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TWO RENAISSANCE VIEWS OF ASTROLOGY

PICO AND KEPLER

by

SHEILA J. RABIN

A dissertation submitted to the Graduate Faculty in History in partial fulfillment of the requirements for the degree of Doctor of Philosophy, The City University of New York.

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This manuscript has been read and accepted for the Graduate Faculty in History in satisfaction of the dissertation requirement for the degree of Doctor of Philosophy.

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To the Memory of

PROFESSOR EDWARD ROSEN

"tu duca, tu segnore e tu maestro"

TABLE OF CONTENTS

INTRODUCTION

During the Renaissance the practice of astrology and the occult was extremely widespread among the educated classes of Europe. One result is that a significant number of treatises attacking or defending astrology were written. This study will examine the views of two important authors of polemical treatises on astrology, Giovanni Pico della Mirandola (1463-94) and Johannes Kepler (1571-1630) and assess how these treatises reflect changes in the relationship between astrology and astronomy during the Renaissance.

In 1494 the Italian humanist Pico wrote his treatise, Disputations against Judicial Astrology, an attack on the practice of studying the stars to understand and predict terrestrial matters. Pico draws on a wealth of philosophical, religious, and scientific sources from ancient, medieval, and Renaissance times to support his arguments.

Two questions often arise with regard to this work. One concerns its relationship to his earlier writings. Does this treatises represent a change in Pico's attitude

toward astrology? Had he earlier supported astrology and then in the last year of his life come to reject it? D. P. Walker, Frances A. Yates, and Eugenio Garin suggest that Pico's attitude toward astrology remained consistent throughout his philosophical career. Walker and Yates claim that he did not totally reject astrology in the Disputations,[1] whereas Garin claims that Pico had never really supported astrology in his earlier works.[2] Others disagree. For example, Lynn Thorndike and Wayne Shumaker insist that this attack is such a departure from earlier works that it constituted an about-face for Pico.[3] The second question that arises concerns the effect the Disputations had during the Renaissance. Lynn Thorndike suggests that the attacks this work evoked are more significant than the defenses.[4] It was primarily attacked by physicists and defended by theologians. Did Pico's treatise have no significant scientific contribution to make in the period of the Scientific Revolution? William G. Craven completely dismisses the importance of the work as he echoes Benedetto Soldati's claim that it was "more often cited than read."[5]

One of the people who read Pico's treatise was the great scientist and mathematician Johannes Kepler, who was

Imperial Mathematician from 1601-1630 and made significant contributions in astronomy, optics, and mathematics. Kepler was a practicing astrologer, and in 1610 he published a rejoinder to an attack against astrology which he titled Third Man in the Middle, that is, a Warning to Certain Theologians, Physicians, and Philosophers, and Especially to Dr. Philip Feselius, that in their Just Condemnation of the Star-gazing Superstition, they Should not Throw out the Baby with the Bathwater and in this Way Unwittingly Harm their Profession. It is his most comprehensive statement concerning his position on astrology and the only defense of astrology he wrote. It is, therefore, the most useful of Kepler's works to study in juxtaposition to Pico's attack.

As the title suggests, Kepler saw his position as intermediary between those who absolutely condemned astrology and those who believed it could be used to predict all terrestrial affairs. Edward Rosen claims that "traditional astrology clung to certain practices that Kepler tried to trim away as deleterious blemishes. But he refused to align himself with those who sought to destroy astrology outright."[6] Nevertheless, scholars have responded variously to Kepler's assertions. E. A. Tondorf

insists that Kepler did not really believe in astrology but practiced it for monetary reasons alone.[7] Arthur Koestler suggests that Kepler was an astrological determinist.[8] In addition, Lynn Thorndike maintains that

> during the long period of scientific development before Sir Isaac Newton promulgated the universal law of gravitation, there had been generally recognized and accepted another and different universal law, which his supplanted. And that universal law was astrological.[9]

Do Kepler's arguments in favor of astrology confirm this claim by Thorndike?

Kepler refers to Pico's Disputations against Judicial Astrology in some of his letters and works which deal with astrology. Pico's treatise is generally used by Kepler to represent the anti-astrological argument. He often expresses his agreement with Pico's position and even suggests that Pico's work had some influence on his thought, but Kepler never elaborates the precise nature of that influence. At the same time, as regards those matters of astrological doctrine which Kepler maintains are indeed valid, he attacks Pico's work. On this issue Lynn Thorndike asserts that Kepler agreed with many of Pico's arguments but was not as radical as Pico in his attacks on astrology.[10] Paul Oskar Kristeller suggests that Pico's work caused Kepler to modify his views on astrology.[11]

Apart from questions of possible influence, did a belief in astrology imply a general acceptance of mysticism and the occult, and to what extent, if any, were these sources of Kepler's creativity? Edward Rosen maintains that "Kepler distanced himself from the mystical philosophy."[12] On the other hand, Joachim Otto Fleckenstein asserts that Kepler was "a Neo-Pythagorean who lost his way in a Neo-Pythagorean number mysticism while trying to interpret the attraction of the Sun on the planets."[13] Frances A. Yates claims that the causes of progress in seventeenth century science were the result of non-scientific philosophical speculations which were favorable to the acceptance of "magico-religious" and "magico-scientific" modes of thinking, and in addition to the Hermetic texts,

> Neo-Platonism itself was favorable to this climate, and medieval traditions of the same type revived. If one includes in the tradition the revived Platonism with the accompanying Pythagoro-Platonic interest in number, the expansion of theories of harmony under the combined pressures of Pythagoro-Platonism, Hermetism, and Cabalism the intensification of interest in astrology with which genuine astronomical research was bound up, and if one adds to all this complex stream of influences the expansion of alchemy in new forms, it is, I think, impossible to deny that these were the Renaissance forces which turned men's minds in the direction out of which the scientific revolution was to come.[14]

Does Kepler's work illustrate Yates's claim? Or does the error lie, as Brian Vickers sees it, "in arguing that the occult sciences in the Renaissance were productive of ideas, theories, and techniques in the new sciences"?[15]

Since Kepler was one of the major innovators in the Scientific Revolution, and since he was also interested in and participated in the debate on astrology, studying his thought on astrology may help us gain some insight into the relationship to the Scientific Revolution of the Renaissance debate on astrology and the occult. By juxtaposing Pico's arguments to Kepler's, we may examine the anti-astrological position in some depth, and this, in turn, may help us assess more fully the extent of Kepler's involvement with astrology and the occult. Such a juxtaposition can also provide us with the means for examining the implications of the anti-astrological arguments for the period of the Scientific Revolution more fully than a study of Kepler's work alone in this context.

We shall begin with an overview of the history of astrology and the attitudes expressed toward it before Pico, concentrating on a few salient developments and the views of representative and outstanding figures, particularly those mentioned by Pico, which will serve as

background to our discussion. Next we shall closely examine first Pico's Disputations against Judicial Astrology and then Kepler's Third Man in the Middle in the context of their other works and try to assess the relationship to their general thought of their attitudes toward astrology as expressed in these treatises. Finally, we shall look at Pico and Kepler together and briefly sketch some of the implications of the debate on astrology for the Scientific Revolution.

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1. D. P. Walker, Spiritual and Demonic Magic: From Ficino to Campanella (New York, 1943; rpt. Notre Dame, 1975), 55; Frances A. Yates, Giordano Bruno and the Hermetic Tradition (Chicago, 1964; rpt. 1979), 115.

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3. Lynn Thorndike, History of Magic and Experimental Science (New York, 1934; rpt. 1966), IV, 485; Wayne Shumaker, The Occult Sciences in the Renaissance: A Study in Intellectual Patterns (Berkeley, 1972; rpt. 1979), 17.

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8. Arthur Koestler, The Watershed (Garden City, NY, 1960), 40.

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10. Thorndike, A History of Magic and Experimental Science, 19.

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14. Frances A. Yates, "The Hermetic Tradition in Renaissance Science," in Art, Science, and History in the Renaissance, ed. Charles S. Singleton (Baltimore, 1967), 273.

15. Brian Vickers, "Introduction," Occult and Scientific Mentalities in the Renaissance, 44.

CHAPTER ONE

AN OVERVIEW OF THE RISE OF ASTROLOGY AND DEBATES AS TO ITS VALIDITY

Astrology, the calculation of the disposition of the heavenly bodies for the purpose of trying to ascertain their effects of terrestrial life, developed from ancient Mesopotamian practices. Early in the second millenium B.C. records were kept of the appearances and disappearances of the planet Venus. Otto Neugebauer notes that there was little astronomical value in these observations. Rather, he suggests:

> They were probably made in order to provide empirical material for omina; important events in the life of the state were correlated with important celestial phenomena, exactly as specific appearances on the livers of sacrificial sheep were carefully recorded in the omen literature.[1]

Such data on Venus provide the earliest records of attempts to observe systematically celestial phenomena in order to draw conclusions concerning human events. It thus shows the beginnings of astrology. Later in that millenium Babylonian omens recorded efforts to make personal

predictions according to the month of a child's birth. These are crude precursors of the horoscope. As far as our available documents show us, the first true horoscopes were cast c. 410 B.C.[2]

Babylon was conquered by the Assyrians in 911 B.C., and, after a short recrudescence from 612, it was conquered by the Persians in 539. Both the Assyrians and the Persians adopted Babylonian practices and developed them further. The Assyrians, for example, began to record systematically certain celestial phenomena such as lunar and solar eclipses and to make astronomical inferences from them. Both the Assyrians and the Persians carried these ideas and practices into new areas covered by their far-flung empires. The Egyptians, according to Herodotus,

> found out from the day of a man's birth, what he will meet with in the course of his life, and how he will end his days, and what sort of man he will be--discoveries whereof the Greeks engaged in poetry have made a use.[3]

The more sophisticated calculations and prognostications of the eastern astrologers had not yet entered Greece in the fifth century, but this was not due to any philosophical or scientific arguments against it. Greeks studied omens and oracles, real or fanciful, as eagerly as others studied the sky. Herodotus records a prodigy which he claims appeared

to the Persian army and which they ignored to their detriment.

> Now the prodigy was this: a mare gave birth to a hare. Whereby it was shown plainly enough, that Xerxes would lead forth his host against Greece with mighty pomp and splendour, but in order to reach again the spot from which he set out, would have to run for his life.[4]

Nor did the Greeks take their omens only from terrestrial occurrences. Thucydides suggests that prodigies forebode the great devastation caused by the Peloponnesian War. Among them, "there were more frequent eclipses of the sun than had ever been recorded before."[5] The native culture accepted the validity of omens and looked at certain celestial phenomena as signs and warnings of future occurrences. In sum, the environment of Greece could be seen as receptive to astrology.

Greek philosophy often fostered that receptivity. The Pythagoreans (sixth century B.C.), for example, believed that number is the cause of all natural phenomena. As J. L. E. Dreyer has summed it up:

> Pythagoras and his followers were led to this assumption by perceiving how everything in nature is governed by numerical relations, how the celestial motions are performed with regularity, and how the harmony of musical sounds depends on regular intervals, the numerical valuation of which they were the first to determine.[6]

Their speculations about harmony had a practical side in music, and Pythagorean intonation continued to be the standard western musical intonation until the seventeenth century. But they also projected these speculations about number and harmony into the heavens and developed the doctrine of the harmony of the spheres, which results from the celestial movements and resonates but is inaudible to us. Although the Pythagoreans made the important contribution of establishing mathematics as the basis of the study of nature, their assertions about numerical relationships were often fanciful and full of mystical implications and would fit in well with astrological analogies and ideas.

In the Timaeus Plato (428-348 B.C.) sets up an association between the heavenly bodies, which he sees as divine, and mortal creatures, who partake in divinity through their souls. After the Demiurge created the heavenly bodies and other gods, Plato informs us, he directed the gods to form the mortal bodies, but first he created their souls out of the ingredients remaining after the earlier creatures.

> And when he had compounded the whole, he divided it up into as many souls as there are stars, and allotted each soul to a star. And mounting them on their stars, as if on chariots, he showed them the nature of

> the universe and told them the laws of their destiny. To ensure fair treatment for each at his hands, the first incarnation would be one and the same for all...And anyone who lived well for his appointed time would return home to his native star and live an appropriately happy life....and what remained to be done after the sowing he left to the newly made gods, who were to fashion mortal bodies and, for the rest, to devise the necessary additions to the human soul and their consequences, and so far as they could control and guide the mortal creature for the best, except, that is, in so far as it became a cause of evil to itself.[7]

Here Plato expresses two points which are conducive to astrology: the destiny of each soul is in its particular star, and the gods, which include the divine heavenly bodies, are to control and guide the mortal creatures for such creatures' benefit.

For Aristotle (384-322 B.C.), as for Plato, the heavens are a divine being superior to the world below. In his discussion on the immutability and eternity of the empyrean in his work On the Heavens, Aristotle remarks,

> It is clear then that there is neither place, nor void, nor time, outside the heaven. Hence whatever is there, is of such a nature as not to occupy any place, nor does time age it; nor is there any change in any of the things which lie beyond the outermost motion; they continue through their entire duration unalterable and unmodified, living the best and most self-sufficient of lives. As a matter of fact, this word "duration" possessed a divine significance for the ancients, for the fulfilment which includes the period of life of any creature, outside of which no natural development can fall, has been called its duration. On the same principle the fulfilment of the whole heaven, the fulfilment which includes all time

> and infinity, is "duration"--a name based upon the fact that it is always--duration immortal and divine. From it derive the being and life which other things, some more or less articulately but others feebly, enjoy.[8]

Here Aristotle expresses the dependence of inferior life, including terrestrial life, on the divine, infinite, immutable highest heaven, an idea which is also conducive to astrological principles.

Between 336 and 323 B.C. Alexander the Great conquered the Persian Empire and its allies, thereby uniting the Greek and Persian worlds. Although political unity did not outlast Alexander's death, the cultural and intellectual spheres were successfully fused in this Hellenistic age, and eastern astrological thought and practice entered Greece.

To be sure, not all Greek philosophers accepted this new-found astrology. Epicurus (c. 342-270 B.C.), for one, basing his natural philosophy on Democritus's atomic theory, maintained, "'Solstices, eclipses, risings and settings' and so on take place 'without the ministration or ordering' of gods, and the regularity of phenomena in the sky is due to the arrangement of atoms, not to god."[9] A belief in the purposefulness of the heavens is a necessary

foundation for a belief in astrology, and Democritus's atomic theory precludes such a belief.

Rome, through its conquests following the First Punic War in the third century B.C., also came into contact with Hellenistic culture, including the concerns and issues of astrology. The philosopher-statesman Cicero (106-43 B.C.) opposed it. "What inconceivable madness!" he proclaims about astrology. "For it is not enough to call an opinion 'foolishness' when it is utterly devoid of reason."[10] He faults astrology for depending upon the visual sense, which he considers the weakest of the senses, instead of mathematics, which teaches us the great distances between the celestial bodies, so that it is improbable that they affect us. He complains that astrologers do not take into account the varying locations of individuals on earth but believe that all people born at the same time have the same fate even though the disposition of the heavenly bodies is different at different places. He accuses astrologers of underestimating the role of the parents in creating a child and of ignoring the fact that some people, like Scipio Africanus and Homer, are unique, though born at the same time many others are born, and many in a battle share the same fate, though they were born at considerably different

moments. He also notes that people can interfere with their destiny through such means as medicine.[11] Cicero is particularly troubled by philosophies, such as Stoicism, which see human beings as tied to a specific fate which they cannot control or alter.

> It is a miserable thing to be tortured by one's own impotence and to forfeit even our last common consolation of hope. Especially when you teach that all is governed by a fate which has been determined from all eternity. So what use is it, what scope for discretion does it give, to know the future, if it cannot be altered?[12]

The philosopher-dramatist Seneca (c. 4 B.C.-A.D. 65) in his tragedy Oedipus illustrates the Stoic belief in such fatalism.

> By fate are we driven; yield ye to fate. No anxious cares can change the threads of its inevitable spindle. Whate'er we mortals bear, whate'er we do, come from on high; and Lachesis maintains the decrees of her distaff which by no hand may be reversed. All things move on in an appointed path, and our first day fixed our last. Those things God may not change which speed on their way, close woven with their causes. To each his established life goes on, unmovable by any prayer. To many their very fear is bane; for many have come upon their doom while shunning doom. (lines 980-994)[13]

To the Stoic, happiness comes from leading one's life in accordance with one's fate instead of trying to fight it. In order to learn one's fate all forms of divination were considered valuable, including trying to read one's fate in

the stars. Thus, astrology was very important in Seneca's outlook.

Ptolemy (A.D. second century) was the most significant beneficiary of the fusion of Greek philosophy and Babylonian astrology produced by Hellenism for the study of the heavens. He is the first to suggest that such study has two parts, although Ptolemy does not see these parts as creating two discrete disciplines:

> Of the means of prediction through astronomy, O Syrus, two are the most important and valid. One which is first both in order and in effectiveness, is that whereby we apprehend the aspects of the movements of sun, moon, and stars in relation to each other and to the earth, as they occur from time to time; the second is that in which by means of the natural character of these aspects themselves we investigate the changes which they bring about in that which they surround.[14]

In the Syntaxis Ptolemy describes what he sees as the mathematics of the motions of the heavenly bodies around the stationary earth. Following the Aristotelian distinction, Ptolemy considers this the theoretical part of astronomy.[15] The practical part of astronomy is that which studies the effects of those motions on terrestrial affairs, and that part is described in his work Tetrabiblos. In defense of astrology Ptolemy asks:

> If, then, a man knows accurately the movements of all the stars, the sun, and the moon, so that neither the place nor the time of any of their configurations

> escapes his notice, and if he has distinguished in general their natures as the result of previous continued study, even though he may discern, not their essential, but only their potentially effective qualities, such as the sun's heating, the moon's moistening, and so on with the rest; and if he is capable of determining in view of all these data, both scientifically and by successful conjecture, the distinctive mark of quality resulting from the combination of all the factors, what is to prevent him from being able to tell on each given occasion the characteristics of the air from the relations of the phenomena at the time, for instance, that it will be warmer or wetter? Why can he not, too, with respect to an individual man, perceive the general quality of his temperament from the ambient at the time of his birth, as for instance that he is such and such in body and such and such in soul, and predict occasional events, by use of the fact that such and such an ambient is attuned to such and such a temperament and is favourable to prosperity, while another is not so attuned and conduces to injury?[16]

Ptolemy defines the terms and describes the operations of astrology. He characterizes the signs of the Zodiac and the planets, establishes what kinds of prognostications can be accomplished through astrology, and shows how the horoscope can be determined and what it can demonstrate. He fixes the natural and "perverted" effects planets can have on individuals. For example, he divides those effects into active and passive parts and suggests:

> The corresponding perversion of the passive portion... is most apparent in excesses and deficiencies in matters of sex, male and female, as compared with what is natural, and in inquiry is apprehended..., though the sun is taken, together with the moon..., and the relation to them of Mars, together with Venus, is observed. For when these thus fall under observation,

> if the luminaries are unattended in masculine signs, males exceed in the natural, and females exceed in the unnatural quality, so as merely to increase the virility and activity of the soul. But if likewise Mars or Venus as well, either one or both of them, is made masculine, the males become addicted to natural sexual intercourse, and are adulterous, insatiate, and ready on every occasion for base and lawless acts of sexual passion, while the females are lustful for unnatural congresses, cast inviting glances of the eye, and are what we call tribades; for they deal with females and perform the functions of males. If Venus alone is constituted in a masculine manner, they do these things secretly and not openly. But if Mars likewise is so constituted, without reserve, so that sometimes they even designate the women with whom they are on such terms as their lawful "wives."[17]

Just as the Syntaxis became the classic text of astronomy in the Middle Ages, the Tetrabiblos became the classic text of astrology.

As Ptolemy was writing, monotheism was spreading in the area of the Roman Empire. The relation of Judaism to astrology had already proved to be problematic. The Hebrew Bible forbids divination. For example, Deuteronomy 18:10-11 teaches:

> There shall not be found among you any one that maketh his son or his daughter to pass through the fire, or that useth divination, or an observer of times, or an enchanter, or a witch,
> Or a charmer, or a consulter with familiar spirits, or a wizard, or a necromancer.[18]

This could be construed to include an injunction against astrology, and yet we find in the Babylonian Talmud such phrases as, "There is not an herb which has not a planet in

heaven that strikes it and says 'grow,'" (Bereshit Raba 10) and "The planet [of birth] makes one wise, rich" (Shabbat 180).[19] These are clearly astrological references, so that we must assume that the Talmudic rabbis who were commenting on the Hebrew Bible did not consider astrology an act of divination and, consequently, forbidden.

On the other hand, early Christian thinkers were forthright in their condemnation of astrology, and the organized Christian Church tried to destroy it. "The Church attacked astrology with all available weapons," writes Theodore Otto Wedel.

> As a part of paganism, the practice of all divinatory arts was forbidden the Christian; and, in the writings of the earlier apologists, astrology is hardly differentiated from soothsaying, oracles, and magic. In its philosophical dress, astrology was even less acceptable. The fatalism implied in the belief that the stars are arbiters of human destinies never found more unyielding opponents than the Church Fathers.[20]

Origen (c. 185-c. 254) calls astrology the wisdom of the rulers of this world and opposes it to the true wisdom of Christ:

> As for the wisdom of the "rulers of this world", we understand this to be what they call the secret and hidden philosophy of the Egyptians and the astrology of the Chaldaeans and Indians, who profess a knowledge of high things, and further the manifold and diverse opinions of the Greeks concerning the divine nature....When these, therefore, and other similar princes of this world, each having his own individual wisdom and formulating his own doctrines and peculiar

> opinions, saw our Lord and Saviour promising and proclaiming that he had come into the world for the purpose of destroying all the doctrines, whatever they might be, of the "knowledge falsely so called", they immediately laid snares for him, not knowing who was concealed within him.[21]

According to Origen, those who advocated such false doctrines as astrology were responsible for the crucifixion of Christ.

The great Latin Church father St. Augustine (354-430) believed in astrology and consulted astrologers during his Manichaean period. In his Confessions he objects to astrology because it absolves the human will of guilt in sin and interferes with God's grace:

> You have recovered your strength. Do not sin any more, for fear that worse should befall you. This truth is our whole salvation, but the astrologers try to do away with it. They tell us that the cause of sin is determined in the heavens and we cannot escape it, and that this or that is the work of Venus or Saturn or Mars. They want us to believe that man is guiltless, flesh and blood though he is and doomed to die despite his pride. Instead they have it that the blame is to be laid on the Creator and Ruler of the heavens and the stars, none other than our God, himself the very source of justice, from whom its sweetness is derived...[22]

While he is undergoing his conversion, he hears a story which convinces him of astrology's falsehood. The wives of a wealthy Roman and his slave gave birth at exactly the same time, so that the sons of each would have the exact same birth chart; nevertheless, the two boys had utterly

different fates. Similarly, he notes that twins have the same birth charts and suggests that this fact must disprove the predictions of astrologers:

> His predictions, then, will not be true, because he would have consulted the same charts for both Esau and Jacob and would have made the same predictions for each of them, whereas it is a fact that the same things did not happen to them both. Therefore, either he would have been wrong in his predictions or, if his forecast was correct, he would not have predicted the same future for each. And yet he would have consulted the same chart in each case. This proves that if he had foretold the truth, it would have been by luck, not by skill.[23]

Thus, St. Augustine discredits astrology for theological and practical reasons. Nevertheless, Theodore Otto Wedel suggests about Augustine:

> In his preoccupation with the practical details of astrology as a divinatory art, Augustine failed to note his own unconscious concessions to it as a physical science--concessions which could be made the basis for an almost complete rehabilitation.[24]

Astrology virtually vanished from western Europe with the collapse of the Roman Empire in the West, and in Byzantium Christian opposition forced it underground. Then in the seventh century Islam arose, and the Arabs conquered many of the Christian lands and inherited the wisdom they possessed. This wisdom included astrology. It flourished among medieval Arab intellectuals who accepted it as part of the Aristotelian heritage.[25] The important ninth-

century philosopher al-Kindi, who translated many works of Aristotle and other Greek philosophers into Arabic and wrote many important treatises in various disciplines, expanded the practice of astrology by using it in making weather predictions. He also introduced the notion that conjunctions could be rated by the frequency of their appearances, and great conjunctions, those between Jupiter and Saturn, bring great changes in history.[26]

Al-Kindi's pupil Abu Mashar was extremely influential in the Latin West as well as the Arab world in disseminating astrological doctrines. Richard Lemay calls him "the principal authority in astrology among the Arabs."[27] His Greater Introduction to Astronomy was translated into Latin twice in the twelfth century and was important for Western philosophy as well as astrology. Lemay suggests Abu Mashar's works played a crucial role in the transmission of Aristotle's natural philosophy, and "through the Introductium, Aristotle's natural philosophy became partially known some time before the translation of any genuine work of Aristotle himself on natural philosophy became available."[28]

Although most Moslem and Jewish thinkers in the Islamic world accepted astrology such significant

philosophers as Averroes (1126-98) and Maimonides (1135-1204), raised objections to the practice of astrology. Maimonides, for example, suggests in The Guide of the Perplexed:

> In order to keep people away from all magical practices, it has been prohibited to observe any of their usages, even those attaching to agricultural and pastoral activities and other activities of this kind. I mean all that is said to be useful, but it is not required by speculation concerning nature, and takes its course, in their opinion, in accordance with occult properties. This is the meaning of its dictum: And ye shall not walk in the customs [huqqoth] of the nation, these being those that are called by [the Sages], may their memory be blessed, Amorite usages. For they are branches of magical practices, inasmuch as they are things not required by reasoning concerning nature and lead to magical practices that of necessity seek support in astrological notions. Accordingly the matter is turned into a glorification and a worship of the stars. They say explicitly: All that pertains to medicine does not pertain to the Amorite usages. They mean by this that all that is required by speculation concerning nature is permitted, whereas other practices are forbidden.[29]

The Amorites are the Chaldeans, and Maimonides identifies their practice of magic and astrology with the forbidden customs of pagans. In response to an inquiry concerning astrology from a group of rabbis in the Provence, Maimonides names astrology as the sin which led to the destruction of the Temple in Jerusalem and the Jewish Diaspora.[30]

Astrology began to return to western Europe in the twelfth century as translators rendered into Latin the texts of the Arabs. Once more the issue raised by Ptolemy concerning the two parts of astrology was taken up. In his Didascalicon, Hugh of St. Victor (1096-1141) distinguishes between the two parts of astrology and significantly assigns different terms to each. He also considers certain parts of astrology to be legitimate, but dismisses others as superstitious.

> "Astronomy" and "astrology" differ in the former's taking its name from the phrase "law of the stars," while the latter takes its from the phrase "discourse concerning the stars"--for nomia means law, and logos, discourse. It is astronomy, then which treats the law of the stars and the revolution of the heaven, and which investigates the regions, orbits, courses, risings, and settings of stars, and why each bears the name assigned it; it is astrology, however, which considers the stars in their bearing upon birth, death, and all other events, and is only partly natural, and for the rest, superstitious; natural as it concerns the temper or "complexion" of physical things, like health, illness, storm, calm, productivity, and unproductivity, which vary with the mutual alignments of the astral bodies; but superstitious as it concerns chance happenings or things subject to free choice. And it is the "mathematicians" who traffic in the superstitious part.[31]

Although Hugh establishes the modern terminology regarding astrology and astronomy, he grants the heavenly bodies an influence in health, temperament, and degree of activity.

An important treatise on astrology is the Speculum astronomiae (Mirror of Astronomy) which medieval authors attributed to the great scholastic thinker Albertus Magnus (1206-80).[32] In this treatise St. Albertus praises astrology and sees it as the natural companion of mathematics and astronomy.

> For if the most high God in His Supreme wisdom so ordained this world that He, who is the living God of a lifeless heaven, wills to work in created things which are found in these four inferior elements through deaf and dumb stars as instruments, and if concerning these we have one science, namely, mathematics which teaches us in things caused to consider their Creator, and another natural science which teaches us to find by experience in created things the Creator of creatures; what is more desirable for the investigator than to have a third science to instruct him how this and that change of things mundane is brought to pass by the change of things celestial?[33]

Lynn Thorndike notes that on the theologically sensitive issue of astrology's possible interference with free will, St. Albertus

> maintains the usual position that the celestial influences make impressions according to the fitness of matter to receive them, and that man by using his intellect can to a considerable degree be master of his fate.[34]

Moreover, St. Albertus claims that nativities, or the attempt to predict a person's life from the birth chart, interfere with free will, whereas interrogations, or

appeals for advice from reading the stars, need not hurt free will but can "rectify it."[35]

The great theologian Thomas Aquinas (1225-74) also accepted astrology. In his Summa Theologiae he asserts such foundations for astrology as God rules earthly bodies through the stars and natural motions of inferior bodies are caused by the motions of the celestial bodies.[36] St. Thomas suggests that the heavenly bodies have a direct influence on physical bodies but act indirectly upon the intellect and will.

> The influence of the heavenly bodies can touch the intellect and will indirectly and accidentally in that the intellect as well as the will receives from the lower powers which are bound up with bodily organs.[37]

Thus, a human being is subject to the stars only insofar as he is subject to his material being. St. Thomas concludes:

> Most men follow their passions, which involve changes in sense-desire, and in these changes the heavenly bodies can play a part. On the other hand, those wise enough to be able to resist these passions are few and far between. Consequently, astrologers are able to foretell the truth in the majority of cases, especially in a general sense. However, they cannot do so in particular cases, for nothing stops a man from resisting his passions by his free-will. Thus these very astrologers say that the wise man is master of the stars in that he is the master of his own passions.[38]

St. Thomas accepts the possibility that astrologers can predict general trends in some people's lives because most

people cannot control their passions. Those who can control themselves have gone beyond the influence of the stars, and, consequently, their lives cannot be foretold through astrology. In this way St. Thomas makes an interesting compromise on the effectiveness of prediction through astrology.

Roger Bacon (c. 1212-c. 1292) had fewer qualms about astrology than Albertus Magnus or Thomas Aquinas. Bacon believes that the stars incline men toward good and bad acts, and although the influence of the stars can be resisted by the human will or by an act of grace, the force of the stars usually prevails.[39] Bacon also accepts al-Kindi's and Abu Mashar's ideas on conjunctions and uses them to show the superiority of the Christian faith, and he believes that Jesus' birth occurred at an astrologically suitable time.[40] The French Cardinal Pierre d'Ailly (c. 1350-c. 1420), also a prolific writer about astrology and a staunch defender, was to follow Bacon on this point.[41] Bacon also maintains that great things and changes can be effected by choosing through astrology the best moment to act, that is by elections.[42]

Astrology was part of many fields of intellectual endeavor in the later Middle Ages. Nancy Siraisi, in her

discussion of medical education and practice in the thirteenth century among the circle of the physician Taddeo Alderotti, sums up the importance of astrology in medicine.

> The importance attached to the study of the stars in medieval medical education derived from a general and widely held belief that the heavenly bodies play an intermediary role in the creation of things here below and continue to influence them throughout their existence. The actual uses of astrology in medical diagnosis and treatment by learned physicians were many and various. "Astrological medicine" is a vague and unsatisfactory term that can embrace any or all of the following: first, to pay attention to the supposed effect of astrological birth signs or signs at conception on the constitution and character of one's patients; second, to vary treatment according to various celestial conditions...third, to connect the doctrine of critical days in illness with astrological features, usually phases of the moon; and fourth, to predict or explain epidemics with reference to planetary conjunctions, the appearance of comets, or weather conditions.[43]

The medieval physician used astrology to understand his patients better and to decide which procedures to perform and when they are best performed, so that a thorough knowledge of astrology was considered essential to good medical practice.

Poets could also find astrology useful. Dante (1265-1321), for example, puts the soothsayers and diviners far down in the eighth circle of hell where they walk with their heads on backwards as punishment for trying to divine the future. And yet in his Paradiso his picture of heaven

is drawn from astrology, and he makes frequent astrological allusions. In Canto XXII Dante apostrophizes the constellation Gemini.

> O stars of glory, constellation steeped
> in mighty force, all my genius--
> whatever be its worth--has you as source:
> with you was born and under you was hidden
> he who is father of all mortal lives,
> when I first felt the air of Tuscany. (112-117)[44]

Dante was born when the sun was in Gemini, and this sign is favorable to the pursuit of letters. Thus, Dante ascribes his literary talent to his birth constellation.

Chaucer (c. 1340-1400) also uses astrology quite frequently and shows its two sides. The young Oxford scholar Nicholas "Hadde lerned art, but al his fantasye/Was turned for to lerne astrologye." (Canterbury Tales, 3191-2)[45] Nicholas's reputation for mastery of astrology allows him to dupe the miller in order to sleep with his wife. In this case the astrologer consciously deceives the foolish believer for his personal benefit. But in Troilus and Criseyde Chaucer uses astrology to give us deeper insight into Troilus's character:

> And also blisful Venus, wel arrayed,
> Sat in hire seventhe hous of hevene tho,
> Disposed wel, and with aspectes payed,
> To helpe sely Troilus of his woo.
> And, soth to seyne, she nas not al a foo
> To Troilus in his nativitee;
> God woot that wel the sonner spedde he. (680-686)

This lets us know that Troilus is somewhat amorous by nature, and as at this moment Venus is in the seventh house (close relationships), Troilus is likely to succeed in his amorous adventure. Chaucer assumes that his reader has enough knowledge of astrology to understand this passage.

An important voice against judicial astrology at this time was Nichole Oresme (c. 1328-82). In his Livre de Divinacions (Book on Divinations) he divides astrology, under which term he considers all matters pertaining to the sky, into six parts: movements, signs, and measurements of the heavenly bodies; the qualities, influences, and physical powers of the stars; the movements of the stars and planets for making predictions about great events, weather, and medical procedures; nativities; interrogations; elections. Oresme believes the first three parts belong to natural science.

> The first part of astrology is speculative and mathematical, a very noble and excellent science and set forth in the books very subtly, and this part can be adequately known but it cannot be known precisely and with punctual exactness...[46]

The second part "can be known so far as its nature is concerned but we know too little about it and in particular the rules in the books are false...and have either slight proof or none."[47] As for the third part, that "which is

concerned with the great events of the world, can be and is sufficiently well known but only in general terms."[48] But when it comes to the weather, Oresme asserts,

> as regards change in the weather, this part by its nature permits of knowledge being acquired therein but it is very difficult and is not now, nor has it ever been to any one who has studied it, more than worthless, for the rules of the second part are mostly false as I have said, and are assumed in this branch. And, similarly, the detailed rules bearing on this part are false, so that we see every day that sailors and husbandmen can prophesy changes in the weather better than the astronomers.[49]

With medicine, too, "we can know a certain amount as regards the effects which ensue from the course of the sun and moon but beyond this little or nothing."[50] Thus, Oresme believes that some of the physical effects of the heavenly bodies can be known and utilized, and the further we get from mathematical astronomy, the less he feels can be known with certainty. And elsewhere, in his Tractatus contra astronomos (Treatise against astronomers), he reminds us that the "part of astrology which studies the motion, measurements, and natures of the heavenly bodies" is acceptable unless it is applied to divination.[51] Though some things that relate to nativities can be known, Oresme feels that, "one often sees in practice that two people are born at intervals of time so minute as cannot be recorded and yet their fortunes are quite different, so I say that

this part of astrology cannot be known and the rules written down on it are not true," and interrogations and elections "have no reasonable foundation..."[52]

Despite such protests as these the belief in astrology and dependence on the advice of astrologers was rising in the thirteenth and fourteenth century. As Jacob Burckhardt colorfully describes the situation:

> The Emperor Frederick II always travelled with his astrologer Theodorus; and Ezzelino da Romano with a large, well-paid Court of such people, among them the famous Guido Bonatto and the long-bearded Saracen, Paul of Bagdad. In all important undertakings they fixed for him the day and the hour, and the gigantic atrocities of which he was guilty may have been in part practical inferences from their prophecies. Soon all scruples about consulting the stars ceased. Not only princes, but free cities had their regular astrologers, and at the universities, from the fourteenth to the sixteenth century, professors of this pseudo-science were appointed, and lectured side by side with the astronomers....The Popes commonly made no secret of their star-gazing, though Pius II, who also despised magic, omens, and the interpretation of dreams, is an honourable exception....Even Leo X seems to have thought the flourishing condition of astrology a credit to his pontificate, and Paul III never held a consistory till the star-gazers had fixed the hour.[53]

Burckhardt's description misses the important link between medieval astronomy and astrology, a tie so strong that even Oresme's criticism only so slightly loosens. But when Giovanni Pico della Mirandola wrote his Disputations against Judicial Astrology in 1494, general dependence on

astrology had become widespread, and the contemporary pope, the notorious Alexander Borgia, maintained court astrologers. Under such circumstances the conflict between astral determinism and free will has important religious, psychological, and moral implications, and the debate to decide whether or not astrology has validity takes on a greater urgency than at a time when the dependence on astrology was less common.

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CHAPTER TWO

PICO AND ASTROLOGY

Giovanni Pico della Mirandola was born in 1463, the youngest child of the count of Mirandola. His father died when he was still a baby, and while his two elder brothers quarreled over possession of the patrimony, Giovanni's mother decided that he should prepare for an ecclesiastical career. At 14 he began to study canon law in Bologna, but he preferred a less specialized education and began studying philosophy in Ferrara in 1479. His pursuit of learning took him to the University of Padua, a major center of Aristotelian philosophy, where he remained from 1480 to 1482. He studied there with the Jewish Averroist Elia del Medigo. During this period he also became acquainted with Marsilio Ficino, who had started his Platonic Academy in Florence, and in 1484 Pico settled in that city. Pico advocated neither a strictly Platonic nor Aristotelian philosophy, however, but worked toward reconciling the two.

In 1485 Pico visited the University of Paris, a noted center of scholasticism at that time. On his return to Italy he created a scandal when he attempted to elope with Margherita, the wife of Giuliano Mariotto de' Medici, count of Arezzo. The husband with a posse caught the pair; Pico was imprisoned and released only at the intervention of Lorenzo de' Medici. The episode had a great effect on Pico, for he abruptly ended his active amorous life and thereafter often contemplated taking orders. Eugenio Garin suggests this episode is instructive.

> The ardor which always characterized the figure of Pico thus transformed, flowing into a renewed impetus for study, into an intolerance of obstacles, which animated him in the tempestuous vicissitudes of the succeeding years. On the other hand, there is in this multiform ardor, impetuous and insatiable, for love, for glory, for knowledge, and, finally, for renunciation, for asceticism, for a mystical thirst for God, a psychological substrate of Pico's celebration of the infinite power of man.[1]

Pico then went to Perugia where he resumed his studies with Elia del Medigo. At this point, Elia may have sensed a mystical strain in the young student, for Elia also introduced Pico to Jewish mysticism, Qabbalah, which became an abiding interest for him.[2] On the other hand, Garin suggests that the Qabbalah itself was not very important in Pico's thought:

> in the adherence to the Qabbalah he did not make for himself a body of doctrine, but it was limited to receiving a few points and the beginning of a method of scriptural exegesis.[3]

In addition to continuing his studies in Latin and Greek, Pico pursued his education in Hebrew and Arabic. Although he remained unattached to any particular school of thought, "Pico's correspondence, in its form, in most of its content, and in the persons with whom he was in touch, makes him appear to us as a typical member of the humanist circles of his day," as Paul Oskar Kristeller notes.[4]

The breadth of his learning was already evident at the end of 1486 when he wrote his 900 Conclusions on "dialectic, morals, physics, mathematics, metaphysics, theology, magic, and Qabbalah, together with his own conclusions and those of the wise men of the Chaldeans, the Arabs, the Hebrews, the Greeks, the Egyptians, and the Latins."[5] This series of statements came from sources as diverse as Plato and Aristotle, Greek Peripatetics and Neoplatonists, Avicenna and Averroes, Pythagoras, Orpheus, Hermes Trismegistus, Zoroaster, and Qabbalah, as well as many others, reflecting an immense spectrum of thought and opinion. As Pico explains in his masterly Oration on the Dignity of Man, which was to have been an introduction to the Conclusions:

> I...have so prepared myself that, pledged to the doctrines of no man, I have ranged through all the masters of philosophy, investigated all books, and come to know all schools....surely it is the part of a narrow mind to have confined itself within a single Porch or Academy. Nor can one rightly choose what suits one's self from all of them who has not first come to be familiar with them all. Consider, in addition, that there is in each school something distinctive that is not common to the others.[6]

Pico sought truth in all systems of belief, but he did not maintain a perspectivist position on the nature of truth; that is, he did not hold that each system of thought forms part of a larger whole. Pico held that each system contained some true statements, a doctrine consonant with his scholastic background.[7] These true statements had to be sought out and defended. Therefore, he presented these 900 Conclusions in Rome for public debate. However, under Pope Innocent VIII's direction thirteen of Pico's theses were condemned or questioned. Pico wrote his Apologia in 1487 in defense of these thirteen, after which all 900 were condemned. He decided to return to Paris to continue his studies there, but was arrested by papal agents on his trip. The arrest threatened to create an international incident, and so Pico was released, and he returned to Florence at the invitation of Ficino. There he was under Lorenzo de' Medici's protection. In Florence he also

cultivated a friendship with the fiery reformist Dominican friar Girolamo Savonarola.

Pico's search for truth was a religious and moral quest. Ultimately all truth lies with God; however, God gave man free will, that is, the power to choose his place in the universe. "'We have made thee neither of heaven nor of earth,'" Pico suggests God told Adam,

> "neither mortal nor immortal, so that with freedom of choice and with honor, as though the maker and molder of thyself, thou mayest fashion thyself in whatever shape thou shalt prefer. Thou shalt have the power to degenerate into the lower forms of life, which are brutish. Thou shalt have the power, out of thy soul's judgment, to be reborn into the higher forms, which are divine."[8]

Thus, man can strive toward God by means of his capacity for knowledge. Ernst Cassirer emphasizes the intellectual nature of Pico's concept of divinity and man's relationship to it.

> The true amor Dei is for Pico amor Dei intellectualis: for only to the intellect is there disclosed the truly Universal, which forms a necessary moment and the real mark of the Divine....Hence Pico is by no means willing to renounce the power of pure thought; he seeks rather to increase it and carry it to the point at which it can be supplemented and enhanced by another purely intuitive kind of knowledge. But at the same time he maintains the position that our thinking and conceiving, in so far as it is directed toward the Divine, can never be an adequate expression, but only an image and a metaphor.[9]

As in Qabbalistic learning, the mystical attainment of the divine for Pico comes through concentrated study as well as intuitive knowledge of God.

We can see the symbolic nature of Pico's religious thought most clearly in the Heptaplus (1487) in the form of a Qabbalistic interpretation of the seven days of creation as set forth in the first chapter of Genesis. The Heptaplus, composed of seven books of seven chapters each, recounts the creation as it pertains to each of four worlds, the elemental, celestial, angelic, and human worlds. It is patterned on the model of Qabbalistic exegesis; into a Zohar-like mold Pico poured that wealth of sources we have seen in his other works. Once again we encounter the potential power of man: here through the mediation of Jesus Christ, the man/God, man can rise above the angels.

> Finally Moses mentions man, not because man is an angel, but because he is the end and terminus of the angelic world, just as when discussing corruptible nature he presents man not as part of that nature, but as its beginning and head....But I see a trap prepared for our interpretation, since it may be pointed out that man is set over the fish of the sea, the birds, and the beasts. If these signify the angelic natures, how can what is written be true, that over them is set man, who, the philosophers know and the Prophet testifies, is lower than the angels? Let Him who also ground Satan under our feet, Jesus Christ, the first-born of all creatures, aid us and destroy the trap. He surely destroys the trap and loosens and bursts

> every knot, not only because in Him, in Whom all divinity dwelt corporeally, human nature is so elevated that Christ as a man, so far as He is man, teaches, enlightens, and perfects the angels, as he inherited a more excellent name than they; but also because all of us, to whom the power is given to become sons of God through the grace whose giver is Christ, can, be raised to an honor above that of the angels.[10]

We can see in this conception, which grants man the potential for breaking out of his place in the medieval hierarchy, the seeds for the destruction of the hierarchical constraints.

In his work On Being and the One, which he wrote in 1491, Pico tries to show that Plato agreed with Aristotle, who maintained that being and unity are coextensive. This is in opposition to the Platonists, who believed that Plato had placed unity above being. With the aim of reconciling the two philosophers Pico had hoped to write a longer work, for which On Being and the One was a preliminary study.[11]

At this point we see three interrelated strands running throughout Pico's writings: 1. that divergent systems of thought can and should be studied and reconciled; 2. that man's freedom of thought and action is given by God and is enhanced by this kind of philosophical inquiry; and 3. that the ultimate aim of such inquiry is to bring man closer to God. These three strands are visible

also in his Disputations against Judicial Astrology. This work was written in 1494, just before his premature death at the age of 31. His nephew, Gianfrancesco Pico (1469-1533), a philosopher in his own right, edited and published the work.[12] It appeared in 1495.

Pico did not condemn all study of the stars. In the Preface to his Disputations against Judicial Astrology he was careful to define the subject of his attack.

> To be sure, when I say astrology, I do not mean that art which measures the size and the motions of the stars by mathematical calculations, a sure and noble art which is very worthy in its merits and very highly approved by the authority of the most learned men, but that art which predicts future occurrences from the stars, the deceit of greedy liars, forbidden by civil and religious laws, sustained by human curiosity, mocked by philosophers, cultivated by quacks, suspected by every one of the best and the wisest....As the former was given the name of astronomy, this one was given the name of astrology...[13]

Pico saw astronomy as a legitimate field of scientific inquiry. Astrology, on the other hand, is a detriment to all areas of human endeavor.

> [Astrology] corrupts all philosophy, adulterates medicine, weakens religion, generates or reinforces superstition, fosters idolatry, destroys prudence, pollutes morals, disgraces the heavens, makes men miserable, anxious, restless, slaves instead of free and quite unfortunate in doing almost everything.[14]

In order to prove the falsity of astrology Pico begins by relying on authority: astrology was condemned "by the

laws of the emperors," "by the oracles of the prophets," and "by the sanctions of popes," as well as by philosophers and mathematicians.[15] He considers that such representatives of pagan antiquity as Pythagoras, Plutarch, Democritus, Seneca, and Cicero[16] lend their support to his position, and "astrology contains so much nonsense that Epicurus, who is crazy with respect to many things, could not give his assent."[17] Plato and Aristotle "considered it unworthy of mention in anything they wrote, condemning it more by remaining silent about it in all their philosophy than anyone else did in speech or writing."[18] He looks to such figures as Augustine, Ambrose, Eusebius, Tertullian, and Origen[19] in Christian antiquity; among the more recent opponents of astrology he includes Albertus Magnus, Nicholas Oresme, Angelo Poliziano, and Marsilio Ficino.[20] He also views the Bible[21] and Justinian's code[22] as proof that prophets and emperors condemned astrology.

On the other hand, Pico has to take into account Ptolemy's acceptance of astrology and his authorship of the astrological treatise, the Tetrabiblos. Ptolemy was a considerable authority for the supporters of astrology. Pico minimizes Ptolemy's contribution to natural philosophy by claiming that where Ptolemy was correct, he basically

followed Aristotle; when he deviated from Aristotle, as in his adherence to astrology, he fell into error.[23] Abumashar, the influential Arab astrologer, could be dismissed entirely, claims Pico, since "he was neither a philosopher nor a dialectician and was ignorant in mathematics."[24]

One must agree with Thorndike that Pico "had a wide, if not exhaustive, acquaintance with past literature germane to his theme, but the use he makes of it is that of the advocate and dialectical disputant...rather than that of the impartial historian of ideas."[25] Pico presents his sources not for the purpose of examining them critically, but as a basis of support from which he can proceed to a polemical examination of the issue. Thus, the list of sources is one-sided. In Book I he presents the ideas of very few supporters of astrology, and, as we have noted, he does so only to impugn their credibility. The argument that Plato and Aristotle condemned astrology by their silence is a rhetorical legerdemain which he uses because his argument from authority would have been greatly weakened for his contemporaries had he not be able to cite the greatest of the pagan authorities. Pico may have sincerely believed that Plato and Aristotle tacitly

supported his position, but their silence was due to the fact that astrology as a discipline had not yet entered Greece when they wrote. Pico seems not to have been aware of this chronology. As we have noted, both had ideas concerning celestial governance of the world which could support the belief in astrology. Pico strengthens his argument by correctly denying that two astrological works attributed to Aristotle, Secret of Secrets and On the Properties of the Elements, were written by him. But Pico does not give reasons for his decision.[26] Furthermore, he incorrectly denies that astrological treatises could be attributed to Albertus Magnus; he prefers Roger Bacon or Robert of York, an obscure fourteenth-century English Dominican.[27] Aristotle and Albertus were major philosophical authorities who wrote about the stars. Pico's claim that neither supported astrology and his denial that Ptolemy's contributions in natural philosophy were original with him are intended to bolster Pico's assertions with respect to his anti-astrological stand and his claim that he did not oppose studying the stars per se.

Pico's treatise as a whole proceeds in its arguments from the general to the particular. He does not build an

argument by first demonstrating the falsehood of certain astrological propositions and on that basis moving on to show the falsehood of astrology itself; he does not follow a scholastic mode of disputation despite the fact that he has entitled this treatise "disputations." Pico sees astrology as a total system of belief, much like those philosophical systems he had studied leading to his writing the Conclusions. He had believed, however, that those systems contained true statements which could be defended and incorporated into the true system of belief, which for him was Christian. He now denies astrology that validity he has granted certain pagan and heretical beliefs. All aspects of astrology are false and anti-Christian; therefore, it merits no defence. This is underscored when he compares the attitude of theologians toward astrology and philosophy by asking:

> Why then did they not condemn philosophy but the impiety of certain philosophers, whereas they do not likewise condemn astrologers but astrology itself? It is only because in philosophy if anything is wrong, the fault is the professor's; in astrology the profession itself is at fault.[28]

From the beginning in Book I where he argues from authority Pico makes it clear that he will not entertain any possibility of astrology's validity, even for the sake of argument. In Book II he contends that astrology is

false and useless. In Book III he deals with the nature of the heavens and their relationship to man, and in Book IV he denies that effects and influences on human events can be attributed to the sky. In Books V-IX he concentrates on celestial details which astrologers claim influence human behavior. In Books X and XI he criticizes astrologers' methods of interpretation. His own method in a sense is first to attack the conclusions, then to attack the data, and lastly to attack the method of gathering the data. Thus, the work as a whole does follow a plan of argument, although one may agree with Thorndike that it does at times ramble.[29]

Whereas Pico does not display critical skills in his argument from authority, he has demonstrated an important methodological point: philosophical analysis of a problem begins with a thorough study of the thought of one's predecessors on that problem. Once Pico has mastered that foundation, he could go on to demonstrate what he considered the logical and empirical deficiencies of astrology.

> But let me not fight by authority alone: we shall demonstrate throughout this entire work that this very superstition was lawfully rejected for definite reasons by the saints, for it is very strongly opposed to religion; it was usefully forbidden by civil laws, for it is useless to life, rather it harms and upsets

> it; it was rationally refuted by philosophers, for they knew how false and uncertain it is.[30]

Thus, astrology adversely affects three realms of human life, the religious, the civil, and the intellectual. Pico's arguments depending on reason and experience deal with all three.

In Book II Pico claims that astrological prediction is useless for guiding our actions both in the private and public realms because astrologers err most of the time. He maintains that Francesco Sforza was the luckiest man in that era. "He always loathed or despised all astrologers; under no circumstances would he consult them about his military or domestic affairs."[31] On the other hand, Pino Ordelaffi, Pico's brother-in-law, resorting to astrology "died in the very year Girolamo Manfredi, the renowned astrologer of our age, promised him a completely secure life..."[32] Nor will Pico grant the possibility that Manfredi's inaccurate prediction may have been an aberration.

> But if any of [the astrologers'] predictions ever turns out to be correct, it should be credited not to reasoning, which does not exist among them, but to accident and chance.[33]

Thus, people make a mistake if they base their decisions on astrologers' predictions.

Pico maintains that astrology is harmful not only to secular human activities but to religion as well. Pico, therefore, castigates Roger Bacon and Pierre d'Ailly for their attempts to use astrology to support the verity of the Christian faith. He notes, for example, the use of astrological calculation to determine the number of years between the creation of Adam and the birth of Jesus and to confirm the oracles of the prophets. Pico doubts the accuracy and finality of those calculations from astrological tables.[34] And underlying this critique of the two theologians is Pico's fear of a greater harm to the cause of religious belief.

> Indeed, among the major writers on astrology I have read not one who would not subject religion, like all the rest of human affairs, to the constellations of the stars.[35]

Pico suggests that astrologers place all terrestrial events under the domination of the stars. He sees no place for divine providence in the philosophy of the astrologers even though they would consider themselves good Christians and deny Pico's allegations. Pico stresses the incompatibility of astrology and Christianity:

> If anyone would consider the matter with the proper measure of judgment, he will see no greater error offending the faith of true religion, for it would be just as impious to deny religion altogether as to deduce it from the sky through fatal necessity.[36]

Moreover, astrology leads to other disreputable forms of superstition, and Pico sees all forms of superstition as idolatry.

> All writers on the subject call geomancy the daughter of astrology. Magicians think the use of this art so necessary that they label astrology the key to magic. Chiromancers imagine seven masses in the palm of the hand to match the number of planets so that future events may be predicted by contemplating the lines there. But we shall attend to these insanities one by one when, after the mistress and queen has been overturned, in due course we shall overthrow the whole remaining host of superstitions....it may be said with Ecclesiastes about it, vanity of vanities is astrology, yea all superstition is vanity.[37]

Pico is standing as defender of the true faith against its opponents who believe in "superstitions." He is letting his readers know that the attack on astrology is the first in a series of attacks against all forms of superstition. Gianfrancesco confirms that this was his intention and links it to a plan to write against all the enemies of the Church.[38]

Pico feels that astrological prediction could never be sure,

> because if you will examine human affairs correctly, you would find almost nothing which...was actually forecast from the sky whose outcome would not change. For it is also man's special nature to arrange his affairs according to the dictates of his will and reason, and that which is completely bound and tied to matter is strongly subjected to what befalls him.[39]

The human will can interfere with the progress of events, for the human being can make decisions which alter this course. Nor can the material stars control the human mind so that the pre-determined outcome will be fulfilled.

In Book III Pico deals very closely with the relationship between human affairs and the heavenly bodies in order to refute the astrologers' claim that the nature of celestial influence validates astrology. He notes that

> the astrologers have said that all motion here below depends on the motion of the sky, but they have at once contradicted their principles, for from this would follow that common belief among philosophers that the whole sky is the cause of effects here below. However, a general cause does not distinguish among its effects. The question is not whether this or that effect follows from the general cause. On the contrary, the difference and variety in effects follow from proximate causes which are different and various.[40]

The effects of the sky on the earth are the same for all: it does not single out particular individuals for particular effects. Consequently, the sky cannot determine particular events, actions or decisions that will affect individual lives, and astrologers' attempts to understand and even predict terrestrial affairs through contemplation of the stars are ill-founded.

Furthermore, Pico suggests, "since an astrologer looks at signs which are not signs, and thinks about causes which

are not causes, he is, therefore, deceived."[41] A sign points to some meaningful occurrence outside itself. It can portend some future occurrence, or it can be the effect of some past occurrence, but there has to be some causal connection between the sign and the occurrence it indicates. Otherwise, what we assert to be a sign is a sham. Since Pico denies that most terrestrial occurrences could be the effects of celestial occurrences, then the stars cannot be signs which indicate terrestrial occurrences.

Pico acknowledges that the heavenly bodies do affect the earth, but that effect is severely restricted. "This is the chief function of the sky, by which bodies are perfected and the living is disposed to life," he maintains,

> the activity of circular motion, necessary not only in order to carry light and heat down to us and by turns more or less imparted to the earth with wonderful aptness, but also by motion to render us more capable of heat which continuously flows from the moving bodies.[42]

To Pico motion, light, and heat are properties that exist in the nature of celestial bodies; they are not occult influences. And through the motion of the celestial bodies, heat and light are carried to the earth. Pico so wishes to limit the influence of the sky over terrestrial

occurrences that despite all the arguments to the contrary he denies that the force of the moon may cause the tides. He prefers such explanations as motion being natural to water or the effect of winds and vapors so that "beyond these causes why is it necessary to add the motion of the moon with itself drawing the water downward and upward..."[43] Likewise he rejects the possibility that critical days, days on which it was believed that marked changes, such as excessive bleeding, took place in a patient's symptoms, were caused by the phases of the moon.[44]

Avery Dulles suggests that "the evolution of Pico's attitude toward astrology seems to reflect an increasing emphasis on the physical aspect of the celestial world."[45] This is a direction which may be perceived from Pico's statements denying the stars any power except through the general influence of motion, light, and heat. Pico is looking in a new direction: he is demeaning the stature of the celestial bodies by emphasizing their corporeality so that he can elevate man by emphasizing his spirituality.

> There is nothing great on earth but man; there is nothing great in man but his mind and soul. If you rise that high you will reach the sky; if you tend toward the body and gaze toward the sky, you find yourself a fly, or less than a fly.[46]

Ernst Cassirer believes that this sentiment, and not the empirical observation of nature, was the source of Pico's rejection of astrology.[47] Indeed, Pico does not seem to have made or used any systematic observations to support his claims. Nor should we expect such observations from him. He was a humanist, not a professional astronomer. His method of argumentation indicates that his sources are almost entirely from books. As Paul Oskar Kristeller emphasizes,

> the basic impulse of his attack was religious and not scientific, and he indicates more than once what his chief objection to astrology was: the stars are bodies, and ourselves are spirits; it cannot be admitted that a corporeal, and hence lower, being should act upon our higher self and restrict its freedom.[48]

And one religious point which interested Pico throughout his career is the problem of free will. It is, therefore, fitting that Pico should end this book of the Disputations, which discusses the nature of the sky, with a chapter on the nature of man.

Angels also do not rule over men according to Pico, but they are messengers from God, and since they are spiritual beings, unlike the corporeal stars, they bring men closer to God. Thus, God and angels may be invoked as the cause of an event which seems to have occurred beyond

human agency. Against the astrologer's claim that the stars are agents of God, Pico responds:

> Those forces interceding between God and man should be superior to man, just as they are inferior to God. And it is not proper that what is accomplished by reason and counsel, as our affairs should, be arranged by the first author through the agency of non-rational beings. But just as he rules and regulates the elementary mass, inasmuch as it is inferior, thrcugh the agency of the sky, which is superior, so it is proper that human affairs be governed by the mystery not of bodies but of angels, who by nature and dignity mediate between us and God. So when you descend from God to the earth, you descend by means of the sky; when you descend from God to man, you descend by means of angels.[49]

Thus, the sky may be superior to the physical earth, but it is not superior to man. Again we note Pico's emphasis on the corporeality of the sky and the spirituality of man. On the other hand, he has toned down that exuberant glorification of man that he expressed in the Oration and Heptaplus. Man's place in the Disputations is securely below the angels.

In Books II, III, and IV Pico focuses on the question of the validity of astrology as a system of thought. Starting with Book V he concentrates his attack on specific principles of astrological dogma. For example, he denies that conjunctions, that is, the times when two planets are very near each other, have any significance. He feels it illogical to claim that they can influence events on earth:

if two planets in conjunction had similar properties, their being in conjunction would have no special effect because of their redundant properties. If, on the other hand, the planets in conjunction had opposite properties, their being in conjunction would cancel out any effect they could have on earth.[50]

Nor does Pico believe that conjunctions could be used to date events. He cites as an example Pierre D'Ailly's attempt to date the origin of the world by calculating the first conjunction between Jupiter and Saturn, that is, the first great conjunction. Each subsequent major event would correspond to each subsequent great conjunction; therefore, by calculating the appearance of each great conjunction astrologers claim they can date those events. But Pico does not regard the stars as the proper means for dating historical occurrences, "for the astrologer does not know what the position of the stars was at the time of the birth of Christ unless he first accepts from history at what time that birth was."[51] Thus, history is the proper source for dating these events, and the crucial historical work for Pico was the Bible. The Bible cannot err, so that in response to D'Ailly's claim that histories err more than the stars, Pico notes that the time period between

conjunctions is uncertain, but errors in history occur because of errors in transcription and translation. He uses the story of the translation of the Septuagint, in which seventy Hebrew scholars separately produced the exact same translation into Greek of the Hebrew Bible, to suggest that "the record of the letters belongs to the Hebrews," an opinion he claims to share with St. Augustine.[52] Thus, the humanist Pico counsels us to rely on the original source, as, of course, the Bible was the ultimate work of history for him.

Pico cannot accept the picture of the heavens that the astrologers draw in order to chart their prognostications.

> Thus, the astrologers say that such power and virtue of the planets and stars are found to vary at individual hours and moments when they are either in different locations of the sky, which the moderns call houses, or in different signs, which they imagine to be twelve, or the distances between the planets are mutually connected in varying intervals of space by rays, which they commonly call the aspects of the planets. These are the principal means, for I would omit the lesser ones, by which they believe the influence and virtue change; namely the diversity of house, sign, and aspects. Indeed, if these are not defended by them, they cannot maintain their dogma about the influence of the planets, namely that every change and divergence of inferior matters arises from the planets. For if they are always the same and immutable in quality, as we consider all of them but the moon, the same or similar effects would always necessarily flow from them. For the astrologer cannot refer the diversity of effect to inferior causes, as we ourselves do, unless they agree with us that they could not divine anything about such diversity from

> the sky when, of course, the sky is not considered to be the authority and cause.[53]

For Pico it is absurd to attribute the diversity and mutability that exist on earth to the effect of the sky, for the heavens are immutable and what cannot change itself cannot cause change. Here we see that Pico, a century before the Aristotelian doctrine of the immutability of the heavens was overturned, bases himself on what would later be considered an absurd notion, but, indeed, he cleverly argues from the physics available to him. Nevertheless, the astrologers claim that the heavens affect terrestrial affairs through the agency of houses (divisions of the sky indicating spheres of life), signs (the constellations of the Zodiac), and aspects (the angles at which the light rays of two planets appear to strike the earth); therefore, Pico attacks this part of astrological dogma with particular urgency.

Pico denies that the position of the stars can dictate the fortune or misfortune of man. He even deems it useless to argue that such an effect results from the change in the angle of the rays which reach the earth.

> How absurd this is will readily be understood by anyone who has even tasted the rudiments of optics and philosophy since there is no one who does not know that the quality of the effect is distinguished from the quality of the ray and the nature of the

> irradiating bodies, not by the divergent dissemination of the ray....The sun's ray, by whatever means, in whatever place it is cast upon us, always makes heat, always gives light. Indeed, when it is at its closest or directly overhead, it illumines more and heats up more, but when it descends from a more distant place or it is oblique or refracted, its effect is the same as when close or overhead, only less so. Nor indeed can another difference in effect be produced except as what results from the intensification and remission of heat and light which follows. Therefore, the doctrine of the astrologers who think that the twelve signs of the sky and the planetary positions with respect to them elate our brothers or make them miserable is insane.[54]

In Book III of the Disputations Pico has argued that the heavenly bodies can affect the earth only physically; they cannot alter spiritual or psychic patterns. Now he is reinforcing that argument: the position of heavenly bodies can only alter the intensity of heat and light on earth; they cannot affect human affairs. Therefore, it is useless to observe the position of heavenly bodies for the purpose of predicting the coming fortune or misfortune of human beings.

Furthermore, Pico notes that the astrologers speak about the twelve signs of the Zodiac as if they were observable in nature. But how do they justify this division of the heavens?

> What philosophical reason will they advance for these things? Or how will they amend the figment invented by astrologers who do not take any properties of nature into consideration but seek more convenient

> numbers for making calculations? But where the certain opportunity for astrology's falling into error lies is when they supposed that the signs had entirely independent powers, and were so distributed not by human judgment but rather by nature.[55]

Pico believes that neither philosophical reasoning nor observation of nature can prove astrological claims about the signs. He argues they were in fact invented to facilitate astrological prediction. Moreover, he claims that the supposed movement of a planet into a new sign is a meaningless event, for the effects of that have nothing to do with the sign.

> When the sun is in Leo, it warms the earth more energetically. When it arrives in Aries, it is as if it renews the world. Hence, it seems to them that the sun has a relationship with Leo and with Aries because as it passes through those signs it becomes stronger, and every year we experience its greater power [in these signs]....they are led from this conjecture about the sun so that they think they perceive a similar thing in other signs...That first proposition upon which the others depend, see how false it is, how full of ignorance and stupidity. For the fact that the sun produces more heat for us in Leo is not due to the nature of the sign it is passing through, but to the point and position, because from that spot it strikes the earth more directly and is closer to our region.[56]

The astrologers prefer to explain the summer heat as the result of occult properties in the sign of Leo; Pico prefers to explain it as the result of the sun's greater proximity to the earth and the directness of its rays. His explanation is simple and direct. It requires fewer

assumptions than the astrological argument. Astrologers assume the existence of signs that they deduced from a series of occurrences but could not observe in nature. Pico prefers an explanation which is purely physical--the position of the sun during the summer--and can be observed in nature--when one is more directly in the line of any source of heat, one feels the heat more intensely. There is no need to refer to the signs and their peculiarities for us to achieve a rational explanation for this particular phenomenon. Pico has denied that the disposition of the heavens can have any influence over human affairs aside from physical effects. Now he is showing us that the assumptions of astrology are not necessary to explain those physical effects. In fact, they divert our attention from seeking the real causes: physical effects have physical causes.

Pico also explains this physical phenomenon using arguments from Aristotelian philosophy. For example, he claims that the kind of reasoning which explains the warmth of the summer by the nature of the sign the sun has entered shows that the astrologers "do not know the basic rudiments of dialectics in which we are taught to distinguish what is essential from what is accidental."[57] Thus, he sees the

position of the sun with respect to the earth as the essential property, whereas the fact that it is in Aries or Leo is accidental to the increase in temperature on earth. Here Pico finds his studies of philosophy useful. At other times, however, he is unable to reason beyond what he has learned. His inability to break away from traditional categories of thought is well exemplified by his refutation of the doctrine that aspects provide a source of astrological data. "When they say that Jupiter is excited by the square rays from Mars, that Venus is warmed by the trine rays of Jupiter," he asks,

> do they mean that the very bodies of the planets are affected by such influence, either good or bad, or that they themselves experience nothing reciprocally, feel nothing of such changes, but by this way of talking indicate what the planets do to us and how they affect the bodies under their influence? For whether they prefer the first or the second answer, whether they respond rather in this way or that, on all sides they fall into a thousand traps, a thousand straits. For if they consider that the planets are affected by one another, cultivating a sort of friendship or hatred, first they caress each other in friendly embrace, then they hostilely pursue and attack with the sword of rays, not only will holy Job protest, in whom we read, "God makes peace in his heights;" but also the whole family of Peripatetics with their Aristotle, among whom it is certain that the superior bodies change only in diversity of position, that none of the qualities received below the moon go up there or come down from there.[58]

The astrological theory of aspects must be rejected not primarily because it can be disproved by any empirical

evidence but because it is contradicted by the authority of the Bible and of Aristotle. In part Pico seems stumped for an empirical argument because unlike the objects which form the signs of the Zodiac and the houses, aspects are observable in nature because light rays from the sun, the moon, and the planets do seem to strike the earth and form angles between two or more of these bodies, so that he must attempt a purely rational argument. The doctrine of aspects according to Pico depicts the heavens as disharmonious, whereas in a statement from Job they are depicted as peaceful. Astrological doctrine according to Pico depicts the nature of the heavens as constantly changing, whereas Aristotle declared the heavens immutable.

Nevertheless, he often has a sharp eye for perceiving the defects of old ways. He reminds us that the images the astrologers find in the sky are fictions, that "all forms, all likenesses there are, therefore, not forms, not likenesses; all are from the power and will of men, none from the nature and reality of truth."[59] The human imagination conceived forms and images out of the positions of various stars and began to respond to these forms and images as if they existed in fact. Thus, Pico feels

astrological calculations are made on the basis of figments of the human imagination.

> But it is not worth the trouble to examine and explore more diligently the insanity of others, while it is clear enough and more than enough to those who do not wish to hallucinate that this is not the work of nature but the foolishness of fantasts or the delusion of dreamers, so that in the last analysis my definition of these concoctions would actually be the following: they have arisen from corrupt philosophy and poets' fables. Nevertheless, they are regarded by all the astrologers as if they were absolutely real things formed by the hand of God so to say, so that it is hardly believable into what superstitions this insanity has led them.[60]

Books VI and VIII deal with similar subjects and are often redundant. They both attack the astrological picture of the universe and its alleged influence on terrestrial affairs. They attack the houses, the signs, and the aspects from which astrological calculations for prediction are made. Despite the redundancy and the awkward positioning of the books, they contain some of his strongest arguments. Pico claims that a physical description of the universe must be drawn from the natural phenomena. The astrologers have not followed this rule. The houses and the signs of the Zodiac are not observable; the effects of the aspects are not demonstrable. Therefore, Pico insists they are not valid tools for astrological calculations.

In Book VII Pico deals with other bases of astrological prediction. For example, he reviews the arguments concerning the moment of destiny, "whether the moment of destiny be when the maker first begins to do it, whatever efficient cause he later chooses, or rather when it is finished, or when it is not done all at the same time but in parts, so that there would also be different fates for differents parts."[61] As it relates to humans, the question is whether the astrologer should calculate their fate using the moment of conception or of birth, or even some time in between. Pico believes that relying on the moment of birth has no validity, but it is the one most commonly used because it can be known; the moment of conception cannot be calculated.[62] Thus, he believes astrologers fashion doctrines in order to make their calculations easier. He ignores the rationale that at birth the human being is first exposed to the heavens. On the other hand, Pico cannot understand why the moment of destiny of a city should be when the first stone was laid but would prefer "after the city is built, when it has begun to be inhabited and ruled and regulated by its laws."[63] He is emphasizing the social function of the city

rather than its physical existence in order to attack this astrological doctrine.

The theory of directions or progressions, that is, the belief that the location of a planet at birth portends the character of the year of the person's life corresponding to the degree the planet has advanced from the subject's horoscope, is also not a description of nature but a figment of astrologers' imaginations, according to Pico. He uses as an example that if at birth one's horoscope is in the fifteenth degree of Leo and Saturn is in the sixth degree of Virgo, harm will befall the subject in his twenty-first year. Pico asks:

> But how will Saturn be able to harm me if it was found in the sixth degree of Virgo when I was born, even if we grant that then, and yet its influence still affects me at twenty-one years of age? For when Saturn will affect me, it would not be present, and when it would be present, that degree would not affect me.[64]

The astrologers argue that the disposition of the heavens at the moment of birth dictates specific events at a specific time in the future. Pico maintains that this theory cannot be true because a cause can be of influence only when it is present. If Saturn, astrology's evil planet, could cause harm, it would logically do so by its presence at the time of the evil; once the source of evil

has been removed, it can no longer exert its evil influence. Thus, even if it could be proved that the moment of birth were the moment of destiny in a person's life, Pico rejects the belief that the disposition of the heavens at that moment of destiny has any significance for one's future.

Furthermore, Pico feels it is impossible to rely on astrological "facts" as bases for astrologers' findings. He disputes their doctrines regarding the stars themselves. He questions how they determine influence, particularly since there is a limit to their ability to account for all of the stars at any one moment. "In musical harmony," he suggests,

> if a small voice is removed, the consonance is dissolved, while what would itself scarcely be heard enables all the others to be heard more harmoniously. The total outfit of the sky, all smoothly interconnected, has nothing which might recede, which might be superfluous, which might be useless; therefore, whatever part you take away, even the smallest, that which the integrated totality make possible immediately perishes. Among haulers, one man who is not strong can upset the haul, so that the absence of his hand produces no haul. Thus, overlooking only one star can impair the truth of a prediction...[65]

Thus, Pico denies the validity of astrological prediction because astrologers cannot be sure of the position of all the innumerable stars at all times. On the one hand, Pico

recognizes the increased difficulty in grasping a situation as the determining factors become more numerous and consequently more complex. On the other hand, he leaves no room for the possibility of improved techniques for observation. He seems to feel that all that can be known about the physical character of the heavens was known in his day: observation has done its turn, and now reason must do its.

Pico denies that astrologers can determine which among all the stars would affect particular circumstances, for not all of them can exert equal influence. He notes that astrologers argue about what effects the stars have and whether they or the planets have greater influence. He agrees with Proclus, the fifth-century commentator on Ptolemy, that the planets can have greater effect than the fixed stars, and the fixed stars are not more sublime as some astrologers would argue.[66] Thus, Pico has no hesitation about settling a dispute among astrologers even though he is arguing against them all. And he finally refutes the reputed astrological effects of the planets because the astrologers "say they effect nothing unless they occupy either solstices and tropics, or at least the first points of houses, or are in conjunction with either

luminaries."[67] Since Pico has maintained that houses are fictitious and conjunctions are uninfluential, the planets cannot have more influence than the fixed stars, which is none.

Problems for astrological prediction do not arise only because of errors in astrologers' observations of the stars. Pico notes that it is not always possible to know the exact hour of birth, "unless, perhaps, [the astrologer] is equipped with an astrolabe to measure the heavenly disposition when the infant appears."[68] If the astrologer's information is incorrect about the moment of destiny, then a prediction which is based on exact knowledge of that moment is also incorrect. This may not be a failing on the part of either astrology or its practitioners, but it is an important point because a client may decide to arrange his affairs according to a prediction which has been invalidated because of faulty information. Likewise, Pico maintains, the origin of cities and kingdoms is unknown by the astrologers who chart their futures. He notes:

> Nor indeed [may there be] more faith in the beginning of cities and kingdoms, about which precise knowledge is far more difficult than of births. For who proclaimed these beginnings? What historian observed it? Whose testimony and accuracy reported the day a city was established or a city was built? Certainly

> this will be too much to ask. There was a custom of celebrating the birthday of Rome, but the astrologers do not know any more about it than that the moon was then in conjunction with Libra.[69]

Pico has earlier claimed that the moment of destiny of a city should not be its founding but its maturity as a city. Here he claims the day of its founding is the moment of destiny. Nevertheless, he believes that an eye-witness account of the founding of a city or a kingdom would be the best way to learn the exact time of that event. In the absence of such an account, would not the date celebrated by tradition be more plausible than a date assigned from calculations of planetary positions? The date determined by astrologers would indicate the time when the configuration of the heavens reflected the nature of the event. But custom and legend come from tradition, from the transmission of information, perhaps originally from eye-witnesses. Custom is closer to the original source than astrological observation and, therefore, a more reliable source.

Not only is the disposition of the heavens suspect as a source for determining the state of humans and their institutions, but the very determination of that disposition through observation itself is suspect. On the one hand, there is no observable reason for the particular

divisions of the heavens which were adopted by astrologers. Pico refers not only to houses and signs but to other geometrical configurations proposed by various astrologers.

> In view of all these varieties of opinions--nearly all equally based on similar arguments or authorities--we shall hold in suspicion all grounds for predicting through the stars, if there is anything in it, at least on the basis of this uncertainty. For every constellation will change if the place divisions are altered, because according to the astrologers...the stars alter their nature, influence, and property when their location is altered, and what is worse, they decree these sites which are connected and contiguous to one another to be in a state of hostility and contention.[70]

It almost seems as if the discord in opinion among the astrologers were mirrored in their discordant view of the heavens. Pico further maintains that "every astrological prediction depends on this; every prediction, therefore, is doubtful, uncertain, unknown."[71] But to Pico there is truth only in unity.

Astrologers even have difficulty charting the heavens and finding the true location of the planets. Pico ascribes this to the inability to measure their movement.

> But if the position is accurately determined, the computations of future movement will be accurate, for they are supported by mathematical reasoning, which errs to the least possible extent. In fact, the determination of location is not everywhere exact at any rate simply because of a deficient instrument, for whatever the size of a mechanical instrument, it cannot suffice [to provide] those actual divisions to

> be perceptible to the senses, which are necessary to avoid error.[72]

The inability to chart the exact location of the planets, of course, means that astrologers cannot make a claim for accurate predictions since their predictions depend on the location of the planets. On the other hand, Pico does not seem to consider that the instrument-making for charting the heavens has improved in the past or would continue to improve in the future.

Book IX completes the central section of the Disputations in which Pico refutes the validity of the signs which the astrologers use. He claims that they rely on "signs which are not signs," so that astrology as a scientific system has no foundation. Astrologers create meaning from the disposition of the heavens, whereas a true science would discover meaning. They note a mathematical relationship between two planets or stars, as in conjunctions, and assert this event's significance without any proof that this event has any significance. They chart the course of the planets and create spatial relationships, for example houses, which are not observable in nature. They deem an event a moment of destiny, for example, birth, which may not have the kind of significance they ascribe to it. In fact, they cannot even accurately describe the

heavens at a given time, so that even if all their claims about the effects and significance of the stars were true, their predictions could not be accurate. Moreover, even if the disposition of the heavens was a true sign, astrology's predictive capabilities would depend on accurate interpretation of that sign. In Books X and XI Pico claims that the interpretations are as arbitrary and as unrelated to nature as he has claimed the signs themselves were.

Pico attacks the principles by which astrologers determine the relative strengths of the houses. Some astrologers would attribute the strength of a house to the relationship of the planetary rays to the horoscope, for example, if they be trine, square, or sextile, which astrologers considered numerologically kindred aspects. He suggests,

> the efficacy of places cannot but be attributed to the position of the place above the horizon, so that any star whatsoever should be considered more effective when placed in the location where it affects us more strongly. The philosopher persuaded by natural reason will concede this at once; even the astrologer is forced to concede this, for that virtue of places is either sought according to the particular nature of space or by its position with regard to us...It cannot be derived from space, not only because the strength of this particular spot does not exist in nature..., but, above all, because if I were to maintain that, I would have to establish the same horoscope and similar distribution of places in whatever region in order for determined sections to have their own properties affecting the stars placed in them. Hence, their

> difference would not originate from the heavens, but they would be the same in all instances.[73]

Thus, the effect of a star on us, assuming that the star could affect us, does not change because the space into which it has moved has different intrinsic characteristics. It is not the position of the planet vis-a-vis another planet which affects us but the direct relation of a planet to us which could affect us. For example, as Pico has argued in Books VI and VIII, the position of the sun with respect to us has a bearing on the temperature we feel; the character of the area in which the sun is found does not. Here, as in those earlier discussions concerning the reputed effects of the signs, Pico prefers the simple, natural explanation over the complicated explanation of the astrologer.

After he has denied that special characteristics of particular locations have any influence, Pico then goes on to refute astrological interpretations of what those places mean and what their particular influence is. Pico discerns five methods by which these interpretations are made: numerical order, cosmological analogy, mathematics, astrological principles, and dialectics.[74] According to Pico all these methods depend on an arbitrary system of correspondences.

For example, interpretation according to numerical order refers to an assumed correspondence between a planet and a sign by virtue of numerical order. Thus, Mars in the astrological system was considered the third planet (Saturn being the first), and Gemini the third sign. Since Gemini are the twins, Mars was assumed to stand for brothers. But Pico notes about this method,

> not only is it not compelling, it does not hold together; not only is it not persuasive, it does not convince. First, the supposition is extremely futile and insane that there would be correspondence through a relationship of nature between the first in any one category and first in another category. Fire is first of the elements; Saturn is first of the planets: what according to the astrologers is more different from fire than Saturn? Mars is the third planet, water the third element; is Mars not different from water as much as fire is different from water? Aries is the first sign, Saturn the first planet; nevertheless, according to the astrologers Aries does not correspond with Saturn: it does not rule, dominate. On the contrary, [Saturn] is depressed within it. The supposition is, therefore, false, crude, and stupid...[75]

Pico considers that correspondence between any two distinct categories cannot be assumed valid, nor is it clear why astrologers chose to compare particular sets of properties. Thus, the planets could have corresponded to the elements as readily as the signs, but that correspondence does not work. He believes, in fact, that the correspondence between the first sign Aries and the first planet Saturn is

meaningless. Therefore, any attempt to interpret a horoscope in light of numerical correspondences between the planets and the signs is necessarily useless. Nor does Pico find the astrologers themselves always consistent in their use of these correspondences as he shows with Saturn and Aries.

Likewise, Pico distrusts astrological interpretations by means of analogy between celestial and terrestrial relationships. According to this doctrine each house, sign or planet respresents some human relationship or ambition; from such analogies certain aspects of an individual destiny can be learned. Pico notes, for example, that some astrologers divide the sky into ten parts, the earth into four. They maintain from this that since more is known about a person's mother than his father, the ten positions represent the mother, the four represent the father for studying the horoscope to learn about an individual. "Whatever arguments are derived from these analogies," Pico claims,

> they are not just unworthy for teaching by philosophers, in fact, they are not fitting or useful for disputations by dialecticians, indeed not proper to the discourses of rhetoricians, and betray instead the play of just empty poetics rather than authority suitable in any serious demonstration.[76]

Such analogies are "poetic" in the sense that they are fictions. Like the houses, signs, and other patterns that astrologers imputed to the sky, these cosmological analogies are the work of the human imagination, not the work of nature. Therefore, they are not part of the study of nature.

Pico also criticizes the use of analogy because it is based on a generalized conception of human inclinations, when in fact such inclinations may not be generalized. When he discusses the houses, he notes that astrologers assign the first house to the self.

> The property of the second one concerns wealth, as they say nothing is closer to man; therefore, abutting the first, the second will signify riches. The reasoning is valid with those for whom nothing is more important than wealth. Nevertheless, many things may be closer and dearer to man, for example, the endowments of the soul and body, wisdom and health. For this reason they should have been signified by the second location rather than the sixth or the ninth. Not to mention among other things also parents, wife, friends, sons, glory are preferred as more important and closer than money, just not among the one type of men who call themselves astrologers.[77]

Pico notes how variable individual preferences and values can be and ends on a sarcastic note indicating his view of the pecuniary self-interest of the astrologers. Meanwhile he has also suggested that such analogies are based on arbitrary judgments.

Pico shows how the attempt to impute specific characteristics by analogy to the order to the planets led Abumashar into a mire of contradiction. In order to complete the symmetry of the heavens he made seven planets correspond to the twelve houses by giving five planets a double house, so that Saturn's two houses correspond to the first and eighth, Jupiter's to the second and ninth, and so on. But, Pico notes, that method of correspondences gets to be a problem when the first house stands for life and the eighth house stands for death: Saturn cannot mean both life and death.[78] With Abumashar's logic all Pico can do is throw up his hands, certainly not in despair, and exclaim, "These things wrote our Abumashar, who, unless he were drunk when he wrote them, was assuredly crazy."[79] (One wonders if this quotation does not show Pico's familiarity with the translation of a biography of Abumashar which attributes to him "a marvelous thirst."[80]) Nevertheless, it is not enough to assert such correspondences to give them scientific validity: they must be proved, and they cannot defy logic.

Likewise, Pico may agree that the planets can affect life below by causing alterations among the primary qualities, the hot, the cold, the wet, and the dry, but he

does not feel that their effect is the one astrologers assert, that is, affecting the health of a human being.[81] Good health was seen as a balance among the humors, disease an imbalance. Pico accuses astrologers of arbitrarily identifying a planet with a particular humor and declaring that the appearance of that planet brings good or ill health. As to the latter claim, Pico notes that the appearance of one humor in and of itself cannot produce ill health.

> For also in the bodies of the living black bile and red bile are not harmful but necessary and not less useful in performing certain functions than either blood or phlegm, for if they are said to be harmful in excess, just so are blood and phlegm harmful if they increase beyond normal.[82]

Nor is any change effected because of any relationship or correspondence of a given planet to a particular humor.

> If what the astrologers think affects us, even if this planet is indeed considered cold and dry, that one hot and wet, nevertheless, they should be regarded as performing many--nay, paramount--effects not through these qualities but through other hidden powers of their rays.[83]

Pico doubts but does not deny outright the possibility that the planets are composed of the primary qualities; nevertheless, he does not entertain any possibility that the bodies of the planets can produce these qualities. Instead he attributes any possible effect to their rays.

Thus, he detaches that presumed influence from any character attributed to the body of the planet itself and seems to deny any living qualities to the action of the planets.

Book X focuses on astrological interpretations based on reason; Book XI concentrates on those interpretations based on observation and experience. Had astrology been shown true through the use of reason, that is, Pico suggests, by understanding of its workings, it could have been called a science. As that is not the case, demonstration that it could be true through observation without understanding why it is so would make it an art and give it "the prerogative of true tradition."[84] But here, too, astrology is shown false.

> For should anyone explore and meditate on what experience is, as well as by what methods it may be acquired in the matter of influence of the stars, there would never have been any doubt that the peculiar power of the stars, as well as their particular workings are as inaccessible to human experience as to human reason.[85]

Pico refers here to such matters as the moment of destiny, whether conception or birth, and those pertaining to casting a horoscope: these are not suitable to human experience. He perceives that astrological interpretation presupposes accurate knowledge of the heavens and an exact

measurement of their course, and yet such accuracy of observation and measurement was not available. Therefore, if experiences are erratic and inconsistent, how can it be maintained that those experiences support some kind of tradition?[86]

Pico has attempted to attack astrology from every conceivable angle. He has attacked the idea of astrology and general principles of astrology; he has attacked astrologers' conceptions of the heavens and what they mean. Pico has attempted to reduce astrology to an absurdity. But if astrology is so ridiculous, how could it ever have been invented? He notes at the outset of Book XII that astrology was not revealed. He ascribes its origin to the Chaldeans and claims that the Egyptians accepted it from them, whereas the Greeks rejected it.

> We maintain that in the matter of primitive natural philosophy which is demonstrated by reason, the Greek philosophers, who reasoned correctly, derived nothing from the Egyptians except religious rites and mathematics.[87]

Thus, Pico believes that astrology is incompatible with true religion, which is based on revelation, and with true philosophy, which is based on reason; it can develop only in places where true religion and philosophy have not taken hold. He continues in his attempt to link a system of

thought to a particular cultural milieu and concerning the Chaldeans and Egyptians he suggests:

> Whoever immerse themselves totally in any school of thought become accustomed quite freely to refer everything to it...for this reason, when the ancient Chaldeans continuously devoted themselves to measuring the movement of the heavens and observing the courses of the stars, and as nothing else occupied their minds more, the stars were everything to them, that is, they naturally ascribed everything to the stars; and the same may be said for the Egyptians....
>
> Then along with constant habit and a kind of intimacy with the stars, was joined innate curiosity to know the futures of all men, for what we desire could happen, we readily believe possible. Add to these the weakness of the age and the appreciation of divination well entrenched by then in the minds of men...Add also that it marvelously conformed to the idolatry to which they were addicted [to think] that the gods whom they worshipped should be accepted by them as authors of all things, not only the good but also the bad....Add the chance for honor and profit, which the astrologers see as offered to them if from the courses of the sky, which they charted with great pain, albeit perhaps for low pay, they were considered to be able to predict the future.[88]

This is a noteworthy attempt to explain the development of astrology in rational, somewhat historical terms. Garin adduces it as an example of the humanist success in regarding human thoughts "as products of a certain culture, as results of certain partial and particular experiences," as opposed to "oracles either of nature or of God, revealed by either Aristotle or Averroes..." Referring specifically to Book XII of the Disputations, Garin suggests:

> In that book he gave a very precise account of the psychological and historical emergence and diffusion of astrology. As he succeeded in historicising the errors of astrology he succeeded, and with no less acumen, in historicising all human knowledge.[89]

It is a sweeping claim which recognizes that a development concerning one sphere of thought, in this case the historicizing of error, will likewise affect a contingent sphere of thought, the historicizing of true knowledge. Thorndike's criticism about the lack of historical objectivity in Book I also suggests that Pico had a historical intent, though Thorndike insists he failed in it. But such suppositions belie the intent of Pico's assertions. He is not interested in locating the historical origin of an error in this book, and he is not interested in establishing any history of astrology or history of ideas. For Pico the very fact that astrology could be located in time and subject to historical development is confirmation of its falsehood. Error is historical; truth is eternal.

The concept of the eternity and immutability of truth underlies all of Pico's works: it is the fundamental principle of his Conclusions. And only in this context can we understand Book I of the Disputations, as well as certain assertions throughout. In this sense Book XII

completes the Disputations with a symmetrical finality. In Book I he tries to establish that the greatest authorities in religion and philosophy opposed astrology, not to set the terms for the debate but to show at the outset that the issue is not and never was really subject to debate. True principles can be discussed, but they are true regardless of the terms of that discussion. The Bible and the Church Fathers handed down the unchanging principles of truth as known through revelation; Plato and Aristotle and the true philosophers handed down the unchanging principles of truth as known through philosophy. Had astrology been true, Ptolemy would have set down its principles, and later practitioners and theoreticians would not have contradicted those principles. For this reason, Pico is anxious to establish the discrepancies between Ptolemy and his successors and, therefore, expends considerable effort in elucidating the disputes among astrologers of all periods. This explains why in Book III he makes the incredible claim that astrology is false because astrologers disagree among themselves; "they argue about the affairs and events themselves."[90]

Pico's attempt to locate the origin of astrology is vague and imprecise. He alludes to a few matters: the

habit of star-gazing among the Chaldeans, cults and mathematics among the Egyptians, and the supposed lack of revelation (i.e., true religion) or a "philosophical" tradition among both. He does not suggest, for example, why the Chaldeans may have been star-gazing nor the advances they made in the science of astronomy as a result; on the other hand, his conception of the development of a habit into a system of thought is an interesting and plausible suggestion. His suggestion about the incompatibility of certain systems of thought has less merit because he does not see that these systems can be modified by circumstances and ideas. After all, Greeks and Christians were, in fact, not constrained by their philosophical and religious traditions from accepting astrology despite Pico's assertions to the contrary (excepting those few bad Christians he mentions). Pico seems to have posited a theory of the origin of error that owes less to historical awareness and more to neo-Platonist and Augustinian ideas about good and evil. It is almost as if truth (from philosophy and revelation) were constricted and in the void error arose. Error thus attaches itself to man when the spark of the divine is absent. In this way, too, Pico reinforces his contention that his fight against

astrology is a form of the Christian fight against idolatry--the eternal, immutable truth against falsehood.

Pico's ultimate test of an idea or a system of thought was the extent to which it confirmed the truth of Christianity. This had been true in all his writings. For example, his interest in the Qabbalah was not necessarily for its own sake, for he asserts that his Qabbalistic conclusions "confirm the Christian religion to the utmost."[91] Nor was he being disingenuous in his Apology when he affirmed that the condemned Conclusions were compatible with orthodox Christianity: he truly believed that his study of all schools of thought could only underscore the truth of Christianity. His use of Plato and Aristotle in On Being and the One and his use of the Qabbalah in Heptaplus are carefully and explicitly directed toward Christian ends.

So, too, Pico decried astrology's incompatibility with Christianity. Since astrology cannot be directed toward Christian ends, it must be rejected as a dangerous untruth which necessarily skews the human mind and leads away from God. As such, astrology is shown to stand in fundamental opposition to a basic tenet of Pico's thought. Not so with astronomy. Astronomy is the direct study of nature rather

than a system of patterns which are made to coincide with the patterns of nature. The direct study of nature is the study of God's book, the study of one of his forms of revelation. God is made manifest in nature, and, therefore, its study is an exalted study.

Pico, furthermore, believes that astrology blocks the road to God through its fatalism, its interference with man's exercise of his free will, for it is only through his will that man can achieve true nearness to God. This theme in the Disputations also runs throught Pico's writings. Indeed, his paean to the human mind in Book III echoes that clarion acclamation of man's will in the Oration.

> O supreme generosity of God the Father, O highest and most marvelous felicity of man! To him is granted to have whatever he chooses, to be whatever he wills. Beasts as soon as they are born...bring with them from their mother's womb all they will ever possess. Spiritual beings, either from the beginning or soon thereafter, become what they are to be for ever and ever. On man when he came into life the Father conferred the seeds of all kinds and the germs of every way of life. Whatever seeds each man cultivates will grow to maturity and bear in him their one fruit. If they be vegetative, he will be like a plant. If sensitive, he will become brutish. If rational, he will grow into a heavenly being. If intellectual, he will be an angel and the son of God. And if, happy in the lot of no created thing, he withdraws into the center of his own unity, his spirit, made one with God, in the solitary darkness of God, who is set above all things, shall surpass them all. Who would not admire this our chameleon?[92]

Man will achieve the higher realms of existence by cultivating his "higher" nature. If he cultivates the stars, he is cultivating his lower nature because, as Pico sees it, the stars represent the corporeal side of his being. As Cassirer has noted:

> In the realm of freedom the same standards do not hold as in the realm of nature: the "Intelligible" and the "Sensible" must be measured with different criteria....Physical things do not change themselves, they are changed...man chooses the form he will bring forth, at which he will arrive in the very process itself. Thus man is not merely subject to a passive becoming: he rather determines his own goal and realizes it in free activity.[93]

Moreover, Pico suggests that astrology can block man from his higher, spiritual self: it can prevent him from exercising his free will, for even if astrological predictions are by their nature false, those who accept them as true will act in accordance with those predictions so that their God-given gift of choice is perverted.

In the Oration Pico expresses a mystical strain: man's highest destiny is to be "made one with God." Union with God is the ultimate goal and ultimate joy of human existence. This strain seems to be muted in the Disputations. Perhaps Pico had repudiated it and was now content with a more orthodox theology. On the other hand, Pico's repudiation of astrology in part seems to be based

on a view that the stars bar man's access to God. It is interesting that Nahmanides, the thirteenth-century Jewish philosopher and Qabbalist, alludes to this matter in his Commentary on the Torah. Nahmanides accepted astrology, and yet he suggests:

> The Glorious Name created everything and He placed the power of the lower creatures in the higher beings, giving over each and every nation in their land, after their nations some known star or constellation, as is known by means of astrological speculation. It is with reference to this that it is said which the Eternal thy G-d hath allotted unto all the people, for He allotted to all nations constellations in the heavens, and higher above them are the angels of the Supreme One whom He placed as lords over them...But the Land of Israel, which is the middle of the inhabited earth, is the inheritance of the Eternal designated to His Name. He has placed none of the angels as chief, observer, or ruler over it since He gave it as a heritage to His people who declare the Unity of His Name, the seed of His beloved ones...It is with reference to this that He said, and ye shall be Mine own treasure from among all peoples; for all the earth is Mine, and it is further written, so shall ye be My people, and I will be your G-d, and you will not be subject to other power at all.[94]

God freed Israel from the dominion of the stars so that they could be his people, under his direct rule. This closes the gap between man and God, making God more accessible to man. This is important for the mystic who seeks the immediacy of experiencing the divine presence.

Pico was aware of Nahmanides as a Qabbalist. He mentions him as a commentator on the Bible in the "Proem"

to Heptaplus[95] and had access to parts of his Commentary on the Torah.[96] On the other hand, Pico need not have been aware of Nahmanides's claims on this point, for this passage in Nahmanides illustrates well how mysticism could affect a philosopher's view of astrology. The rational philosopher seeks to understand God; the mystical philosopher seeks to experience him. Consequently, it is the mystical philosopher who would perceive that astrology presents an obstacle to his union with the Godhead, since at the very least the sky becomes an intermediary between man and God which must be overcome. Pico may have been struck by this when he was pursuing his mystical studies.

On the other hand, there are no direct references to the Qabbalah in the Disputations. Pico does note that "just as the astrologers contend that they find their images in the stars, so the Hebrew masters contend that they find their alef-beth, that is, the letters and elements of their language, in the stars..."[97] This probably refers to the Qabbalists, but the brunt of the attack seems to be against their recourse to the stars, not Qabbalistic study itself. The question arises whether he rejected the Qabbalah and whether it ceased to exert an influence on him. To what extent can a thinker control a

particular influence, especially after such an extensive sortie into the field? A remark or an attitude once encountered can be unconsciously retained and can unconsciously alter a thinker's train of thought. Pico does not mention the Qabbalah in the Disputations. He does not even list any Jewish thinkers who support his position: Maimonides, for instance, was respected among Christians; his absence is conspicuous. Neither does Pico attack the Qabbalah even though it fostered astrology. The major Jewish object of his attack is Abraham ibn Ezra, who was not a Qabbalist. This, too, is conspicuous. Pico may have wished to set aside his Qabbalistic studies by the time he wrote the Disputations, and yet he was not ready to go so far as to repudiate the Qabbalah by classifying it with the superstition he was trying to eradicate. Since Pico does ignore the Qabbalah in the Disputations, however, we can only guess at its influence, if any.

A thornier question arises when we confront the issue of Pico's attitude toward astrology over the course of his career: did he change his mind about astrology? He ends his Conclusions with the declaration that "just as true astrology teaches us to read in the book of God, so the Qabbalah teaches us to read in the book of the law,"[98]

that is, astrology, properly conceived, is a key to our understanding nature just as the Qabbalah, properly conceived, teaches us to read the Five Books of Moses correctly, that is, Christianized. In the light of the Disputations, do we take "true astrology" to mean astronomy or science and "false astrology" or "judicial astrology" to mean astrology as a superstition? On the other hand, do we note that Pico is refuting only "judicial" astrology in the Disputations, and does he perhaps accept another kind of astrology as distinct from astronomy which he considers beneficial or "true astrology?" Finally, could we simply assume that Pico believed in 1486 when he wrote the Conclusions that astrology had identifiable good and bad forms, and that the good form of astrology was true, whereas by 1494 when he wrote the Disputations he had become convinced that all forms of astrology were false and, therefore, he repudiated his earlier stand? We have no letters or other documents from Pico's hand which can give us direct insight into his mind concerning this issue, so that we must rely on indirect evidence which in this case can lead to contradictory answers.

D. P. Walker, in a cautious, controlled discussion of the Disputations, shows how Pico's views on celestial

influence as expounded in Book III of the Disputations are very similar to those expressed by Marsilio Ficino in his 1489 treatise On Guiding Our Life by the Stars (De Vita coelitus comparanda). Both express a belief in a causal connection between the spirits which move the heavens and human souls. Walker notes that Pico differs from Ficino in denying specificity to that influence: Pico denies that a particular astral condition can affect individuals differently because of an astrological predisposition. Nevertheless, Walker maintains that Pico accepted a modified version of Ficino's astrological theories, particularly that astrology had good and bad forms, that it was good when it did not interfere with human free will or divine providence, and Walker adduces Pico's earlier writings to bolster this conclusion.[99] Walker leaves it to the reader to infer from his arguments to what extent Pico changed his mind, if at all. Nevertheless, Walker has placed severe limits on Pico's reputed rejection of astrology.

Frances A. Yates draws on these arguments to support her contention that "Pico is really defending the Ficinian 'astral magic'...the book against astrology is really a vindication of Magia naturalis."[100] Yates does not show

any textual evidence to support this claim beyond Pico's references in Book I to Ficino and Plotinus as opponents of astrology. Her use of the term "astral magic," of course, implies the manipulation of the stars for human benefit. Nowhere in the Disputations does Pico state or even hint that man can or should manipulate the stars in any way for any ends whatsoever. As we have noted, Walker himself sees this as a point of difference between Pico and Ficino, as the latter maintained that the wise man could use the astral properties of various things to control his own fate.

This is an important difference between the two thinkers. Pico's denial of the specificity of astral influence means that he has made it impossible to do astrology. When the effects of the stars on human affairs are universal, the study of those effects no longer teaches us anything about ourselves as individuals. It becomes equally useless to attempt prognostications because all the stars could indicate to us in Pico's scheme is the universality of our fortunes, which is absurd. Any measurable action of the stars has no measurable effect on the individual human being; therefore, astrology is a meaningless discipline.

Furthermore, Pico denies that the bodies of the stars themselves have any non-physical effects: they produce only light, heat, and motion. The stars are material bodies, completely undifferentiated except for three physical properties which produce universal material effects. This conflicts with astrological thought, including that of Ficino, which identifies planets and stars with human personality traits through which in part they influence human affairs. And, lastly, the belief in "celestial spirits" or "intelligences" which move the heavens was not a necessary concomitant with a belief in astrology, although it certainly reinforced the belief in astrology. Learned opinion at that time accepted that the heavens were moved by "intelligences," although uneasiness had begun to surface, particularly among early opponents of astrology like Oresme.[101] These intelligences could be angels, and, indeed, in Book IV, Chapter 4 of the Disputations Pico identifies them as such. This would explain the vivifying and ennobling effect of the "celestial spirits" on the human soul: angels draw men closer to God. This idea is not necessarily astrological; it definitely could be Christian. Nevertheless, the ideas that the heavens are material and produce universal

physical effects but that they are moved by intelligences which unite with the human soul and vivify it stand in uneasy juxtaposition. Pico may not have had the imagination and certainly did not have the training to enable him to break out of the established mode of scientific thought on this question, but as the Disputations progress, the intelligences disappear from the discussion, and the material universe seems to prevail. This concept is fundamental to his later discussions concerning such issues as the division of the heavens and cosmological analogies. Thus, we are left with a sense that we have moved closer to a materialistic view of the universe, even though the author has expressed his belief in an animistic universe.

Pico made a major break from Ficino in his critique of astrology despite attempts on both sides to assert their fundamental agreement. Even such assertions seem tentative. Pico refers to Ficino once in the Disputations as "our Marsilio" among a list of contemporary opponents of astrology, but he never elaborates on Ficino's thought as he does with others. On Ficino's part there may have been a note of disingenuousness in his declaration that he agrees with Pico's treatise, and Angelo Poliziano, Pico's

friend and an opponent of astrology, receives Ficino's declaration skeptically.[102] The close friendship between Pico and Ficino may very well have led them to assert their agreement over the issue of astrology's validity. And Ficino may have been loath to criticize the "last testament" of his dead friend.

On the other hand, Eugenio Garin believes that Pico may always have rejected astrology, and the Disputations should not be considered surprising in light of his other works. Garin notes that the only mention of astrology in the Conclusions is the indirect reference, noted above, "true astrology teaches us to read in the book of God." He claims that this reference to astrology could in fact be taken to mean astronomy, and he reinforces this claim with references to Pico's condemnation of astrology in other works.[103] Indeed, Pico wrote in Heptaplus a passage reminiscent of the Disputations:

> How are the stars placed in the firmament? As its more noble parts, as the Peripatetics think, or like the animals in their spheres (fish in the water, cattle on earth), as Eusebius the Mede and Diodorus would have it? This point would require conversation with the astrologers, who, from Moses' statement that God placed the stars for signs, draw support for their science of divining by the stars and of foreknowing future events. This science not only has been sharply criticized by Christians like Basil, who rightly called it a busy deceit, and by Apollinarius, Cyril, and Diodorus, but also was spat upon by the good

> Peripatetics. Aristotle despised it and, what is more, according to Theodoretus, it was repudiated by Pythagoras and Plato and all the Stoics.[104]

More recently Garin, though less sure of Pico's earlier position, has elaborated points which indicate that Pico distrusted astrology throughout his career.

> ...he was always hostile to the theory of conjunctions, far from "naturalistic interpretations" of prophetic phenomena, convinced of the conflict between human liberty and astral determinism, persuaded of the difficulties in establishing causal relationships between general principles and individual events, loath to admit that that which is not the cause could be the sign.[105]

Nevertheless, I would agree with Walker that Pico may have entirely agreed with Ficino's On Guiding One's Life by the Stars when it appeared in 1489.[106] Pico may have condemned astrology in Heptaplus, but he also notes:

> Jupiter is hot, Mars is hot, and the sun is hot, but the heat of Mars is angry and violent, that of Jupiter beneficent, and in the sun we see both the angry violence of Mars and the beneficent quality of Jupiter, that is, a certain tempered and intermediate nature blended of these. Jupiter is propitious, Mars of ill omen, the sun partly good and partly bad, good in its radiation, bad in conjunction. Aries is the house of Mars, Cancer the dignity of Jupiter: the sun, reaching its greatest height in Cancer and its greatest power in Aries, makes clear its kinship with both planets.[107]

Pico not only condemns astrology in the Disputations; he refutes this very sort of reasoning about the heavens. In Book X, Chapter 7, he ridicules Abu Mashar for making the

same kinds of associations between planets and signs that Pico accepts in this passage from Heptaplus. He condemns the attribution of human personality traits to the stars and planets; he disputes the notion that the disposition of the stars and planets in the heavens can have any meaning either as a sign or as a particular influence. The kind of reasoning Pico used in Heptaplus would have been consistent with Ficino's On Guiding One's Life by the Stars; it opposes the kind of reasoning about the nature of the stars which produced the Disputations: his arguments about analogy in Book X are a word-by-word refutation of this passage in Heptaplus.

What we see in Heptaplus may be "true astrology," the belief that the planets have particular traits and the ascendancy of a planet will result in the ascendancy of that trait. "True astrology" attempts not to contradict divine providence or human free will. "False astrology" contradicts both and, therefore, must be eradicated. Ficino wrote against this "false astrology" and may have encouraged his friend, who at that time probably agreed with him, to do the same. What emerged was a massive denunciation of all astrology rather than a refutation of a "false" type and approval of a "true" type. All astrology

emerged as false; all astrology emerged as inimical to divine providence and human free will.

This is not to claim that Pico's work is unsullied by superstition and "unscientific" arguments: its "science" can be as specious as the superstition it attempts to refute. What modern reader with an elementary knowledge of science and philosophy would not chuckle at Pico's "empirical" refutation of astrological statements concerning good and bad sailing days. Pico rejects the influence of the sky in favor of the unsupported assertions of sailors, and from their experiences alone proceeds to list the days sailors ought to remain in port.[108] As if weather were not a factor! We may chuckle, but Renaissance readers did not: whether opponent or supporter of astrology, they took the Disputations quite seriously. Ficino's testimony notwithstanding, contemporaries believed that Pico's attack was complete and effective. Giovanni Pontano and Luca Bellanti, both noted astrologers, attacked the Disputations as attempting to subvert the study of the stars altogether. Bellanti seems sure that had Pico lived, he would have burned the Disputations rather than allowed them to be published.[109] Much learned opinion assumed the scientific validity of astrology, and Pico was a highly

esteemed author. How could such a learned individual turn against this important science? A legend surfaced periodically concerning the reason why Pico wrote the Disputations, and two centuries after its appearance was repeated by the astrologer Antonio Bonatti: Bellanti himself had predicted Pico's premature death, and in uncontrolled fury over this prediction Pico spewed out his attack, hoping to deny the validity of that prediction.[110]

Perhaps Pico's growing friendship with the Dominican Savonarola was important in bringing him to total repudiation of astrology, as Boll suggests.[111] The friar attacked astrology as utterly incompatible with Christianity. Perhaps he pushed Pico in the direction of an all-out attack on all forms of astrology. But Pico had been aware of tensions between astrology and Christianity. His passage in Heptaplus claims that it is not supported by "true religion." Thomas Aquinas accepted astrology but claimed that he accepted it only insofar as it did not interfere with divine providence and human free will.[112] A dubious limitation indeed, but it shows that St. Thomas was aware that a major problem existed. Ficino, too, grappled with this problem. If Savonarola persuaded Pico that the only solution to this problem was total repudiation of

astrology, it is less likely that Savonarola provided him with the specific arguments Pico used. After all, Savonarola's only major work on astrology was an Italian summary of Pico's arguments,[113] and Pico could draw on a cornucopia of sources to help him fashion those arguments. But it is in those arguments that Pico had a real contribution to make; his repudiation of astrology provided the context, but his arguments on the physical effects of the stars, the need to prove, not just assert, the significance of patterns, the lack of validity of the cosmological analogies not only repudiate astrology but foster rational scientific discourse on causality. Pico may have been impelled to attack astrology in the service of religion, but in furthering the cause of religion, he furthered the cause of science as well.

NOTES

1. Eugenio Garin, Giovanni Pico della Mirandola: Vita e Dottrina (Florence, 1937), 26.

2. G. Dell'Acqua and L. Muenster, "I rapporti di Giovanni Pico della Mirandola con alcuni filosofi ebrei," L'Opera e il Pensiero di Giovanni Pico della Mirandola nella Storia dell'Umanesimo (Florence, 1965), 155.

3. Garin, Giovanni Pico della Mirandola, 27.

4. Paul Oskar Kristeller, "Giovanni Pico della Mirandola and his Sources," L'Opera e il Pensiero, 52.

5. Giovanni Pico della Mirandola, Conclusiones sive Theses DCCCC, ed. Bohdan Kieszkowski (Geneva, 1973), 27.
De adscriptis Numero Noningentis Dialecticis, Moralibus, Physicis, Mathematicis, Meta-Phisicis, Theologicis, Magicis, Cabalisticis, cum suis tum sapientum Chaldaeorum, Arabum, Hebreorum, Grecorum, Aegyptiorum, Latinorumque placitis, disputabit publice Johannes Picus Mirandulanus Concordie Comes.

6. Giovanni Pico della Mirandola, "Oration on the Dignity of Man," tr. Elizabeth Forbes, in Cassirer, et al., ed., The Renaissance Philosophy of Man (Chicago, 1948), 242.

7. Paul Oskar Kristeller, "Pico," Eight Philosophers of the Italian Renaissance (Stanford, 1964), 60; cf. Kristeller, Introduction to "Oration," 220.

8. Pico, "Oration," 225.

9. Ernst Cassirer, "Giovanni Pico della Mirandola," in Kristeller and Wiener, ed., Renaissance Essays (New York, 1968), 26-27.

10. Giovanni Pico della Mirandola, "Heptaplus," tr. Douglas Carmichael, in On the Dignity of Man, etc., (Indianapolis, 1965), 115-16.

11. Giovanni Pico della Mirandola, "On Being and the One," tr. Paul J. W. Miller, On the Dignity, 37.

12. For the place of Gianfrancesco Pico as a philosopher see Charles B. Schmitt, Gianfrancesco Pico della Mirandola (1469-1533) and his Critique of Aristotle (The Hague, 1967).

13. Giovanni Pico della Mirandola, "Proem," Disputationes adversus astrologiam divinatricem, ed. Eugenio Garin, (Florence, 1946-52), v. 1, 40. Citations of this work below all refer to this edition. In addition, the book, chapter number, and lines are also listed. Translations by author.
Astrologiam vero cum dico, non eam intelligo quae siderum moles et motus mathematica ratione metitur, artem certam et nobilem et suis meritis honestissimam auctoritateque hominum doctissimorum maxime comprobatam; sed quae de sideribus eventura pronunciat, fraudem mercenariae mendacitatis, legibus interdictam et civilibus et pontificiis, humana curiositate retentam, irrisam a philosophis, cultam a circulatoribus, optimo cuique prudentissimoque suspectam...ut illi astronomiae, ipsi astrologiae nomen daretur. (lines 1-16)

14. Ibid., "Proem," v. 1, 44.
...philosophiam omnem corrumpit, medicinam adulterat, religionem infirmat, superstitiones parit aut roborat, idolatriam fovet, prudentiam aufert, polluit mores, caelum infamat, homines miseros, anxios, inquietos, et de liberis servos, et in rebus paene agendis omnibus plane facit infortunatos. (lines 18-23)

15. Ibid., I, v. 1, 46.
Hinc Caesarum legibus et prudentum, uti noxia vitae civitatibus, eliminatur; hinc oraculis prophetarum, pontificum sanctionibus, hominum sanctissimorum vocibus et doctrinis, ut moribus et pietati pestifera, condemnatur; hinc a philosophis et mathematicis...vel contemnitur fere vel confutatur. (lines 12-19)

16. Ibid., I, v. 1, 46, 48.

17. Ibid., I, v. 1, 48.
...quantum insaniae continet astrologia, cui nec multa delirans assentiri potuit Epicurus! (lines 7-8)

18. Ibid., I, v. 1, 48.
Plato et Aristoteles, philosophiae principes, indignam putaverunt de qua verbum aliquando facerent, tota sua philosophia plus eam silendo quam quisque voce scriptisve condemnantes. (lines 9-12)

19. Ibid., I, v. 1, 88, 90, 92.

20. Ibid., I, v.1, 58, 60, 62, 64, 66.

21. Ibid., I, v. 1, 80.

22. Ibid., I, v. 1, 96.

23. For example, see Ibid., I, v. 1, 70, 72.
Sed demus ei hanc veniam loquendi. Aristoteles ipse, quem probat, quomodo ei dabit a motu oriri genus theologicam, cum et ipse Deus, quatenus primi motus auctor et causa, non a theologo, sed a philosopho investigetur? Reliqua etiam aut falsa, aut quae facile videas ab homine prolata parum perite gnaroque philosophiae. (lines 27-30, 1-3)

24. Ibid., I, v. 1, 72.
Albumasar...nec philosophus fuit nec dialecticus et in mathematicis imperitus... (lines 19-21)

25. Lynn Thorndike, A History of Magic and Experimental Science, (New York, 1934, rpt. 1966), IV, 530.

26. Pico, Disputationes I, v. 1, 64. On pseudo-Aristotelian works see Charles Schmitt and Dilwyn Knox, eds., Pseudo Aristoteles Latinus (London, 1985).

27. Ibid., I, v. 1., 66. For a discussion of the controversy over the authorship of the Speculum astronomiae, see James A. Weishopl's review of the most recent edition of that work in Isis LXIX (1978), 616-18.

28. Ibid., I, v. 1, 86.
Cur igitur philosophiam quidem non damnabant, sed impietate quorundam philosophorum, non autem pariter astrologos, sed ipsam astrologiam? Utique quoniam in philosophia si quid erratur, professoris est vitium; in astrologia, ipsa professio vitium. (lines 4-9)

29. Thorndike, IV, 531-532.

30. Pico, Disputationes II:1, v. 1, 100.
Sed ne sola auctoritate pugnemus, demonstrabimus toto hoc opere certis rationibus reiectam iure a sanctis istam superstitionem, quia religioni maxime adversaretur; utiliter legibus interdictam, quia vitae inutilis sit, immo noceat et pervehementer; rationabiliter a philosophis confutatam, ut quam falsam incertamque cognoscerent. (lines 5-10)

31. Ibid. II:2, v. 1, 108.
Quis enim nostra aetate fortunatior Francisco Sfortia?...Cui tamen semper omnes astrologi, vel odio fuere, vel contemptui, nedum eos in suis rebus aut bellicis aut domesticis consiliarios adhiberet. (lines 16-22)

32. Ibid. II:9, v. 1, 164.
Pino Ordelapho, principe foroliviensi, cui Lucretia soror nupserat, quo anno obiit omnimodam vitae incolumitatem fuerat pollicitus Hieronymus Manfredus, astrologus nostra aetate singularis... (lines 19-23)

33. Ibid. II:2, v. 1, 112.
Quod si quando ex illorum praedictionibus recte usu accidat, non in rationem, quae nulla sit apud eos, sed in temeritatem casumque esse referendum. (lines 13-15)

34. For a discussion concerning the origins and development of astrological history, see Anthony Grafton and Noel M. Swerdlow, "Technical Chronology and Astrological History in Varro, Censorinus and Others," Classical Quarterly XXXV (1985), 454-65.

35. Pico, Disputationes II:5, v. 1, 128.
Ego vero ex scriptoribus astrologiae praecipuis neminem legi qui religionem et leges omnes, ut reliquas res humanas, constellationibus siderum non

subiciat. (lines 13-15)

36. Ibid. II:5, v. 1, 134.
...si quis recto iudicii examine penset, videbit nullo magis errore pietatem verae religionis offendi, cum aeque sit impium totaliter nullam putare esse religionem et ex caelo fatali quadam eam necessitate deducere. (lines 4-7)

37. Ibid. II:5, v. 1, 134.
Geomantiam omnes illius scriptores astrologiae filiam vocant. Magi ita huius artis usum necessarium putant, ut magiae clavem astrologiam appellent. Chiromantici in vola manus septem pro numero planetarum montes effingunt, unde ex lineis quae ibi conspiciuntur futura praevideantur. Sed has fatuitates particulatim prosequemur cum, post eversam dominam ac reginam, reliquam omnem superstitionum turbam in cursu proteremus....ut de ipsa illud Ecclesiastici dici possit: Vanitas vanitatum astrologia, et omnis superstitio vanitas. (lines 15-27)

38. Henri de Lubac, Pic de la Mirandole, (Paris, 1974), 307.

39. Pico, Disputationes II:6, v. 1, 138.
Quod si res humanas diligenter examines, nullam fere invenies in qua non aliquid...praevisum etiam vere de caelo exitum non immutet. Nam et hominis proprium arbitrio et ratione res suas disponere, et id quod materiae undique annexum est et colligatum, illius mutationi vehementer est obnoxium. (lines 14-19)

40. Ibid. III:3, v. 1, 188.
...dixerunt astrologi motum omnem inferiorem a caeli motu dependere, statim dogmati suo contradixerunt, cum inde illud sequatur tritum apud philosophos, esse caelum universalem causam effectuum inferiorum. Causa autem universalis effectus non distinguit, neque cur hoc fiat, aut illud, quaeritur ab ea, sed a proximis causis, quae variae et differentes sunt, pro effectuum differentia et varietate... (lines 19-26)

41. Ibid. III:19, v. 1, 358.
...quandoquidem astrologus signa respicit quae non sunt signa, causas speculatur quae non sunt causae, propterea fallitur. (lines 9-11)

42. Ibid. III:4, v. 1, 196.
Hoc est caeli munus praecipuum, quo corpora perficiuntur et viventia disponuntur ad vitam, praeter agitationem circularis motus, non modo necessarium ut lumen istud atque calorem devehat ad nos et per vices, oppotunitate mira, plus minus terris impartiatur, sed ut motos nos quoque calori reddat abiliores, qui de perpetue moto corpore iugiter emanat. (lines 20-27)

43. Ibid. III:15, v. 1, 306, 308, 310.
...quispiam dixerit hunc accedendi recedendique motum naturalem esse aquae...Poterit autem cuipiam apparere satis aperta et sufficiens causa marinae reciprocationis, siquidem de tali terra et aqua vapores identidem quales diximus ventique suscitantur, unde in aqua fit ventus atque tumultus, praesertim quod ex motu impulsuque isto et vaporum admixtione calescit, quare locum quaerit ampliorem quo se diffundat....aut cur necessarium praeter has causas addere Lunae motum, secum aquas deorsum etiam in sublime trahentem... (lines 18-20, 9-14, 2-4)

44. Ibid. III:16, v. 1, 322.
Crisimos, quos latine iudicatorios dixeris, ad Lunam refelli tam falso quam superstitiose equidem non dubito... (lines 3-4)
Daniela Mugnai Carrara, in her article "Fra causalità astrologica e causalità naturale. Gli interventi di Nicolò Leoniceno e della sua scuolo sul morbo gallico," Physis XXI (1979), 37-54, shows how the physician Leoniceno was influenced by Pico's work to attempt a non-astrological explanation for medical causes.

45. Avery Dulles, Princeps Concordiae, Pico della Mirandola and the Scholastic Tradition (Cambridge, MA, 1941), 85.

46. Pico, Disputationes III:27, v. 1, 416.
...nihil magnum in terra praeter hominem; nihil magnum in homine praeter mentem et animum; huc si ascendis, caelum transcendis; si ad corpus inclinas et caelum suspicis, muscam te vides et musca aliquid minus. (lines 3-6)

47. Cassirer, "Pico," 68. William G. Craven in Giovanni Pico della Mirandola: Symbol of his Age, Modern Interpretations of a Renaissance Philosopher (Geneva, 1981), highly criticizes Cassirer's view and suggests that the issues of free will and human freedom were really incidental to the work and that this is the only point at which Pico mentions them. Although this is a useful corrective to an overzealous imputation, Craven seems more bent on disparagement than on true understanding of Pico and his work. These issues come up throughout the work, and Craven contradicts himself on p. 144 where he discusses Book IV in the Disputations and writes about Pico's examples of how the astrologers "subject the mind to the heavens even where it does not depend on the body."

48. Kristeller, "Pico," 68.

49. Pico, Disputationes IV:4, v. 1, 442, 444
...siquidem intercedentes istae causae inter Deum et nos, sicuti humiliores Deo, ita sublimiores hominibus esse debent; nec quae ratione consilioque peraguntur, qualia nostra sunt, per irrationalia corpora decet ab auctore primo disponi, sed quemadmodum ille elementariam molem, utpote deteriorem per caelestem, quae melior est, regit et moderatur, ita res humanas, non corporum sed angelorum mysterio, qui natura dignitateque mediant inter nos et Deum, convenit gubernari, quare, cum a Deo descendis ad terram, descende per caelum; cum a Deo descendis ad homines, descende per angelos. (lines 22-29, 1-4)

50. Ibid. V:5, v. 1, 546.
Nam si qui simul coeunt planetae eadem essent proprietate, et vires haberent earundem rerum effectrices, profecto accessione facta duplicis radii effectus quoque duplicaretur; at cum contrariae sint repugnantisque naturae, qualis Iuppiter et Saturnus, necessario alter alterum impedit, et dum invicem suas frenant ligantque potestates, diversitate mixturae fit ut expectare ab eis nihil possimus nisi mediocre, quemadmodum omnia sunt quae ex extremorum mixtione dissultant; sicuti et ipsi dicere solent, cum sunt simul Saturnus et Mars, quamquam uterque noxius, uterque sit maleficus, quia tamen diversam habent nocendi potestatem, non fieri ex illorum coniunctione

maius aliquod malum et admirabile, sed frangi potius debilitarique alterius vires ab altero, ita ut nocere neuter possit dum nocere uterque pro suae naturae conditione contendit. (lines 3-18)

51. Ibid. V:8, v. 1, 570.
Nam qua siderum positione natus sit Christus astrologus nescit, nisi prius acceperit ab historia quo ille tempore natus sit. (lines 26-28)

52. Ibid. V:8, v. 1, 574.
...tamen hoc est litterae veritatem apud Hebraeos esse non dubitat. (lines 13-14).

53. Ibid., VI:2, v. 2, 16.
Est igitur quod astrologi dicunt, huiusmodi virtutem ac potestatem siderum et stellarum aliam atque aliam esse singulis horis ac momentis, dum aut sunt [in] aliis caeli locis, quas neoterici vocant domos, aut in aliis signis, quae duodecim fingunt inveniri, aut ipsi inter se planetae tantum spacii intervallo distantes variis invicem radiationibus copulantur, quos vocant vulgo planetarum aspectus. Hi sunt praecipue modi, ut iuniores quosdam omittam, quibus mutari defluxum virtutemque caelestium putant, domus scilicet, signi, aspectusque diversitas; quae quidem nisi ab illis defendantur, tueri dogma non possunt de siderum efficientia, ut omnis rerum inferiorum mutatio diversitasque a sideribus proficiscatur; quandoquidem si illa eadem semper immutabilique virtute sunt, ut nos de omnibus excepta Luna putamus, necessario aut iidem aut similes ab illis semper effectus provenirent. Nam effectuum diversitatem in causas inferiores, quemadmodum nos ipsi, referre non possunt, nisi et nobiscum fateantur de ista diversitate nihil posse de caelo se divinare, cum scilicet caelum auctor et causa non habeatur. (lines 1-20)

54. Ibid. VI:3, v. 2, 26.
Quam enim hoc sit absurdum, qui optices philosophiaeque rudimenta vel delibaverit facile intelliget, cum nemo sit qui nesciat effectus qualitatem pro radii qualitate proque natura corporis irradiantis, non pro diversa radii circulatione, distingui....Solis radius, quocumque modo, quocumque situ in nos deiciatur, semper calefacit, semper

illuminat; verum cum vel proximus, vel ad lineam, magis illuminat, magis calefacit; cum vero vel obliquatus vel fractus, aut e loco remotiore descendit, eadem quidem quae rectus, quae propinquus, sed minus eadem facit. Nec alia quidem in effectu fieri potest diversitas, quam quae ipsam intentionem remissionemque caloris luminisque consequitur. Insanum igitur dogma astrologorum, putantium et signa caeli duodecim, et planetas, hic quidem positos fratres nostros perbeare vel miseros facere... (lines 4-19)

55. Ibid. VI:4, v. 2, 36, 38.
...quam super his afferent philosophicam rationem? aut quomodo purgabunt factam a mathematicis, nullas ibi naturae proprietates existimantibus, sed quaerentibus numeros ad supputandum magis opportunos? Unde lapsus astrologis vel occasio certa fallendi super his decernentibus, quasi vires haberent omnino separatas, nec arbitrium illa, sed natura potius invicem divisisset. (lines 24-26, 1-4)

56. Ibid. VI:4, v. 2, 40, 42
...nam quoniam in Leone positus Sol violentius terras calefacit, et veniens idem ad Arietem quasi mundum instaurat, visum illis cum Leone cumque Ariete cognationem habere, quoniam peragrans illa signa fortior redditur, et vim eius maiorem quotannis experimur....qua ducti in Sole coniectura, simile putaverunt in signis aliis decernendum...In quibus id primum, unde reliqui pendent, vide quam sit criminosum, quamque plenum et ignorantiae et tarditatis. Nam quod Sol in Leone magis nos calefaciat, non ex natura signi quod peragrat, sed ex situ posituque contingit, quia ex eo loco rectius terram ferit nostris regionibus proximam magis. (lines 26-32, 1, 18-23)
An identical argument is made in Book VIII:5, v. 2, 252, 254.

57. Ibid. VIII:3, v. 2, 254
Sed prima dialectices nesciunt rudimenta, in quibus docemur distinguere quod est per se ab eo quod est ex accidenti. (lines 2-4)

58. Ibid. VI:5, v. 2, 48, 50.
...cum radiis quadrangularibus lacessiri Iovem a Marte, foveri Venerem trigona Iovis radiatione loquuntur, ipsa corpora intelligant planetarum huiusmodi aut bonis aut malis affectionibus promoveri, an illa quidem nihil invicem pati, nihil sentire huiusmodi mutationum, sed quid erga nos faciant, et quonam pacto subiecta corporea moveant, tali loquendi genere significari? Sive enim hoc potius, sive illud respondeant, mille undique laqueos, mille angustias incidunt. Nam si putant planetas invicem moveri, et quasi amicitias et odia exercentes nunc se amico fovere complexu, nunc mucronibus radiorum hostilem in modum persequi atque invadere, reclamabit non solum divinus Iob, apud quem legimus Deum facere pacem in excelsis suis; sed cum suo Aristotele Peripateticorum universa familia, apud quam certum est corpora superiora locorum sola varietate mutari, qualitates illas sub Luna exceptas nec accedere illuc ullas neque decedere. (lines 25-32, 1-10)

59. Ibid. VIII:4, V. 2, 268.
...ibi omnes formae, omnes effigies, quare nullae ibi formae, nullae effigies; omnes potestate et arbitrio hominum, natura et veritatis actu nullae. (lines 27-29)

60. Ibid. VIII:4, v. 2, 272, 274.
Sed nec operae praetium rimari diligentius et explorare insanias aliorum, dum satis superque constet nolentibus delirare, non esse naturae haec opera, sed fingentium nugas, vel somniantium deliramenta, sic ut tandem recte de his inventis diffiniam: a corrupta philosophia et poetarum fabulis sunt exorta, quibus tamen quasi rebus verissimis et digito, ut sic dixerim, Dei formatis tantum astrologi omnes tribuunt ut vix credibile sit in quas superstitiones haec illos insania perduxerit. (lines 27-30, 1-5)

61. Ibid. VII:2, v. 2, 154.
...an sit fatale illis tempus quo primum opifex facere illam aggreditur, quamcumque demum causam efficientem sortiatur, an potius cum absolvitur, an cum non tota quidem simul exigitur, sed per partes, sint partium diversarum fata quoque diversa. (lines 7-11)

62. Ibid. VII:2, v. 2, 160.
...quod astrologi decreverunt, uti ex hora nativitatis nascentis hominis fata dependeant, in quam opinionem nec ratione astrologi sunt adducti. Sed quia hoc principium assequi magis posse videbantur, ideo primas illi partes concesserunt. (lines 5-9)

63. Ibid. VII:4, v. 2, 174.
Primum quidem in auspicando urbis fato a iactu lapidis qua ratione moventur? Quandoquidem iam civitatis potius quam urbis fata perscrutantur, illud momentum potius observandum quo urbs aedificata coepta est habitari, et suis legibus regi et contineri. (lines 4-8)

64. Ibid. VII:7, v. 2, 192.
Sed quomodo mihi nocere poterit Saturnus in sexta Virginis parte, sicut erat acceptum, cum nascebar inventus, etiam si illis demus primo et vigesimo aetatis anno eius influxum ad me pertinere? nam quando ad me pertinebit Saturnus, illic non erit; et quando ibi erit Saturnus, pars illa ad me non pertinebit. (lines 20-25)

65. Ibid. VII:8, v. 2, 210.
Ceterum saepe in musica melodia, si vocula parva subtrahatur, solvitur concentus, dum quae per se parum exaudiretur, facit ut reliquae modulatius omnes exaudiantur. Caelorum ornatus, totus invicem nexus atque consentiens, nihil habet quod cesset, quod supervacuum, quod inutile sit; quare quamcumque vel minimam partem adempseris, periit statim, quod tota integritas faciebat. Inter helciarios, ut potest haud fortis homo tractum adimere, ut illius si desit manus non trahatur, sic potest unius stellae tantum ignoratio veritatem fati labefactare... (lines 1-12)

66. Ibid. VII:9, v. 2, 214.
Ego vero tum Proclo super Timaeum Platonis, tum ratione asseverante, maiora a planetis quam a stellis fixis praestari posse contendo. Neque enim sedes ipsa sublimior sublimiorem naturam non errantium indicat cum moderator omnium Sol, si non omnes, excepta Luna, certe supra se multas habeat stellas collocatas. (lines 21-26)

67. Ibid. VII:9, v. 2, 216.
Nam efficere nihil aiunt, nisi vel cardines, aut domorum initia saltem occupent, vel Luminarium alteri copulentur. (lines 24-26)

68. Ibid. IX:2, v. 2, 288.
...nisi forsan accinctus cum prodit infans astrolabio caelestia metiatur. (lines 16-17)

69. Ibid., IX:6, v. 2, 310.
Neque vero melior fides in urbium et regnorum initiis, quorum noticia scrupulari longe difficilior quam geniturarum. Quis enim haec prodidit? Quis observavit scriptor historiarum? quarum fides et diligentia si reddiderit diem urbis instauratae, vel urbis conditae, utique magna nimis existimabitur. Romae diem natalem coli mos fuit, sed non plus inde constat astrologis quam in iugo fuisse Lunam, hoc est in Libra cum condebatur. (lines 12-19)

70. Ibid. IX:7, v. 2, 318.
Quas omnes opinionum varietates, si paribus fere omnes vel rationibus vel auctoritatibus communitas animadverterimus, vel hac dumtaxat incertitudine totam pronunciandi per astra rationem si qua sit illa, in ambiguo esse confitebimur. Nam, variatis locorum divisionibus, omnis variatur constellatio, quandoquidem...mutant stellae apud astrologos, pro loci mutatione, naturam, influxum et proprietatem, et, quod maximum est, illa loca pugnanti et contraria in primis conditione decernunt, quae sunt situ coniuncta et cohaerentia. (lines 9-19)

71. Ibid. IX:7, v. 2, 320.
...sed omnis hinc pendet astrologica pronunciatio; omnis igitur dubia, incerta, inexplorata. (lines 3-4)

72. Ibid. IX:8, V. 2, 320, 322.
Quod si locus vere deprehenditur, vera motus futura supputatio, nam mathematica ratione nituntur, quae minime fallitur; verum loci deprehensio fidelis usquequaeque non est, organo simpliciter utique deficiente; neque enim potest qualiscumque vastitas instrumenti mechanici satis esse divisionibus actu sensuque perceptibilibus, quae sunt errori vitando

necessariae... (lines 22-25, 1-3)

73. Ibid. X:3, v. 2, 360, 362.
...efficacia locorum non potest alio referri quam ad habitudinem loci supra finitorem, ut in eo situ putetur stella quaelibet efficacior, in quo posita supra nos fortius operatur. Haec philosophus statim dabit naturali ratione persuasus; hoc dare cogitur et astrologus, quoniam virtus ista locorum, vel a natura petitur ipsius spacii, vel ex ista...habitudine ad nos. A spacio derivari non potest, non modo quia nulla istius spacii vis natura est..., verum quoniam istud si dixerim, erit idem horoscopus eademque locorum partitio quacumque regione constituenda, siquidem spacii partes determinatae suas habuerint proprietates, quibus inibi positas stellas afficiant, quare non variabuntur ex caelo, sed erunt omnibus eaedem. (lines 25-26, 1-12)

74. Ibid. X:4, v. 2, 370.
Sunt autem fere capita quinque ad quae redigas omen astrologicam probationem. Primum, locus dici potest ab ordine numerorum; secundum, a parabolica similitudine; tertium a mathematicis; quartum ab astrologicis principiis; quanitum a dialecticis. (lines 3-7)

75. Ibid. X:4, v. 2, 370.
...non modo non cogit, sed nec colligit; nec solum non persuadet, sed nec suadet. Primum igitur futilis nimis insanaque suppositio, primum genere quoque primo generis alterius naturae cognatione consentire. Primum ignis elementum, primus planetarum Saturnus; quid ab igne diversum magis astrologis est Saturno? Mars tertius planetarum, aqua tertium elementum; nonne dissidet Mars ab aqua quantum ab aqua dissidet ignis? Aries primum signum, Saturnus primus planeta; neque tamen astrologis habet Aries cum Saturno proportionem, non regnat in eo, non dominatur, immo deprimitur. Fallax igitur suppositio, rudis et imperita... (lines 19-30)

76. Ibid. X:4, v. 2, 376.
Nam quaecumque de istis similitudinibus argumenta petuntur, non solum philosophis sunt indigna docentibus, verum nec dialecticis apta vel utilia

disputantibus, quin nec rhetorum persuasionibus commoda, et vanae fere poeticae lusum potius prae se ferunt, quam seriae cuiusque probationis idoneam auctoritatem. (lines 7-12)

77. Ibid. X:5. 2, 378, 380.
Est secundi proprietas super divitiis, quoniam nihil aiunt homini magis proximum; igitur haerens primo secundus locus divitias significabit. Necessaria ratio penes eos, quibus nihil potius est divitiis; verum homini proximiora et intimiora multa, puta dotes animi et corporis, sapientia et valitudo, quare debuerunt potius haec a secundo loco significari, quam a sexto vel a nono, quid quod inter externa quoque parentes, uxor, amici, filii, gloria, pecuniae praeferuntur, ut potiora, ut proximiora, praeterquam apud unum hominum genus, qui se vocant astrologos. (lines 21-28, 1-3)

78. Ibid. X:7, v. 2, 392, 394.
Aboasar istas locorum proprietates a planetarum colligit ordine, ut primus primo detur, secundus secundo, tertius tertio, proque planetae comparis numeri proprietate proprietas quoque loci decernatur. Sed gravissimum statim incidit incommodum, ut eidem planetae rerum oppositarum loca attribuantur; Saturno primus et octavus, Iovi nonus atque secundus, Veneri quintus et duodecimus. Est enim primus locus vitae, locus octavus mortis; quomodo igitur primo pariter et octavo praeerit Saturnus? (lines 19-24, 1-3)

79. Ibid. X:7, v. 2, 396.
Haec noster Aboasar, qui nisi scripsit ebrius, haec certe scripsit insanus. (lines 24-25)

80. Lynn Thorndike, "Albumasar in Sadan," Isis XLV (1954), 28. I wish to thank Professor Richard Lemay for this reference.

81. Pico, Disputationes X:14, v. 2, 438.
Ceterum sive talibus experimentis, sive primis adducti rationibus concedimus quae de primis qualitatibus dicunt, non plus efficitur quam influxus siderum exploratos in permutando aeris statu, non corporum per istiusmodi primas affectiones, verum nec salutares has

esse stellas, alias noxias, nec quae propriae peculiaresque siderum dotes inde colligi potest. (lines 1-10)

82. Ibid. X:14, v. 2, 438.
Nam in viventium quoque corporibus bilis atra rubraque non sunt noxiae sed necessariae, nec minus utiles quibusdam muneribus subeundis, quam vel sanguis vel pituita; quod si nocere dicantur excessu, nocent eo modo sanguis et pituita, si supra modum excreverint. (lines 13-18)

83. Ibid. X:14, v. 2, 450.
...si quae putant astrologi influunt nobis, etiam si hic quidem planeta frigidus et siccus, ille calidus humidusque censeatur, multa tamen ea quae praecipua, non per has qualitates, sed per alias radiorum suorum occultas vires agere sunt putandi... (lines 2-7)

84. Ibid. XI:1, v. 2, 456.
Si natura caelestium consequi ratione non potuerunt... an potuerunt experientia? Et quamquam cur ita fiat ignorent, ita fieri tamen observationibus didicerunt, ut si non possit astrologia scientiae nomen, possit tamen et artis et verae traditionis habere praerogativam, quare vera quoque praedicere, sive id syllogismis sive experimentis sit consecuta? (lines 8-14)

85. Ibid. XI:1, v. 2, 456.
Nam siquis exploratum meditatumque habeat quid sit experientia, tum quibus viis super influxu siderum comparari possit, is ne utique dubitabit siderum vires peculiares propriasque operationes tam esse experimentis quam rationibus homini imperscrutabiles. (lines 23-27)

86. Ibid. XI:1, v. 2, 456, 458.
Et quidem patere potest hoc satis ex superioribus, quoniam si vel nullum e caelo fatum, aut si quod iam fatum, non ex hora initiali, sed a materiae cognatione dependet, patet experimentis nullam viam relinqui, quando quae quemque stella imprimis afflaverit tam tibi erit incertum, quam prorsus ignota primae illius materiae conditio singularis, sed et horam seminalem, siquis fatalem faciat, ipsi non negabunt astrologi

nimis abditam fore observationis opportunitatem. (lines 27-28, 1-7)

87. Ibid. XII:2, 494.
... hoc tantum asseveramus naturalis primaevae philosophiae, quae rationibus demonstratur, nihil Graecos philosophos, quicumque recte philosophati sunt, ab Aegyptiis accepisse, sed quae ad caerimonias matemathicamque spectarent. (lines

88. Ibid. XII:3, v. 2, 498, 500, 502.
Solent quicumque in aliquam disciplinam se totos ingurgitarunt, omnia ad illam referre quam libentissime...hac ratione, cum essent veteres Chaldaeorum in caelestium motibus metiendis et stellarum cursibus observandis iugiter assidui, nec aliud quicquam eorum magis ingenio detinerent, omnia illis erant stellae, hoc est ad stellas libenter omnia referebant, id quod de Aegyptiis dictum pariter intelligatur....tum assidua illis cum stellis consuetudine, quasique familiaritate, quibus omnibus accedebat innata sciendi futura hominibus curiositas. Nam quae fieri posse cupimus, eadem facile possibilia credimus. Accedebat saeculi vitium, et in hominum mentes alte dedita per id tempus persuasio divinandi...Adde quod idolatriae, cui erant obnoxii mire consentiebat, ut quos Deos colebant, eos auctores omnium rerum arbitrarentur, non bonarum modo, sed malarum....Adde gloriae et quaestus occasionem, quam paratam sibi viderunt astronomi, si de cursibus caeli, quos magno labore sed exigua mercede forsitan indagarent, putarentur futura praevideri. (lines 15-16, 27; 1-5; 9-14, 19-22, 25-28)

89. Eugenio Garin, Italian Humanism: Philosophy and Civic Life in the Renaissance, tr. Peter Munz (New York, 1965), 9.

90. Pico, Disputationes II:6, v. 1, 136.
...res ipsa eventaque refellant. (lines 16-17)

91. Pico, Conclusiones, 83.
Conclusiones Cabalistice...ex ipsis Hebreorum sapientum fundamentis Cristianam Religionem maxime confirmantes.

92. Pico, "Oration," 225.

93. Cassirer, "Giovanni Pico della Mirandola," 46.

94. Ramban Nahmanides, Commentary on the Torah, tr. and annot. C. B. Chavel (New York, 1974), III, 268-9.

95. Pico, "Heptaplus," 73.

96. Pearl Kibre, The Library of Pico della Mirandola, (New York, 1936; rpt. 1966), 41.

97. Pico, Disputationes VIII:4, v. 2, 268.
Hebraeorum Magistri, sicuti imagines suas astrologi, ita suum in stellis alephetarium, hoc est suae linguae notas et elementa, invenire contendunt... (lines 22-24)

98. Pico, Conclusiones, 90.
Sicut vera Astrologia docet nos legere in libro Dei, ita Cabala docet nos legere in libro legis.

99. D. P. Walker, Spiritual and Demonic Magic: From Ficino to Campanella (New York, 1943; rpt. Notre Dame, 1975), 54-57.

100. Frances A. Yates, Giordano Bruno and the Hermetic Tradition (Chicago, 1964; rpt. 1979), 115.

101. For discussions on the medieval and Renaissance contibutions to the opposition to the animistic view of the universe see Harry A. Wolfson, "The Problem of the Souls of the Spheres, from the Byzantine Commentaries on Aristotle through the Arabs and St. Thomas to Kepler," The Dumbarton Oaks Center for Byzantine Studies, May 1961, and Richard C. Dales, "Medieval Deanimation of the Heavens," Journal of the History of Ideas, XLI (1980), 531-50. Neither author suggests any possible contribution by Pico.

102. Paul Oskar Kristeller, The Philosophy of Marsilio Ficino, tr. Virginia Conant (New York, 1943; rpt. Gloucester, MA, 1964), 310-311.

103. Garin, "Introduction" to Pico, Disputationes, 7-8.

104. Pico, "Heptaplus," 132.

105. Eugenio Garin, Astrology in the Renaissance: The Zodiac of Life, tr. Carolyn Jackson and June Allen, rev. tr. Clare Robertson and Eugenio Garin (London, 1983; rpt. 1984), 80.

106. Walker, Spiritual and Demonic Magic, 56.

107. Pico, "Heptaplus," 100-1.

108. Pico, Disputationes III:13, v. 1, 282, 284.
A quibus etiam observati dies, quibus abstinendum navigatione praedicant, si quam habent a caelo causam, aliunde habere quam a Sole non possunt, quoniam stata de illis et perpetua observatio est; quare ad Solem tantum referri potest, cuius iisdem temporibus eadem fere omnino semper est habitudo, ad alias constellationes nullo modo, quae numquam eaedam iisdem corporibus inveniuntur. Verbi gratia suspecti dies nauticis semper: Martii primus, VII, XV, XVII, XIX et XXV; Aprilis quintus, VI, XII, XX; Februarii sextus, XII, XV, XVII, XIX, XX. Hac illi invariabili observatione semper utuntur aiuntque per hos dies magnas maris plerumque fieri mutationes, vel ad tranquillitatem, vel ad tempestatem, quare, dubii cum sint eventus, securius agent qui abstinent, ne forte in malum mutatio eveniat. (lines 30-32, 1-12)

109. Wayne Shumaker, The Occult Sciences in the Renaissance: A Study in Intellectual Patterns (Berkeley, 1972), 27.

110. Ibid., 17.
This legend has had a long life, indeed. Erhard Oeser in Kepler: Die Entstehung der modernen Wissenschaft (Zurich, 1971), 92, finds it a useful comparison to Wallenstein's horoscope.

111. Franz Boll, Carl Bezold, Wilhelm Gundel, Sternglaube und Sterndeutung: die Geschichte und das Wesen der Astrologie (Stuttgart, 1966), 41.

112. St. Thomas Aquinas, Summa Theologiae 115:4, tr. M. J. Charlesworth (Westminster, 1970), XV, 105-107.

113. Garin, Astrology in the Renaissance, 84.

CHAPTER THREE

KEPLER AND ASTRCLOGY

After Pico's untimely death in 1494, at the age of 31, significant events affected the political and intellectual situation in Europe. The Protestant Reformation ended the apparent unity of the Western Church. And in 1543 Copernicus's On the Revolutions, in which he set forth his heliocentric system, was published. Both these events strongly influenced the direction of Kepler's life.

Johannes Kepler was born in 1571 in the Swabian imperial city known today as Weil der Stadt. His family was Lutheran, and they finally settled in Leonberg, a nearby town in the duchy of Wurttemberg, a Lutheran stronghold in predominantly Catholic southern Germany. This was fortunate. Unlike Pico, Kepler came from a poor family. He could, nevertheless, get an excellent education because the dukes of Wurttemberg provided scholarships for poor but promising students. Thus, in 1589 he entered the University of Tübingen as a seminary student. There he received a humanist education with its grounding in

classical Greek and Latin authors. "From the very beginning," Max Caspar notes,

> his whole thinking was stamped in accordance with Platonic and Neo-Platonic speculation. From this, just as from the system of ideas which tradition connects with the name of Pythagoras, he received the strongest impetus for his work."[1]

At Tübingen, moreover, he studied with Michael Mästlin. Mästlin endorsed the Copernican cosmology and "often mentioned Copernicus in his classroom lectures and pointed out his superiority over Ptolemy."[2] Kepler thus became a Copernican.

Kepler never finished his training in theology. In the middle of his last year the Protestant seminary in the Austrian city of Graz applied to the University Senate at Tübingen for a successor in mathematics, and they recommended Kepler for this position. Kepler's acceptance pushed his career in a different direction. It was in Graz that he wrote his first astronomical treatise, The Secret of the Universe (Mysterium Cosmographicum). He tells us that he "persistently sought the reasons why they were such and not otherwise: the number, the size, and the motion of the circles."[3] He thought he found the solution to the number of the planetary orbits. It came to him while he was teaching.

> Therefore on the 9/19th of July in the year 1595 when I was going to show my audience the leaps of the great conjunctions through eight signs at a time, and how they cross step by step from one triangle to another, I inscribed many triangles, or quasi-triangles, in the same circle, so that the end of one was the beginning of another. Hence the points at which the sides of the triangles intersected each other sketched out a smaller circle. For the radius of a circle inscribed in a triangle is half the radius of the circumscribed circle. The ratio of the circles to each other appeared to the eye almost the same as that between Saturn and Jupiter...[4]

The experience suggested to him that he could inscribe each of the planets' orbits, still assumed to be circular, in a different regular polyhedron, to form an accurate mathematical picture of the universe, for there were five regular polyhedrons and, at that time, six known planets (if one accepted the Copernican system). He played around with the order and jugggled the numbers a bit, and he found that by inscribing an octahedron around Mercury, an icosahedron around Venus, a dodecahedron around the earth, a tetrahedron around Mars and a cube around Jupiter he did, indeed, get ratios proportional to the ratios between the planets established by Copernicus. In The Secret of the Universe Kepler also speculates about the movement of the planets and suggests a relationship between a planet's distance from the sun and the length of its orbit.

> But if, nevertheless, we wish to make an even more exact approach to the truth, and to hope for any

> regularity in the ratios, one of two conclusions must be reached: either...the moving souls are weaker the further they are from the Sun; or there is...a single moving soul in the center of all the spheres, that is, in the Sun, and it impels each body more strongly in proportion to how near it is.[5]

In The Secret of the Universe Kepler set forth the astronomical questions which were to occupy him for his entire life. As Owen Gingerich notes,

> although the principal idea of the Mysterium cosmographicum was erroneous, Kepler established himself as the first...scientist to demand physical explanations for celestial phenomena. Seldom in history has so wrong a book been so seminal in directing the future course of science.[6]

Kepler sent copies of his book to the best known astronomers of his day, among them Tycho Brahe. Tycho was a great observer of the heavens. With his cleverly-devised instruments set up in his specially constructed castle and observatory Uraniborg on the Danish island Hveen, he had collected twenty years of the most accurate data concerning the position of the stars prior to the invention of the telescope. Tycho was not a Copernican, but his observations taught him that the Ptolemaic model was not correct. He therefore developed a compromise model of the universe which could be reconciled with the apparently geostatic view in the Bible: six planets revolve around the sun while the sun revolves around a stationary earth.

But it was not only Kepler's advocacy of the Copernican system which disturbed Tycho about The Secret of the Universe. As he wrote to Kepler:

> The harmony and the analogy of the dispositions should be sought a posteriori, where the motion and the periods of the motion would be established exactly, not, however, a priori as you and Mästlin would want...[7]

Nevertheless, Tycho was enthusiastic about Kepler's potential and invited Kepler to work with him.

In 1599 Tycho had moved to Prague at the invitation of Holy Roman Emperor Rudolph II. Rudolph was an ardent patron of learning and the arts; he was also an ardent believer in the occult. As Imperial Mathematician Tycho was to continue his observations and eventually establish new planetary tables in Rudolph's honor; he was also to be available as court astrologer and advisor to Rudolph. Kepler traveled to Prague at the end of that year and spent several months working with Tycho. When he returned to Graz, he discovered that the new duke of Styria had redoubled efforts to enforce the Counter Reformation and rid the duchy of "heretics," making it impossible that Lutheran Kepler and his recently acquired family should remain. Attempts to find a place for himself in Tübingen proved fruitless, and in the autumn of 1600 he returned to

Prague with his family to continue his work with Tycho. Tycho died a year later, and Rudolph thereupon appointed Kepler Imperial Mathematician.

Tycho had assigned Kepler the task of describing the orbit of Mars. Mars was a problem for observers because of the extent of the eccentricity of its orbit. Tycho's superior observations showed a longitudinal deviation of 8'. "Now because they could not have been ignored," Kepler declares, "these eight minutes alone have, consequently, led to the total reforming of astronomy."[8] In The New Astronomy (Astronomia nova), which was finished in 1605 but not published until 1609, Kepler takes his reader step-by-step through the procedures the calculations and miscalculations, as he meandered his way toward solving the problem posed by that 8' eccentricity. He apologizes to his reader lest he be bored with the story.

> If you are wearied by this laborious procedure, by right you should take pity on me who has performed it at least seventy times with much loss of time, and you cease to wonder that the fifth year has now passed since I undertook Mars..."[9]

Kepler wanted to construct mathematical models that described the physical universe, as, it turned out, Ptolemy's and Copernicus's models had not been. In the New Astronomy Kepler reveals his first two laws of planetary

motion: the planetary orbit is an ellipse with the sun as one of the foci, and the radius vector drawn from the sun describes equal areas in equal times. Two age-old cherished canons of astronomy were thus destroyed, circular spheres and uniform velocity. It was accomplished not through a flash of insight but through painstaking calculation. As Walter Gerlach and Martha List note:

> In the New Astronomy Kepler consciously left the way that had led him to The Secret of the Universe. It was as Tycho had always demanded: an a posteriori astronomy whose development was founded step-by-step on numerical observation.[10]

In the New Astronomy Kepler also returns to speculating on the cause of planetary motion and continues to locate its source in the sun. New studies had appeared since he published The Secret of the Universe which affected his thinking on the subject. In 1600 William Gilbert published his findings about magnets and magnetic forces. And Kepler himself did significant work on optics which he published in 1604 in The Optical Part of Astronomy (Astronomiae pars optica). In this work he discusses measurement of light intensity, parallax, and refraction. He also describes the process of vision, giving a description of how the retina works, and the operation of eyeglasses. Thus, in chapters 33-35 in the New Astronomy

he refers to both these publications in his attempts to define the nature of the cause of planetary motion. He suggests that it is a material substance that has a magnet-like power of attraction, and the planets exert a contrary force to keep themselves in their orbits. Furthermore, he suggests, the same relationship holds between the moon and the earth as between the sun and each of the planets. Max Caspar emphasizes the importance of Kepler's work and ideas in the New Astronomy.

> It is Kepler's greatest service that he substituted a dynamic system for the formal schemes of the earlier astronomers, the law of nature for mathematical rule, and causal explanation for the mathematical description of motion. Thereby he truly became the founder of celestial mechanics.[11]

Although Kepler accepts the belief that the heavenly bodies have souls, he now draws back from locating the source of this motive power in the souls. He underscores this in a letter to his friend Herwart.

> My view is this, that I will cite that the heavenly machine is not like a divine living being but like a clock (he who believes that a clock is animate attributes the maker's glory to the work), in that as almost every kind of motion is from a very simple, magnetic, physical force just as in a clock all motion is from a very simple weight.[12]

Kepler was very active in Prague, and he produced several notable works in addition to The New Astronomy and The Optical Part of Astronomy. The appearance of Galileo's

book reporting his sightings through a telescope in 1610 prompted Kepler's response in his Conversation with the Sidereal Messenger (Dissertatio cum nuncio sidereo, 1610), and in his Dioptrics (Dioptrice, 1611) he described more fully how the telescope works based on the theories of lenses elaborated in The Optical Part of Astronomy. His Six-cornered Snowflake (Strena seu de nive sexangula, 1611), a Christmas gift to a friend, was a pioneering study of crystallography.

Meanwhile, political upheaval had begun to affect Kepler's security in Prague. Archduke Matthias, the brother of Kepler's patron Rudolph II had been chopping away at Rudolph's empire and already by 1608 had wrested the crowns of Austria, Hungary, and Moravia from the emperor. Kepler again began sending out feelers for a position in Tübingen, but his admission that he deviated from the orthodox Lutheran position on the eucharist proved an obstacle to his obtaining a position there. Then in 1611 civil war broke out in Bohemia. Rudolph was forced to abdicate in May. Kepler, fearful of Matthias's intolerance of his Lutheranism, arranged a position for himself as district mathematician in the Austrian city of Linz, but Rudolph demanded that he stay with him in Prague. During

that year Kepler suffered the loss of a child and his wife as well. In January 1612 Rudolph died, and Kepler moved with his stepdaughter and two surviving children to Linz. There the Lutheran minister denied him communion because of his unorthodox views. He also embarked on a second marriage and family in October 1613.

Kepler's great task for which he had been appointed district mathematician in Linz, and reconfirmed as Imperial Mathematician by the new emperor Matthias, was the completion of the Rudolphine planetary tables. Nevertheless, the first work which he produced there was occasioned by his curiosity about finding a way to measure the volume of wine irregularly shaped wine barrels could hold. His Stereometrics of Wine Casks (Stereometria dolorium vinariorum, 1615) is a pioneering work in the problem of integration. In 1615 another snag entered Kepler's life when his mother, who still lived in Leonberg, was accused of being a witch. She was acquitted after six years only after she was taken to a torture chamber and threatened, and she still maintained her innocence. Her renowned son's interference saved her from torture; nevertheless, she died shortly after her release from prison.

In the meantime Kepler worked on his Harmonics of the Universe (Harmonice mundi, 1619). In this work he deals with geometry, music, astrology, and astronomy in terms of harmonic relationships. Kepler feels geometry forms the basis for harmony, because it provides the archetypes for divine creation.

> Geometry prior to the origin of things, coeternal with the divine mind, God himself (for what is in God that would not be in God himself), provided achetypes to God for creating the universe and with the image of God passed to man.[13]

By projecting these geometric relationships in music man creates the beautiful harmonies he hears. So, too, in the heavens the planets are governed harmonically.

> The motions of the heavens are nothing other than a certain perennial harmony (rational not voiced) through dissonant tensions just as through certain syncopations or cadences (by which men imitate the natural dissonances) extending into certain and prescribed endings, six separate limits (just as of voices) and notes marking and distinguishing an immensity of time...[14]

In Book V Kepler reveals his third law, which shows a harmonic relationship between the period and distance: the squares of the periodic times of any two planets is proportional to the cubes of the mean distances from the sun. In The Secret of the Universe Kepler felt he discovered the plan on which the universe was conceived; now he has uncovered its inner workings.

The writing of the Harmonics of the Universe was the fulfillment of two decades of thought and speculation on all aspects of the sensible and nonsensible world, of outer and inner nature. Max Caspar suggests:

> With the accuracy of the researcher, who arranges and calculates observations, is united the power of shaping of an artist, who knows about image, and the ardor of the seeker for God, who struggles with the angel. So his Harmonice appears as a great cosmic vision, woven out of science, poetry, philosophy, theology, mysticism, a vision risen from the abyss of the human mind, seen as a radiation from the countenance of God, nourished from the supply of the senses, molded in the belief in ratio, inflamed by the inspiration of the prophet.[15]

Though Kepler could perceive harmony in the cosmos, disharmony pervaded in Europe. Religious tensions had reached the breaking point, and in 1618 the Thirty Years War began.

When Kepler began work on his Harmonics of the Universe, he had been writing a textbook of astronomy. The Epitome of Copernican Astronomy (Epitome astronomiae Copernicae, 1620) is Copernican in that the sun is in the center, and the planets, the earth among them, revolve around it, but the book also incorporates Kepler's three planetary laws and other findings, so that it differs considerably from the system established by Copernicus. The Rudolphine Tables (Tabulae Rudolphinae, 1627), the

completion of which had been his primary task as Imperial Mathematician, were finally ready for printing in 1624, but increased pressures from the Counter Reformation and the war intervened, particularly in 1626 when, during a siege of Linz, his printer's house was burned and with it the part of the work that had already been printed. He left Linz, settled his family in the Bavarian city of Regensburg, and proceeded along the Danube to Ulm, in Wurttenberg, where the work was at last printed in 1627.

But Kepler needed a new position, and Count Albrecht Wallenstein, the great imperial general, offered him one in Sagan, Wallenstein's fief in Silesia. This was not Kepler's first dealing with Wallenstein. In 1608 Kepler was asked by an intermediary to chart the nativity of an unnamed Bohemian lord. That lord was Wallenstein. It appears, however, that Kepler did, in fact, know the identity of his client, for Kepler wrote his name in code on the document.[16] Martha List suggests that the reason for this secrecy was that "Wallenstein, in fact, did not want his plans, which were already ambitious at that time undermined by his rivals through knowledge of his horoscope."[17] Wallenstein was so superstitious that he was constantly seeking astrologers' advice before making a

move. Kepler's interpretation of the birth chart is quite revealing of Wallenstein's character.

> Thus may I in truth say about the lord, that he has an alert, excited, industrious, restless temperament, eager for all kinds of novelties, not liking common human pursuits but seeking new, untried, solitary paths, yet for all that has much more in his thoughts than he lets outwardly be seen or felt. Saturn on the ascendant makes for deep, melancholic, constantly alert thoughts, alchemy, magic, sorcery, communion with spirits, scorn and disregard for human law and custom, also all religions, makes everything suspicious and distrustful that God or men do as if it were pure fraud and it were underneath much different from what one pretends.[18]

In response to a 1624 request for further elaboration of the horoscope, Kepler extended the chart to 1634 for which he foresaw chaos in the land with respect to Wallenstein in March of that year.[19] Wallenstein was assassinated on February 25, 1634. This horoscope is still the subject of debate. The astrologer Thomas Ring in Astrologie ohne Aberglauben (Astrology without Superstition) adduces this horoscope as an example that astrologers can obtain the goal set forth in Ring's title.[20] On the other hand, Günter Doebel, in his recent biography of Kepler, does not think it takes a horoscope or even great insight to see Wallenstein as superstitious, uncommunicative, and distrustful, nor does he understand how Kepler's prediction of "chaos in the land" with respect to Wallenstein in the

1624 elaboration of the horoscope means Wallenstein's death.[21]

Kepler moved with his family to Sagan in the summer of 1628. It was here that he began printing his last work The Dream (Somnium, 1634). This is a story of a boy's trip to the moon, giving a description of the solar system as it appears from a lunar perspective. It is a forerunner of the modern genre of science fiction.

Kepler was unhappy in Sagan; moreover, his situation was becoming precarious as pressures against Protestants mounted and Wallenstein lost imperial favor. He left Sagan to conduct business in Linz in October 1630. On the way he was to stop in Regensburg where he could consult with Ferdinand II, who had been emperor since 1619. He became ill after he reached Regensburg, and on November 15, 1630, he died.

Kepler published over eighty works on the many areas of interest to him: astronomy, mathematics, physics, optics, theology, chronology, music. Astrology was also an important interest of his. He wrote a number of works that deal with astrology. In 1601 he published his reform of astrology in On the More Certain Fundamentals of Astrology (De fundamentis astrologiae certioribus), which lists the

principles of his astrology and is an extended introduction to a calendar for the year 1601. It opens with a prognostication which is not deduced from astrology:

> This year there will be a rich harvest of prognostics, since, owing to increasing popular demand, more authors are adding daily to their number.[22]

This work only deals with astrology and is not a polemic. It antedates all his great achievements in science, which were to affect his outlook in astrology, as well. In his work On the New Star (De stella nova, 1606) he discusses the supernova which appeared in the constellation Draco within a few degrees of Jupiter and Saturn after the great conjunction in 1603 at the start of the fiery trigon. He describes the supernova after two years of observing it and discusses its value as an astrological sign. He also redates Jesus's birth to 4 or 5 B.C. based on the appearance on a similar heavenly configuration. Subsequently, Helisaeus Röslin, physician-in-ordinary to the count-palatine of Velderiz and the count of Hanau-Lichtenberg in Buchsweiler, attacked Kepler's reservations about astrology, which he expressed in On the New Star. Kepler refutes Röslin in his Response to Röslin's Discourse (Antwort auf Roeslini Diskurs, 1609). Kepler also applies his harmonic principles to astrology in Book IV of the

Harmonics of the Universe. He was also a practicing astrologer; he cast horoscopes and wrote calendars as part of his duties as mathematics instructor in Graz, Imperial Mathematician in Prague, and district mathematician in Linz.[23] And yet he was ambivalent about its practice. He also developed his own special theory of astrology, which he elaborated in On the More Certain Fundamentals of Astrology and then more elaborately in Third Man in the Middle (Tertius interveniens, 1610). This is his only work devoted to a defense of astrology. He also discusses his view of astrology in the context of some of his greatest achievements in science. Since it is a polemical work, it is the most useful to study alongside Pico's Disputations. Kepler wrote Third Man in the Middle in response to a vehement attack against astrology by a contemporary physician Philip Feselius, who was physician-in-ordinary to Georg Friedrich, Margrave of Baden. Both Feselius and Kepler dedicated their treatises debating the value of astrology to this prince.

The full title reads, Third Man in the Middle, that is, a warning to certain theologians, physicians, and philosophers, and especially to Dr. Philip Feselius, that in their just condemnation of the star-gazing superstition,

they should not throw out the baby with the bath water and in this way unwittingly harm their profession (Tertius interveniens. Das ist Warnung an etliche Theologos, Medicos und Philosophos, sonderlich D. Philippum Feselium, daß sie bei billicher Verwerffung der Sternguckerischen Aberglauben nicht das Kindt mit dem Badt außschütten und hiermit ihrer Profession unwissendt zuwider handlen). Kepler sees himself standing between the two physicians, Philip Feselius and Helisaeus Röslin. In the dedication, in response to Feselius's suggestion that astrology be banned, Kepler compares the suggestion to a flourishing Roman Empire making a law "partly from justified reasons, partly from apparent or seemingly half presumed ones, to banish mathematicians and philosophers from Rome or from Italy."[24] Kepler notes Feselius's objections to the waste of money and resources on astrological publications and the deflection of energy from worthier pursuits. "Should astrology be entirely banished," Kepler responds, "indiscriminately condemned, and considered everything that is basest, it would be denounced and imperiled because of annoyingly superstitious people."[25] In other words, Kepler feels there is a type of astrology which falls under the rubric of superstition, but just because some of it is

superstition does not mean it should all be condemned. There is thus a type of astrology which is not a kind of superstition; this is the astrology that Kepler believes in. Kepler does not consider himself one of those superstitious people. In this connection we might recall that in his Conclusions Pico also referred to a good astrology, as opposed to a presumed bad astrology. Like Pico's Disputations, Kepler's Third Man in the Middle is often wordy, repetitive, and poorly organized. Kepler's natural prolixity is unfortunately reinforced by the nature of this ad hominem attack.

Kepler begins Third Man in the Middle with a theological discussion about good coming out of evil. He gives human procreation as one example. After the fall from innocence, in order to bring children into the world and regenerate the human race, human beings had to procreate like the non-rational creatures. Out of the calamity of the fall came "this delight and charm of nature from God himself" which makes possible the preservation of the divine order.[26] So, too, with the study of nature, "out of superstitious curiosity forbidden by God, not only in earlier times but also yet today, something good, useful, healthy, and enriching to God's honor will be

brought forth and into daylight."[27] Thus, human curiosity, which in a sense caused Adam's fall, also produces good.

For Kepler, the astronomer, astrology has important roles to fill.

> So one sees clearly that this curiosity benefits the study of astronomy, which will be condemned by no one but justly praised highly. It is true that this astrology is a foolish little daughter...but, dear God, where would her mother, the highly rational astronomy be if she had not had this foolish daughter? The world is yet much more foolish, and so foolish that this old, reasonable mother, astronomy, in herself pious, must be tricked and deceived by her daughter's foolery particularly because she also has a mirror.
>
> And besides the salaries of mathematicians are so infrequent and so small that the mother must surely suffer hunger if the daughter earned nothing. If just no one had been so silly that he had created the hope of learning future events from the heavens, so you, too, astronomer would not have been so clever that you would have thought about studying the course of the heavens for the honor of God.[28]

In this unflattering description of astrology Kepler advances two arguments on its behalf. First, he suggests that curiosity about the future precedes curiosity about nature. Men looked to the heavens in an attempt to divine the future, but because they were looking at the heavens, some also became interested in knowing about the heavens for their own sake. Secondly, it supports the astronomer. In Kepler's case, his salary from the emperor was

constantly in arrears. In 1618 when he was trying to get an Ephemerides printed, he wrote,

> in order to raise the money for the Ephemerides of two years I wrote a cheap calendar with two prognostications; this seems at least a bit more decent than begging.[29]

When he died, the imperial treasury still owed him an enormous sum which his survivors could never recover.

Kepler sums up these arguments about good coming out of evil by telling us:

> No one should consider it unbelievable that in the astrological foolishness and godlessness could not also a useful sense and holiness be scraped out and found, in unclean slime not also a snail, mussel, oyster, or eel useful for eating, in the big heap of caterpillar egg droppings not also a silk spinner, and finally in an evil-smelling dung heap not also a good granule from a busy hen a peach or gold nugget.[30]

Thus, he graphically and charmingly let us know that he recognizes all the superstitious garbage of astrology, but by digging into the pail he will save that which is useful and good in astrology. Kepler is in effect making an argument for toleration of all forms of knowledge whether good or evil, right or wrong, for some good or truth could emerge from any of them.

Kepler agrees with Feselius that there is much uncertainty and fallibility in astrology:

> As long as it concerns itself with the same imaginary things, then what results from an imaginary cause is

> not just a completely uncertainly predicted and contingent one, but also rests on no rational supposition, much less can one have a sure basis because such is imaginary and not true.[31]

This is reminiscent of Pico's arguments against imaginary causes and signs. Kepler's example, relating to a common prejudice, is apt:

> The conjunction of Saturn and the moon should be the cause that someone is going to be cheated by a Jew. But if this conjunction takes place on the Sabbath, then no one in Prague will be cheated by any Jew, and, on the other hand, several hundred Christians will daily be cheated by Jews and vice versa, and yet the moon runs below Saturn only once a month.[32]

On the other hand, Kepler maintains that "some effects will be attributed to the stars which will certainly not be invented but proved through tedious experience in way of general suitability."[33] He compares it to medicinal use of herbs:

> As medicine at first in the investigation knew nothing about the nature and character of herbs as regards any different, necessary, and certain causes, but finally learned it through industry and rational conjecture, though in part it is still searching, so I also hold that there is nothing in any part of astrology which one cannot attain in time either the basic cause or yet every possible way of legitimate, natural, in other cases apparent cause, or at least an experience that is durable and freed from childish presuppositions.
>
> Then all that appears in astrology similar from experience and is not obviously based on childish principles (as the odd number of certain grains in medicine) I believe worthy of receiving attention as to whether it usually happens and stands thus, and if

> it then appears almost constant, then I would believe it so worthy that I would investigate its causes and not outright condemn it if I cannot fully discover its use.[34]

Thus, Kepler suggests that like the physician who found a cure by experiment and knows by experience that it works but does not know the reason why it works--a common occurrence in the seventeenth century--the astrologer often comes by improvement in his art by experiment and knows by experience that it works but does not know why it works. This was written after Kepler founded celestial mechanics and revealed it in the New Astronomy. There Kepler was searching for causes; here he is not. Astrology, like medicine, is partly an art; therefore, the experience of its validity is sufficient. Not so with astronomy. Science requires a causal explanation. It is higher than art; it is philosophy. This also helps us understand Kepler's daughter-mother metaphor a little better. Though the daughter astrology supports the mother astronomy, the daughter depends on the wisdom of the mother; the more the daughter strays from the mother, the more foolish she gets. Nevertheless, should experience in astrology indicate some valid observation, then it, too, deserves investigation into its underlying causes, though should that

investigation not prove successful, the experience would still be valid.

Kepler indicates one area which should be investigated, and that is weather prediction, which was then still part of astrology. As an example, he asks why there should be cold, dark weather when Saturn is at its height, in the first degree of Aquarius.

> For here it is appropriate to pursue those intermediate causes which unite heaven and earth, under which is also that light which comes down to us on earth from the highest heaven.[35]

The first example of an astrological observation that requires investigation into its possible cause is a purely physical one. He also does not claim that Saturn's being in the first degree of Aquarius is the cause of the cold but that there is a relationship here, the cause of which should be investigated. Kepler chides Feselius for not following the authority of the great founders of medicine, Hippocrates and Galen, for not recognizing the effect that the sky could have in medicine.[36] He insists very strongly on the relationship between heaven and earth. Thus, he was able to conceive of a force of attraction keeping the planets in their courses.

Kepler then turns to the question of the purpose of the stars. He wants to know "if the stars were created for

the good of us humans and if the human being was so created that he could make use of the stars." Kepler continues:

> And I am of the opinion that as the sun, the moon, and the stars are created yet before man on the fourth day, they, consequently, also have their own purpose and end according to which they are guided by God, also without human view. But after that on the sixth day man is to be created so that he may not only partake of the stars' light with his eyes and of their wondrous, completely ordered course with his mind but also have received such a natural soul which would be aroused in and of itself at certain times through some different disposition of the heavenly lights impelled by their action.[37]

Thus, he believes that the celestial bodies have not only an aesthetic and a scientific purpose for human beings, but they act upon the human soul by virtue of their disposition in the sky.

In order to understand the nature of the effect of the stars on the human soul Kepler starts by giving a physical description of the stars. He considers their first characteristic to be light, and along with light comes heat and color. And he claims that the character of different lights varies in both quantity and quality. Two considerations of quantity are size and distance of the heavenly body.

> As regards quantity, one star is bigger than another; therefore, it is also a bigger light and stronger at warming up the earth than another.

> And because quantity though without matter and motion though without time is characteristic of the wonderful light which flows from the sun down to us, as I showed in The Optical Part of Astronomy, so it also follows that the light from the sun to us will be now thinner and weaker, then thicker and denser according to whether the sun climbs higher and lower.[38]

Moreover, Kepler notes, the light will vary depending on whether or not it strikes directly.

> From this again it follows that the light of the planets, but especially that of the sun strikes us more strongly in this part of the world when it travels in Cancer than when it is in Capricorn, for in Cancer it strikes directly, in Capricorn obliquely. Also such light would project a different way when the sun sets than if it rises.[39]

Kepler advances observations about the physical operation of light and heat. The argument about heat's relationship to distance might recall Pico's demand for a physical explanation for hot weather without recourse to astrology. Here, even though Kepler refers to Cancer and Capricorn, the reason is to provide a means of locating the position of the sun, not to ascribe some astrological effect. He tells us in On the New Star that the signs of the Zodiac have only a geometrical meaning, and here he refers us to that source and notes "in one sign there are thirty degrees, conventional but not natural."[40]

Kepler suggests that the issue of oblique as opposed to direct illumination has both a quantitative and a

qualitative component and then proceeds to a discussion of "the material forms which emanate from spherical physical bodies,"[41] and gives numerous examples of what he means. He begins by telling us that "a material form from a luminescent body is the light which comes down to us and illuminates us."[42] He suggests commonplace examples such as sound from a source of noise and the odor from smoke. He also considers magnetic force in this category.

> There is a material form from the magnet which pulls iron there.
>
> There is a material form from the earth, and indeed shaped the shape of its body, which directs the magnet toward the north.
>
> There is a material form from the sun which leads the planets about the sun in a circle, which has quantity, thinness and thickness, which would also be moved like a vortex because its source spins it and also the sun's sphere around, as I brought to light in my book on the motion of Mars.[43]

Kepler is referring to his discussions of the motive force which keeps the planets in their courses in The New Astronomy. This discussion reinforces his emphasis on the physical nature of the forces.

Kepler suggests that color also enters the eyes through a material form, and Kepler again refers the reader to his Optical Part of Astronomy for a discussion of the process of vision. And he sees color as a quality by which

stars are differentiated. Having discussed light and color in relation to these material forms, he now turns to the possibility that such material forms emanate from the stars and planets.

> Now it may be that such properties use a special carrier or vehicle for this, namely light and colors, or that instead of light and color they themselves have material forms.
>
> Then I showed in my book on the motion of Mars that material forms travel there and back from the sun to all the planets and the earth, and in reverse the material form of the earth travels to the sun and the moon, also from the moon to the earth, as well as light and reflection. And because it is not only so widespread but also powerful, the celestial motion is able to operate and regulate itself continuously and unceasingly.
>
> Therefore, it seems to me quite conceivable that the inner corporeal natures of the planets reach us on earth through such continuously emanating material forms.[44]

Again Kepler is groping toward an explanation of the mechanism by which the planets move. He does it by analogy either with the magnet, as in the earlier example, or with light and color here, all suggesting action over a distance. Nevertheless, as regards the mechanism of planetary motion, he postulates an action which is mutual among the bodies, universal and physical.

It is interesting to note here how Kepler moves back and forth in this discussion between The Optical Part of

Astronomy and The New Astronomy. Just as he interrupted his work on Mars to pursue his optical studies, so here he seems to see the work in these two treatises as combined or flowing out of one another.

Kepler then moves on to discuss possible characteristics and effects of different heavenly bodies. "And as the sun does nothing but provide heat," he suggests, "so the moon does nothing but provide moisture."[45] Moreover, he notes, "material things in themselves are disposed toward dryness as well as toward cold by the absence of heat and moisture..."[46] Thus, he establishes that the heavens are responsible for the four qualities, depending on the presence or absence of the heavenly body.

Kepler speculates, too, about the possibility of each of the five planets (excluding the earth) having its own special effect. He notes that they, too, affect heat and moisture.

> So it may be asked further whether it is also possible that out of these two bases may such a characteristic be distributed from each single planet by which it would be distinguished from the other five in addition to light, clearness, size, speed, and distance and whether such a presumed characteristic also agrees with that which the astrologers assert concerning the qualities of the planets in operation.[47]

He then proceeds to combine varying degrees of heat and moisture and comes up with the following five combinations: excessive heat and deficient moisture; average heat and moisture; deficient heat and excessive moisture; excessive or average heat, and average or deficient moisture; excessive or average moisture, average or deficient heat.[48] These combinations represent the five planets, Mars, Jupiter, Saturn, Mercury, and Venus, and he finds the division into the three upper and two lower planets valid in the Copernican system. He first used this argument in his On the More Certain Fundamentals of Astrology as a means of adapting it to the Copernican system.[49]

But Kepler not only ascribes physical characteristics; he ascribes moral qualities as well. For him, however, this stems from the physical qualities associated with the theory of contraries, for moderate Jupiter is good, and excessive Saturn and Mars are bad. To Kepler it does not diminish God's work if there are bad planets, as Feselius asserted, also echoing Pico:

> These contraries belong to the purpose of the universe and, therefore, are none other than good, for they all with one another are useful to God the Creator in his universal, most holy plan.[50]

He suggests by way of example that in the mind of the hare the dog chasing him is bad. Moreover, Feselius's own

profession provides justification, for two of the humors are black bile and yellow bile. "Both these humors would be proclaimed as only for excrement by most physicians just as Saturn and Mars are bad planets by most astrologers."[51]

Kepler then turns to the question of whether or not it is possible to understand the effects of the stars considering their great number and distance and to predict future events from them. Kepler insists,

> all natural characteristics of the five planets and in part the noblest fixed stars, through which they effect something by us on earth, can be grasped by human understanding, although not perfectly but well enough, and included in true learning and knowledge, and will be regarded useful in prognostications of future things as well and as perfectly as this can happen in medicine considering the many and manifold herbs.[52]

To Kepler astrology is not an exact science, any more than medicine is an exact science, but we can have knowledge of the stars, and that knowledge is constantly growing. Based on this knowledge predictions are possible. Here he is reinforcing his earlier statements about the truth of astrology based on his belief that experience showed that it worked.

Kepler maintains that we can learn from the stars because they interact with us. But they do not rule us.

> Had the stars only remained in heaven and we here on earth, so they would administer no message at all down

> here and then it would be lost. Had they governed and ruled every human affair, then we indeed would not know whence it came, but we would have to remain in this general knowledge that it all comes from God. However, because the light of the stars comes down to us and different colors and brightnesses bring it along, then the stars are not any longer too high for us, but we judge from them out of that which they announce down here on earth and into our eyes.[53]

According to Kepler the light of the heavenly bodies in all its variety reaches us; therefore, their message is meant to be accessible to us.

But is prediction of the future not forbidden by the Bible? Pico asserted that it was, and Kepler notes Feselius's reference, for example, to the passage from Ecclesiastes about the vanity of arts that attempt to foretell the future. Kepler responds that there are two types of affairs, those that are contingent on specific circumstances and those that are quite general in nature. Prediction of the former is prohibited; prediction of the latter is not.

> Firstly, as far as they be so circumscribed by time and place and other circumstances, as one records them in chronicles or an individual in his house calendar, which concern the body and life, possessions and goods, honor and danger of one or another man as an individual, there I admit that the astrologers presume much too thirstily to predict such things in general or in a particular person's nativity in an unerring and detailed manner from the heavens, and King Solomon is rightly drawn against this.

> Next, mundane affairs will be viewed not thus in particular but according to a general similarity, for example, that there comes a year when peace is in all the world, there is a man whom one year or another misfortune strikes in droves. There one views the condition not as this or that misfortune in particular but as a general one which appears in different particulars.[54]

Kepler suggests that if astrology were condemned for engaging in the second form of prediction, then the study of medicine and politics should also be condemned because they also engage in this type of prediction.[55] Kepler maintains that there are and should be strict limits to the type of prediction permissible in astrology. He asserts, "namely, I do not mean to defend the prediction of future events which are contingent on the particular, for they depend on human free will."[56]

Another part of Kepler's task as an astrologer was to make weather predictions in his annual calendars, and Kepler suggests that this useful task cannot be included in the injunction against divination.

> It is true if a Christian is in need of a rainstorm, that he does not run to a calendar but is pious and asks God for it. There is no idolatry, however, about a calendar which predicts a rainstorm from natural causes, such that one seeks a rainstorm from it or must honor it with reading as if to receive a rainstorm from it. Also a calendar is not written in such a way that Christians do not pray on days when a rainstorm exists but abandon themselves to it and depart in sin and shame, but the calendar, when it relies upon natural causes is a preacher of the

> wonderful order of God, the creator, which he stretches forth and sets before the eyes and so he brings about that pious Christians remember to ponder God's miracles.[57]

Here again he emphasizes the study of natural causes as a pious study. Kepler, as a calendar-writer, composes paeans to God's natural order. Certainly the prediction of rainstorms is useful to people, but usefulness is not the criterion for piety.

> For example, an eclipse has nothing to do with them and yet is not curiosity, for they view one quite diligently and begin to praise God for his heavenly order and for the grace given to astronomers.[58]

Kepler may have given up his career in theology and may not have attained his goal of becoming a Lutheran minister; nevertheless, he still saw himself as God's minister.

Feselius condemned the practice of astrology because knowledge of astronomy was imperfect, a condemnation which echoed Pico. Kepler insists that the practice of medicine should likewise be condemned because knowledge of the medical sciences was imperfect. "It is true," he says,

> if it is imperfect, so one rightly warns that no one should rely on it too much. Likewise I would also do right if I would warn a patient that he should not rely too much on Dr. Feselius's cure because medicine is still very deficient in many things.[59]

But just as Feselius probably would have protested that the state of medical knowledge was sufficient for him to effect

certain cures, so Kepler maintains that the state of astronomical knowledge was sufficient for certain astrological predictions.

On the other hand, Kepler suggests that the inability of astronomers to calculate the exact size of the heavenly body or the speed of the heavens does not impede astrology because in his view that the ways in which their light rays strike the earth are not affected, for the planet's power is in its light.

> For one does not ask in astrology how wide the planet moves in the wide or narrow heaven but how big an angle its downward striking light throws everywhere on earth into a single point. Then one draws a circle about such a point, divides it into 360 degrees, God grant it be wide or narrow. For the natural point (which is the natural soul in every man, or also in the earth's orb itself...) is as capable as a real circle. In the point there exists a potential circle because of the zone whence come the radii that intersect at this point.[60]

Kepler has already argued that the power of the heavenly bodies is in their light. Now he goes further in defining its operation. The light from two planets strikes the earth forming an angle, and that angle determines the effect on earth. Moreover, the point formed by the angle works in relationship to the human and the earth soul, which is potentially perfect, just as the point is a potential circle, the perfect shape.

Like Pico Kepler rejects the astrological distribution of the twelve signs of the Zodiac among the seven planets because he does not consider it logical.[61] He also rejects the possibility to speak of the fortune and misfortune of the whole world, a country, a city, etc., for one can establish no nativity for the world, the division of countries among the twelve signs, and the table of elections.[62] On the other hand, he accepts the doctrine of progressions, the belief that the location of a planet at birth portends the character of the year in a person's life corresponding to the degree the planet has advanced from the subject's horoscope.

> The doctrine of progressions will earn fine consideration from me. If I would allow with Copernicus that the earth revolves, then the proportion naturally embedded between a day and the year turns out to be one to 365, whether we will be carried around in the universe with a field, a residence, or a ship for our dwelling. And it is, therefore, more believable that in progressions and the nativities of human beings who are the inhabitants of this ship, this proportion should also rule.[63]

Thus, the idea of a natural geometric proportion, which Kepler can find in the doctrine of progressions but not in the other doctrines like the distribution of the twelve signs among the seven planets, helps Kepler decide which theory to accept and which to reject. The fact that Kepler accepted the doctrine of progressions, which is for the

purpose of making predictions, belies Garin's assertion that "Kepler himself...certainly did not believe in the validity of 'predictions.'"[64]

Kepler also argues with Feselius's contention that there are many heavens. The arguments adduced on both sides are religious and scientific. Kepler notes that Feselius had argued that the Bible assumes a multiplicity of heavens. He remarks that Feselius depended on the Latin translation for this argument and even reminds Feselius of an additional argument in his favor: whereas the Latin uses the singular "coelum" in the first chapter, the Hebrew uses the plural "ha-shamayim." He notes the Greeks use the singular. Nevertheless, Kepler maintains that this philological argument does not necessarily reveal the Bible's position in this matter.

> Whereas the Hebrew language always speaks of the heavens as if they were many, one may listen to the theologians about this. For although their several heavens do not belong in physics, they explain that the lower air is also heaven and is called the bird of the heavens. And it may certainly be asserted in the explanation of the theologians that all the stars stay in one heaven, which opinion many excellent Greek and Latin fathers held.[65]

This leads Kepler into Feselius's next argument which asserts that it is contrary to physics to believe that the heavens are "fluid and penetrable," and the Bible supports

the idea of the solid sphere. Kepler again falls back on his knowledge of Hebrew to refute this assertion.

> Scholars of the Hebrew language give the word raqi'a [firmament] to mean an expanse or extension, that between the waters and the waters God made a thin, transparent substance from the water through attenuation and the material, at first so narrow and tight, was extended into an immeasurable room or space.[66]

Kepler continues in a more humorous vein and suggests the upper waters could freeze "and thus become a crystalline sphere and truly solid."[67]

Kepler then moves to a refutation of Feselius's contention that the fact that we can see the sky proves that it is not air but a thick body. Here Kepler has recourse to his work on optics and describes his experiments with viewing white paper through a camera obscura, noting that paper appears to take on the color of a background object such as the green of the grass below. He suggests that the eye acts like a camera obscura with respect to the sky which is why it appears blue when, in fact, it is clear air. And he suggests that the blue color originates below, so that the upper sky may be clear. He also tells Feselius to consult with a painter about the presumed invisibility of air. Kepler concludes,

> Firstly, it is proved that air is visible, and yet it is not a solid body. Therefore, were the sky also

> equally visible, it would not consequently be a solid body. In addition, it is not proved that the sky is visible. Because Feselius is of the opinion that a body which is invisible is also fluid, penetrable, and soft, so he must let pass the sky as soft, fluid, and penetrable.
>
> Finally, it appears that Feselius knows nothing at all about the basic proof that there are not many transparent spheres above one another, namely, because the comets shoot through everything, likewise because the visage or the shine of the planets and stars nowhere rebounds except just a little here below in the thick air around a mile up above the earth. But it should be that one first grasps the principles in his head before he attempts to publicly refute an issue.[68]

Here, after a long, complex argument about the color of the sky, Kepler appends a short, concise scientific refutation of the solid spheres based on Tycho's observations of comets and hints that the untutored in astronomy should perhaps study before making pronouncements.

Feselius's final argument in favor of multiple heavens is the contention that the planets would fly off in all directions if there were open space. Feselius denied the possibility that a living intelligence keeps the planets in their courses, although Kepler notes that Feselius accepts the idea of living intelligences in the planets, as Kepler himself does. But in The New Astronomy Kepler rejected the possibility that these intelligences move the planets and

suggested instead a mechanical force. Here he summarizes those thoughts.

> [The planets] are driven, however, by a material form of the sun into a very rapid circular orbit. Likewise they will be driven by their own special magnetic power through which half the time they travel toward the sun, at other times pull away from the sun. But the sun alone has a living quality through which it informs, will be made to shine, and turned continuously like an orb about its axis. Through this rotation it also simultaneously makes its material forms go around and be diffused to the extremities of the universe and thus pulls all the planets successively around. Several living intelligences would not be needed for the celestial motions.[69]

Kepler then reminds Feselius that knowledge of the heavens in their day is considerably more accurate than in earlier times. Kepler becomes irate over the fact that Feselius questioned Tycho's observations, which is taken as an implicit criticism of Kepler's astronomical work, and suggests, "Dr. Feselius, consequently, misunderstands here a great deal, which indeed is too good for him to hold, because he is not an astronomer by profession."[70] He then proceeds to list developments in astronomy which Feselius failed to understand, specifically the contributions of Copernicus, Tycho, and himself. Kepler focuses on an explanation of how it is possible to get accurate information about the heavenly bodies. He explains the

roles of astronomical instruments and geometry in observing the heavens.

In his support of the Copernican system Kepler opposes both Feselius and the astrologer Röslin, and it is interesting that Kepler alludes to the agreement of both the advocate and the opponent of astrology on this point. Feselius adduced four points in opposition to the Copernican system: it is against nature, sense experience, reason, and the Bible. As regards the first three points Kepler alludes to the small size of the earth in contrast to the entire heavens. He notes, for example, that the movement of the earth "is much less against nature than that the heavens should have such an inconceivable speed."[71] Likewise our senses and our reason can more easily grasp the diurnal rotation of the small earth than the diurnal revolution of the immense heavens. Moreover, he protests the continual recourse to the Bible in the debate about the Copernican system.

> Just as if the Holy Ghost taught astronomy or physics and did not have a much higher purpose to which he not only made use of his word and language first known of people, but also of common, popular knowledge of natural things to which people attain with the eyes and external senses.[72]

Nevertheless, Kepler maintains that the quotations which according to Feselius supposedly assert the immobility of

the earth can be interpreted otherwise. For example, Kepler suggests that the passages from Psalms 93 and 96, "The world also is established, that it cannot be moved," and "The world also shall be established that it shall not be moved," really refer to the kingdom of Christ which is not moved.[73]

Kepler believes there is a connection between the heavens and events on earth, and he claims Aristotle was his authority for this. The question concerns the nature of that connection and the extent to which the heavens are a cause of the events on earth. He notes,

> although many things happen on earth to which the heavens apparently contribute, so it happens that indeed they are not quite celestial. But because they originated from their causes and are already in effect, so the heavens come forth and make something new therein, which they would have had to let be if the thing had not already been also existing without the heavens.[74]

He gives as one example a battle between the Medes and the Lydians on May 28, 585 B.C. In the middle of the battle a solar eclipse occurred which forced them to stop fighting, and they made peace.

> If the battle had not already been in progress, the eclipse would have slowly caused a battle and likewise a peace. Thus, the eclipse also had not alone made the peace but only frightened the people and gave them guidance that they would be eager for peace.[75]

In this case Kepler suggests that the sky played a more incidental role in bringing about peace. It did not cause the peace, but it did affect human behavior.

Kepler cannot accept the sky as the source of essential qualities on earth.

> All creation of form and quality are not from the heavens but were given by God some time before the creation of heaven....
>
> To me consequently it is ever so absurd a thing that the sun or other stars should bestow on an herb or animal its essential quality. It sounds as absurd as if one asserted that the sheep or cow received its essential quality from the elephant.[76]

The sky cannot impart an essential quality to another being that it itself does not have. But it can impart its own essential quality--motion.

> So it is not, therefore, to be denied that the autonomous creatures that move air, water, and earth also contain the celestial motion in common and so the heavens in certain measure impart to them the impetus toward motion.
>
> For the seed truly has in itself the source of its motion in growing. This source exists in its character, power, and ability, or the potentiality of growing. But the heavens cause it toward action, as to the actuality of growing, in that the sun shines forth and causes the warmth that draws out the power of the seed in the moisture.[77]

Like Pico Kepler attributes physical properties to the body of the sun. It gives light and heat, and Kepler would add that it makes the planets revolve. Kepler maintains

that "the sun and the mother and father of the hare produce a hare," but he explains parenthetically,

> in this sense, that the sun brought the spring so that it became warm or whatever else originates with the sun, and not as if the sun gave to that the formal faculty, for it must be innate in the hare.[78]

The sun makes the physical environment which facilitates breeding; rabbits make rabbits.

Kepler finds another point of contact between the heavenly bodies and the earth in the ebb and flow of the tides.

> There also a contact occurs of a magnetic material emanation flowing from the body of the moon with the water of the sea. This contact does not take place superficially up above but entirely corporeally through the whole depth of the sea.
>
> However, the union and joining of the heavens and the earth is yet mere child's play, and although it takes place through a material form, it is, nevertheless, material, for the form has dimension of quantity.[79]

Here he sums up the arguments he made in The New Astronomy about the moon's responsibility for the tides. Again he stresses the physical nature of this relationship, and although he is not completely correct in his explanation, he does essentially understand the nature of tides. Pico rejected the possibility that the moon governs the tides as did Galileo who refused to accept such an occult

explanation for this phenomenon.[80] Concerning this dispute Judith V. Field observes,

> it is...clear that no general refutation of astrology was a reasonable proposition while the influence of the Sun upon the weather (in determining the seasons) and that of the Moon upon the sea (in causing the tides) were regarded as examples of astrological "force" in action.[81]

Kepler also maintains that there are contacts between the heavens and the earth which are other than physical ones.

> There follows, however, a much nobler, more wonderful union of heaven and earth, which produces nothing material, but is formal, takes place in this lower world through forms and not simply through unfeeling forms, as they will be found in hard stone, but through spiritual powers, through soul, through reason, indeed through understanding of the most subtle things which are in all of geometry. For the earthly creatures were created so that they may in the way be capable of heaven.[82]

That special union comes from the contemplation of the heavens in whatever degree a human being is capable. The highest degree of contemplation, after inquiry into the different bodies, the planetary courses, their mover, and the geometric harmonies of the heavens, is to inquire "whether such stars in the heavens effect something here below on earth."[83] Kepler continues,

> however, that which such natures thus grasp is firstly the material form from the heavenly bodies and orbs; it would be from their lights, colors, or bodies, and this is the material. For another, it is thus the

> subtlest geometrical harmony of two intersecting rays, either of light or of bodies, to be sought in the most hidden secrets of the subject of geometry, from which finally the true causes of harmony in music also originate and nearly know the same thing. Indeed, something different is implanted in the natural power of the human soul.[84]

Here is a reference to harmony as a geometric relationship, an idea which Kepler has contemplated for some time already but which he will fully develop in his Harmonics of the Universe. Only those proportions from regular polygons or knowable figures, as he calls them, are harmonic. "Therefore, we also do not find any body or other thing in the world that would have been made or specified by God according to a seven-sided, nine-side, or eleven-sided figure," Kepler suggests.

> And thus it would also follow that nature does not take pleasure from any proportion that would be taken from such rejected figures, whether it be in voices or in rays of stars. And, on the other hand, all proportions of voices and chords which are taken from the knowable figures give in music its harmonies and in planetary rays all proportions which appear when two light rays strike together (as far as they are noted in the daily experience and recording of the weather itself in nature's drive toward violent weather), such [harmony] is also found under the knowable figures and not one under the unknowable. And so a wonderful secret follows from this, that nature is God's image and geometry is the archetype of universal beauty. So much was put into the work through creation; so much could be known in geometry through finitude and equations. And what falls outside the limits, comparison, and knowledge would also remain unformed and uncreated in the world. That is given no special beauty or shape but of

> corporeality, fortune, and accident, which in themselves are boundless, would be abandoned as, for example, individual fruits and flowers are, indeed, found which have seven, nine, or eleven branches or leaves when the species commonly varies in the individuals. But no species is found which does not regularly contain this number, as five, six, four, three, ten, twelve, etc.[85]

Kepler sees geometry as the key for understanding all that is beautiful and true, for God created the universe according to geometric patterns. Therefore, violation of the natural geometric proportions results in dischord, anomaly, ugliness. He believes this to be true in music; he believes it true in nature. The angle at which light from two stars strike the earth is an aspect, and that angle will produce harmony if it belongs to one of the regular polygons, dischord if not. This is Kepler's view of the natural world: ordered, comprehensible, reducible to a single principle, as God's world ought to be.

Aspects, consequently, are important to Kepler. He refutes Feselius's contention that aspects are indistinguishable and lists various aspects for the coming year to underscore his point.[86] He uses aspects to make weather forecasts. A conjunction between Mars and the sun is a case in point.

> They note when there is a conjunction between Mars and the sun that there is a hot period according to the kind of season. For in winter instead of the heat it

> is mild, with thunder and rain, as in December 1598, February 1601. In spring such a conjunction drives off what it finds, namely much still rough air, as in April 1603, to which a fire also pertains, though this may appear a nonsensical thing to Dr. Feselius. Otherwise it is usually hot, as in July 1590, a good year for wine. In the year 1592, although it was a thoroughly wet year, because of other things,...there in the middle a conjunction between Mars and the sun occurred, it was a hot and dry period. In September 1594 was also good wine. In October 1596 a wonderful period. In July 1605 hot and unbearable, for at that time an unfavorable aspect also entered which gave much bad weather. In the year 1607 there was a fruitful year (which had its special reasons) when Mars in July also raged in moisture, and which much hot, driving rain brought up with the help of other nearby aspects. In the year 1609 it was also very hot one day before and after the conjunction in August and September. And it benooves everyone daily to pay attention that Dr. Feselius may take note in October 1611 New Style.[87]

Kepler may attribute variations in weather to aspects, but he upbraids astrologers who attribute variations in natural products to astrological causes. Like Pico, Kepler maintains that the relationship of a particular area to the sun and its heat sufficiently accounts for the variety. For example, he notes:

> In Italy there is good, spirited wine, for the countryside faces the midday sun. Along the Rhine there is also much wine but gentler, for the countryside faces north and yet has deep valleys to retain the heat. Along the upper Danube there is no wine because the countryside is not protected against the harsh winds from the snowy mountains. But down below in Austria and Hungary there is good, strong wine because the land faces east and south and starts to become deep between very high mountains. The Elbe

> produces little wine, for the countryside faces north and is more level than other regions.[88]

Kepler may not have converted Feselius by the accuracy of his weather predictions, but after reading all this and seeing the importance Kepler attached to wine, we should not be surprised that a few years later he was to write his Stereometrics of Wine Casks.

And Kepler makes a resounding prediction from another set of aspects:

> A conjunction between Jupiter and Mars in the sextile of the sun and Mercury will cause on March 1 New Style...a strong movement of all humors...
>
> Now as March 1 comes by, a terrible gale wind will bring here a very black and thick cloud from which it will become so dark...as if it were a half hour after sunset. Because of this abrupt change some will begin to ask with astonishment what that could be. One gave the answer: Kepler came and so made the remark that this day has long been foretold by me. Now what does Dr. Feselius think of this stormy Aeolus.[89]

Kepler was still writing beyond March 1, and proudly lets us know that the storm came to pass.[90] However, one wonders if it was quite as dramatic as Kepler predicted.

The bond between heaven and earth that makes possible a celestial effect on the earth such as in weather is expressed through aspects. But the effect is made on the earth's soul.

> In this lower world or earth's sphere is set a spiritual nature of which geometry is capable, which

> is quickened by the geometric and harmonic joining of the celestial light rays from the instinct of the creator without reasoning, and is aroused and impelled to use its powers.[91]

Kepler is not sure that plants and animals have such a faculty, although he does not find it inconceivable that they do, but as befits their station in the hierarchy of being. Man, however, definitely has a soul which is divine and immortal. Kepler believes that man's soul has that same relationship with the heavens as the earth's soul, and it is this relationship that astrology probes. He finds it "a pearl of nobility from astrology, in no way to condemn with astrology but to keep and explain diligently."[92] Kepler continues:

> The human being in the first igniting of his life, when he first lives for himself and cannot remain any more in his mother's body, receives a character and image of all the constellations of the heavens, or of the shape of the rays streaming toward earth and retains it until he is in his grave. Afterwards it leaves marked traces in the formation of the face and the rest of the shape of the body, as well as in the business affairs of the person, his manners and gestures, so that he also causes similar inclination and sympathy for his person in other people through the form of the body and corresponding fortune through his behavior. Through that then (as well as through the imagination of the mother before the birth and through rearing after birth) a very big difference between people will be produced, that one will become good, lively, gay, trusting, another sleepy, indolent, careless, obscurantist, forgetful, timid, and what are such general qualities that are compared to the beautiful and exact or extensive, unsightly

> configurations and to the colors and movements of the planets.[93]

Thus, Kepler believes that a configuration of the heavens is imprinted on a human soul at birth, and the human birth is rightly the moment of destiny. As the relationship of the planets to each other through their aspects causes certain personality traits to develop, the birth chart will give a description of a person's character. In this way geometry becomes the archetype of the human being just as it is for the natural world. Kepler does recognize other influences such as the person's upbringing. How the imagination of the pregnant mother affects the child he leaves to our imaginations.

At birth the human being receives more than an imprint of the heavens on his soul, for he, like plants and like planets, has a course which is subject to time.

> Moreover, just as every herb comes upon its time when it should ripen and bloom, the time itself prescribed in its creation, though through outside warmth and other means it may be somewhat lengthened or shortened but never entirely transformed, so, too, the nature of human beings at their entrance into life receives not only a momentary picture of the heavens but also its course, as it shines down on earth one day after another, and gains from this course its pattern for a certain year in excess of this or that humor. The nature of which year is already inscribed quite sharply and exactly in the first few days of his life.[94]

The natural proportion which describes the relationship between the person's life and the course is the theory of progressions, but here he ties it into the theory of aspects whereas earlier he gave it its own geometric justification.

In the theory of aspects and theory of progressions we have the crux of Kepler's view of how the disposition of the heavens affects the human being at birth and afterwards and why, consequently, astrology is a valid and useful tool for studying a person's character and predicting trends in his life.

Kepler does not believe, moreover, that a person is affected by the heavens only at birth and the first days of life. It is a continuing relationship.

> Each nature knows not only its celestial character but also heavenly configurations and courses of every day as well, so that as often as its planet presently comes into the ascendant of its character or into the chief place, particularly on the birthday it assumes its character and thus will be affected and moved distinctly.[95]

This continuing sympathetic relationship means that not only is a birth chart useful but later horoscopes will also enlighten the astrologer, and presumably the subject, as to the direction of his life. Max Caspar notes that Kepler made a chart for himself at the beginning of every year of

his life. For his sixtieth year Kepler observed that the planets occupied the same positions as at his birth. However, he never reached that birthday.[96]

In the Bible after God created heaven and earth, he created light in heaven, and the alteration of darkness and light brought about time; therefore, Feselius argued that the essential task of the heavenly lights is the distinction of time. Indeed, Kepler asserts his agreement "that the first essential function of the heavenly lights is none other than to make the differentiation of time."[97] But Kepler does not feel that this determination about the essence of the lights' action is in any way incompatible with his speculations about their action on earth, for things are as they are not only because of essence but because of accident as well.

> [The heavenly lights] move natures through harmonic consonances secondarily, for what this harmonic consonance contributes through its light rays is by accident, especially down below here on earth as regards place. Rather what this by accident (but by unceasing accident and from the measured foresight of God) will cause is to move natures and emotions here on earth and so they will participate in whatever happens here on earth just as fire, air, water, and earth do.
>
> This use, which occurs with living creatures, is indeed an accident of essence, or an accident of essential action, but not an accident of the end, for which they were created.[98]

A creative use of the Aristotelian distinction indeed, for the essence of accident is limitation! Kepler has chosen a cleverly convoluted way to argue that the essence of the lights' action is not only to distinguish time but to shine down on earth. After all, on the fourth day God made the heavenly lights to shine down on earth, so that Kepler has a Biblical source for his argument. But Kepler was not one to eschew an intellectual joke when the opportunity presented itself. Nevertheless, lest the reader think that this is the only possible response to Feselius's argument, and Feselius was, consequently, correct in his assertions, Kepler reminds Feselius that an object can have more than one essential purpose, including the heavenly bodies. He notes the many functions of the angels and concludes, "Thus, the planets would also go around them even had they not been necessary for any time, day or night."[99]

Furthermore, since the heavenly bodies are creatures of God and part of the divine plan, the question arises how the heavens can be the source of evil in this world. Kepler insists that nothing evil can come from the heavens, but he first expresses the position of astrologers in general,

> that the stars would have yielded nothing in their position of innocence, nothing other than just a

> difference among people as to their hot or cold nature. Therefore, the present evil arises from the transgression of people, and there is not a temperament without blemish. For although Jupiter is moderate, nevertheless, the astrologers describe him such that he would be in effect a haughty type.
>
> On the other hand, as far as my opinion goes, it holds this: that in the stars themselves there is nothing but light, colors, qualities from the indication of colors, warmth, moisture, and finally the geometry or harmony in the meeting of rays here on earth, which are quite good things, as not less, too, the character of these things, which will be imprinted there in the new-born human beings, must be a good, beneficial order of God because everything that God creates is good. However, this nature of people then is advised such and such, and the understanding of people then misuses this and that imprinted quality and harmony such and such. Therefore, neither the heavens, nor their light rays, nor the harmony, nor the character, but original sin and the evil will that lets itself be incited by age-old lust alone are guilty.[100]

By thus juxtaposing the view of other astrologers with his own in this matter, Kepler starkly contrasts his view of the heavens and astrology with theirs and also makes his view of astrology consonant with his Augustinian theology. It is interesting that the views of the origins of evil are based on St. Augustine, and yet Augustine utterly condemned astrology. Nevertheless, whereas other astrologers attributed qualities like temperament to the stars and planets which affect our temperament, Kepler denies that the stars affect us through any means but their physical properties.

Moreover, when God created the stars on the fourth day, as the Bible claims, he intended them for "signs." Kepler suggests that there are several possibilities as to what kinds of signs they are, and he can agree with a non-astrological exegesis.

> Now I am in the first place satisfied with the interpretation of the word signs that Moses from the mouth of God meant by it nothing other than signs for the differentiation of time. Just as it does not follow, however, that they, therefore, are not also signs of God's omnipotence, although Moses' word in this place does not expressly speak of this, so Peselius should not also decide that they, therefore, are not signs to move the natures in this lower world, objective signs, or that they are not also signifying signs through which the harmonic combination of light rays strike down here on earth.
>
> And, consequently, I well prefer that they not be fools' signs but useful and necessary signs for the use of this life, for the ordering of the seasons, also not signs of each and every future thing under all circumstances, which alone belongs to God, but merely signs of natural, undifferentiated future things which behave as the signs themselves, which follow from them.[101]

Thus, if the exegete can extrapolate from the idea of the stars as signifying time to their signifying God's omnipotence, then, Kepler maintains, he can also extrapolate their signifying other things. But those things which the heavenly bodies can signify must follow naturally from their physical properties, just as the light and heat of the sun help make it possible to differentiate

the seasons. Since Kepler believes, for example, that the aspect formed when two light rays hit the earth affects natures on earth, then that aspect becomes a sign for that effect just as naturally as the sun's light is a sign for a day. On the other hand, aspects affect natures that are complex and subject to many influences; their effect is not the direct physical effect of the sun's light bringing day. Therefore, the stars cannot signify specific future occurrences, only general tendencies.

Kepler also suggests that the heavens are limited in their role as signs in another way, for they are not all that affect human action.

> Thus, it is also not believable that one can see from the birth chart how it will come out for someone with certainty. For although each one is usually master of his own fate, as is generally written, nevertheless, there are indeed many more incidental causes than just the heavens or just a person's feelings and habits, each of which by itself can produce confusion in a person's condition and turn it upside down.[102]

Therefore, it is impossible to foresee specific occurrences. For Kepler, astrology can give insight into a person's character, so that he can discern tendencies and possible occurrences.

> The inclination of the stars in and of itself is general; they incline toward nothing other than toward sobriety, bravery, diligence, industry, and the like. Also toward that which agrees in kind with their colors and courses. As was often said, the stars

> themselves do not incline toward all this, but the nature of the human being inclines himself toward it, symbolizes and incorporates as it were the character of the constellation in all its effects.[103]

Thus, some aspects of a human personality may be predicted or discovered by studying the birth chart, and some general future possibilities and trends may be observed, but astrology can yield no more; it cannot predict the exact course of a person's life. Kepler shows how he makes predictions and contrasts his method to that of other astrologers:

> For example, when I see that there are many beautiful aspects in a birth chart, and it is so provided that there is no melancholy or lack of reason but rather an inner joyous nature appears, and if the person is already at an appropriate age for marriage, a bachelor, and is in a land where one does not vow eternal chastity, then I may well say on the issue of marriage if such a one will not be situated in a lowly station, so he will acquire a rich wife. Then if one considers that I predicted nothing particular here, and as regards the marriage it must also remain in doubt whether or not it will take place. But my unfailing principle is to be general, that it is of a good reasonable nature which one is wise to seek. The rest that concerns such particular points is only probable.
>
> But, on the other hand, are these predictions that are so utterly worthless, baseless, superstitious, and divinatory, that the newly-born's wife will be born in this or that land, will have a hidden defect on the body, that she will not remain faithful to her husband, will have so and so many children, and the newly-born will have two, three, or more wives.[104]

Kepler considers his use of astrology reasonable and acceptable. He takes the horoscope into account along with current circumstances in the person's life and tentatively suggests what could happen considering those factors. The astrologer who predicts specific occurrences from the birth chart is practicing and promoting superstition and must be condemned. And, unfortunately, many people give the stars credence for being able to effect and disclose so much more.

> That one gives the stars such great credence and, consequently, will so frightfully obscure the truth that finally one must go with the other of what I also consider God's misfortune, even more than the prime misfortune or hereditary disease. All this garbage follows from there also without particular subsequent misfortune.[105]

But not all attempts at prediction should be banned because of this misfortune, nor should people be enjoined from consulting such predictions provided they are limited to what Kepler maintains can be predicted.

> That one looks in a calendar at the outset of a new year [to find out] what kind of year it will be I consider as much curiosity as [consulting] recent periodicals and discourses about the end of an on-going war and the like. If one is right, then the other is also right; if one should be banned, then the other should also be banned. And supposing one has the same principles in both places, then there is also in one as much use as in the other.[106]

Of course, we presume that a war will end even when it is in progress, and there will be discussions about the possible circumstances attending its end, presumably based on the writer's perception of the direction of present trends and events. Kepler does not consider a person who reads these discussions guilty of the sin of idle curiosity. Neither is the person who consults an astrological calendar necessarily guilty of idle curiosity. And just as those discussions about the end of the war can be useful in planning and preparing for it, so, too, Kepler claims, astrological calendars may be useful.

In response to Feselius's assertion that judging things by external appearances, such as the character of planets by their color, Kepler asserts that external appearances are God's creations to be studied and appreciated by human beings. He mentions three of his favorite theories as examples: the planetary distances proportional to the regular solids, the universe in the image of the trinity, and the harmonic theory of aspects. Although we would question the scientific merit of these theories, Kepler was proud of them because they confirmed his view that God created the world according to geometrical principles. He sees that act as a divine play.

> Now God and nature have thus enacted the prologue, so must human reason enact the epilogue, not to be foolish child's play but a talent naturally implanted by God, so that the intemperate head, that is, that which is not satisfied with the ignorance of the common masses, with a nature that luxuriates in the quest for truth, sees and probes into the signatures of things, although not like God himself in the creation of an herb, having intended use with the bestowal of its color and external appearance. Then what happens with some pieces, that one may also consider other pieces with good reason. Had God himself not intended by placing eclipses in [the paths of] the sun and the moon that man should learn the courses of the heavens? Had he not intended by the shaping and forming of the steed and its well-adapted back that man should ride on it? Then why should one not also go further and inquire whether such things do not also take place in yet more hidden things?[107]

Kepler sees himself as God's servant in probing the secrets of the universe. But those secrets can only be known when one starts by probing appearances in nature and getting beyond appearances. And in going beyond appearances he finds in the shape of the universe the image of the Trinity.

> Indeed it is the holiest Trinity in a concave sphere and the same in the universe, and the first person, the fountain of the deity, in the center, but the center is depicted in the sun, which is in the center of the universe, for it, too, is a source of all light, movement, and life in the world.[108]

He makes a similar comparison in The Optical Part of Astronomy using the sphere as his example, for his photometric law, which considers the intensity of light as a function of the distance from the source of light which

is conceived of as a point. Here, too, he suffuses his view of science with religious symbolism. Regarding this comparison Pauli suggests:

> From this example it can be seen that in Kepler the symbolical picture precedes the conscious formulation of a natural law. The symbolical images and archetypal conceptions are what cause him to seek natural laws. For this reason we also regard Kepler's view of the correspondence between the sun with its surrounding planets and his abstract spherical picture of the Trinity as primary: because he looks at the sun and the planets with the archetypal image in the background he believes with religious fervour in the heliocentric system--by no means the other way around, as a rationalistic view might cause one erroneously to assume. This heliocentric belief to which Kepler remained faithful from early youth, impels him to search for the true laws of the proportion of planetary motion as the true expression of the beauty of creation.[109]

Kepler, who often says so much, does not go beyond stating these relationships. He was an intensely religious man who had been destined for the ministry and had wished to serve God. The resort to religious symbolism could as easily be a justification for the finding of scientific laws rather than the motivation, a necessary proof that the laws served God. The imagery of the sphere appears in The Optical Part of Astronomy, after he found his photometric law to which it related; the universe imagery appears in Third Man in the Middle, after he found his first two laws of planetary motion, to which this image could be seen as related. The

religious symbolism need not represent a prior archetypal image, and the religious fervor could be the result of finding the laws rather than the motivation for seeking them.

Kepler also disagrees with Feselius, and with Feselius's source Cicero, who maintained that the truth of astrology is disproved by experience. We have noted that Pico also made this argument. Kepler's first argument in this work is that experience shows that there is some truth in astrology. Now he counters Feselius's final argument by asserting that it is not the fault of the discipline but of the practitioner when his predictions go far afield. The astrologer must have "right principles."

> It is true that whoever wants to write a calendar, as it is now in fashion, and though all the principles on which such a calendar is based, according to everyday experience, and though this calendar appears to be effective, proving, and showing, it directs nothing properly but rather works the opposite. And it is quite natural to see it so. If he persists, it is as if he plays with dice to predict a storm. The reason: the calendar-writer has in general false principles and few truly in nature.[110]

This stress on principles of astrology which are truly found in nature accords with Kepler's emphasis on aspects, angles which are observable to exist.

But even with right principles astrologers do make mistakes. Kepler claims he has given up writing calendars

because he cannot take the irritation of his readers when the weather does not turn out as he predicted.[111] Nevertheless, mistakes in his predictions should not invalidate the fact of his overall success, just as a good physician's failures should not invalidate the success of his medicine.

> Dr. Feselius should consider how often it happens to him that with his rational advice and wholesome doctoring of his patients according to the shape of things he made much profit and yet earned this thanks: that he was scolded, decried, and disparaged for it, for he not only could not help but also made the malady worse...[112]

Kepler then assays the validity of his using astrology to predict the weather by comparing the aspects with the weather he recorded in the past. He uses as an example the belief among astrologers that a conjunction between Saturn and the sun produces cold weather in Capricorn and Aquarius. This is the period from December 22 to February 19, and the cold weather could be the result of its being winter. We have noted Pico's argument that the heat of the summer months is due to the position of the earth with respect to the sun rather than the astrological sign the sun is in. In his argument with Feselius Kepler tries to subvert that kind of argument by viewing the weather each

time that that conjunction took place regardless of the time of year. He concludes:

> The effect of this conjunction is to be sure general and at the very least causes nature to drive up the winds which make the sky pure in winter and bring cold. The ground is somewhat damper as the wind goes from there, so that snow may also be produced by it. In summer or in a mild winter it brings rain, especially when it is supported by other aspects.[113]

Here again Kepler bases his view on the effect of planetary aspects. By thus following the conjunction between Saturn and the sun throughout the year, he has made a two-pronged attack: against the person who does not believe in the astrology of aspects and against the person who believes in astrological conventions which Kepler has deemed invalid. In his view of the weather he takes the intermediate stand he claims for his general view of astrology. He reinforces this by rejecting the possibility that the sky is alone responsible for the weather. He notes, "Within the earth there are its hidden causes."[114] This helps account for variations, such as the length or degree of an effect.

This is how Kepler presents himself as regards astrology. He did not believe in "astrological determinism," as Arthur Koestler suggests.[115] His "scientific mind" may have searched for laws and causes in astronomy, mathematics, and optics, but he had plenty of

room for dealing with ambiguity and uncertainty in astrology. He never claims for it the possibility of being an exact science and never suggests that the stars determine our fate. Even in predicting the weather he does not give the stars the sole determining power. In talking about the human personality and human events he sees the influence of the stars even more limited.

On the other hand, one cannot agree with E. A. Tondorf that Kepler did not seriously believe in astrology.[116] He did not only cast horoscopes because he needed the money. He did charts for himself and members of his family; surely that practice did not alleviate his financial difficulties. Kepler was not a hypocrite in this. Yes, he did cast horoscopes and write calendars and charts because he needed the money it brought in. Yes, he did frequently complain about having to do so and probably did not "secretly" enjoy the work, as Koestler suggests he did,[117] because it took time away from his true love, astronomy. But that is not sufficient cause to claim that he did not seriously believe in it when he categorically states that he believes in parts of it, namely, the theory of aspects and the theory of progressions.

As Edward Rosen has shown, Kepler often criticized astrology; nevertheless, he maintained his belief in some aspects of it.[118] Kepler claims that he stands in the middle between Röslin's total acceptance of astrology and Feselius's total rejection of it, and wrote Third Man in the Middle to establish his position. He never wavered from it. Therefore, we must accept as fact that Kepler believed in astrology, albeit a limited, personal kind that never found its way into the mainstream of astrological practice, and if it is difficult for modern readers to reconcile Kepler's belief in astrology with his enormous contribution to modern science, we must remember that Kepler was a man of the Renaissance. He was taught astrology along with mathematics and astronomy by his teacher Mästlin.

Third Man in the Middle is interesting from another point of view as well. Although it is a minor work, Kepler used this German attack against Feselius and defense of astrology as a chance to write in German, and perhaps disseminate more widely, his views on Copernicus and his non-astrological work and thought, as well as his astrological opinions that had hitherto only appeared in Latin. Nor were his astrological beliefs in conflict with

his non-astrological work. Astrology is anthropocentric because it studies how the heavenly bodies affect humans, and for this reason it appears geocentric, so that Kepler's Copernicanism in astronomy does not preclude his acceptance of astrology. Kepler's belief in a physical heaven was more problematical, because traditional astrology depended on the belief in the superiority of the heavens. Consequently, Kepler had to reform astrology or give it up altogether. Kepler chose reform. As he developed his scientific principles, he turned around and tried to bring astrology within that framework.

The truth of astrology, according to Kepler, rests on two points--experience and geometry. In Kepler's experience he succeeded in making accurate predictions and in understanding himself and others, and he was sure that he depended on astrological charts for part of that knowledge. He had accurately predicted a peasants' uprising and a Turkish invasion in 1595. He more often than not forecast the weather accurately. He believed he knew about Wallenstein through his birth chart. In Kepler's mind astrology had proved and continued to prove itself.

Kepler was also sure he was not practicing a superstitious art in astrology. He felt he had stripped it of its superstitious elements when he established an astrology based on natural principles. The foundation of his form of astrology was the theory of aspects, which have a real, not just conventional, existence. Planetary rays do strike the earth at measurable angles or aspects. As Gérard Simon notes,

> when he attacks the tradition, he dedicates his efforts not in showing evidence of the absence of cause (this had been inexact) but the absence of a natural cause....Also one sees him center his attack on two traits characteristic of a system of transformations, the lack of distinction between the cultural and the natural and the arbitrariness of the sign.[119]

Kepler could perceive such distinctions because he believed that the heavenly bodies affected human lives differently from the view of traditional astrology. Kepler did not believe that the bodies themselves affect human beings but the light rays and the aspects they form. According to Kepler the configuration of the sky, that is, the aspects of the planets, imprints itself on the human soul at birth, and the individual remembers and responds accordingly. With his emphasis on aspects Kepler makes the planets more central than the fixed stars, for the planets move, or in the case of the sun appear to move, and,

therefore, form aspects. Thus, such an important astrological concept as the Zodiac is seen by Kepler as a human convention. For Kepler the images of the Zodiac do not affect human lives, but the Zodiac instead expresses a spatial relationship.

Aspects reflect geometric relationships. They are expressed in angles and circles. They are quantifiable; the images of the Zodiac as signs are not. This reinforces the reality of aspects as the basis for astrology. Thus, geometry forms the building-block of Kepler's astrology, as it does with his astronomy. As Kepler believed that God created the world according to geometric archetypes, astrology, like astronomy, becomes a study of the divine plan of the universe, a means of knowing God. All other forms of astrology are profane. They are the "dung-heap" while his astrology is the "pearl." His astrology leads toward God. The profoundly religious spirit pervades all of Kepler's work. It fills him with a sense of the importance of his work.

On the other hand, if we look at Kepler's astrology, we see that there are elements which contradict his belief that he had discovered an astrology that was entirely based on mathematics and natural causes. As Simon notes:

> The natural mediator which is the World Soul is not quantifiable and cannot be answerable to any direct empirical verification. The harmonic relationships are justified thanks to mathematics only; they signify a rationality which they do not draw from the physical conceptualization of facts from experience. Finally experience itself is not quantifiable and does not obey any formula tending to isolate physical variables.[120]

Though Kepler thought he had made astrology more scientific, he knew he did not make it into an exact science. The World Soul is necessary for astrology but not for astronomy. Perhaps that is one reason Kepler stopped thinking of souls as motive forces in planetary motion, for astronomy to him only deals with quantifiable entities. The harmonic relationships were not meant to be physical; they defined proportions. But the motivation behind them was philosophical and religious: God's universe must be beautiful and harmonious. No other concept is compatible with God, and Kepler was studying God's universe. Since astrology could not be an exact science, experience was also a necessary guide. Thus, he knew that the use of the houses and the signs of the Zodiac in charting horoscopes were human conventions, and yet he used them in his astrological calculations.

The fact that Kepler was not completely in accord with the modern scientific outlook cannot obscure his enormous

contribution to that outlook. His attempt to remold astrology in accordance with physical, mathematical principles shows how strongly he accepted the emerging outlook which he himself was helping to fashion. And though modern astrologers point to him as an honor to their profession, few of his principles have been adopted by them.

NOTES

1. Max Caspar, Kepler, tr. and ed. C. Doris Hellman (London and New York, 1959), 44.

2. Edward Rosen, "Lutheran Attitudes," Kepler: Four Hundred Years. ed. A. Beer and P. Beer (Oxford, New York, Toronto, Sydney, Braunschweig, 1975), 322.

3. Johannes Kepler, The Secret of the Universe, tr. A. M. Duncan (New York, 1981), 63.

4. Ibid., 11-12; The Secret of the Universe, 65-67.

5. Ibid., 70; The Secret of the Universe, 199. Cf. Alexander Koyré, The Astronomical Revolution: Copernicus--Kepler--Borelli, tr. R. E. W. Maddison (Paris, London, Ithaca, 1973), 151-2.

6. Owen Gingerich, "Kepler," Dictionary of Scientific Biography VII, 292.

7. Letter 145 from Tycho to Kepler, 9.12.99, GW XIX, 94. Translations by author unless otherwise noted.
...harmonia et dispositionum analogia ex posteriori, ubi motus, et motuum occasiones ad amussim constiterint, non autem ex priori, uti et tu et Maestlinus voluistis, petenda erit...(lines 197-9)

8. Astronomia nova, GW III, 178.
Nunc quia contemni non potuerunt, sola igitur haec octo minuta viam praeiverunt ad totam Astronomiam reformandum... (lines 9-11)

9. Ibid., 156.
Si te huius laboriosae methodi pertaesum fuerit, jure mei te misereat, qui eam ad minimum septuagies ivi cum plurima temporis jactura, et mirari desines hunc quintum jam annum abire, ex quo Martem aggressus sum... (lines 4-7)

10. Walter Gerlach and Martha List, Johannes Kepler: Leben und Werk (Munich, 1966; rpt. 1980), 64.

11. Caspar, Kepler, 136.

12. Letter 325 to Herwart von Hohenburg, 10.2.05, GW XV, 145.
Scopus meus hic est, ut Caelestem machinam dicam non esse instar divini animalis, sed instar horologii (qui horologium credit esse animatum, is gloriam artificis tribuit operi), ut in qua pene omnis motuum varietas ab una simplicissima vi magnetica corporali, uti in horologia motus omnes a simplicissimo pondere. (lines 57-61)

13. Harmonice mundi, GW VI, 223.
Geometria ante rerum ortum Menti divinae coaeterna, Deus ipse (quid enim in Deo, quod non sit Ipse Deus) exempla Deo creandi mundi suppeditavit, et cum imagine Dei transivit in hominem. (lines 32-4)

14. Ibid., 328.
Nihil igitur aliud sunt motus coelorum, quam perennis quidam concentus (rationalis non vocalis) per dissonantes tensiones, veluti quasdam Syncopationes vel Cadentias (quibus homines imitantur istas dissonantias naturales) tendens in certas et praescriptas clausulas, singulas sex terminorum (veluti Vocum) iisque Notis immensitatem Temporis insigniens et distinguens... (lines 20-26)

15. Caspar, Kepler, 290.

16. Martha List, "Das Wallenstein Horoskop von Johannes Kepler. Zur Geschichte seiner Entstehung, " Johannes Kepler--Werk und Leistung, ed. Gerold Maar (Linz, 1971), 130.

17. Ibid., 135.

18. Johannes Kepler, "Nativitas Wallenstenii," Opera omnia, ed. Christian Frisch (Frankfurt, 1858-71), I, 388.
Solchergestalt mag ich von diesem Herrn in Wahrheit sagen, das er ein wachendes, aufgemunttertes, embsiges, unruhiges Gemuth habe, allerhandt Neuerungen

begiehrig, dem gemeines mentschliches Wesen und Händel nit gefallen, sondern der nach neuen, unversuchten, selzamen mitteln trachte, doch viel mehr in Gedanken habe, dann er eusserlich sehen und spüren lässet. Der Saturnus im Aufgange machet müssige, melancolische, allzeit wachende Gedanken, Alchymiam, Magiam, Zauberei, Gemeinschafft zu den Geistern, Verachtung und Nichtachtung menschlicher Gebote und Sitten, auch aller Religionen; macht Alles argwöhnisch und verdechtig, was Gott oder die Menschen handeln, als wen es alles lauter Betrug und viel ein anderes derhinder wäre, dan man fürgibt. (2nd paragraph)

19. Johannes Kepler, "Wallensteins Horoskop," Die Astrologie des Johannes Kepler, ed. Heinz Artur Strauß and Sigrid Strauß-Kloebe (Munich, 1926), 214. Frisch's rendition of the elaboration omits the predictions for the years 1625-34.

20. Thomas Ring, Astrologie ohne Aberglauben (Dusseldorf, 1972), 174-5.

21. Günter Doebel, Johannes Kepler: Er veranderte das Weltbild (Graz, 1983), 213-14.

22. GW IV, 12; "Johnnes Kepler's On the More Certain Fundamentals of Astrology, Prague 1601," tr. Mary Ann Rossi, annot. J. Bruce Brackenridge, Proceedings of the American Philosophical Society 123 (1979), 91. Kepler was amused enough by this comment to make a similar one in his first work on the supernova of 1603. See Bericht vom neuem Stern, GW I, 398.

23. Caspar shows that Kepler was not court astrologer to Wallenstein but was to supply more accurate planetary positions for his astrologers. Kepler, 344.

24. Johannes Kepler, Tertius interveniens, GW IV, 149-50. ...daß wie vorzeiten im Römischen noch blüenden Reich/theils auß erheblichen/theils aber auß scheinbarlichen/oder auch ansehens halben angemasseten Ursachen/Gesetze gemacht worden die Mathematicos unnd Philosophos auß Rom oder auß Italia zu verweisen. (lines 37-38, 1-2)

25. Ibid., 150-1.
...die Astrologia gantz benommen indiscriminatim verworffen/unnd alle die das deringeste Stück auß deroselben behaupten würden für/ärgerliche abergläubische Personen angegeben und gefährt werden. (lines 42-43, 1-2)

26. Ibid., 158, Thesis II.
...daß diese Lieblichkeit und Anmuhtung der Natur von Gott selber/wo nicht dem Standt der Unschuldt/doch dem Menschen der da fallen können würde/zu nohtwendigem behelff/ohne einige sündtliche Gebrechen anfangs erdacht/unnd zu dem Ende gerichtet worden sei/darmit das menschliche Geschlecht also wider alle mügliche Fälle fortgepflantzet/unnd diese Ordnung Gottes erhalten würde. (lines 30-6)

27. Ibid., 160, Thesis IV.
...auß abergläubischem von Gott verbottenem Fürwitz/nicht nur vor zeiten/sondern auch noch heut zu Tag etwas gutes/nutzes/heilsames/und zu Gottes Ehr gereichendes herfür und ans Tagsliecht gebracht wirdt: (lines 2-5)

28. Ibid., 161, Thesis VII.
So siehet man augenscheinlich/daß diese Curiositet zu erlernung der Astronomia gedeie/welche von niemandt verworffen/sondern billich hoch gerühmt wird. Es ist wol diese Astrologia ein närrisches Töchterlin...aber lieber Gott/wo wolt ihr Mutter die hochvernünfftige Astronomia bleiben/wann sie diese ihre närrische Tochter nit hette/ist doch die Welt noch viel närrischer/und so närrisch/daß deroselben zu ihren selbst frommen diese alte verständige Mutter die Astronomia durch der Tochter Narrentaidung'weil sie zumal auch einen Spiegel hat/nur eingeschwatzt und eingelogen werden muß.

Und seind sonsten der Mathematicorum salaria so seltzam und so gering/daß die Mutter gewißlich Hunger leiden müste/wann die Tochter nichts erwürbe. Wann zuvor nie niemandt so thöricht gewest were/daß er auß dem Himmel künfftige Dinge zu erlernen Hoffnung geschöpfft hette/so werest auch du Astronome so witzig nie worden/daß du deß Himmels Lauff von Gottes Ehr wegen/zu erkündigen sein/gedacht hettest: Ja du

hettest von deß Himmels Lauff gar nichts gewust. (lines 9-23)

29. Johannes Kepler, Letter to Wackher beginning of 1618, cited in Carola Baumgardt, Johannes Kepler: Life and Letters (New York, 1951), 130.

30. Kepler, Tertius interveniens, GW IV, 161, Thesis VIII. ...niemandt für ungläublich halten/daß auß der Astrologischen Narrheit und Gottlosigkeit/nicht auch eine nützliche Witz und Heiligthumb/auß einem unsaubern Schleim/nicht auch ein Schnecken/ Müschle/Austern oder Aal zum Essen dienstlich/auß dem grossen Hauffen Raupengeschmeiß/nicht auch ein Seidenspinner/und endtlich auß einem ubelriechenden Mist/nicht auch etwan von einer embsigen Hennen ein gutes Körnlin/ja ein Perlin oder Goldtkorn herfür gescharret/und gefunden werden köndte. (lines 32-39)

31. Ibid, 163, Thesis XI.
...so ferrn sie sich umb dergleichen erdichtete Sachen anneme/dann was auff ein erdichtete Ursach folget/ist nicht allein gar ungewiß vorzusagen/unnd ein contingens, sondern beruhet auch auff keiner vernünfftigen muhtmassung/viel weniger man dessen gewissen Grundt haben kan/weil socher erdichtet/und nicht wahr ist. (lines 6-9)

32. Ibid., 163, Thesis XI.
...die conjunctio Saturni et Lunae Ursach gewest sein solle/daß einer von einem Juden betrogen worden ist. Dann wann diese conjunctio geschicht am Sabbath/so wirdt zu Prag niemandt von keinem Juden betrogen/unnd hingegen werden täglich etlich hundert Christen von Juden et contra betrogen/so doch der Mondt im Monat nur einmal zum Saturno läufft. (lines 14-18)

33. Ibid., 163, Thesis XII.
...etliche Wirckungen den Sternen zugelegt werden/die nicht allerdings erdichtet/sondern durch die langwierige Erfahrung/quoad generalem aliquam convenientiam bezeuget werden. (lines 24-26)

34. Ibid., 164, Thesis XII.
Und wie die Medicina anfangs in Erkündigung der Kräuter Art und Eigenschafft/von keiner

underschiedenen nohtwendigen und gewissen Ursachen nichts gewust/aber dieselbige durch Fleiß unnd vernünfftige muthmassung endtlich erlernet/zum theil aber noch suchet: Also halte ich auch von keinem Theil der Astrologiae nichts/da man nicht mit der Zeit entweder auff die gründtliche Ursach/oder doch auff eine Art und Weise einer rechtmässigen natürlichen bei andern Fällen erscheinenden Ursachen/oder zum wenigsten auff eine beständige/und von allen kindischen Umbständen gefreite Erfahrung gelangen kann.

Alles nun/was in der Astrologia einer Erfahrung gleich sihet/und sich nicht offenbarlich auff kindische fundamenta zeucht (als wie bei der Medicina die ungerade Zahl etlicher Körner)/Das halte ich für würdig/daß man darauff achtung gebe/ob es sich gewöhnlich also verhalte und zutrage: Und wann es dann sich fast zu einer Beständigkeit anlässet/so halte ichs nun ferrner für würdig/daß ich der Ursachen nachtrachte/verwirff es auch nicht gleich gantz und gar/wann ich schon die Ursach nicht völlig erlernen kan. (lines 1-15)

35. Ibid., 164, Thesis XIII.
Dann hie ligt es an/nach den jenigen mittelenden Ursachen zu trachten/welche den Himmel und die Erden zusammen knüpffen/unter welchen ist auch eine das Liecht/welches vom allöbersten Himmel zu uns auff Erden herunter kömpt. (lines 21-23)

36. Ibid., 164, Thesis XIII.

37. Ibid., 166-7, Thesis XVIII.
Ob die Sterne uns Menschen zu gutem erschaffen/und ob der Mensch also erschaffen/ daß er der Sternen geniessen köndte?...Und bin ich der meinung/wie Sonn/Mondt unnd Sterne am vierdten Tage noch vor dem Menschen erschaffen seind/also haben sie auch ihren eigenen Zweck und Endt/nach welchem sie von Gott/auch ohne ansehen deß Menschens gerichtet seind. Hernach aber am sechsten Tage sei der Mensch also erschaffen worden/daß er nicht allein mit seinen Augen der Sternen Liechtes/und mit seinem Verstandt deroselben wunderbalichen gantz ordentlichen Lauffs theilhafftig

werden möchte: sondern habe auch eine solche natürliche Seel empfangen/welche an und für sich selbst auff gewisse zeiten durch etliche der himmlischen Liechter unterschiedliche Beschaffenheiten auffgemundert/und in ihrem Werck angetrieben würde. (lines 42-3, 1, 3-12)

38. Ibid., 167-8, Thesis XX.
Belangend Quantitatem, ist ein Stern grösser als der ander/derhalben auch ein Liecht grösser/und in Erwärmung der irrdischen Cörper kräfftiger als das andere.

Unnd weil dem wunderbarlichen von der Sonnen zu uns herabfliesenden Liecht gebüret quantitas doch sine materia, und motus doch sine tempore, wie ich in Opticis erwiesen/so folgt/daß auch das Liecht von der Sonnen bei uns jetzt dünner und blöder/bald gedüchter und densior werde: nach dem die Sonne höher und nidriger steiget. (lines 40-44, 1-2)

39. Ibid., 168, Thesis XXII.
Hierauß abermal folget/daß der Planeten/sonderlich aber der Sonnen Liecht stärcker auff uns in diesem Theil der Welt treffe/wann sie im Krebs lauffen/als wann sie im Steinbock seind/dann im Krebs treffen sie geradt/im Steinbock aber schlims/auch solches Liecht ein andere Art erzeige/wann die Sonne fället/als wenn sie steiget. (lines 15-19)

40. Ibid., 184, Thesis XXXIX.
...in einem Zeichen seind dreissig gradus, gesetzt nun/doch nicht gegeben. (lines 7-8)

41. Ibid., 169, Thesis XXVI.
...den speciebus immateriatis, welche von den corporibus Physicis orbiculariter außfliessen. (lines 24-25)

42. Ibid., 169, Thesis XXVI.
Ein species immateriate von einem leuchtenden corpore, ist der Schein/welcher zu uns herzukömpt/und uns erleuchtet. (lines 30-1)

43. Ibid., 171, Thesis XXVI.
Ein species immateriata von dem Magnet ist/die da Eisen zeucht.

Ein species immateriata von dem Erdtboden/et quidem figurata, figura sui corporis, ist/die den Magnet nach Norden richtet.

Ein species immateriata von der Sonnen ist/die alle Planeten in einem circulo umb die Sonnen herumb führet: die ihre quantitates raritatem und densitatem hat: auch wie ein Wirbel bewegt wird/weil sich ihr Brunnquell/die Sonnenkugel auch umbträhet/wie ich in meinem Buch de motu Martis ans Liecht gebracht. (lines 3-9)

44. Ibid., 172, Thesis XXIX.
...es sei nun/daß solche Eigenschafften hierzu diesen einigen Postreutter oder vehiculum, nemlich das Liecht und die Farben brauchen/oder daß sie auch neben dem Liecht und Farben an und für sich selbsten species immateriatas haben.

Dann ich habe in meinem Buch de Marte erwiesen/daß species immateriatae motus auß der Sonnen in alle Planeten/und in den Erdtboden/und hinwiderumb die species immateriata deß Erdbodens biß in die Sonne und den Mondt/auch deß Mondts biß in die Erde hin und wider passieren/so wol als das Liecht unnd der Widerschein: und nicht allein so weit gereichen/sondern auch kräfftig seind/die himmlische bewegungen beständiglich und unauffhörlich zu verrichten und zu moderiren.

Derohalben mir es sehr gläublich ist/daß der Planeten innerliche Leibsqualiteten durch solche stättigs außfliessende species immateriatas zu uns auff den Erdtboden reichen. (lines 6-20)

45. Ibid., 172, Thesis XXX.
Und wie die Sonne nichts thut dann wärmen/also der Mondt nichts thue dann befeuchtigen. (lines 28-29)

46. Ibid., 172, Thesis XXXI.
..die materialische Dinge an unnd für sich selbst zu der Trückene so wol also zu der Kälte/als negationibus

caloris et humoris disponiert seien... (lines 38-40)

47. Ibid., 173, Thesis XXXI.
...einem jeden Planeten eine solche Eigenschafft außgetheilet werden möge/dardurch er von den übrigen vieren so wol als am Liecht/Klarheit/Grösse/ Schnelligkeit und Höhe unterscheiden werde: und ob auch eine solche erdachte Eigenschafft mit dem jenigen übereinkomme/was die Astrologi von den qualitatibus Planetarum in operando fürgeben? (lines 9-13)

48. Ibid., 174, Thesis XXXII.

49. "Johannes Kepler's On the More Certain Fundamentals of Astrology," 94.

50. Ibid., 176, Thesis XXXIV.
...diese Contrarieteten gehören zur Zierdt der Welt/und seind derowegen anderst nicht dann gut/dann sie alle mit einander Gott dem Schöpffer zu seinem allgemeinen allerheiligsten Intent dienstlich seind... (lines 11-14)

51. Ibid., 176, Thesis XXXV.
Welche beide Humores von den gemeinen Medicis nur für excrementa außgeschrien werden/so wol als Saturnus unnd Mars von den gemeinen Astrologis für böse Planeten. (lines 37-39)

52. Ibid., 177, Thesis XXXVI.
...alle natürliche der fünff Planeten/zum theil auch der fürnembsten unbeweglichen Sternen Eigenschafften/durch welche sie bei uns auff Erden etwas wircken/die können durch menschlichen verstandt/wiewol nicht vollkommen/doch gleich so wol ergrieffen/auch in ein gewisse scientiam und Wissenschafft eingeschlossen/und bei den Prognosticationibus künfftiger Dinge nützlich betrachtet werden/so wol und so vollkommen dieses in der Medicina mit den viel und mancherlei Kräuttern geschehen kan. (lines 18-25)

53. Ibid., 178, Thesis XXVI.
...wann die Sterne nur allein im Himmel blieben/unnd wir hie auff Erden/unnd also sie uns gantz unnd gar keine Bottschafft herunter thäten/so were es

verlohren: Wann sie schon alle menschliche Handel trieben unnd walteten/so würden wir doch nicht wissen/woher es käme/sondern wir würden bei dieser generali notitia bleiben müssen/daß diß alles von Gott komme. Weil aber das Liecht der Sternen zu uns herunter kömpt/und unterschiedliche Farben unnd Klarheiten mit sich führet/so seindt jetzo die Sterne uns nicht mehr zu hoch/sondern wir urtheilen von ihnen auß dem jenigen/was sie herab auff den Erdtboden/unnd in unsere Augen hinein anmelden. (lines 14-22)

54. Ibid., 180, Thesis XXXVII.
Erstlich/so ferrn sie mit der Zeit unnd Ort auch andern Umbständen also umbschrieben seind/wie man sie in den Chronicken/oder ein jeder in seinem Hauß Calender auffzeichnet/welche auch eines oder deß andern Menschens in indiuiduo Leib und Leben/Hab und Gut/Ehr und Gefahr betreffen. Da bekenne ich/daß die Astrologi sich viel zu dürftiglich vermessen/solche Ding ins gemein/oder in sonderbarer Personen Nativiteten/auß dem Himmel umbständiglich und unfehlbarlich vorzusagen/unnd hierwider ist der König Salomo recht angezogen.

Darnach so werden die weltliche Händel nicht also in specie, sondern wegen einer allgemeinen Gleichheit betrachtet: Als daß etwan ein Jahr kömpt/da Friedt in aller Welt ist/etwan ein Mensch ist/auff welchen das Unglück mit Hauffen ziehlet/ein Jahr für das ander: Da man nicht diß oder jenes Unglück insonderheit/sondern ins gemein den Zustandt betrachtet/welcher auß allen Particulariteten erscheinet. (lines 6-18)

55. Ibid., 180-1, Thesis XXXVII.

56. Ibid., 198, Thesis LV.
...ich nemlich nicht gensinnet/die vosagungen futurorum contingentium in indiuiduo, so ferrn sie von deß Menschen freiem Willen dependirn/zu vertheidigen... (lines 5-7)

57. Ibid., 240, Thesis CXVI.
Es ist ein guter raht/wann ein Christ eines Regens bedarf/daß er nicht dem Calender zulauffe/sondern fromb werde/und Gott darumb bitte. Es ist aber darumb

ein Calender/der auß natürlichen Ursachen einen Regen verkündiget/kein Abgott/daß man den Regen von ihme erbitten/oder ihn mit der Ablesung ehren müste/zu erhaltung deß regens/als von ihme: so ist auch der Calender nicht darumb geschrieben/daß die Christen auff solche Täge wo ein Regen stehet/nicht betten/ sondern sich darauff verlassen/und in Sünd und Schandt fortfahren sollen/sondern der Calender/wann er auff natürliche Ursachen gehet/ist ein Prediger von der wunderbarlichen Ordnung Gottes deß Schöpffers/die er herauß streichet/unnd für Augen stellet/und so er zutrifft/so werden fromme Christen erinnert den Wunderthaten Gottes nachzudencken. (lines 33-43)

58. Ibid., 241, Thesis CXVI.
Zum Exempel/ein Finsternuß gehet sie auch nit an/und ist doch kein Fürwitz/daß sie einer solchen gantz fleissig zusehen/Gott uber seiner Himmels Ordnung/und uber der Gnad/die den Astronomis gegeben/anfahen zu loben. (lines 18-20)

59. Ibid., 182, Thesis XXXVIII.
Wahr ist es/wann es unvollkommen/so warnet man recht/daß niemandt sich zuviel darauff verlasse. Gleich wie auch ich recht daran thäte/wann ich einen Patienten warnete/er solte sich auff D. Feselii Cur nicht allzuviel verlassen/dann die Medicina sei noch in vielen Stücken sehr mangelhafft. (lines 23-27)

60. Ibid., 184, Thesis XL.
Dann man fragt in Astrologia nicht darnach/wie weit der Planet in seinem weitten oder engen Himmel gelauffen/sondern wie ein grossen Winckel sein herabfallendt Liecht allhie auff Erden bei einem einigen Puncten durchgelauffen/da zeucht man umb einen solchen Puncten einen circulum, theilt denselben in 360. Grad/Gott gebe er sei weit oder eng. Dann das Punctum Naturale, (ist die natürliche Seel in einem jeden Menschen oder auch in der Erdenkugel selbsten...) vermag so viel als einen wircklichen Circulum. In puncto inest circulus in potentia, propter plagas vnde aduenium radii se mutuo in hoc puncto secantes. (lines 28-36)

61. Ibid., 185, Thesis XLI.
...so gedünckt mich/wie die Alten die zwölff Zeichen unter die sieben Planeten außgetheilt. (lines 11-12)

62. Ibid., 241-2, Thesis CXVII.
...bekenne ich gern/daß es eine vermessenheit sei/von Glück unnd Unglück der grantzen Welt/eines Landts/einer Statt &c. zu sagen. Dann der Welt Kan man kein Natiuitet stellen/so ist die außtheilung der Länder unter die zwölff Zeichen/ein Fabel....

Gleiche Musterung gehöret auch in das Täfele der Erwehlung... (lines 35-38,1)

63. Ibid., 185, Thesis XLI.
...wil bei mir die doctrina directionum ein feines Ansehen gewinnen/wann ich mit Copernico die Erde umbgehen lasse/dann alsdann findet sich die proportio diei ad annum, hoc est, vnius ad 365. unserm domicilio Hütten/Wohnung oder Schiff/darinnen wir in der Welt herumb geführt werden/natürlich eingepflantzet: Und ist derohalben desto gläublicher/daß in directionibus und Natiuiteten der Menschen/welche dieses Schiffs Innwohner seind/diese Proportz auch regiren solle: als dann die Astrologi lehren. (lines 15-21)

64. Eugenio Garin, Astrology in the Renaissance: The Zodiac of Life, tr. Carolyn Jackson and June Allen, rev. tr. Clare Robertson with author (London, 1983; rpt. 1984), 9.

65. Kepler, Tertius interveniens, GW IV, 189, Thesis XLVIII.
Warumb die Hebraische Spraach allezeit deß Himmels gedencke/als ob ihrer viel weren/da mag man die Theologos drüber hören/dann ihre mehrere Himmel gehören nicht in die Physicam, außgenommen/daß diese nidrige Lufft auch Himmel/und die Vögel Tzippor schammajim genennet werden. Und mag neben der Theologorum Außlegung gar wol fürgegeben werden/daß alle Sterne nur in einem Himmel stehen/deren Meinung dann viel treffliche Griechische unnd Lateinische Patres gewest. (lines 29-35)

66. Ibid., 189-90, Thesis XLVIII.
Die Gelehrten in der Hebraischen Spraach geben das Wort Raquia, eine Außdehnung oder Außspannung/in dem Verstandt/daß Gott zwischen Wasser und Wasser habe auß Wasser ein dünneres durchsichtiges Wesen per attenuationem gemacht/unnd die Materi/so zuvor gar eng und nahe beieinander gewest/in ein unermeßlichen Raum oder spacium außgespannen. (lines 41-44, 1-2)

67. Ibid., 190, Thesis XLVIII.
Dasselbige Wasser zwar mag wol gefroren/und also ein sphaera crystallina und warhafftige Feste sein. (lines 5-6)

68. Ibid., 191-2, Thesis XLIX.
Erstlich ist erwiesen/daß die Lufft sichtbar sei/die doch kein hartes Corpus nicht ist: Derohalben auch der Himmel/wann er gleich sichtbar were/darumb nicht ein hartes corpus sein würde. Fürs ander/so ist nicht erwiesen/daß der Himmel sichtbar: Weil dann Feselius vermeinet/daß ein corpus, welches unsichtbar ist/auch flüchtig/durchdringlich unnd weich seie/so muß er den Himmel/als welcher unsichtbar/für weich/flüssig/ durchdringlich passieren lassen.

Schließlich/so erscheinet/daß Feselius umb die gründtliche Beweiß/daß nicht viel sphaerae perspicuae ubereinander seien/allerdings nichts wisse: Weil nemlich die Cometen uberall durchschiessen/Item weil sich das Gesicht/oder der Schein von den Planeten und Sternen nirgendt widergellet/als nur allein gar ein wenig hierniden in der dicken Lufft/etwa ein Meil Wegs hoch uber dem Erdtboden. Es solte aber einer zuvor die fundamenta in Kopff fassen/ehe er sich hinder ein Materi macht/dieselbige öffentlich zu widerlegen. (lines 37-44, 1-7)

69. Ibid., 192-3, Thesis LI.
Sie werden aber getrieben per speciem immateriatam Solis, in gyrum rapidissime circumactam. Item werden sie getrieben von ihrer selbst eignen Magnetischen Krafft/durch welch sie einhalb der Sonnen zu schiffen/ andertheils von der Sonnen hinweg ziehlen. Die Sonn aber allein hat in ihr selbst ein virtutem animalem, durch welche sie informiert/liecht gemacht/unnd wie ein Kugel am Drähstock beständiglich umbgetrieben

wirdt/durch welchen Trieb sie auch ihre speciem immateriatam ad extremitates vsque mundi diffusam in gleicher Zeit herumb gehen macht/und also successiue alle Planeten mit herumb zeucht. Mehrere scientia animalis wirdt zu den himmlischen bewegungen nicht erfordert. (lines 41-44, 1-6)

70. Ibid., 193, Thesis LIII.
Und vergreifft sich demnach D. Feselius hie in viel weg/welches ime zwar zu gut zu halten/weil er nicht ex professo ein Astronomus ist. (lines 38-39)

71. Ibid., 196, Thesis LIV.
...es ist viel weniger wider die Natur/als daß der Himmel so ein unbegreiffliche Schnelligkeit haben solle. (lines 26-28)

72. Ibid., 196-7, Thesis LIV.
Gleich als wann der H. Geist in der Schrifft die Astronomiam oder Physicam lehrete/und nit viel ein höhers Intent hette/zu welchem er nicht allein deren Wort und Spraach/den Menschen zuvor kundt/sondern auch deren gemeinen popularischen Wissenschafft von natürlichen Sachen/zu welcher die Menschen mit Augen und eusserlichen Sinnen gelanget/sich gebrauchete? (lines 44, 1-4)

73. Ibid., 197, Thesis LIV.

74. Ibid., 198, Thesis LVI.
... ob wol viel Ding auff Erden geschehen/da der Himmel augenscheinlich mitwircket/so geschehen sie doch nicht gantz Himmels halben: sondern weil sie auß ihren Ursachen hergeflossen/und allbereit im Werck seind/so kömpt der Himmel darzu/und macht etwas neuwes darinnen/das wirdt er wol haben müssen bleiben lassen/wann nicht die Sach schon zuvor auch ohne den Himmel fürhanden gewest were. (lines 34-40)

75. Ibid., 199, Thesis LVI.
Wann nicht die Schlacht zuvor im Werck gewest/würde die Finsternuß langsam eine Schlacht/unnd in derselbigen einen Frieden gemacht haben. So hat auch die Finsternuß den Frieden nicht allein gemacht/ sondern nur allein die Gemühter erschrecket/ unnd ihnen Anleitung gegeben/daß sie deß Friedens seindt

begierig worden. (lines 3-7)

76. Ibid., 199, Thesis LVI.
...aller Geschöff formae und Eigenschafft nicht vom Himmel seien/sondern von Gott etlichen noch vor Erschaffung deß Himmels gegeben seien.

...mir derowegen eben so ungereimbt Ding ist/daß die Sonne oder andere Sterne einem Kraut oder Thier seine wesentliche Eigenschafft ertheilen solle als ungereimbt es lautet/so einer fürgebe/das Schaaf oder Kuh empfienge ihre wesentliche Eigenschafft von dem Elephanten. (lines 34-35, 38-40)

77. Ibid., 200, Thesis LVI.
...so ist drümb nicht zu läugnen/daß nicht auch die selbständige Geschöpff/so in Lufft/Wasser und Erden weben und schweben/mit den himmlischen Bewegungen Gemeinschafft halten/und also der Himmel ihnen den Anfang zur Bewegung auff sein gewisse Maaß mittheile.

Dann es hat zwar ja der Saamen in sich selbst den Ursprung seiner Beweglichkeit im wachsen/welcher Ursprung besteht in seiner Eigenschafft/Krafft und Vermögen/oder potentia crescendi, aber der Himmel verursachet ihn zu dem Werck selbst/als zu dem actu crescendi, in dem die Sonne herzu rücket/die Wärme verursachet/welche deß Saamens Krafft in die Feuchtigkeit herfür locket. (lines 6-14)

78. Ibid., 217, Thesis LXXV.
...wie die Sonne und der Haasen Mutter unnd Vatter einen Haasen ziehlen/(in diesem Verstandt/daß die Sonne den Frühling gebracht/da es warm worden/oder was sonst dergleichen von der Sonnen herkömpt/und nich/als ob die Sonne die facultatem formalem darzu gebe/dann die muß dem Haasen anerschaffen sein)... (lines 18-22)

79. Ibid., 201, Thesis LVII.
Da auch ein contactus geschicht speciei immateriatae magneticae fluentis ex corpore Lunae, mit dem Meerwasser/ welcher contactus nicht superficialiter oben hin/sondern gar corporaliter durch die gantze Dicke deß Meerwassers zugehet.

Es ist aber diese Vereinigung und Verknüpffung Himmels

und der Erden noch lauter Kinderspiel/unnd ob es wol zugehet per speciem immateriatam, so ist doch sie materialisch/dann die species hat dimensiones quantitatis. Und diese nidere Geschöpffe empfinden ihrer leiblicher greifflicher Weise. (lines 26-34)

80. Galileo Galilei, Dialogue Concerning the Two Chief World Systems--Ptrolemaic and Copernican, tr. Stillman Drake (Berkeley, 1953; rpt. 1967), 462.

81. Judith V. Field, "A Lutheran Astrologer: Johannes Kepler," Archive for History of Exact Sciences XXXI (1984), 220.

82. Kepler, Tertius interveniens, 201, Thesis LIX.
Es folget aber viel ein edlere wunderbarlichere Vereinigung Himmels und der Erden/die vermag nichts Materialisches/sondern ist Formalisch/gehet zu durch formas in dieser nideren Welt/unnd nicht schlecht durch die taube formas, wie sie gefunden werden in Stein und Bein/sondern durch Geistliche Kräfften/durch Seel/durch Vernunfft/ja durch Begreiffung der allersubtilesten Sachen/die in der gantzen Geometria seind. (lines 35-40)

83. Ibid., 202, Thesis LIX.
...ob auch solche Sterne im Himmel etwas hienieden auff Erden wircken. (lines 33-4)

84. Ibid., 203, Thesis LIX.
Das jenige aber/welches solche Naturen also begreiffen/ist anfänglich die species immateriata, von den himmlischen corporibus und Kugeln/es sei von ihren Liechtern/Farben oder Leibern/und dieses ist das materiale: fürs ander/so ist es die subtilissima Geometrica concinnitas binorum inter se radiorum, seu lucis seu corporum, ex abstrusissimis Geometriae figuratae arcanis petenda, dannenhero auch entlich die eigentliche Ursachen der Concordantien in der Musica entspringt/und fast auff gleiche weiß/doch etwas unterschiedlich/deß Menschen natürlicher Seelenkrafft eingepflantzet ist. (lines 22-9)

85. Ibid., 204, Thesis LIX.
Darumb wir auch kein corpus oder ander Ding in der Welt finden/das von Gott nach einem septangulo,

nonangulo, vndecangulo were gemacht und specificirt worden: Und dahero kömpt es auch/daß die Natur sich ab keiner Proportz erfreuwet/die auß solchen verworffenen Figuren genommen were/es sei jetzo in vocibus, oder in radiis stellarum. Und hingegen/daß alle Proportiones vocum seu chordarum, die auß den figuris scibilibus genommen seind/in Musica ihre concordantias geben/und daß in radiis planetarum alle proportiones, die da erscheinen bei zusammenfallung zweier Liechtstraalen/(so fern sie täglicher Erfahrung unnd Auffschreibung deß Gewitters sich in Antreibung der Natur zu hefftiger Witterung mercken lassen) solche auch unter den figuris scibilibus, unnd kein einige sich unter den non scibilibus finden lässet: Und also hierauß ein wunderbarliches arcanum folget/ daß die Natur Gottes Ebenbildt/und die Geometria archetypus pulchritudinis mundi seie/darinnen durch die Erschaffung so viel ins Werck gestellet worden/so viel in Geometria per finitatem et aequationes müglich gewest zu wissen/unnd was ausserhalb den Schrancken der Endtlichkeit Vergleichung und Wissenschafft gefallen/dasselbige auch in der Welt ungeschaffen und ungemacht geblieben seie: Das ist/keine besondere pulchritudinem oder species gegeben/sondern der Materialitet/ fortunae et casui, die an ihnen selber unendtlich seind/uberlassen worden/als zum Exempel finden sich wol einzehle Früchte unnd Blumen/die sieben/neun/oder eilff Fäche oder Blätter haben/wann die species in indiuiduis gemeiniglich variert/aber kein species findet sich nicht/die diese Zahl beständig halte/wie fünff/sechs/vier/drei/zehen/ zwölff/&c. (lines 23-44)

86. Ibid., 205-6, Thesis LX. Cf. Thesis LXII, 207-8.

87. Ibid., 188, Thesis XLVI.
Sie sehen/wann ein coniunctio Martis et Solis ist/daß es ein hitzige Zeit gibt/nach Art der Jahrszeit: Dann im Winter ist es an statt der Hitz doch lindt/gibt Donner und Regen/als 1598. im December/1601. im Februario. Im Frühling treibt solche coniunctio auff was sie findet/nemlich noch viel rauher Lufft/als 1603. im Aprili, darzu auch ein Feuwer gehöret/ob schon diß D. Feselio ein ungereimbt Ding scheinen möchte. Sonsten ist es gemeinglich hitzig/als 1590. im Julio, ein gut Wein Jahr. Anno 1592. ob wol gar

ein nasses Jahr gewest/propter alia...da im mittels die coniunctio Martis et Solis gefallen/heiß und truckene Zeit gewest. Anno 1594. Septembri, ist auch ein guter Wein worden. 1596. im October ein herrliche Zeit. 1605. im Junio hitzig/unangesehen/daß damalen auch widrige Aspect zumal eingefallen/darumb es viel Ungewitter gegeben. Anno 1607. ward ein fruchtbar Jahr/(welches seine besondere Ursachen hatt) da hat Mars in Julio auch in der Feuchte gewühtet/und viel heisse dämpffechte Regen/mit hülff anderer beikommender aspecte auffgetrieben. Anno 1609. ward es auch ein Tag vor und nach der coniunction im Aug. und Septem. sehr hitzig. Und steht noch täglich einem jeden bevor/ darauff achtung zu geben/D. Feselius mag Anno 1611. im October stylo nouo auffmercken. (lines 20-37)

88. Ibid., 235, Thesis CIX.
In Italia gibt es guten hitzigen Wein/dann die Landtschafft häldet nach der Mittag Sonnen. Am Reinstrom gibt es auch viel aber lindere Wein/dann die Landtschafft häldet nach Norden/und hat doch tieffe Thäler/zu auffenthalt der Wärme. An der Thonaw gibt es oberhalb keinen Wein/weil die Landtschafft vor den rauhen Lüfften auß den Schneegebürgen nich geschützet. Unterhalb aber in Osterreich und Ungarn wird guter starcker Wein/weil die Landt gegen Orient unnd Mittag halden/und anfangen tieff zu werden/zwischen sehr hohen Gebürgen. Die Elb bringet weig Wein/dann die Landtschafft haldet gegen Norden/und ist mehr eben dann andere tractus. (lines 16-24)

89. Ibid., 217-18, Thesis LXXV.
...ein coniunctio Iouis et Martis in sextili Solis et Mercurii den 1. Martii St. nouo...ein starcke Bewegnuß aller humorum verursachet....

Wie nun der 1. Martii herbei kommen/und ein grausamer Sturmwindt einen sehr schwartzen und dicken Nimbum daher geführet/ darvon es uber Tisches an vorerwehntem Ort so dunckel worden/als were es ein halbe Stundt nach der Sonnen Untergang/Wegen welcher jählingen veränderung etliche mit verwunderung angefangen zu fragen/was das seie? Hat einer zur antwort gegeben: Der Keppler kömpt/und also die Erinnerung gethan/daß es der längst von mir gezeigte Tag sei. Was dünckt

nun jetzo D. Feselium von diesem Aeolo nimbiuolo. (lines 31-3; 4-10)

90. Ibid., 257, Thesis CXXXVIII.
Vom 19. Februar. oder 1. Mart. ist droben num. 75. meldung geschehen... (line 27)

91. Ibid., 209, Thesis LXIV.
..in dieser niedern Welt oder Erdenkugel stecket ein Geistische Natur/der Geometria fähig/welche sich ab den Geometrischen und Harmonischen Verbindungen der himmlischen Liechtstraalen ex instinctu creatoris, sine ratiocinatione erquicket/unnd zum Gebrauch ihrer Kräfften selbst auffmundert und antreibt. (lines 10-15)

92. Ibid., 209, Thesis LXIV.
...ein Edels Perl auß der Astrologia ist/keines wegs mit der Astrologia zu verwerffen/sondern fleissig auffzubehalten und zu erklären. (lines 27-8)

93. Ibid., 209-10, Thesis LXV.
...der Mensch in der ersten Entzündung seines Lebens/wann er nun für sich selbst lebt/unnd nicht mehr in Mutterleib bleiben kan/einen Characterem und Abbildung empfahe totius constellationis coelestis, seu formae confluxus radiorum in terra, und denselben biß in sein Grube hienein behalte: Der sich hernach in formierung deß Angesichts und der ubrigen Leibsgestallt/so wol in deß Menschen Handel und Wandel/Sitten und Geberden mercklich spüren lasse/also daß er auch durch die Gestalt deß Leibs bei andern Leuten gleichmässige neigung und anmuhtung zu seiner Person/und durch sein Thun und lassen ihme gleichmässiges Glück verursache: dadurch dann (so wol als durch der Mutter Einbildungen vor der Geburt/und durch die Auffzucht nach der Geburt) ein sehr grosser Unterscheidt unter den Leuten gemacht wirdt/daß einer wacker/munder/frölich/trauwsam: Der ander schläfferig/träg/nachlässig/liechtscheuh/vergessentlich/zag wirdt/und was dergleichen für general Eigenschafften seind/die sich den schönen und genauwen oder weitschichtigen unformlichen figurationibus, auch gegen den Farben und Bewegungen der Planeten vergleichen. (lines 30-44, 1-2)

94. Ibid., 210, Thesis LXVI.
Zum andern und ferrners/gleich wie ein jedes Kraut seine Zeit trifft/wann es zeitigen oder blühen solle/Welche Zeit demselben in der Erschaffung vorgeschrieben/und durch eusserliche Wärme und andere Mittel zwar etwas erlängert oder verkürtzet/aber niemalen gar verkehret werden mag: also empfähet auch deß Menschen Natur im eintritt ihres Lebens nicht nur ein augenblickliches Bilde deß Himmels/sondern auch den Lauff desselbigen/wie er hienieden auff Erden scheinet/etliche Tage nacheinander/und gewinnet auß diesem Lauff ihre Art zu gewissen Jahren diesen oder jenen humorem zu ergiessen/welche Jahr sie auch aff Vorschreibung der ersten wenig Tagen ihres Lebens gantz genauw unnd scharpff trifft. (lines 15-23)

95. Ibid., 211, Thesis LXVIII.
Zum vierdten/so weiß ein jede Natur nicht allein ihren characterem coelestem, sondern auch jedes Tags himmlische configurationes und Läuffe so wol/daß so offt ihr ein Planet de praesenti in ihres characteris ascendentem, oder loca praecipua kömpt/sonderlich in die Natalitio sie sich dessen annimbt/und dadurch unterschiedlich affectionirt und ermundert wird. (lines 14-18)

96. Caspar, Kepler, 357, author's note.

97. Kepler, Tertius interveniens, 219, Thesis LXXVIII.
...die eigentliche erste Verrichtung der himmlischen Liechter anders nichts seie als den Unterscheidt der Zeit zu machen... (lines 10-11)

98. Ibid., 219, Thesis LXXVIII.
...sie die Naturen per harmonicas concinnitates bewegen secundario, dann was das diese Harmonica concinnitas ihre Liechtstralen per accidens anfalle/allererst hieunten uff Erden in loco: vielmehr wird ihnen diß per accidens (sed per incessabile accidens, und auß gemessener vorsehung Gottes) begegnen/daß sie die Naturen und Gemühter hieunten auff Erden bewegen/und also zu allem dem was hieniden auff Erden geschicht/concurrirn müssen/und sich also wie das Feuwer/die Lufft/das Wasser/die Erdt brauchen lassen.

Dieser Gebrauch der da geschicht bei den lebendigen Creaturen/ist zwar ein accidens essentiae, auch ein accidens proprius operationis, aber nicht ein accidens finis, zu welchem sie erschaffen seindt. (lines 13-23)

99. Ibid., 219, Thesis LXXIX.
Werden also die Planeten auch ihnen umblauffen/ob schon sie keiner Zeit/Tag oder Nacht bedürfftig seind. (lines 38-9)

100. Ibid., 225, Thesis XC.
Dann erstlich den Astrologis ihr Wort zu reden/so hetten die Stern im Standt der Unschuldt nichts anders geben dann nur allein einen Unterscheidt der Leute ihrer hitzigen oder kalten Natur nach. Kömpt derowegen das böse heut zu tag von deß Menschen Ubertrettung her/und ist kein Temperament ohne Mangel. Dann ob wol Jupiter temperirt ist/so beschreiben ihn doch die Astrologi also/daß er hoffertiger Art in effectu seie.

Fürs ander/meine eigene Meinung belangendt/so vermag dieselbige/daß in den Sternen selber nichts seie dann Liecht/Farben/Qualiteten nach der Farben Anzeig/Wärme/ Befeuchtigung und endtlich hieniden auff Erden in concursu radiorum die Geometria oder Harmonia, das seindt lauter gute Sachen: wie nicht weniger auch der character dieser dinge/der da in deß neuwgebornen Menschen Natur eingedruckt wirdt/eine gute heilsame ordnung Gottes sein muß/weil alles gut/was Gott geschaffen. Daß aber diese deß Menschens Natur hernach so und so geräht/und der Verstandt deß Menschens hernach sich dieser unnd jener eingedruckter Qualiteten und Harmonien so und so mißbrauchet: Daran ist nicht der Himmel noch sein Liechtstraalen/noch die Harmonia, noch der Character, sondern die Erbsündt und der böse Will/der sich von der Erbsucht anreitzen lässet/allein schuldig. (lines 14-30)

101. Ibid., 229, Thesis C.
Nun bin ich anfangs mit der Außlegung deß Worts/ Zeichen/zufrieden/daß Moses auß dem Mundt Gottes damit nichts anders gemeint habe/dann Zeichen zu dem unterscheidt der Zeiten. Gleich wie es aber nit folgt/daß sie darumb nit auch Zeichen seien der

Allmacht Gottes/ob schon Mosis Wort an diesem Ort nicht außtrücklich hiervon lauten: also soll auch Feselius nit schliessen/daß sie drümb nit seien Zeichen zu bewegen/die Naturen in dieser nidern Welt/ signa obiectiua, oder daß sie nicht auch seien zeichnende Zeichen/signa characterisantia, durch die Harmonisch Verbindung der Liechtstralen/die sie hienieden auff Erden anfället.

Unnd liebt mir derhalben wol/daß es seien nit Narrenzeichen/sondern nützliche/unnd zum Gebrauch dieses Lebens nohtwedige Zeichen/zu ordnung der Jahrszeiten: auch nicht Zeichen aller unnd jeder künfftiger Dinge/welche mit allen Umbständen zu erforschen/allein Gott zugehört: sondern nur allein Zeichen natürlicher unverschiedener künfftiger Dinge/ die sich halten wie die Zeiten selbst/die auß ihnen herfolgen. (lines 22-35)

102. Ibid., 231, Thesis CIV.
So ist auch nicht gläublich/daß man auß der Natiuitet sehen könne/wie es einem allerdings ergehen werde. Dann ob wol gemeiniglich ein jeder seines Glücks eigener Meister ist/so uberhäupt dahin zu schreiben: so seind doch vielmehr zufällige Ursachen/dann nur der Himmel/oder nur deß Menschen Gemüht und Sitten/deren jeden für sich selbst ein Gewirr in deß Menschen zustandt machen/und denselben verkehren kan. (lines 21-6)

103. Ibid., 243, Thesis CXIX.
...der Sternen Neigung an und für sich selbst/ist general, neigen zu nichts anders als zur Nüchterkeit/Wackerheit/Fleiss/Arbeitsamkeit/unnd was deßgleichen/Item zu dem jenigen was mit ihren Farben und lauffen in genere uberein kömpt. Zu diesem allem/als offt gesagt/neigen nit die Stern selber/sondern deß Menschen Natur neiget sich selbst hierzu/symbolisirt und incorporirt gleichsam den characterem constellationis in allen ihren Wercken. (lines 7-13)

104. Ibid., 232, Thesis CIV.
Zum Exempel/wann ich sehe/daß in einer Natiuitet viel schöner Aspecte seind/also beschaffen/daß kein Melancholei oder Fehl der Vernunfft/sondern vielmehr

ine frewdige Natur erscheinet: Wann auch der Mensch schon sein ziemliches Altert ehat/lediges Standts/und in einem Landt ist/da man nicht viel ewige Keuschhei gelobt. So mag ich in puncto coniugii wol sagen/Ein solcher werd nach keiner geringen Condition stehen/unnd also ein reichs Weib erlangen. Dann wann mans bedencket/so hab ich hiermit nichts specialiter prognosticirt/unnd muß es auch mit dem Heirahten im zweifel bleiben lassen/ob es geschehen werde oder nicht: sondern mein unfehlbarlich Fundament ist general/daß es ein gute vernünfftige Natur sei/die ihr wol werdt wissen wol zu betten. Das ubrige/was solche Particular Puncten anlanget/ist allein vermuhtlich.

Hingegen aber so seind diß gantz unnd gar nichtige/ grundtlose abergläubische/sortilegische Vorsagungen/daß deß Gebornen Gemahl werde auß diesem oder jenem Landt bürtig sein/am Leib einen verborgenen Fehl haben/daß sie bei ihrem Mann nicht werde fromb bleiben/so oder so viel Kinder/und der geborne/zwei drei oder mehr Weiber haben. (lines 26-41)

105. Ibid., 243, Thesis CXX.
Daß man den Sternen so grossen Glauben gibt/und hiermit die Warheit so schrecklich verdunckelt wirdt/ daß endtlich eins mit dem andern gehen muß/halt ich auch eine Verhengnuß Gottes/doch mehr die erste Verhengnuß uber die Erbsucht dahero auch ohne sonderbare folgende Verhengnuß aller dieser Unraht folget/in Astrologia so wol als in Medicina. (lines 25-29)

106. Ibid., 243, CXXI.
Daß einer mit Eingehung eines neuwen Jahrs in einen Calender schauwet/was es für ein Jahr werden werde/halt ich für einen solchen Fürwitz wie mit den neuwen Zeittungen und discursibus vom Außgang schwebender Kriege und dergleichen. Ist eins recht/so ist das ander auch recht/mag eins verbotten werden/so mag auch das andere verbotten werden/und gesetzt/man habe beider Orten gleiche fundamenta, so ist auch bei einem so viel nutzen also bei dem andern. (lines 31-6)

107. Ibid., 246, Thesis CXXVI.
So nun Gott und die Natur also vorspielen/so muß dieses der menschlichen Vernunfft nachspielen/kein närrisches Kinderspiel sondern eine von Gott eingepflantzte natürliche anmuhtung sein/daß die unmüssige Köpffe/das ist/welchen bei deß gemeinen Hauffens Unwissenheit nicht wol ist/ingenia luxuriantia in inquisitione veritatis, auff die signaturas rerum sehen/und nachforschen/ob nicht etwa Gott selbst in Erschaffung eines Krauts/mit ertheilung seiner Farb und eusserlichen Gestalt auff den nutzen gedeutet habe. Dann was in etlichen Stücken geschehen/dem mag man auch in andern Stücken mit guter Vernunfft nachtrachten. Hat nit Gott selber mit Anstellung der Finsternussen an Sonn und Mondt dem Menschen auff erlernung deß Himmels Lauffs gedeuttet? Hat er nicht in Gestaltung unnd Formirung deß Rosses/unnd seines wolgeschickten Rückens/dem Menschen auff das Reitten gedeutet? Warumb solte man dann nicht auch weitter gehen/unnd erkündigen/ob nicht solches auch in noch verborgenern Dingen statt haben? (lines 32-44)

108. Ibid., 246, Thesis CXXVI.
Ja es ist die hochheilige Dreifaltigkeit in einem sphaerico concauo, und desselbige in der West und prima persona, fons Deitatis, in centro, das centrum aber in der Sonnen/qui est in centro mundi, abgebildet/dann die auch ein Brunquell alles Liechts/bewegung und Lebens in der Welt ist. (lines 13-16)

109. Wolfgang Pauli, The Influence of Archetypal Ideas on the Scientific Theories of Kepler, tr. Priscilla Silz (New York, 1955), 170-1.

110. Kepler, Tertius interveniens, 252, Thesis CXXX.
Wahr ist es/wer da wil das Calenderschreiben/wie es jetzo im Schwang gehet/und alle die principia, darauff ein solcher Calender gebauwet ist/durch die tägliche erfahrung/und durch das zutreffen/so die Calender thun/probiren und erweisen/der richtet nichts/hauwet sich vielmehr zum Widerspiel selbst in die Backen/unnd so es wolgeräht/so bestehet er/als der das künfftige Gewitter mit Würffeln daher spielet. Ursach/die Calenderschreiber haben in gemein gar viel falsche

principia und wenig warhafftige Natürliche. (lines 8-14)

111. Ibid., 253, Thesis CXXX.
Welcher verdruß mich verursachet/daß ich endtlich hab auffhören Calender zuscreiben. (line 13)

112. Ibid., 253, Thesis CXXX.
...wölle D. Feselius bedencken/wie offt es ihme begegnet/daß er mit seinem vernünfftigen Rath unnd heilsamen Artzeneien bei den Patienten/nach gestalt der Sachen viel nutzen geschaffet/und dannoch diesen Danck verdienet/daß er drüber außgescholten/ beschreiet/unnd verkleinert worden/daß er nicht allein nicht helffen können sondern auch das ubel ärger gemacht...(lines 30-4)

113. Ibid., 255, Thesis CXXXIV.
...dieser Conjunction Wirckung eben so wol general, und zum wenigsten der Natur Ursach gebe/die Lüffte auffzutreiben/die machen im Winter den Himmel rein/bringen Gefröhr/ist der Erdtboden daher der Windt gehet/etwas feuchter/so mag auch Schnee darauß werden/im Sommer/oder auch in linden Wintern/bringt sie gar Regen; sonderlich wann ihr durch andere aspecte unter die Arm gegrieffen wirdt. (lines 22-7)

114. Ibid., 256, Thesis CXXXV.
Das wirdt innerhalb deß Erdtbodens seine verborgene Ursachen haben. (lines 5-6)

115. Arthur Koestler, The Watershed (Garden City, NY, 1959), 40.

116. E. A. Tondorf, "Kepler's Attitude toward Astrology," Popular Astronomy, 12 (1904), 303.

117. Koestler, The Watershed, 38.

118. Edward Rosen, "Kepler's Attitude toward Astrology and Mysticism," Occult and Scientific Mentalities in the Renaissance, ed. Brian Vickers (Cambridge, 1984), 256.

119. Gérard Simon, Kepler: Astronome/Astrologue, (Paris, 1979), 125.

120. Ibid., 128-9.

CHAPTER FOUR

PICO, KEPLER, AND THE OCCULT

We know that Kepler read Pico's Disputations against Judicial Astrology at least twice, for he argues extensively against it in On the New Star (1601) and mentions rereading it in Harmonics of the Universe (1619).[1] Although Kepler was a practicing astrologer and defended astrology, he did not always sneer at Pico. Even while disputing Pico's arguments, Kepler treats them with respect. We have noted in our examination of Third Man in the Middle that Kepler had many reservations about commonly accepted practices and principles of astrology. In other works, such as On the New Star and Harmonics of the Universe, he mentions Pico's Disputations in conjunction with those reservations.

In his work On the New Star Kepler refers to Pico's treatise several times, expressing both agreement and disagreement. For example, he argues that the names of the signs of the Zodiac are human contrivances, not derived from anything in nature, and further notes:

> Although I use this argument for a different reason from Pico, for I am not about to go against every experience of all the teachings of astrologers as he does, but I am about to show that in the matter of the names this has not come from experience with the stars, unless as in other arts, they appear as things that had been corrected over the course of the ages and changed for the better under the same rule of experience.[2]

Kepler agrees with Pico that neither the names of the signs nor the images to which they refer, are in nature; they are a convention established by poets, a fiction.[3] Although Kepler maintains that Pico is correct in this case, he nevertheless feels compelled to reproach Pico for not always paying attention to the successful experiences of some astrologers. Kepler also reproaches Pico for going too far in his total rejection of the value of the Zodiac. For example, it indicates the time of the year.[4] On the other hand, Kepler expresses his agreement with Pico about problems with the naming of constellations.

> Some constellations representing a human image might have earned the name of certain individuals who, to be sure, could be historical, or real, or mythical....And indeed not dissimilarly, the peasants in turn have assigned names of animals to certain constellations whose origin is mythical, in poetic practice.[5]

Kepler sees the Zodiac as useful not only as an indicator of time but also as an indicator of position.

> Therefore, just as was said above about the division of the Zodiac, that nature itself indeed does not divide it into twelve precise parts but only displays

> the occasions for their receiving these divisions, as when the moon conjuncts with the sun during every year in all twelve Zodiacal places. So although that same nature of celestial motion does not perfectly describe trigons, as they are so constituted by authorities, it nevertheless provides the occasions for observing these trigons. Indeed, of Saturn and Jupiter, the highest planets, it [nature] so disposes them at two of their consecutive meetings that these meetings are located at nearly one third of the Zodiac from one another. It is effected by this cause that in whichever period three signs of the Zodiac, combined by authorities into one trigon, gain special power from the conjunctions of the superiors in moving (I do not say forcing) the nature of sublunar affairs. Giovanni Pico della Mirandola has not yet wrested this part of astrology away from me; nevertheless, I subscribe to most of what he has argued in the twelve books against astrology, soberly and with understanding, according to the validiy of the arguments he used.[6]

Here Kepler seems to acknowledge that Pico has indeed affected his stand on matters pertaining to astrology, although Pico did not succeed in undermining Kepler's astrological beliefs.

Kepler devotes Chapters 8 and 9 of On the New Star to a critique of some of Pico's arguments. Nevertheless, he introduces that chapter by telling us,

> I have said so far that neither is the distribution of the Zodiac into twelve signs natural, nor this distinction into four triplicities, which is made by the motions of the superiors, nor the connection of three distinct points continuous and accurate. It was also said that neither are any properties of their animals, by which they are denominated, qualities of their elements in the triplicities of signs present. All this Giovanni Pico, Count of Mirandola, taught more than a hundred years ago. By right, I should

> have been able to be seen to concede all in his judgment about the vanity of astrology.[7]

Thus, Kepler would agree with Pico's arguments against the doctrines concerning the divisions of the Zodiac, but he cannot accept all the Pico maintained. In these chapters he disputes Pico's judgments against the possible effects of great conjunctions, aspects, and trigons. As he was to do in Third Man in the Middle, Kepler argues his points on the basis of physical existence, mathematical foundations, and experience. He is especially concerned with the validity of astrologers' experience and tells us:

> I will not deny, with Pico, that there is great vanity of experience vaunted by astrologers, even about this chapter, but I will not on that account concede that experience has been nothing.[8]

Kepler expresses similar attitudes toward Pico in his Harmonics of the Universe. In Book 4, chapter 7, he writes a summation to the section on astrology which deals with the earth soul and its role in weather. In this summation he again feels it necessary to justify his defense of astrology by taking into account Pico's arguments against it. "Before everything, in fact, I undertook to read the 14 [sic] books of Giovanni Pico, Count of Mirandola, against astrology and to investigate the reasons he raises

against each and every topic," he writes. "It happened thereby," he continues,

> that not only did it strengthen me in my condemnation of most superstitions, but it also shed new light for me concerning certain issues. While shattering the power of the objections through mental exertion, I looked more deeply into the thing itself. Finally by refuting some things, that book brought about that I should now have faith in things in which I had lost faith before as a result of astrologers trying to defend them. Thus, it has been with aspects. For on the one side I would look at most constant experience, not indeed with snows or winds or thunderstorms or other things which astrologers are accustomed to predict, paying attention to detail, but generally paying attention to the condition of the wind in whatever way it is stirred up if there are aspects when Mars and Jupiter, for example, are in conjunction; and then there is quiet when they are not. On the part of Mirandola I would hear him asking: how could he rather believe that Jupiter and Mars, when they are seen together, do more than when they are separated? Surely the light would not be increased in conjunction, for as much as they possess when separated, so much they bring into a conjunction. But if planets of different qualities come together, it would seem that one would rather be impeded by the other. Here seeking a response in order to defend aspects I observed them to follow weather phenomena. I first began to consider them carefully as a cause, then the others as effects. For the aspect's form, which makes the aspect from the mutual configuration or angulation, was a qualitative quantity, indeed the relation of such quantities was a rational entity. For it, therefore, to stir up the air, it was necessary that it should have first moved some reason which has in its power either air or that by which it is agitated.[9]

The importance of angles is the crux of Kepler's Harmonics of the Universe, and we have noted that his theory of aspects--the angles at which the light rays of two planets

appear to strike the earth--is central to his astrology. Thus, he sought to defend as strongly as possible this facet of his astrological beliefs. That he should have reread Pico's Disputations against Judicial Astrology shows that he considered this to be the major work he had to take into account. Indeed, Pico's work is the only anti-astrological treatise of abiding interest for Kepler. Here he again notes that he did not read the work without some positive response, for Pico's treatise strengthened his resolve against some facets of astrology. On the other hand, Kepler also felt compelled to rethink his own support for other parts of astrology. Experience showed him that he could rely on planetary aspects for weather prediction. But he sees in his defense of aspects a philosophical component, too. They are a relationship of quantities: they are geometrically quantifiable, and they have physical existence.

Nevertheless, Kepler's positive feeling toward Pico's work is re-emphasized later on in this chapter where he suggests,

> perhaps it will come to pass that I will publish the book of Giovanni Pico della Mirandola with a commentary, if I understood that in doing this I would render a service to the students of philosophy, and if I would not lack the necessary means.[10]

Here Kepler implies that confronting the objections of Pico was useful to his philosophical development and thus had considerable impact on his thought. But Kepler never discussed what that impact might have been.

We have noted that Kepler expresses his agreement with Pico on certain commonly accepted beliefs among astrologers. For example, he agrees with Pico on such matters as countries not being subject to horoscopes, the distribution of the seven planets among the twelve signs being false, the signs of the Zodiac and the houses being human contrivances. Kepler also agrees with Pico that there is a lot of quackery in the practice of astrology and there is too much dependence on astrologers.

Like Pico he was also aware of the disastrous effects that too great a dependence on astrology could have. In Kepler's experience the effects could extend far beyond the individual believer, for his patron during his years in Prague, Emperor Rudolph II, was highly susceptible to astrology and had a court full of astrologers, of whom Kepler was one. Rudolph made Prague into a cultural center and promoted religious peace in an era of great religious tension, but he was weak militarily. His brother Matthias had been encroaching on his territory and sought to usurp

the imperial throne as well. In 1611 agents of Matthias approached Kepler to write a bogus horoscope predicting that Rudolph would fall from the throne on the assumption that if Rudolph learned of such a prediction, he would simply sit down and let Matthias take over. Kepler informed one of the emperor's confidantes of this attempt. He concluded by suggesting,

> In short, I am of the opinion that astrology has to be withdrawn not only from the Senate but also from the heads of those who want to advise the Emperor today to the best of their abilities; one must keep astrology entirely from the emperor's mind.[11]

Kepler was thus well aware of how astrology could turn the mind of a ruler, and perhaps was also aware of other astrologers who did engage in duplicitous and treacherous activities for monetary gain. Thus, Kepler was critical of both traditional astrology and astrologers.

To be sure, Kepler did not always express admiration for Pico. His first reference to Pico's treatise is in a letter he wrote in 1599, and his comment is rather sarcastic. He is discussing the effects of the configuration of the sky on birth and suggests that parents would never try to manipulate the time of birth in order to produce a child at the astrologically most auspicious moment. Kepler adds, "This fact alone would convert even

Mirandola himself (if indeed he fights against more than trivialities)."[12] From this kind of comment it would be hard to believe that Kepler had any respect for Pico's treatise, let alone that it influenced him in any way. Again, in On the More Certain Fundamentals of Astrology (1601), in which he outlines the principles of his new astrology, he refers to Pico in a negative vein. In Thesis 49 Kepler is discussing his belief that the distribution of the twelve signs of the Zodiac among the seven planets is a false astrological doctrine. He notes:

> The astrologer Stoeffler, however, has some time ago indirectly refuted this trifling side of astrology with physical reasons (thus no testimony need be sought from the enemy...della Mirandola...)[13]

Thus, in 1601, Kepler dissociated himself from Pico on the very astrological doctrine that in 1606, in On the New Star, he would identify himself as agreeing with Pico.

Kepler mentioned Pico one more time before On the New Star appeared, in his letter of October 7, 1602, to his friend, Herwart von Hohenburg. Kepler there registers his agreement with Hohenburg's rejection of the assertion that the sun and the moon serve chronology and the five remaining planets serve astrology. Kepler adds parenthetically, "I condemn as much in [astrology] as Pico."[14] This is a strange statement, for Kepler makes

plain in his later works that his condemnation is not as sweeping as Pico's. Perhaps Kepler is here trying to dampen his friend's overzealousness for astrology, or perhaps he is again trying to trivialize Pico's arguments (as he did in On the More Certain Fundamentals of Astrology) by implying that they are not significant. It would seem that such an exaggerated claim indicates that Kepler still saw Pico as an opponent.

Thus, Kepler disparaged Pico's work at the very period when he was revising his own astrological beliefs. Did Pico nevertheless influence Kepler's attitude toward astrology? We have noted that Pico repeatedly assailed astrology for inventing things which are not in nature. Kepler, too, assails traditional astrology for inventing things which are not in nature, and most of what he retains, particularly aspects, Kepler considers physically real. Could Kepler have been subtly under Pico's influence without realizing it at the time and only later come to realize the extent of that influence? Comments like "Pico has not yet wrested that part of astrology away from me" seem to suggest as much.

On the other hand, possibly not. Kepler's citation of Stoeffler in On the More Certain Fundamentals of Astrology

shows that he believed his endeavors to make astrology conform more to the requirements of physical reality perfectly consistent with a pro-astrology position. He did not feel that he needed assistance from the anti-astrological side. Moreover, Kepler's first reference to the fact that he was revising his views on astrology appears in his calendar for the year 1598. In this calendar he predicts three eclipses for that year and uses the opportunity to discuss the meaning of eclipses. He denies that an eclipse portends an event of earth-shattering importance: subjects or enemy powers will not rise up; governments will not fall; religions will not change; pestilence will not strike.

> But where and with what person something will happen a stargazer cannot pronounce determinedly from the simple sight of eclipses. Likewise the astrologers still have many rules about the twelve houses, the rulerships and limits of the planets, which, however, because of their groundlessness have no value of which one is mindful. But what remains doubtful in nature is of such a kind in nature are so constituted that one cannot determine anything in particular. Indeed, I also want to set it aside for the sake of greater industry.[15]

This came out in 1597, presumably after much thought about the matter. Kepler's first reference to Pico was not until April 1599, so we might suggest that Kepler may not have even read Pico's treatise when he began revising his own

ideas about astrology, although he might have heard of it. It could be that while he was thinking about the problem of astrology, he may have thought Pico's book useful to read. Afterwards he rejected it as trivial. Later, in 1606, On the New Star appeared, and in it Pico was treated in an entirely different manner. Kepler expresses agreement with Pico on some points and is respectful when he disagrees. What could have caused Kepler to change his mind?

Between 1600 and 1605 Kepler was concentrating on the calculations to define the orbit of Mars, and The New Astronomy was ready for publication in 1605, although it did not appear in print until 1609. Here Kepler presented his first two laws of planetary motion from which he showed that ideal mathematical concepts divorced from physical reality should no longer suffice to provide descriptions of the workings of the universe. He also advanced an extended discussion about what moves the planets and keeps them in their orbits. In particular, he began to consider that the planets were moved by physical forces and kept in their courses by some kind of magnet-like attraction. Prior to this Kepler thought that the planets were moved by such entities as souls or intelligences. In the 1596 edition of The Secret of the Universe Kepler suggests:

> if...we wish to make an even more exact approach to the truth, and to hope for any regularity in the ratios, one of two conclusions must be reached: either (2) the moving souls are weaker the further they are from the Sun; or, there is (3) a single moving soul in the center of all the spheres, that is, in the Sun, and it impels each body more strongly in proportion to how near it is.[16]

This is the first hint that some kind of motive power from the sun must be responsible for holding the planets in their courses. It is interesting to note that while the source of this kind of thought appears to be in the occult tradition (the idea of action at a distance), Kepler's mentor at Tübingen, Michael Mästlin, who was otherwise enthusiastic about the book, warned him against such speculation.[17] Nevertheless, when Kepler brought out a new edition of The Secret of the Universe in 1619 he not only retained this idea but commented on the use of the word soul in these two instances. Note 3 is particularly interesting in this regard.

> If for the word "soul" you substitute the word "force," you have the very same principle on which the Celestial Physics is established in the Commentaries on Mars, and elaborated in Book IV of the Epitome of Astronomy. For once I believed that the cause which moves the planets was precisely a soul, as I was of course imbued with the doctrines of J. C. Scaliger on moving intelligences. But when I pondered that this moving cause grows weaker with distance, and that the Sun's light also grows thinner with distance, from that I concluded, that this force is something corporeal, that is an emanation which a body emits, but [a material] one.[18]

E. J. Dijksterhuis, in his Mechanization of the World Picture, stresses the importance of this change in terminology.

> This appears to be no more than a substitution of one word for another, but the two words represent altogether different views. To read vis for an earlier anima is to abandon an animistic in favour of a mechanistic conception.[19]

Souls are immaterial substances which partake in infinity; they are not quantifiable.

And yet Kepler continued to believe planets had souls! His picture of the universe was indeed animistic in this regard. Not only did the sun, the moon, the earth, and the other planets have souls, but souls were a natural part of all creation. Kepler believed the earth soul responds to planetary aspects, which produces weather conditions, just as the human soul responds to aspects, which produces variation in personalities and actions. What then made Kepler decide that souls did not move the planets, and why was he so insistent on this point? Kepler did make a comparison between planetary attraction and light to argue that intensity diminishes over distance. But could not the power of souls also grow weaker over distance as he suggested in the original version?

Returning to Pico's attack against astrology, Dijksterhuis suggests that

> the criticism he levelled at it also partly applied to Aristotelian physics, for he opposed the idea that something which is only defined by ideal mathematical concepts could have a concrete physical effect.[20]

Conversely, concrete physical effects in the working of the universe must have physical causes. But souls are not physical; their very nature is the opposite of physical. It is not unlikely that while Kepler was thinking about the question of how the planets are moved and the weakening of the motive power over distance, he may have thought of Pico's critique of astrology, and that, too, impelled him to think in terms of a physical force rather than a spiritual force moving the planets. Physical forces operate in astronomy; souls operate in astrology. This suggests that the more thought Kepler gave to the problem, the more his astronomical and astrological thought separated from one another. His astronomy was thus more naturally open to the anti-astrological position.

Nor did Kepler's belief in astrology and planetary souls necessarily mean that we could systematically identify him with the occult tradition. Kepler repeatedly insisted that the foundation for his belief in astrology was his experience; he believed that on the whole it

worked. He was also able to fashion an astrology that was consistent with his general philosophical framework. Nevertheless, Frances A. Yates sees the source of Kepler's scientific work in occult thought of the time. She suggests that he was a hermetist and should be studied as a "heretic" from what she makes out to be a confraternity of occultists, the Rosicrucians.[21] However, to assume this is either to ignore the times in which he lived or to project those times into neat simplistic patterns. Kepler went to the University of Tübingen in an age when astrology was a natural part of mathematical studies. He was apparently taken to task for his criticisms of astrology in his 1598 calendar by none other than Mästlin, for in his letter of March 14, 1598, to Mästlin Kepler feels it necessary to explain and justify his criticisms.[22] Thus, Kepler began his criticizing traditional astrology in 1597, three years before he arrived in Prague where he could have been subjected to Rosicrucian "influences." Nor was a belief in planetary souls or intelligences necessarily restricted to occultist groups at this time. Rather it was a typical cosmological assumption. And Kepler did not conclude from these beliefs that magic or anything associated with the name of Hermes Trismegistus had any philosophical validity.

In this context the noted physicist Wolfgang Pauli is correct when he stresses Kepler's vitriolic interchange with the English physician and Rosicrucian Robert Fludd, in particular Kepler's quantitative emphasis as opposed to Fludd's qualitative emphasis.[23] Kepler felt it necessary to add an appendix to his Harmonics of the Universe attacking Fludd's view of harmony and showing how different it was from his own. "I do not seek harmonies except in motions," argues Kepler. But Fludd

> extracts some consonances, and these he conjures up from the mixing of his pyramids which he himself privately carries around in his mind as a pictured universe or holds that it is represented in it. I have demonstrated that the whole body of proportioned harmonies with all parts exists in the extreme, proper motions of the planets according to sure measurements demonstrated from astronomy. To him, therefore, his image of the universe, to me the universe itself, or the real motions of the planets, are the subject of universal harmonies.[24]

To Kepler, Fludd's harmonies were derived from the occult; they were arcane mysteries which he conjured up from his imagination and had little to do with the real physical world. Kepler's own harmonies, on the other hand, were derived from the real motions of the real physical universe. Kepler dealt in mathematical quantities, not in images.

Even Kepler's concept that the five regular solids which form the ratios of the distances between the planets can also be seen to fit this quantitative mold. As Robert S. Westman notes:

> For Kepler the polyhedra are mathematical forms existing independently of matter, yet defining the distance relations between the sensible bodies of the planets. At the same time the polyhedra partake of divine intelligibility and purpose. We neither see the polyhedra nor hear the musical harmonics with the corporeal senses, but grasp them, instead, with the eye of the intellect. The physics of world harmonics then reduces to a discourse of purpose (metaphysics) and structure (mathematics).[25]

It was not an issue of the number in itself, since for Kepler number had no mystical meanings. Kepler underscored this point in a letter to Mästlin. "We see that God created the planets in a certain number," he remarks.

> But number is an accident of quantity, I mean number in the universe. For before the universe there was no number, except the Trinity, which is God himself. Therefore, if the universe is constructed according to numerical measure, it is the measure of quantities.[26]

Kepler was not "a Neo-Pythagorean who lost his way in a Neo-Pythagorean number-mysticism while trying to interpret the attraction of the Sun on the planets," as Joachim Otto Fleckenstein asserts.[27] The goal of the mystic is to experience God. Kepler did not seek to experience God; he sought to understand God by understanding his creation. As Judith V. Field suggests, Kepler endeavored "to prove that

God was a Platonic geometer rather than a Pythagorean numerologist."[28] For Kepler it was the geometrical relationships and proportions that were at the heart of the universe, for they produce order, regularity, and beauty. And God's universe is beautiful.

In sum, Kepler did not seek any kind of knowledge of any hidden mysteries. His interest in some alchemy further shows how he rejected what he considered occult and concerned himself with the natural aspects of that field of inquiry. As Karin Figala notes, he attacks "the occult alchemists who like Fludd concern themselves with Cabbala, Magic, Geomancy, Astrology, and so forth, rather than the more experimentally-minded 'Iatrochemists.'"[29] He also tried to pull astrology out of the hands of the occult. This is the result at which he appears to be aiming when he tried to strip his astrological practice and belief of its conventions, maintaining and refining only those elements which he saw as "natural" and seeking to predict only trends and general matters. Thus, Kepler thought that an astrologer who attempts to predict specific futures is exploiting a superstition. When he predicts general possibilities, however, as Kepler did, he knows the limitations of astrology.

But most important of all, the astrologer must be thoroughly versed in astronomy, for that is the basis of astrology.

> He could not do more for himself than to be learned and read in astronomy. It is also surer than astrology because it is taken from natural and direct causes; therefore, it can come closer to the particular.[30]

Astronomy is a true science because it can come close to predicting the future exactly as it will be, not the trends or tendencies but the actual events themselves. Astrology could only suggest trends and tendencies and is not an exact science. Thus, astrology was "less a science" than astronomy in Kepler's view, contrary to what Gérard Simon suggests.[31] Nevertheless, Kepler could not reject astrology as he could other occult systems. Kepler's experience led him to believe in astrology's validity. For whatever reason he was rather successful at obtaining the information concerning people and the weather that he sought through the use of astrology, and it never occurred to him that he might have really gotten any of that information through other means, such as his own perspicacity. But, as his own inclinations were anti-occult and as he was trying to understand nature, and not change, subvert, or circumvent it, he tried to bring

astrology closer to the true science, astronomy, to which it gave birth and was still related. Nevertheless, Kepler had driven a wedge further between astrology and astronomy, and the anti-astrological arguments of Pico appear to have aided that separation.

In his "Preface" to the Rudolphine Tables Kepler echos the dictum of Ptolemy when he says:

> The study of the stars has two parts: the first is of the motion, the next of the effect of the stars on the nature of sublunar affairs. The ancients were accustomed to call both by the common name astrology. As, in fact, there existed a wide difference between each part by reason of their certitude, later usage prevailed of distinguishing them through different names. The doctrine about the motions came to be called astronomy, whose laws of motion are immutable and rest upon highest reason. The other part, busy with conjectures, had once privately for itself the common name of astrology; it even occupied first place in human minds concerned (as they are) about the future, through contemplations of celestial phenomena...[32]

For Kepler astronomy defines itself as it assumes its distinctiveness from astrology. In this sense Kepler helped define astronomy.

NOTES

1. Johannes Kepler, De stella nova, Gesammelte Werke, ed. Max Caspar, et al. (Munich, 1937-) (hereinafter cited as GW), I, 172 ff; Harmonice mundi, GW VI, 266.

2. Kepler, De stella nova, GW, I, 172-3.
Quanquam ego diversa ratione, quam Picus, hoc argumentum usurpo, non adempturus eo Astrologis omnem omnium dogmatum experientiam, quod ille facit; sed ostensurus, haec in specie nomina non venisse stellis ab experientia, nisi constet, eadem duce experientia, ut in ceteris artibus, aliqua etiam successu saeculorum emendata, et in melius commutata fuisse. (lines 32-35, 1-2)

3. Ibid., 174.
...causam imaginum non ex naturae penetralibus... (lines 32-33)

4. Ibid., 175.
Hanc causam Picus extendit ad omnes imagines, non minus ridicula conjectura de hominum cogitationibus, quam sunt Astrologorum de signorum naturis, quas tantopere deridet: dum consilium ipsis fuisse ait; anni tempora per imagines Zodiaci duodecim exprimere. (lines 1-4)

5. Ibid., 175.
Esto et tertia causa, primae permixta, a Pico etiam commemorata, quae effecit, ut constellationes nonnullae humanam repraesentantes effigiem, quorundam individuorum nomina meruerint, historiae nempe seu verae seu fabulosae....Nec dissimile vero, vicissim ex eo quod vulgus agricolarum sideribus quibusdam animalium nomina transcripsit, ortas esse fabulas, poetica commentatione... (lines 5-11)

6. Ibid., 181.
Itaque quemadmodum supra de ipsa zodiaci sectione dictum, quod natura quidem ipsa in praecisas duodecim

partes ipsum non dividat; sed tamen occasiones exhibeat hujus suscipiendae divisionis; dum Luna duodecim zodiaci locis quolibet anno cum Sole congreditur: ita etsi eadem motuum coelestium natura Trigonos, ita uti sunt ab authoribus constituti, ad unguem non describit; occasiones tamen subministrat, hos Trigonos observandi Saturnus enim et Jupiter altissimi Planetae binos proximos congressus mutuos sic ordinat, ut tertia fere zodiaci parte distent. Qua ratione efficitur, ut quolibet saeculo tria zodiaci signa, ab authoribus sub unum trigonum redacta, ex conjunctionibus superiorum praecipuam vim obtineant in commovenda (non dico in cogenda) natura rerum sublunarium. Quam Astrologiae partem Joan. Picus Mirandulus mihi nondum eripuit; etsi plerisque, quae libris 12. contra Astrologos disputavit, sobrie et secundum valorem argumentorum usurpatorum intellectis, subscribo. (lines 1-15)

7. Ibid., 184.
Dixi hactenus, neque naturalem esse distributionem zodiaci in signa duodecim, neque perpetuam vel accuratam, hanc, quae a motibus superiorum fit, in triplicitates quatuor distinctionem, triumque distantium connexionem: Dictum etiam, neque signis proprietates ullas eorum animalium, neque signorum Triplicitatibus, qualitates eorum elementorum inesse, a quibus denominantur. Quae omnia cum centum amplius annis ante me docuerit Joannes ille Picus, Mirandulae comes: jure videri possim totus in ejus sententiam de Astrologiae vanitate concedere. (lines 8-16)

8. Ibid., 186.
Non nego Pico, magnam esse vanitatem experientiae ab Astrologis jactatae, etiam circa hoc caput; at non ideo concedo, nullam fuisse experientiam. (lines 21-23)

9. Kepler, Harmonice mundi, GW VI, 266-7.
Ego vero ante omnia Jo. Pici Mirandulae Comitis libros XIV contra Astrologiam mihi legendos censui, rationesque, quas is cuique capiti opponeret, excutiendas: qua re factum, ut non tantum confirmarer in damnatione plurimarum superstitionum; sed etiam in quibusdam nova mihi lux oriretur; dum vim objectionum, ingenii contentione discutiens, rem ipsam penitius

introspiciebam. Denique fecit liber ille refutando nonnulla, ut iis ego fidem adhiberem; quibus antea ut fidem derogarem, astrologi defendendo effecerant. Sic fuit cum Aspectibus. Cum enim ex una parte respicerem ad constantissimam experientiam; non quidem nivibus, aut ventis, aut tonitribus, aliisque, quae praedicere solent Astrologi, sic in specie inhians; sed generaliter animadvertens, statum aeris quocunque modo commoveri, si essent aspectus, verbi causa, si essent conjuncti Mars et Jupiter; quiescere, si non essent: ex vero parte Mirandulanum audirem, quaerentem; quare potius credat, Jovem et Martem, cum videntur simul esse, majora facere, quam cum sunt separati? quippe conjunctione non augeri lumina, quantum enim possederant separati, tantum afferre in congressum: quod si diversarum qualitatum planetae coirent, videri alterum ab altero potius impediri: hic inquam ego responsionem quaerens, ut Aspectus tuerer, ad quos Meteora sequi videbam: primum illos, ut causam, deinde haec, ut effectum, diligentius considerare coepi. Aspectus enim forma, quae ex configuratione vel angulatione promiscua Aspectum facit, quantitas qualitativa erat, imo Relatio talium quantitatum erat, ens sc. rationis. Ut igitur commoveret aerem: oportebat, ut Rationem aliquam prius moveret, quae vel aerem, vel id quo is turbatur, in potestate habet. (lines 25-40, 1-9)

10. Ibid., 285.
...et forte erit, ut libros Joh. Pici Mirandulani cum commentario edam; si me rem studiosis Philosophiae gratam facturum intelligam, nec mediis necessariis fuero destitutus. (lines 23-25)

11. Letter of Easter 1611 in Carola Baumgardt, Johannes Kepler: Life and Letters (New York, 1951), 99-100.

12. Letter 117 to Herwart von Hohenberg, 9/10 April 1599, GW XIII, 313.
Res haec vel sola ipsum etiam Mirandulam (si quidem plus quam contra nugas pugnat) convertat. (lines 328-330)

13. Johannes Kepler, On the More Certain Fundamentals of Astrology, tr. Mary Ann Rossi, in Proceedings of the American Philosophical Society, CXXIII (1979), 99.

I have deleted an interpolation by the translator. After the word "enemy" she inserts the following words that do not appear in the original: "of astrology, Pico." The original reads, "Sed Hanc nugacem Astrologiae partem olim Stöflerus Astrologus (ut nullum ab hoste Mirandulano testimonium petatur) Physicis rationibus oblique refutavit:" (De fundamentis astrologiae certioribus, GW IV, 26, lines 24-27). I feel the interpolation detracts from the force of what is being said here and is misleading. Kepler sees Pico as his enemy.

14. Letter 228 to Herwart von Hohenburg, 7 October 1602, GW XIV, 285.
...damno autem tantum in ea quantum Picus... (lines 137-138)

15. Johannes Kepler, Schreib-Calendar 1598, Opera omnia, ed. Christian Frisch (Frankfurt, 1858-71), 398.
3. Capital. Von Bedeuttung der Finsternussen und anderer Aspecten. Wo aber, und mit welcher Person sich dergleich zutragen werde: das kan ein Sternseher auss dem blossen anblick der Finsternussen nicht namhafft machen. Es haben gleichwol die Astrologi noch vil reguln von den zwölf Heüsern, Herschafften und Terminis der Planeten, die aber wegen ires Ungrunds nich wehrt, das man irer gedencke. Was aber noch für mutmassungen in der natur uberig, seind dieselbe also beschaffen, das man nichts in specie schliessen kan. Doch wil Ich sie von meheren Vleiss wegen auch herbeysetzen.

16. Johannes Kepler, The Secret of the Universe, tr. A. M. Duncan (New York, 1981), 199. Emphasis mine.

17. Letter 63 from Mästlin, GW XIII, 111.
Non aspernor hanc de anima et virtute motrice speculationem. Verum metuo ne nimis subtilis sit, si nimium extendatur. Qualis illa ipsa est, quam de Luna moues. Vereor profecto, si ultra modum nimis specialis fiat, ne iacturam vel certe ruinam totius Astronomiae post se trahat. Existimo omnino parce quod sentio: Non aspernor, at profecto languidus est meus assensus, plurima enim contraria mihi obstant. (lines 127-138)

18. Kepler, The Secret of the Universe, 203.
I have altered the translation of the word "immateriatam," which was translated as "immaterial." See Mysterium Cosmographicum, GW VIII, 113 (line 26).

19. E. J. Dijksterhuis, The Mechanization of the World Picture, tr. C. Dikshoon, (London, 1961; rpt. 1969), 310.

20. Ibid., 239.

21. Frances A. Yates, The Rosicrucian Enlightenment (London, 1972; rpt. Boulder, CO, 1978), 222-3.

22. Letter 89 to Mästlin, 15 March 1598, GW XIII, 183-5.
Kepler begins this section, "Pergo ad astrologiam. Et quia prolixum nimis esset rationes explicare mei instituti, quae omnino necessariae fuerunt, propter vestros homines, illam opinionem tuam exemplo refellam, quasi aut totam astrologiam traduxerim, aut sine domibus terminis faciebus triplicitatibus (quas etiam in meo libello in dubium vocavi) praedictio nulla institui possit." (lines 142 ff)

23. Wolfgang Pauli, "The Influence of Archetypal Ideas on the Scientific Theories of Kepler," tr. Priscilla Silz, in The Interpretation of Nature and the Psyche (New York, 1955), 190-208.

24. Kepler, "Appendix," Harmonice mundi, GW VI, 376-7.
Ego Harmonias non nisi in motibus quaero. Ille pauculas aliquas concordantias delibat, easque ex suarum Pyramidum mixtura, qua Mundum ipse privatim in suo animo pictum circumgestat, elicit, seu ab illa repraesentari probat: Ego totum corpus Harmonicae contemperationis, cum omnibus partibus, in extremis planetarum motibus propriis, secundum certas et ab Astronomia demonstratas mensuras inesse demonstravi. Ipsi itaque conceptus suus Mundi, mihi Mundus ipse, seu in eo reales Planetarum motus, sunt sujectum Harmoniae Mundanae. (lines 135-40, 1-3)

25. Robert S. Westman, "Nature, Art, and Psyche: Jung, Pauli, and the Kepler-Fludd Polemic," in Occult and Scientific Mentalities in the Renaissance, ed. Brian Vickers (London, 1984), 207.

26. Letter 23 to Michael Mästlin, 3 October 1595, GW XIII, 35.
Videmus, deum creasse corpora mundana ad certum numerum. Numerus autem est quantitatis accidens, numerus inquam in mundo. Nam ante mundum nullus erat numerus, praeter Trinitatem, quae est ipse deus. Quare si ad numerorum mensuram est conditus mundus, ergo ad quantitatum mensuram. (lines 54-58)

27. Joachim Otto Fleckenstein, "Kepler and Neoplatonism," Kepler: Four Hundred Years, ed. Arthur Beer and Peter Beer (Oxford, 1975), 428.

28. Judith V. Field, "Kepler's Rejection of Numerology," in Vickers, Occult and Scientific Mentalities in the Renaissance, 284.

29. Karin Figala, "Kepler and Alchemy," Kepler: Four Hundred Years, 462-3.

30. Johannes Kepler, "Introduction," Schreib-Calendar 1598, Oo I, 394.
...mit ime selber nicht vill mehr, als er in Astronomia gelehrnet, redern würde. Sie seind auch gewisser, als Astrologia, dieweil sie auss irdischen und benachtbarten ursachen genommen, derowegen sie näher ad speciem kommen khönden.

31. Gérard Simon, Kepler: Astronome/Astrologue (Paris, 1979), 14.

32. Kepler, "In Tabulas Rudolphi Praefatio," GW X, 36.
Duas habet Astrorum scientia partes: prior est de Motibus, posterior de Effectibus Siderum in natura sublunari. Utramque Veteres communi vocabulo Astrologiam soliti sunt appellare. Cun vero ingens sit inter has partes discrimen causa certitudinis, Nominibus etiam distinguere illas posterior usus obtinuit; ut doctrina de motibus Astronomia potius nuncuparetur, quod leges motuum sint immutabiles, summaque ratione constent: altera vero pars, in conjecturis occupata, commune quondam Astrologiae nomen sibi privatum haberet: quippe quae primum etiam locum in animis hominum, futuri providis, fecerit rerum coelestium contemplationibus...

CONCLUSION

In this study we have examined the views of Giovanni Pico della Mirandola and Johannes Kepler toward astrology. We have seen that Pico's rejection of astrology, as represented in his Disputations against Judicial Astrology, was directed against astrology as we conceive of it today; it was not directed against astronomy in the modern sense. It was also a departure from his earlier views, and the motivation for that departure was religious. Nevertheless, Pico's change of mind was not a complete about-face; he had expressed some doubts about astrology in his earlier works.

Kepler's attitude toward astrology may be summed up in the very words which he used to describe himself in the title of his treatise--Third Man in the Middle. He rejected much of traditional astrological thought but continued to accept the overall validity of astrology. His acceptance of astrology, however, was not part of a general belief in mysticism and occultism. Kepler tried to reform astrology to make it less mystical and occult and more like a science. If the source of Kepler's astronomical creativity can be located in the occult tradition at all,

it is primarily in the fact that the study of the heavens in the sixteenth century still included astrology as well as astronomy. But Kepler very clearly distinguished astronomy from astrology and did not regard the latter as a science.

Kepler did not modify his views on astrology as a result of reading Pico's treatise. Rather, he had begun to revise his astrological principles before he ever mentioned Pico in his writings, and Kepler's earliest comments about Pico were derogatory. Subsequently, Kepler changed his mind about Pico and began to praise Pico's treatise against astrology. Nevertheless, Kepler argued against Pico's refutation of certain principles in astrology, particularly his theories of aspects and progressions, and maintained that his own experiences in working with astrology tended to prove its overall validity.

Pico's treatise emphasizes the physical nature of the universe; the human will, in Pico's view, cannot be controlled by corporeal heavenly bodies. The astrological world view stresses the superiority of the heavenly bodies over human beings. The emphasis on the physical universe is more typical of the anti-astrology debates in the late Middle Ages and the Renaissance, but Kepler mentioned only

Pico's treatise as having influenced him. It may be possible to conclude, therefore, that Pico's Disputations encouraged Kepler's shift toward physical causality in astronomy. Certainly, Kepler made an important innovation in astronomical thought when he maintained that the planets are kept in their orbits by physical forces rather than by souls. And this strain of thought has more in common with anti-astrological than pro-astrological arguments.

Thus, while Pico's treatise may have been motivated primarily by religious considerations, some of his anti-astrological arguments could indeed prevail with a scientific astronomer. The anti-astrology debate, which we have examined in the work of Pico, did, in fact, make a valuable contribution to science during the period of the Scientific Revolution, and we can see some indications of that contribution in the work of Kepler.

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