

COMMITTEE VI

The Universe and Its Origin:
From Ancient Myth to Present Reality
and Fantasy

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**ASTROLOGY'S IMPACT ON ASTRONOMY:
PROTO-SCIENCE TO SCIENCE?**

by

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TEXT

Astronomy, the science of the heavens, began in primeval times in response to the needs of, especially, organized agrarian societies, to understand and predict the seasons which regulated or controlled harvests, flooding (as in Egypt) and the like.

In many ancient societies, as in Mesopotamia, China and in the "New World" the dominant theocratic priestly classes soon associated celestial events - such as lunar and solar eclipses, planetary and lunar positions and movements, comets and even meteor showers - with important religious festivals and practices.

Thus began the empirical practice of connecting celestial happenings and positions with human events and conduct, and even personalities, aside from political and religious matters. Astrological practice thus became more widespread, believable and systematic and has survived and even expanded into our own times.

Although it's difficult to untangle early astronomical and astrological practices there seems to have been mutually beneficial interactions between them from their very beginnings. While hieroglyphics and Sumerian cuneiform tablets, for example, have shown that astronomy (as a science) influenced astrology, there is less basis for the reverse.

Nevertheless, a case can be made for astrological methods and beliefs influencing the science of astronomy and astronomers up to, and including, Kepler.

Before pursuing this thought, it may be of interest to compare the influence of another pseudo or empirical "science" - alchemy - upon

chemistry. Alchemists began their chimerical quests for the Elixir of Youth, the transmutation of base metals into gold and silver and the discovery of a universal cure for disease, in medieval times - long before the science of chemistry was established in the late 18th century.

While the alchemists did not, of course, achieve their goals, they (unwittingly, perhaps) set the stage for the development of chemical science. Amongst other apparatus they bequeathed to chemists such items as: retorts; kilns; muffle furnaces; glass ware; crucibles; tongs and other handling gear; test tubes and glass flasks; high temperature combusters; fume hoods, etc.

And then, just as important, the alchemists left a legacy of techniques which the budding chemistry community of the late 18th century adopted and adapted. These include: colour indicators for bases and acids; reduction and oxidation processes (eg: cinnabar reduction to mercury and then the metal's precipitation and amalgamation were important processes for the hoped-for mercury-to-silver transmutation) distillation; alloying; grinding and filtering; smelting and flotation, various reagents, Lavoisier and his colleagues and 18 - 19th century transition successors noted - albeit indirectly - their debts to the disappearing alchemists.

On the other hand, the influence of astrology upon astronomy is much more diffuse and ambiguous and no shorter, important, transition period (as in alchemy-to-chemistry, from, say 1750 - 1800) can be indentified.

Some facts are known about Chaldean, Egyptian or Greek astrology's relationship to astronomy. Something is known about each subject (as in

Chaldean cuneiform horoscope tablets) and, of course from such early writings as the Almagest of Claudius Ptolemy or his Tetrabiblos. The latter is mostly concerned with astrology coupled with astronomical references and symbolisms.

The Ptolemaic writings and theories show indubitably, as do those of other early philosophers, that mysticism, a belief in the occult and interests in empirical philosophies were intertwined with their "other side," that is, a belief in objective and rational disciplines - such as astronomy.

It must be remembered that the ancient, and even the early mediaeval world-picture, was much more circumscribed, even for the most astute and iconoclastic thinker.

Heliocentricity, the "New World," the relationships and extent of the ocean, atmosphere and earth, the nature of the stars and planets, human physiology and "scientific" medicine were unknown. Therefore, to allow even the intellectuals of their time to come to grips with, or understand, their world and the behaviour and organization of nature, and even their own bodies, it was necessary for them to "hedge their bets" with beliefs in supernatural forces, medical mysticism and such diversions as palmistry and, of course, astrology.

Astronomy, mathematics and astrology flourished in the Arabian* world from the 8th century on. Physicians, for example, had to know astrological portents to find the most favourable time for medical treatments.

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*Arabian here really means Jews, Syrians, Persians and other people of the Levant and Mesopotamia.

In Baghdad, during the eighth and ninth centuries flourished an ordered and comprehensive school of astronomy and astrology, with these two elements intertwined and mutually influential. This school of scholars drew heavily upon Judaic and Christian experiences and literature. Astrology was considered a conjugate of astronomy; the reverse could also be claimed. One of the more important astrological works to appear during this period was written by Jafar Abu Ma'shar or "Albumazar."

This book, which was considered a standard work during the Middle Ages, dealt with the positions of the planets and signs, and, explained their meaning. The book was almost an astronomical reference source and was used by later astronomers such as al-Battani (or "Albategnius") in the early 10th century. Battani, who published his own rigorous astronomical text gave credit to Albumazar for such ideas as the use of armillas, quadrants and even the astrolabe - which, apparently, (but not conclusively) may have been used by his predecessors (including Albu) for their positioning - and predicting - of heavenly bodies for astrology.

There is little doubt, then, that during the 8th, 9th and 10th centuries of "Arabian" scientific enlightenment, astrologers and astronomers were often the same men and, when not, the disciplines interacted with astrology - a better funded(!) endeavour by the Caliphs - having the dominant influence upon the teachings and practices of astronomy.

Arabian astrology and astronomy spread far and wide. For example, the writings of the above scholars, amongst others, appeared, not unsurprisingly, in Spain. There, for example, the Castilian King, Alfonso X,

or "Alfonso the Wise" surrounded himself with various astronomers for producing new tables of astronomy. The leader of this group was the great Jewish scholar, Isaac ben Said. He acknowledged the debt owed by him and his colleagues to Arabian astrology and, of course, astronomy. He was a friend of the King's astrologer (who was an ancillary and honoured member of the group) and was a frequent visitor to the extensive library of this (also) Jewish scholar, Abram al-Wefa.

Chinese astrology and astronomy were well-developed and continuing endeavours until even recent times, with a resurgence of astronomy and astrophysics now under way.

The need for reckoning time motivated the early Chinese to expand their knowledge of astronomy. During the Chou period, a century rich in literature and philosophy, the movement of the constellations and planets were charted and predicted, along with the seasons.

The astronomical activities of that time were actually "astrological" in that the "meaning" of the various phenomena were discussed in terms of their effect on human events. The "Court Astrologer" was also the "Court Astronomer." The astronomical scholars were supported by the Emperor and the state since they also prepared horoscopes and described the sky and its bodies in such terms as "the North Pole and its surroundings, at the peak of the heavens," was the seat of the Emperor. The philosopher Shih-shen, buttressed by the Emperor's interest in, and dependence upon, astrology, wrote an astrological work of which many fragments survived into later times. His "astrological work" was really an astronomical

catalogue containing several hundred entries of constellations and stars.

Although he drew on earlier works, much of the material was new, based on his own studies and observations. The point here is, again, that astrological "data" and the supporters of astrology provided the basis and support for an astronomical work - although it was not (then) called that. This catalogue, by the way, was earlier than the time of Hipparchus, ca. 130 B.C. Later Chinese scholars, such as Shu-ying (1231-1316), were, one might say, bread-and-butter astrologers who were able to blend their belief in their empirical practices with their development of astronomical mathematics such as those used to improve the tables of the sun and moon. The Mongol Emperor Kublai Khan provided such scholars funds to build shadow poles, quadrants and armillas, provided that they kept him abreast of astrological forecasts.

Returning to mediaeval Europe, we find that while astronomy began to flourish (after the "Dark Age's" hiatus) astrology was doing very well indeed and was to provide the underpinnings for much astronomical thought during the 12th to 14th centuries. The astronomical world-picture, as proposed, for example, by John of Holywood (died in Paris in 1256) was couched in astrological or quasi-astrological terms. This approach had its dangers since the church accepted astrology on its own terms: the astrological doctrine had to fit in with ecclesiastical notions of the predicted heavenly implications, only as these would be conjugate with the Holy Canons.

Dante's "Divine Comedey" in which he described the Celestial Sphere, heaven and hell and Lucifer at the center of the earth, had astrological implications. His views reflected the "Weltanschauung" of those days (13th century) which was not confined to the earnestly thoughtful structure of Aristotle's Cosmos. Instead, it was saturated and dominated by astrology. This then, seemed to appear as the encompassing doctrine of the world. Thirteenth century thinkers, including Albertus Magnus (1193-1280) and Thomas Aquinas (1225 - 1274) believed that the stars' movements dominated life on earth. This belief was, for them, consistent with their more objective and deductive speculations about the nature of the cosmos and, particularly, the place of the earth within the celestial sphere.

During the Renaissance, speculation and inductive reasoning were superseded by deduction, observation and experimentation. Celestial navigation became an established science whose tenets were derived from Arabian Science and such Jewish astronomers as Jacob Carsono whose patron was King Pedro III of Catalonia. Celestial navigation not only permitted long ocean voyages leading to the discoveries of the Portugese and Spaniards, but, it created a fruitful feedback into the consequently expanding science of astronomy.

One might think that, with astronomy becoming a viable and flourishing science with practical applications, astrology would wither and become inconsequential.

But, instead, belief and interest in astrology became even more widespread in the 16th century and more widely studied, or at least

accepted, than the pragmatic activities of astronomy. Almanacs, horoscopes and calendar sheets were widely distributed. They contained not only celestial phenomena such as eclipses and conjunctions, but also weather predictions and medical advice.

The Princes of Europe employed, as did their predecessors, court astrologers who were called "mathematicians." It might seem that such astrological diversions might detract from the resources - financial and otherwise - needed by the growing body of observational astronomers. Instead, the opposite occurred, at least for the "father of observational astronomy," Tycho Brahe (1546 - 1601).

This Danish nobleman had, as a youth, shown not only a great passion for observational astronomy, but also for astrology. He believed that, by careful observation and study, astrology could move into the undisputed ranks of rigorous science. He stated, in a lecture at the University of Copenhagen in 1574, that astrology was the chief practical objective of mathematical discipline.

It was his belief in the astrological doctrine of the unity of heaven and earth that brought him into scientific research: ie.: mainly systematic and accurate astronomical observations and measurements. His observations of a new star, a nova - or rather a supernova - in November 1572 expanded his zeal for astronomy; yet, he speculated not on its origin or dynamics but rather on its astrological implications as to what great events it could foretell.

In 1575 he visited Cassel, on his travels through Germany where he

gained the attention of the Landgrave Wilhelm IV of Hesse, who was in the process of establishing an astronomical observatory. Wilhelm was so impressed by Tycho's erudition and enterprise that he wrote his friend King Frederick of Denmark a laudatory letter wherein he suggested that Tycho would become a famous Danish astronomer if he were given the necessary patronage by King Frederick. Now, the King had, earlier, already given Tycho some support for his - mostly chemical - studies. More importantly, he had long been interested in astronomy and astrology. Although, apparently, no great believer in horoscopes, he was fascinated by the astrological writings and predictions of the ancients. As a youth he had been deeply influenced by this subject through one of his tutors who would show him the star charts and tables illustrated in the many extant treatises on astrology. The young King, later, then easily graduated into astronomical studies.

The King thus needed little encouragement from Wilhelm to urge Tycho to return to Denmark, where he established him, subsequently, on a small island near Copenhagen. Tycho then built his world famous observatory "Uraniborg" where one of his assistants, Kepler, was, later, to confirm the (then, still rejected) heliocentric theory of Copernicus.

At any rate, had Frederick not been imbued with the romance of astrology which started him on his heavenly interests, it is doubtful that he would have diverted his not-overly-endowed resources (and against opposition from some of his nobles) to Tycho's great observatory. And, to extend the linkage, Kepler, Tycho's trainee, might not have got his chance

to break the back of the anti-Copernican opposition. It was, of course, not only Kepler's genius, as such, which did this, but his dependence on the enormously detailed and accurate astronomical data which accrued from Tycho's twenty years of painstaking observations at Uraniborg. During that time, by the way, Frederick spent many hours discussing astrology with Tycho, who never lost his interest in that subject.

Kepler himself had absorbed many astrological ideas from Tycho; he treated astrology not as a mystical system of conjectures but rather as a doctrine of world unity. His astronomical insights arose, from his own admission, that his astrological interest motivated him to probe and understand the secrets of the heavens. It need hardly be said that he succeeded very well indeed!

In conclusion then, it can be said that astrology played an important historical role in influencing the development of astronomy, at least until the early 17th century. While many charlatans were, later, to dominate astrological speculations, the great scholars of Antiquity, the "Dark" Ages, Mediaeval times, the Renaissance and then the scientific "Transition Period" of the 16th - 17th centuries were comfortable with the subject and, as noted before, used it as inspiration for the deductive science of astronomy.

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