suffices and affords enjoyment by easing examination so remarkably. For as even Pico recalled it, this cause holds up miserably and is rightly rejected by him.[25] To begin with, what does a harmony of voices have in common with the rays of the planets? Second, if two planets may be said to be consonant by the same reason, while some signs are said to be silent, one form of futility is confirmed by another. Finally, if the signs should be equal in number to the voices, the cause is now completely butchered, for neither

Explanation of the source of efficacy of the aspects.

[23] Ibid., p. 62.

[24] Ibid., p. 64.

[25] 'Leaving aside the similarity of so many diverse sorts of things', Pico wrote, the aspects did not share the same causal essence as the musical consonances. 'For among musicians, every sound either agrees or disagrees with another, while among astrologers there are many intervals, so to speak, that are mute to one another, that is, they are neither consonant nor dissonant'. Kepler recalls this point along with the rest of Pico's argument in the following three sentences. See ibid., p. 64.

will their similarity be consistent nor will the cause of their comparison be clear.

[*GW* 1, p. 192] And so it is true that the conjunctions and the aspects rely [for their efficacy] on a most natural reason not in bodies, but in spiritual faculties.

It is allowed among the leading philosophers that traces of geometry are expressed in the world in such a way that geometry may, as it were, be a certain archetype of the world, whether one refers to the world with the Christians as founded at a particular beginning of time or conceives of this creation as eternal with the Platonists. This much, then, is true: in all living creatures, as much as life itself, the growth of the body, and the procreation of species, there is a certain play of creation (*creationis lusus*); in this way, the architect of this work bears a certain similarity to God the Creator. For this reason, those things that are of the most common use to us should rival the most remarkable miracles when considered more closely. On this, one would rightly refer to the words of the poet:

Every plant refers back to God and His presence.[26]

Indeed, in the formation of a foetus, in the procreation of even the most common of plants, there is nothing that is not done by that faculty according to highest and most absolute reason, perfectly directed to its own end as if it were done deliberately (according to the deliberation intended by the Creator, at any rate). This rule of highest reason must not be attributed to a body or matter, but above all to the faculties of an informing soul (*informantis animae facultatibus*). In this way, every sort of natural or animate faculty in bodies bears a certain resemblance to God.

And so if we may connect the first [things] with these final ones, since God Himself elected from geometry an archetype for creating the world, it is no surprise that His resemblances provide pleasure, when they move their bodies, with those same geometrical figures that bear witness to their author (to whom they look back) established in the world and therefore in themselves as well. In truth, however, those spiritual essences

[26] On the provenance of this passage, often attributed by early modern authors to Ovid, see Miguel Benítez, 'Scepticisme et panthéisme dans l'*Anima Mundi* de Charles Blount', in *Scepticisme et modernité*, eds Marc André Bernier and Sébastien Charles (Saint-Étienne, 2005), p. 78.

meant to move the body appear to have taken up the geometrical figures in some remarkable way, without distension in the expanse of matter, which they appear to lack. You might say that those essences are actually mathematical points, though ones that admit the distinction of areas in themselves, certainly points of another sort, ones such as those that come from the section of certain rays of light assembling together into one.

Thus, [these spiritual essences] take in figures present to them externally, and from familiar things, in fact, such as light and the celestial luminaries; and as often as the rays of two luminaries join in such a way that a rudiment of a more suitable figure is represented, whether by the extension of a plane or by constituting among themselves a solid figure, so often do [the essences] readily revive their very own image of creation, that is, they move their bodies by seizing upon the impetus, doing especially diligently and with great ardour what they do normally, stirred up by a certain fervour.

Definition of harmonic ratios.

[*GW* 1, p. 193] Nevertheless, it does not follow that [the essences] adore every figure that forms a body indiscriminately. Rather, they make among them the following choice, namely the lesser number subtracted from the greater and from their difference, or the difference continually subtracted from the lesser number, all [of the numbers] up to the unity may be notes of the figures forming bodies. For example, the ratio of 5 to 8 is harmonic, since the result of 5 removed from 8 is 3, which when removed from 5 is 2, which when removed from 3 is 1. And the numbers 1, 2, 3, 5 and 8 are all denominations of suitable figures, or notes geometrically designated by a rational part of the circle. For 1 signifies a whole circle, 2 a half-circle. From this circumscription, there arise 8 ratios among which no ratio is either absent or able to be added, [and] anyone of which, when introduced into a circle, prescribes the form of the rays of a single aspect.[27] He who cannot accept these ratios as confirmed by nature may

[27] Kepler had already compared the aspects and the eight notes of an octave in his first book, the *Mysterium cosmographicum* (1596). There, he straightened a circle in which he had inscribed a series of geometrical figures, extending it like a string. The section cut off by two points of eight of these figures gave him a ratio that related to the division of string producing each of the eight notes. (This could also be done the other way around, by forming a circle from the outstretched string.) See *GW* 1, p. 42: 'Since we have just made a circle from a string, it is easy to see how the three perfect harmonies may be compared so beautifully to the three perfect aspects, that is, to opposition, trine and quadrature. The first imperfect note, B flat, is also extremely similar to sextile …

by this arrangement refer to music, not in order to reckon the rays according to sounds, but rather to reckon the harmonic ratios, which he can study more in the clear example of music than in the obscure example of the rays. Indeed, although sound shares nothing in common with light, there are as many consonances as there are aspects of the celestial luminaries, and they each share the same geometrical and cosmopoetical origin.

One will find in music, however, precisely the same proportions of chords so long as the notes are in tune with one another. But one may not then enumerate for me the notes of an octave according to the signs of the zodiac, for what difference does it make whether one counts seven or ten intervals in a single diapason system? He should rather do the following, namely divide the segment of string over which a chord extends by signs in the same way that the zodiac is divided into seven aspects and extended in length, without deviating from this geometrical section by a hair. He may then apply a saddle or bridge to the individual notes of the divisions, first striking the full string and then both parts of the string that stretches across the bridge above that note of division. It will then be clear that as many couples or thirds of consonant notes are formed as my definition displays harmonic ratios, matching the number of celestial aspects if we include conjunction. Thus, if we begin with this keynote [corresponding to conjunction, $^1/_1$], seven further pairs form a harmony, (2) the minor third [$^5/_6$] with the fifth above the double octave [$^1/_6$], (3) the major third [$^4/_5$] with the major third above the double octave [$^1/_5$], (4) the fourth [$^3/_4$] with the double octave [$^1/_4$], (5) the fifth [$^2/_3$] with the fifth above the octave [$^1/_3$], (6) the minor sixth [$^5/_8$] with the fourth above the octave [$^3/_8$], (7) the major sixth [$^3/_5$] with the major third above the octave [$^2/_5$], and (8) the octave [$^1/_2$] with the other octave [$^1/_2$]. Since the last one divides the chord in two, the same consonances will be found in reverse order in the remaining half of the string, just as the same aspects are

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And since all four of these harmonies agree with their own aspects, and yet there still remain three harmonies in music, I have suspected now and then that we should not overlook the separation of the planets by 72º, 144º or 135º in the casting of horoscopes, especially since I see that one of the imperfect harmonies now has its own aspect'. Cf. Johannes Kepler, *The Secret of the Universe*, trans. A. M. Duncan (Norwalk, 1999), p. 135. On Kepler's early elaboration of this relationship among the aspects and the eight consonances, based on 'the division of the circle by the inscription of a regular polygon', see J. V. Field, 'A Lutheran Astrologer: Johannes Kepler', *Annals of Science* (1984), vol. 31, pp. 189-272, esp. pp. 205-206.

found in the second half of the zodiac. No further thirds of notes can be found, judging from the sound of a string. But why so many words about a foreign subject? For now, I ask that it be allowed that I shall prove elsewhere in a suitable book, God willing, that this comparison of the notes and aspects, **[*GW* 1, p. 194]** as you may read among the ancients of quintile, biquintile and sesquiquadrate, enjoys absolute mathematical agreement, without anything amiss and anything that can be objected against it.[28]

Yet if the human ear, that is, the sense of hearing, instructed by common sense, affirms in sounds what geometry confirms in quantities, and if there is nothing beyond geometry that can be conceived as the cause of the consonances and satisfy all of the specific considerations, what then, I ask, will Pico say in response [to this]? For a harmony of sounds does not *per se* produce an influence on man other than a sensory perception, nor can it create a cheerful humour on its own. There is, however, a sensitive soul also operating in man, which makes use of the sensory organs and even accepts sounds internally. It assesses proportion, in fact, and when it judges [the proportion] good and geometrical livens up and moves its body accordingly. These things do not occur at all by ratiocination, unless perhaps Pico will attribute to farmers knowledge of the same geometry that we still scarcely scrutinize after so many centuries. He might as well attribute this knowledge to a deer! Instead, he should attribute it to the sensitive faculty (*facultas sensitiva*) of the peasant, which is affected through an innate power without discursive reasoning by these same figures, that is to say, by the sections and proportions constituted by these figures in the creation of notes, which the most wise Creator chose for the creation of the world. Any babbling fool will easily find a middle point between [this faculty and the figures], though every true philosopher will say that it cannot be found. And so what cause does Pico produce for why geometry moves man through the

[28] Isaac Beeckman (1588–1637), an avid reader of Kepler, inquired in his journal in 1616 why 'the aspects of the planets (conjunction, opposition, trine, quadrature and sextile) are said to possess powers over earthly affairs?' As Beeckman observed, the aspects were even thought 'to share something in common with the musical consonances'. For his own part, Beeckman only pondered an explanation, proposing that the efficacy of the aspects came from the incalescent rays of the stars themselves (rather than the metaphysical properties put forward by Kepler). The concentration of these rays could produce 'a notable effect', Beeckman claimed. See Isaac Beeckman, *Journal tenu par Isaac Beeckman de 1604 à 1634*, ed. De Waard (The Hague, 1939), p. 97.

notes? I shall say the same [cause] through which geometry moves sublunar nature by the rays of the stars.

The theory of the aspects that Pico put forward in Chapter 7, namely that the artificers (*artifices*) accepted as many aspects as there are lunar phases in the period of half a month (crescent-shaped, half, gibbous and full),[29] proves to be such an ingenious conjecture that I wonder why the astrologers have not followed it, since they have anxiously sought causes everywhere else.

Perhaps it is true, however, that the astrologers have been recalled to the aspects by this occasion; and so it happens that they are led to the truth by error (as Pico allows elsewhere for the astrologers, ridiculing them), in the same way that a ship now and then is led to port by a storm.[30] For almost all of the discoveries in the arts are the children of chance.

[29] There, Pico outlined the view of those who matched 'the mutual configurations of the planets in number and form' with the five phases of the Moon, when it was 'conjoined with the Sun, gibbous, half, crescent-shaped or full'. Pico wrote that these phases related to the aspects of conjunction, sextile, quadrature, trine and opposition respectively. See Pico, *Disputationes*, vol. 2, pp. 66-72.

[30] Pico, *Disputationes*, vol. 1, p. 558: 'Yet what if one of the astrologers should say, 'Wait! We have not understood Ptolemy correctly. What if this error has led us to the truth in the same way that a storm leads a ship to port now and then? Experience confirms in [the case of] anything observed by Ptolemy and the others that no legal or political change has ever occurred that some conjunction of the superior planets has not anticipated, nor has any one of those conjunctions ever occurred without anticipating this sort of change in earthly affairs'. It is good if they recognize the storm, though we shall see if they are in port'.