

The Scientific and Epistemological Paradigm Shift of the Early 1900's

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THE GREAT PARADIGM SHIFT OF 1900

The term **paradigm shift** is widely used to describe any major shift in understanding the basic framework and assumptions of a discipline or field of study. Originally, the term "paradigm shift" applied only to shifts in scientific thinking. Thomas Kuhn coined the term, and the explanation given at the http://en.wikipedia.org/wiki/Paradigm_shift of how and why Kuhn developed the term is excellent, and I quote it here:

"Paradigm shift is the term first used by Thomas Kuhn in his 1962 book *The Structure of Scientific Revolutions* to describe a change in basic assumptions within the ruling theory of science. It has since become widely applied to many other realms of human experience as well even though Kuhn himself restricted the use of the term to the hard sciences. According to Kuhn, "A paradigm is what members of a scientific community, and they alone, share." (*The Essential Tension*, 1997). Unlike a normal scientist, Kuhn held, "a student in the humanities has constantly before him a number of competing and incommensurable solutions to these problems, solutions that he must ultimately examine for himself." (*The Structure of Scientific Revolutions*). A scientist, however, once a paradigm shift is complete, is not allowed the luxury, for example, of positing the possibility that miasma causes the flu or that ether carries light in the same way that a critic in the Humanities can choose to adopt a 19th century theory of poetics, for instance, or select Marxism as an explanation of economic behavior. Thus, paradigms, in the sense that Kuhn used them, do not exist in Humanities or social sciences. Nonetheless, the term has been adopted since the 1960s and applied in non-scientific contexts."

As Kuhn points out, scientific thinking differs from thinking in the humanities in that scientific thinking is less flexible. Scientific thinking advances progressively, and new understanding supersedes and replaces earlier ideas. For example, when microorganisms were discovered to be responsible for many diseases, then previous theories of the causes of disease must be revised to accommodate this new understanding. Kuhn points out that scientific theory is embedded in an overall world view. There is a kind of chain reaction like this: observations lead to theories which in turn lead to a world view. We can notate this briefly as:

observations -> theories -> world view

The world view is the paradigm, the underlying conceptual model in which theories are embedded. As summarized in the Wikipedia article [Paradigm shift](#):

"A scientific revolution occurs, according to Kuhn, when scientists encounter anomalies which cannot be explained by the universally accepted paradigm within which scientific progress has thereto been made. The paradigm, in Kuhn's view, is not simply the current theory, but the entire worldview in which it exists, and all of the implications which come with it ... When enough significant anomalies have accrued against a current paradigm, the scientific discipline is thrown into a state of crisis, according to Kuhn. During this crisis, new ideas, perhaps ones previously discarded, are tried. Eventually a new paradigm is formed, which gains its own new followers, and an intellectual "battle" takes place between the followers of the new paradigm and the hold-outs of the old paradigm."

A paradigm shift is a scientific revolution. One might conclude, then, that science does not provide the solid bedrock of truth that we associate with scientific thinking, and when the next paradigm shift occurs, all of our current ideas will be tossed out the window in favor of a new paradigm. Kuhn does not agree with this.

Again, as summarized in the Wikipedia article at [Paradigm shift](#):

"A common misinterpretation of Kuhnian paradigms is the belief that the discovery of paradigm shifts and the dynamic nature of science (with its many opportunities for subjective judgments by scientists) is a case for relativism: the view that all kinds of belief systems are equal, such that magic, religious concepts or pseudoscience would be of equal working value to true science. Kuhn vehemently denies this interpretation and states that when a scientific paradigm is replaced by a new one, albeit through a complex social process, the new one is always better, not just different"

The paradigm shift in science around the year 1900 and that continued to blossom and develop in the 20th century with the success of the theory of relativity and quantum theory, did not replace the calculations and concepts of Newtonian physics. It placed Newtonian physics within a larger framework and demonstrated that Newton's theories of gravity and inertia are applicable within a particular domain, and at the smaller dimensions of the subatomic world and at the vast dimensions of the Universe other conceptual models must be employed, and these other conceptual models radically alter our view of the ultimate nature of matter, energy, light, and the fundamental principles of what the reality we live in actually is.

THE SLOW AND GRADUAL RISE OF EMPIRICISM AND RATIONALISM

While there are paradigm shifts according to Thomas Kuhn, there are also long-term gradual trends. The paradigm shifts occur when spectacular discoveries resolve anomalies in the current understanding provided by science, and accelerate the gradual trend and transform the dominant world view to a new one.

Dr. Francis Heylighen, a research professor at the Free University of Brussels articulates the gradual shift in the way that intellectuals and academicians have viewed what is true from an absolute, permanent, passive approach from the time of Plato to an observational (empirical) approach in modern times. This is a gradual shift over about 2,500 years!

Epistemology is the branch of philosophy that studies knowledge. It attempts to answer the basic question: what distinguishes true (adequate) knowledge from false (inadequate) knowledge?...

When we look at the history of epistemology, we can discern a clear trend, in spite of the confusion of many seemingly contradictory positions. The first theories of knowledge stressed its absolute, permanent character, whereas the later theories put the emphasis on its relativity or situation-dependence, its continuous development or evolution, and its active interference with the world and its subjects and objects. The whole trend moves from a static, passive view of knowledge towards a more and more adaptive and active one.

Let us start with the Greek philosophers. In Plato's view knowledge is merely an awareness of absolute, universal Ideas or Forms, existing independent of any subject trying to apprehend to them. Though Aristotle puts more emphasis on logical and empirical methods for gathering knowledge, he still accepts the view that such knowledge is an apprehension of necessary and universal principles. Following the Renaissance, two main epistemological positions dominated philosophy: empiricism, which sees knowledge as the product of sensory perception, and rationalism which sees it as the product of rational reflection.

The implementation of empiricism in the newly developed experimental sciences led to a view of knowledge which is still explicitly or implicitly held by many people nowadays: the reflection-correspondence theory. According to this view knowledge results from a kind of mapping or reflection of external objects, through our sensory organs, possibly aided by different observation instruments, to our brain or mind. Though knowledge has no a priori existence, like in Plato's conception, but has to be developed by observation, it is still absolute, in the sense that any piece of proposed knowledge is supposed to either truly correspond to a part of external reality, or not. In that view, we may in practice never reach complete or absolute knowledge, but such knowledge is somehow conceivable as a limit of ever more precise reflections of reality.

Source: [Epistemology, introduction](#)

Heylighen refers to the very common implicitly held epistemological view held nowadays as the reflection-correspondence theory. We keep observing, experimenting, and analyzing and eventually the truth is discovered. We cure disease and progress in many other ways through greater understanding achieved by a better grasp of the truth of how reality actually functions.

To the modern mind, it may seem strange that the ancients felt understanding was a more self-revealed, absolute truth immediately understood by the mind. To appreciate the Platonic view,

one must keep in mind that the rock-solid support for Platonic idealism is clearly manifest in the pearl of intellectual achievement: Euclidean geometry, which is developed by Euclid about 100 years after Plato. Circles, lines, and geometry are apprehended directly by the mind. The circles and lines of the physical world are only inexact replicas of what our mind understands directly. Preceding Plato about 100 years earlier is Pythagoras. We can view Pythagoras as the person who heralds a great epistemological shift from the Babylonian omen-oriented approach to understanding to an emphasis on comprehension of abstract mathematical truths as being the foundation for gaining knowledge and wisdom. I shall reiterate these points again below in the discussion of important epistemological paradigm shifts.

THE PARADIGM SHIFT TO THE NEW SCIENCE OF THE 20TH CENTURY

The term "paradigm shift" was developed by Thomas Kuhn largely in an attempt to understand the revolutionary change in thinking that occurred around the year 1900 and required several decades to become fully developed, supported, and accepted. To appreciate the magnitude of this paradigm shift, we need to look at two earlier epistemological paradigm shifts. There are 3 massive paradigm shifts that changed the course of human thought and understanding according to many historians:

1. The Pythagorean-Platonic-Euclidean paradigm shift to Platonic idealism from the 500's BC to 300's BC.
2. The Newtonian-Cartesian paradigm shift to scientific rationalism which became fully developed in the 1700's. With the extraordinary developments of Newton and others, had its greatest inspiration in Kepler's discovery of the laws of planetary motion around 1600, and early precedents to this way of thinking going back to William of Ockham in the 1300's. Galileo's use of the telescope and experiments with dropping balls of different weights exemplify the shift to empiricism. Galileo was a contemporary of Kepler.
3. The New Science paradigm shift of the early 1900's.

Pythagoras lived in the 500's BC and established abstract mathematical thinking as a foundation for intellectual thought. Pythagorean thought influenced Plato (circa 400 BC), and the development of pure, abstract mathematics reached a pinnacle of success in Euclid's book *The Elements* (circa 300 BC). The impact of Euclid on intellectual thought can hardly be exaggerated. To give some idea of the scope of its impact, note that "*Euclid's Elements* is the most successful textbook ever written. It was one of the very first works to be printed after the printing press was invented, and is second only to the Bible in number of editions published (well over 1000). It was used as the basic text on geometry throughout the Western world for about 2,000 years." ([Euclid's Elements](#))

In the book **The Manual of Harmonics** by Nicomachus of Gerasa written in the 1st century A.D., the translator Flora R. Levin points out that Pythagoras was viewed not only as a mathematical

wizard, but also as a person with high spiritual attainment. Pythagoras, and also some of his followers, were believed to have the ability to be in more than one place simultaneously, and to have other magical powers. The power of pure thought and feeling to attune to the divine and to help one develop divine qualities was deeply ingrained in the human psyche. This awareness and belief eroded after the Newtonian-Cartesian paradigm shift was completed in the 1700's.

The huge success of Euclidean geometry cemented the power of Platonic thinking as the primary way of gaining truth and wisdom. There are no perfect circles in the world but there is a perfect circle in our minds. There are no straight lines without any width in the real world but there is one in our minds. The power of pure thought to solve mathematical problems validated the power of pure, elegant, and beautiful thoughts, and reinforced the perception of the material world as a poor reflection of the perfect mind of god.

The Newtonian paradigm shift had precedents in the ideas of William of Ockham and others. It reached a radical transition point in Kepler's discovery of the laws of planetary motion around the year 1600. Physicist Mario Livio in his book "The Golden Ratio" points out that Kepler's discovery is one of the most monumental, if not most monumental discovery in the history of science.

Kepler had discovered that our physical world is, indeed, based on pure geometry and mathematics and that, God is a geometrician, so to speak. Kepler married pure geometry and mathematics with the actual physical world. From Kepler's time on, we continue to apply mathematics to our understanding of the world. It was Kepler who set this process in motion.

In the 1700's, Isaac Newton builds a towering intellectual edifice with the discovery of the laws of gravity. His breakthroughs in the development of calculus (simultaneously with Leibnitz) push the powers of mathematics and the development of physics and engineering forward to the astounding miracles of science in the 19th and 20th centuries. Interestingly, Newton spent more time studying the Bible and theology than physics. Kepler had set out to be in the ministry and pursued science with an eye to understanding the mind of God. Kepler practiced astrology, accepting some tenets of astrology but rejecting others.

Descartes, who established the cartesian coordinate system, a pillar of rational mathematical and scientific analysis, distrusted the senses. Platonic idealists, trusted the direct perception of his inner mind more than empirical evidence. The transition from Platonic idealism to empirical science was ushered in by some notable people with strong Platonic and mystical inclinations. Many others participated in this transition as well, such as these 3 important contemporaries of Kepler: Galileo, Francis Bacon, and John Napier.

Napier discovered logarithms, formulated Napier's rules of spherical geometry, and made other outstanding contributions to mathematics. Some of which assisted Kepler in his work, and there is considerable evidence that he may have also practiced, or at least believed in, astrology and magic.

The New Science shift of the 1900's was pioneered by Einstein's theory of relativity, augmented by the development of quantum theory, and perhaps best exemplified by Bell's Theorem. Physicist Henry P. Stapp called Bell's Theorem "the most profound discovery of science." Note that he says science, not physics. Bell's Theorem, therefore, along with relativity theory and quantum theory, and other important discoveries, is a competitor with Kepler's laws of planetary motion as the most profound and important scientific discovery of all time.

"Bell's Theorem (Reality must be non-local) is remarkable for several reasons:

- it is a mathematical proof, not a conjecture or speculation;
- it is a proof about Reality not Appearances. How often does one find such a window into the nature of reality?
- it is counter-intuitive: why should everywhere local facts need to be supported by a non-local reality?

[\(Bell's Theorem\)](#)

Brief definition of Bell's Theorem:

"Bell's Theorem is the collective name for a family of results, all showing the impossibility of a Local Realistic interpretation of quantum mechanics." [\(Bell's Theorem\)](#)

Given below is some background information about Bell's Theorem:

In 1964 John S. Bell, a native of Northern Ireland and a staff member of CERN (European Organisation for Nuclear Research) whose primary research concerned theoretical high energy physics, published a paper in the short-lived journal Physics which transformed the study of the foundation of Quantum Mechanics (Bell 1964). The paper showed (under conditions which were relaxed in later work by Bell (1971, 1985, 1987) himself and by his followers (Clauser et al. 1969, Clauser and Horne 1974, Mermin 1986, Aspect 1983)) that no physical theory which is realistic and also local in a specified sense can agree with all of the statistical implications of Quantum Mechanics. Many different versions and cases, with family resemblances, were inspired by the 1964 paper and are subsumed under the italicized statement, "Bell's Theorem" being the collective name for the entire family. [\(Bell's Theorem\)](#)

Irish physicist John Stewart Bell considered the EPR system and showed with a devilishly clever proof that all conceivable models of Reality must incorporate this instant connection. What Bell showed is that despite the fact that Relativity prohibits instantaneous connections, despite the fact that no such connections have ever been observed either in EPR experiments or any other, despite the fact that quantum theory itself predicts no observable instant connections, despite all these considerations from Fact and Theory, the Reality of the EPR particles is such that their initial contact must create an instantaneous voodoo-style link between them below the level of Appearances.

In short, according to Bell's Theorem there are instantaneous, non-causal relationships and interactions between things that are separated from each other. Modern science is not founded simply on causality, common sense, and logic, as some people believe. The revolution in scientific thinking of the early 1900's changed the face of science. Modern science is replete with a large number of concepts that are counter-intuitive, such as curved space, weightless particles, among many others.

WHAT THEN IS THE FOUNDATION OF SCIENCE?

Chinks in the Knight's Armor and an Emperor with No Clothes: The Limits of Newtonian Physics

Kepler's extraordinary breakthrough discovery of the laws of planetary motion, followed in the 18th century with the unparalleled advancements of science by Newton and others shifted the attention of intellectuals from pure mathematics and reason to empiricism. Empiricism proved to have great, unforeseen powers in that the application of scientific discoveries and practical experimentation fostered the discovery of the industrial revolution, the development of the automobile, airplanes, electricity, and all of the other marvels of the modern age.

However, Newton himself devoted more time to studying the Bible, alchemy, and other subjects than he did to mathematics and physics. For a fascinating, brief account of Newton's life, for example, see this article by University of Florida professor Robert A. Hatch at <http://web.clas.ufl.edu/users/rhatch/pages/01-Courses/current-courses/08sr-newton.htm>

More importantly, Newton's theory of gravity involves action at a distance! Newton's theory of gravity states that objects affect each other instantaneously! Newton employed a conceptual model which was counter-intuitive, defied our common sense notions of how the universe operates, and contradicts the notion that the universe is a giant clock, even though Newtonian physics was used as the foundation for building a conceptual model of the universe as a great mechanical clock! The view of reality as being mechanical in nature and this great scientific and philosophical edifice which is presented as being as strong and impervious as a knight's armor, is, in fact, flawed with cracks from the beginning. Newton's great discoveries never fully implied a mechanical universe, even though many scientists, engineers, and philosophers believed that all evidence pointed to the universe as being inherently mechanical.

Einstein pointed out that Newton was the first to describe a universe that operates by forces that work at a distance in an address he gave in 1920:

It was Newton's theory of gravitation that first assigned a cause for gravity by interpreting it as action at a distance, proceeding from masses. Newton's theory is probably the greatest stride ever made in the effort towards the causal nexus of natural phenomena. And yet this theory evoked a lively sense of discomfort among Newton's contemporaries, because it seemed to be in conflict with the principle springing from the rest of experience, that there can be reciprocal action only through contact, and not through immediate action at a distance. ([Ether and the Theory of Relativity](#))

In other words, Newton's contemporaries felt uncomfortable with the theory of gravity because the theory of gravity postulated that bodies can affect each other from a distance with no intermediate force to bridge the gap in space. Because gravity operates instantaneously, bodies attract each other from a distance without any causal mechanism by which this attraction can occur. The modern view of gravity is that gravity is a consequence of space being curved, but curved space is also a counter-intuitive concept. Physics has never consistently produced concepts that agree with common sense and the notion of a mechanical universe.

Newton assumed that there must be some mechanism through which gravity operated but he was at a loss to understand what that mechanism. In his classic work Principia Newton states:

"...that one body may act upon another at a distance through a vacuum without the mediation of anything else, by and through which their action and force may be conveyed from one to another, is to me so great an absurdity that, I believe no man, who has in philosophic matters a competent faculty of thinking, could ever fall into it."

(this quote of Principia is taken from the article at <http://www.blazelabs.com/f-g-dist.asp>)

Newton would not accept that gravity worked via the mediation of some as yet undiscovered agent, although how it could function instantaneously was difficult to comprehend. Modern physics has found that mechanism via the curvature of space caused by mass, and the large mass of our Sun creates a significant curvature of space. That space could be distorted by so great an amount that the planets are traveling a line of least resistance in curved space. Staying in their orbits provide an explanation of how gravity can operate at a distance. The notion of space being curved by mass defies our common sense notion of space being immutable and simply an inert context in which things exist.

THE LIMITS OF THE RELATIVISTIC AND QUANTUM UNIVERSE:

Our Fragmented View of Reality

Science evolves because there are always mysteries, unresolved mysteries, and unexplained phenomena. Even with the great advances of science in the past century, we are still unable to conquer disease, make long-range weather predictions, forecast financial markets, etc.

Progress is often made by repeated attempts to resolve unanswered questions. For example, eventually an answer, even if it is only a partial or very abstract answer, to the riddle of how gravity can operate at a distance, was discovered.

The view of the universe proposed by the theory of relativity and quantum theory is that the principles by which the universe operates when "zoomed in" to the subatomic level or "zoomed out" to view galaxies is different from how we perceive the world. Quantum physics works wonderfully when applied to the subatomic world but when we attempt to conceptualize or visualize these concepts in a common sense way, they seem bizarre. The implications of

relativity theory, such as that time slows down when an object speeds up, for example, are also counter-intuitive. Even the world we live in according to physics consists of an electromagnetic spectrum of varying wave lengths which our senses determine as being qualitatively more different from each other than they are. As Pythagoras postulated, number is at the essence of much of our reality and the harmonies of a church choir are simply the overlaying of measurable wavelengths.

Astrology is an ancient system of thought that somehow seems to utilize a view of the universe that is more acausal, integrated, and somehow more compatible with the notions of modern physics. However, unlike quantum theory and relativity theory, and also the insights into the electromagnetic spectrum, astrology has not (yet) been validated through experiments and research studies. It would seem that astrology might act as a bridge to integrate our fragmented views of reality, where we use one set of rules and a paradigm when working in our everyday world, another paradigm for the subatomic world, and a third paradigm for the world from a large astronomical perspective. Physicist Victor Mansfield of Colgate University appears to be one of the few modern thinkers who has recognized the potential of astrology in this regards. Here are a few poignant and insightful quotes from an address by Professor Mansfield to an astrology conference in 1997.

Professor Mansfield emphasizes, as I have also do in this paper, that science and astrology are not adversaries:

As a young man in 1975, I was enthusiastic about my latest astrophysics research but also deeply hurt by many of the scientists I admired most because of their signing such an uninformed statement against astrology. I knew they understood nothing about real astrology and its extraordinary value, nevertheless it pained me to have my scientific elders denigrate something of importance for my inner life. More than two decades later, it distresses me just as much to hear some of the astrologers I admire most at this conference bash science in an equally uninformed way. Science is hardly above criticism, but neither side is served by shadow projection. I'll argue that the way to the personal and societal transformation we so desperately need is through reconciliation and understanding between astrology and science, not recriminations and intolerance. As we all know, in a religious war with all its primitive emotional eruptions and inability to communicate across the battle lines, truth is the first victim.

Mansfield points out similarities in astrological thinking and scientific thinking:

Although I know of no quantum mechanical explanation for astrological influence, since the quantum worldview is so much more appropriate as a starting point for its discussion, I will very briefly summarize three of its key features. First, quantum mechanics is radically acausal. Despite its unprecedented accuracy and vast applicability, individual events do not have well-defined causes. It teaches us that lawfulness in nature does not require causality-an important lesson for astrology.

Second, objects in quantum mechanics cannot always be localized in finite regions of space and time. For example, certain correlated systems of particles, that are carefully studied in the so-called Bell Inequality experiments, appear to instantaneously communicate between the parts of the correlated system. In other words, what happens in a region, say at one end of the lab, instantaneously effects what happens at the other end and vice versa. Amazingly, the correlation does not diminish with increasing distance, nor is it a causal connection. There is no energy or information exchange between the parts. Much more needs to be said about this deeply mysterious phenomenon than I can say here, but let me characterize it with the following brief statement. Nonlocality teaches that the relationship between parts is more fundamental, more real, than the isolated identity of the parts. From an astrological perspective, we could say that our relationship to the cosmos is more fundamental, more real than our isolated existence.

Third, quantum objects do not have well-defined properties independent of observation. It is not simply that our observation of these very small systems disturbs them, but that they are intrinsically indeterminate prior to observation. In other words, we must participate in defining the world through our observation. Astrologically we might say that a transit is not a fully defined entity but more a potentiality for experience made actual by our participation in it.

Astonishingly, this quantum view is not merely an artifact of its current mathematical formulation. Analysis and experiments, independent of the present formulation of quantum mechanics, show that nature is so deeply acausal and nonlocal that any future replacement for quantum mechanics must have nonlocal connections that work without any exchange of energy or information between the parts of the correlated system-without any causal connection. This is an extraordinary fact that should play a central role in any approach to understanding nature in general and astrology in particular. This is a long way from the Cartesian/Newtonian view at the basis of current attempts at formulating a physical mechanism for astrological influence.

Mansfield points out that synchronicity, a term used by Carl Jung to describe how astrology works, is not an adequate model for explaining astrology.

Synchronicity is a sporadic and creative eruption of the unity underlying psyche and matter. Unless you are in some serious psychological or spiritual crisis, synchronicity experiences like the one above are infrequent. In contrast, astrology is effective 24 hours a day, 365.25 days a year. With or without meaning, it continually works as well for Carl Sagan as it does on you and me.

One might think that with Mansfield's observation that the Newtonian-Cartesian assumptions of much astrological research disinclines him to the use of traditional research studies using statistics, but this is not quite correct. He states

Astrology needs sophisticated statistical confirmation...

Some astrologers may worry that by calling for a significant statistical verification for astrology, I am trying to cram it into a scientific framework totally unsuited to its depth and multilevel symbolism. This is an unwarranted concern. I am only asking for a sturdy flagpole of carefully verified statistical correlations from which the exuberant, multicolored banner of astrology can wave. It is neither possible nor desirable to make astrology a branch of science.

Mansfield later states:

If we revived Kepler, he would surely recognize modern astrology, be delighted by the elegant astrological software, Transjovians, asteroids, etc. But he would be struck by how little has changed since his day, especially in contrast to the extraordinary explosion of knowledge in astronomy. Where are the astrological advances that compare with Kepler's three laws of planetary motion, Galileo's formulation of the scientific method, Newton's mechanics, or Einstein's general relativity?

Although Mansfield does not see astrology evolving to become a branch of science, he does sense the need for a revolution or theoretical breakthrough in astrological thinking, similar to the breakthroughs in scientific thinking. In other articles on this website I describe research methodologies and a theoretical framework for astrology that accelerates the development of astrology to a vastly more sophisticated and sensitive level than has been undertaken before. These new developments do share much in common with theoretical developments in physics, help resolve numerous dilemmas in astrology, and pioneer a path for astrology that revolutionizes the way that astrologers work and does utilize very sophisticated statistics as a part of the process as well.

His closing remark is:

I'll conclude with an experience that happened to me last night about a block from this room. There I came upon two men nearly at the point of physical violence over who had rights to panhandle at a certain corner. Most of us have grown hardened to the site of panhandlers and disheveled nests of blankets in doorways posing as bedrooms. But this pathetic squabble reminded me afresh of how obscene it is that the richest country in the world allows so many of its citizens to lose so badly in our "winner take all" economy. Perhaps if astrology can be integrated into our intellectual and cultural heritage, then the unity so evident in the cosmic dance of the planets may find an expression in a deeper appreciation of our shared responsibility for the planet and the welfare of all humanity.

To read Mansfield's full address you can visit this site:

<http://www.lightlink.com/vic/astrol.html>

Mansfield is sensing exactly what I also sense: that astrology can play an important role in bringing the sense of interconnectedness, elegant beauty, and wonder into our lives. Astrology can act as a bridge for a more enlightened perspective to flood our troubled and materialistically driven world. Astrology appears to philosophically have much in common with

the New Science of the 20th and 21st centuries. Physics is validated however and astrology is not.

A breakthrough for astrology could align our understanding of one another to be more commensurate with our understanding of the subatomic world and the intergalactic world. Recently I wrote an article soon to be posted on this website regarding the relationship of what I refer to as first-order and second-order harmonic influences on overall cultural and social development, and both the failures and successes of societies from crime, inertia, poverty to creative genius, prosperity, and social harmony.

The cosmic relationships to various cultural and religious traditions are also explored. The innovations in exploratory and assumptionless research and the application of sophisticated analytical models in successful pilot studies are described in other articles on this website. These may be stepping stones to a new level of sophistication and accelerated progress to astrology. This progress, however, requires continued research, and a greatly expanded education for astrologers in order to step into this new world of astrological understanding. In the coming years, we will publish more articles and offer training programs continue the work of transitioning astrology to a functioning level that is commensurate with the effectiveness, usefulness and sophistication of the understanding of the quantum universe gained in the 20th century.

FALSIFIABILITY:

Karl Popper's Important Contribution to the Definition of Science

Karl Popper had a big impact on the philosophy of science in the 20th century, primarily through his emphasis on falsifiability as a foundation of science. The essence of falsifiability is that a statement which can be shown to be false is a statement that science can address. A statement that cannot be shown to be false is one that science cannot address. If I postulate that I believe in God, or that I don't believe in God, there is no way to show that these statements are false, so they lie outside the domain of science. If, however, I state that apples fall to the ground when I drop them (assuming that winds of hurricane or tornado strength are not present), I can show that I am unable to falsify this statement and I therefore can accept it as true.

THE IMPORTANCE OF THEORIES IN SCIENCE

Theories are extremely helpful to the advancement of science because a theory helps us be able to make predictions about behavior that otherwise could not be made. The theory of gravity, for example, allows us to accurately predict the behavior of objects in outer space. A theory, however, is not necessary, to make scientifically valid statements. If I do not know about Newton's theory of gravity or any other theory that explains how or why objects fall to the ground, I can still predict that if I drop an apple, it will fall to the ground. Falsifiability is at the heart of scientific thinking and is the most essential concept in science according to Karl Popper, and it is difficult to argue this point.

20TH CENTURY INNOVATIONS TO ENSURE SCIENTIFIC PROGRESS

In the 20th century a set of procedures for scientific inquiry were developed that help science to fulfill its mission of determining whether a statement is falsifiable, and to make steady progress in developing theories that enable predictions of behavior in other circumstances (such as the ability of the theory of gravity to predict the behavior of celestial objects). Among these procedures and regulations are:

1. The scientific method, which is a series of steps required for conducting research. In the scientific method, a hypothesis is stated first, data collected, and the data is analyzed. There are extensive rules for ensuring that data is gathered in an unbiased manner, and a set of terms has evolved for different issues that arise in scientific research (such as: control group, placebo, statistical significance, confounding variable, etc.)
2. In a research study, the hypothesis is stated as a null hypothesis, that the effect does NOT exist. For example, if I conduct an experiment to test whether vitamin C prevents colds, my hypothesis might be stated as "the intake of large amounts of vitamin C does not prevent colds". In science, a "guilty until proven innocent" approach is taken. We assume that nothing is true, and then gradually let into a "circle of truth" those things that have been demonstrated to be true. This approach makes progress slow, but progress is also nearly rock solid if the rules of scientific inquiry are observed.
3. Clear definition of terms, emphasis on the limitations of a study, and skepticism regarding generalization of results and causal relationships. If a study on the ability of vitamin C to prevent colds is conducted, the study will involve a certain measurement of vitamin C intake administered to a particular demographic group (the experimental group) and compared to a control group with a different intake of vitamin C and hopefully of the same demographic profile as the experimental group. Other demographic groups (i.e. of different age, ethnicity, social environment, gender, health status, diet, etc.) may have different results. Scientists also look for confounding variables. For example, if students who take after-school programs score higher on examinations, a non-scientist may quickly conclude that after-school programs contribute to higher test scores, whereas a scientist realizes that many other variables may correlate with attendance in after-school programs and these other variables may actually account for the success of the program. Because of the conservatism of science, progress is slow and expensive. Huge amounts of time, energy, and resources, are needed for scientific progress.
4. Science is practical, not idealistic. Perfect control groups, completely unbiased data, and other ideals of scientific research are not always possible or may be too expensive. Science progresses by taking small steps when necessary. Exploratory research, pilot studies, and small steps that may help eliminate some, but not all, biases, are taken

when more comprehensive and sophisticated studies are impossible, too time consuming, or too expensive.

5. Peer review is an important part of scientific research. Even an excellent researcher can overlook limitations, problems, and possible alternative explanations for results of a study. Constant peer review and re-examination of studies is critically important. In most cases there is no simple check list that one can go through to ensure that every possible issue has been dealt with effectively. Research is about discovering what is not currently understood and this means, to some extent, going beyond the limits of current knowledge, and it is easy to overlook important issues that are relevant to a particular line of research.
6. Research journals, libraries, databases, and institutes that catalogue and organize research. Scientific research builds upon the work of other researchers. One does not fabricate ideas out of one's own imagination without regard to previous work done on the subject of interest. In order to build upon previous research, previous research must be available to the researcher. Research journals are monitored by a team of experts in the field to help ensure that the rules and regulations for scientific research are observed. The results of these efforts are not perfect, but the vast majority of scientists abide by the regulations and progress forward is steady, as is evidenced by the great explosion of scientific knowledge over the past hundred years.
7. There are standards for how scientific research articles are written as well as conducted. There are also standards for how one becomes a chemist, physicist, biologist, etc., by requiring certain levels of education in order to have certain titles of accomplishment in these fields. These standards and regulations do not work perfectly but they do ensure, on the whole, high standards of professionalism and steady progress forward in the sciences. Some standards may seem more like etiquette or arbitrary traditions, such as the standard 5% and 1% cutoff points for statistical significance, or the statement of a hypothesis as a null hypothesis. Nevertheless, these regulations are nearly universally accepted and they do create a universal language upon which scientific research and communication between scientists can be effectively conducted throughout the world.

The flowering of the Einstein's new insights around the year 1900 into a massive paradigm shift of science, a shift from a view of our universe from a giant clock to something mysterious and awesome is propelled forward by the development of these systems to ensure that science is practiced in a way that generally meets the high ideals of science to fairly and systematically produce valid results. As we shall see in our discussion below, these principles are not 100% effective but they do help.

THE IMPORTANCE OF INTEGRITY AND HONESTY IN SCIENCE

It is easy to think of science as some kind of objective phenomenon, like a hammer or a saw, that we pick up and use. We can think of science as an iron-clad entity that is impervious to the

foibles of humanity. Science is rigorous and well-defined, or so it would seem. However, the celebrated American physicist Richard Feynman, emphasizes that astrology, ESP research, and sometimes even research in psychology and other fields typically are a false science:

But even today I meet lots of people who sooner or later get me into a conversation about UFO's, or astrology, or some form of mysticism, expanded consciousness, new types of awareness, ESP, and so forth. And I've concluded that it's not a scientific world.

- From a Caltech commencement address given in 1974

(<http://www.cs.umbc.edu/www/graduate/feynman-cargo.shtml>)

He refers to these areas, as typically pursued, as being "cargo cult sciences", or false sciences. The origins of the term "cargo cult science" are given in his address, which you can read by visiting the website cited, but is not of importance for our purposes here. Here is a section of his discussion on the importance of honesty and integrity as a bedrock of science in this address to a graduating class in 1974:

But there is one feature I notice that is generally missing in cargo cult science. That is the idea that we all hope you have learned in studying science in school--we never say explicitly what this is, but just hope that you catch on by all the examples of scientific investigation. It is interesting, therefore, to bring it out now and speak of it explicitly. It's a kind of scientific integrity, a principle of scientific thought that corresponds to a kind of utter honesty--a kind of leaning over backwards. For example, if you're doing an experiment, you should report everything that you think might make it invalid--not only what you think is right about it: other causes that could possibly explain your results; and things you thought of that you've eliminated by some other experiment, and how they worked--to make sure the other fellow can tell they have been eliminated.

Details that could throw doubt on your interpretation must be given, if you know them. You must do the best you can--if you know anything at all wrong, or possibly wrong--to explain it. If you make a theory, for example, and advertise it, or put it out, then you must also put down all the facts that disagree with it, as well as those that agree with it. There is also a more subtle problem. When you have put a lot of ideas together to make an elaborate theory, you want to make sure, when explaining what it fits, that those things it fits are not just the things that gave you the idea for the theory; but that the finished theory makes something else come out right, in addition.

In summary, the idea is to give all of the information to help others to judge the value of your contribution; not just the information that leads to judgement in one particular direction or another.

The easiest way to explain this idea is to contrast it, for example, with advertising. Last night I heard that Wesson oil doesn't soak through food. Well, that's true. It's not dishonest; but the thing I'm talking about is not just a matter of not being dishonest; it's a matter of scientific

integrity, which is another level. The fact that should be added to that advertising statement is that no oils soak through food, if operated at a certain temperature. If operated at another temperature, they all will--including Wesson oil. So it's the implication which has been conveyed, not the fact, which is true, and the difference is what we have to deal with.

- From a Caltech commencement address given in 1974

(<http://www.cs.umbc.edu/www/graduate/feynman-cargo.shtml>)

What keeps astrology, ESP research, etc. from being a valid science is not the subject of astrology or ESP itself, but rather the way in which it is researched. Feynman does not talk without experience; he spent some time with new age researchers of various kinds. He gives an example of an outstanding research study done in psychology, but which is ignored by later researchers who conduct similar kinds of research. This is another example of cargo cult science, the unwillingness to honestly and fairly use all information to make progress in our understanding. He gives an example of a colleague who fails to report negative results in a study, another example of falling off the path of real science. When a field is dominated by lack of honesty, integrity, fails to build upon previous studies, and is in denial or ignorance of what has been found in other studies, then the entire field has become a cargo cult science. If we want astrology to be more than a cargo cult science, then we must be honest and have integrity.

Cargo Cult Science in Medicine: Richard Feynman does not give this example, but a great amount of medical research is conducted by scientists funded by, and sometimes even employed by, companies that are invested in products that depend on the research being conducted. A pharmaceutical company frequently donates money to a university department to research their product or the active ingredient in the product. Jessica Utts, author of widely used textbooks in college level statistics books, points out that research funded or conducted by people with who experience a tangible result in their success and/or income as a result of the research is a serious bias to be avoided in scientific research. The rules of scientific research are to remove every possible contamination of the research results, and yet the medical community continues pursuing these methods of funding and conducting their research. A bias does not invalidate a research study but it does decrease the likelihood of the research results being valid. This statement is not a political or subjective personal statement, but a statement based on the principles of scientific inquiry.

THE RELATIONSHIP OF SOCIAL AND POLITICAL SYSTEMS TO EPISTEMOLOGY

In the introduction to the book "Quantum Reality" by Nick Herbert he mentions that the 18th century was simultaneously the time of the flowering of science and of the rising of democracy. The French Revolution and the American Revolution created on the North American and European continents nations that were guided by the will of the people rather than the will of a ruling nobility. The unparalleled success of Newtonian physics and accelerated developments in

mathematics propelled breakthroughs in the knowledge of the universe based on careful analysis and study our world with the aid of mathematics and logic and perseverance.

How was knowledge gained before the 18th century? Until Galileo dropped 2 balls from a tower around the year 1600 no one had verified whether a small ball would drop slower than a large ball. Experimentation and observation were secondary to logic and pure reason. Euclid did not need to conduct experiments to develop a powerful system of geometry that became a mainstay of academia for two thousand years. Observation was not completely ignored.

A story of Pythagoras told by Nicomachus about 600 years after the life of Pythagoras is that Pythagoras was inspired to develop his theories of harmonics and the harmony of the spheres from an observation of a blacksmith striking iron rods of different lengths and observing that the longer the iron rods, the lower the pitch that they produced when struck. Thus, the concept that numbers, as the measurement of things, was the foundation of sound, had begun. However, observation and experimentation did not have the huge endorsement and support that they have today as keys for discovering the truth. Today we spend billions of dollars on research, and research is seen as the key to finding cures for diseases and other advancements of civilization.

We can speculate that the paradigm shift of the early 1900's ushered in an age of tolerance and broad acceptance of cultures, where tribalism, racial and gender prejudices are replaced with a sense of universality, and where a mechanical universe and an emphasis on discipline is replaced with a sense of an inspiring and awesome universe where creativity and the development of creative potential is more important than rigid disciplines. We spank our children less and we encourage them to be creative, independent, and accepting of a diverse world community. The transition to this new view may take centuries and in those places where the transition is slowest, the pain and suffering of holding on to a moribund paradigm is evident. I am speculating here, but the main point is that epistemology and any area of human inquiry does not exist in a vacuum. Our social environment is formed by our beliefs and attitudes and in turn our beliefs and attitudes are affected by our social environment.

THE ROOTS OF ASTROLOGY IN PLATONIC IDEALISM

Demetra George, Robert Schmidt, and other astrologers who have carefully studied the early roots of astrology point out that astrology as we know it today was formulated in an extraordinarily short amount of time between the time of Pythagoras and the time of Christ, in perhaps as few as two hundred years! I suspect that as more ancient texts are translated and discovered and we learn more about ancient cultures, we are likely to find out that the transition in astrological thought that occurred around the 300's BC and 200's BC had longer roots than is now known, but the essential fact that a rapid transformation in astrological thought from a form of omens to a vast and complex system of analysis occurred, for the most part, in this very compact time frame.

Given the historical context of this time period, the rapid development of a system of astrology is not completely surprising to me. With an emphasis on the power of pure reason and the divine intelligence to "see" directly into the fundamental truths of our existence, intellectuals were inclined to see a well-developed, tightly integrated, coherent, and elegant system of ideas as true, just as Euclidean geometry is known to be true by virtue of its own inherent internal consistency, applicability, and appeal to the intelligence, intuition, and sensitivity of the human mind and soul.

Freed from the huge emphasis on validating itself through extensive empirical research which we greet any new idea with in modern times, the ancients could devise and develop wonderfully intricate and sophisticated cosmic systems of 12 constellations beautifully patterned with connections to the 4 elements of fire, earth, air, and water, and the actions of the various planets and fixed stars in relationship to each other. Built upon a rich heritage of associations of the planets and fixed stars through Babylonian times, the observations and theories of the Babylonians became raw materials for the intellectuals of Greece to develop elegant cosmic analytical systems.

Again, we want to underscore the point that the ancients were not oblivious to observational evidence and observation; they simply were not as heavily emphasized as they are today, and greater emphasis was placed on ideas based on direct reason and understanding. Platonic idealism is not dead today and, no doubt, there are a larger number of Platonic thinkers among mathematicians than among scientists, and Euclidean geometry has the same appeal to our intelligence today as it did 2,000 years ago. However, in modern times a tremendously greater emphasis is placed on observation and experimentation and less emphasis on the natural ability of the human mind to directly perceive truth.

DIVINE REVELATION AND THE WISDOM OF THE ANCIENTS

Because of the emphasis on the ability of the mind to directly perceive truth, and the sense that the ability to perceive this truth connects the human soul to divinity, it becomes very easy to see the genius of Pythagoras, Plato, Euclid, and others as a form of divine inspiration which has filled their minds, and in some cases, their entire lives. Legends of Pythagoras, according to Flora Levin in her commentary on Nicomachus's book *The Manual of Harmonics*, portray him as saintly or enlightened being beyond the scope of normal human experience. Throughout the Middle Ages in Europe and the Middle East and also back to the early Hellenistic astrology there are exaggerated claims of the source of astrological knowledge. Many astrological ideas are attributed to Hermes or to Natchepso and Petosiris, or to other persons of high repute.

There are attributions of ideas to Plato, Ptolemy, and others in the Middle Ages, some of which are clearly not properly referenced. It may seem strange today that attribution of an idea is given to some ancient person who is dead, when we are much more likely to claim credit ourselves if we are feeling greedy, arrogant, or selfish! However, when the basis for gaining wisdom and knowledge is primarily direct perception, one's ideas will find much more credence

among others when attributed to a person who is almost a deity rather than to oneself, no matter how clever or pure of heart one might be.

In the book *The Arabic Parts in Astrology: A Lost Key To Prediction* Robert Zoller points out that "Traditionally, knowledge was transmitted by oral means, from teacher to students. The teachers were thought of not as researchers or scientists but rather as enlightened spiritual masters whose words embodied great wisdom. Written material, if used at all, was only secondary to oral teaching. It was not intended to supply all the details of the skill but was simply meant as an aid to the memory. For this reason, most ancient esoteric texts, especially magical and astrological ones, were brief, cryptic, and incomplete." (page 11) We can see, then, that the epistemological assumptions of the astrological tradition and our modern empiricism are very different indeed! Platonic idealism provided a good basis for an emphasis on divine revelation.

Note that Pythagoras was regarded by many as enlightened and having mystical powers, so the close connection of the ability to perceive the truth with closeness to the divine and transcendental is deeply ingrained in the thinking of most people until the transition to empiricism during the Newtonian-Cartesian paradigm shift.

Interestingly, Zoller sees the future of astrology in hearkening back to the metaphysical, spiritually inspired roots of astrology, and he states that the "present confused state of affairs stems entirely from the widespread ignorance of the traditional metaphysical foundation of astrology among Western practitioners since the Renaissance, or perhaps since the Middle Ages" (Ibid, page 12). By his focus on ancient philosophy, Zoller fails to see the actual geometric basis of Arabic Parts and their close affinity with harmonics, wave theory, and symmetry. See the article at https://astrosoftware.com/cpnew/a_and_v/arabic_parts.html for more information on this topic. Zoller devotes about 60 pages to an elaborate discussion of the numerological basis of astrology in the second chapter of the book on the metaphysical basis of the parts, without ever identifying the fundamental geometric basis of the Arabic Parts. This is not, however, surprising because the geometric basis of the Arabic Parts and their relationship to harmonics, wave theory, and symmetry has been overlooked in the written literature for thousands of years.

While I agree with Zoller that religious and spiritual dedication and a life inspired by purposes other than materialistic and greedy ones is extremely important, his regressive view of idolizing the ancient methods and alienating himself from modern insights, is highly destructive to the development and progress of astrology. Progress in astrology is made not by pitting divine revelation and ancient wisdom against modern science and technology, as Zoller does (read the appendix to this book, for example, for an example of his views in this regards), but rather in allowing knowledge, information, and insights from all possible sources, including the invaluable insights of modern science, to illuminate astrology. A very simple example of the results from this open-mindedness is the understanding that the numerical and mathematical basis of Arabic Parts is much more clearly described in the article

at https://astrosoftware.com/cpnew/a_and_v/arabic_parts.html in a few pages than in 60 pages of discussion by Zoller which never directly explain why Arabic Parts are important.

Zoller explains the metaphysical meaning behind various numbers but he does not explain specifically how this numerological theory indicates why Arabic Parts are important or how Arabic Parts would be critically important within the context of the conceptual framework that he uses. However, from the standpoint of modern physics, as described in the above article, we can see that Arabic Parts are extremely fundamental and important. Divine revelation and wisdom may be helpful to astrology, but should not be pitted against technology and "materialistic" science, as Zoller does. People may be materialistic and some may be scientists and some may be clergymen, but modern science is not inherently materialistic.

THE NEW SCIENCE AND THE NEW ASTROLOGY

Astrology is an enormous intellectual evidence largely based on its direct intellectual appeal. The evidence from actual observation involves many deceptive illusions that make astrology appear to be more accurate than it is. In other words, when the ancients did use observation to support a theory, the observations were anecdotal evidence based on the study of particular individuals and cycles. These anecdotal observations are prone to a host of biases and confounding variables that make them appear to be more accurate than they are.

One of the confounding variables is the effect of the divinatory experience that occurs in a given moment. I have discussed the divinatory effect in other articles on this website. Some astrologers, such as Patrick Curry, Geoffrey Cornelius, and Nick Campion have emphasized that the lack of scientific support for astrology and the fact that the ability of astrology to work very well in actual practice, indicate that astrology is primarily, if not completely, a divinatory, and not a scientific discipline. However, unlike these authors, I am more optimistic that a new form of astrology that is commensurate with the paradigm of modern physics can evolve.

In fact, astrology may play a very important part in developing an understanding of our universe that fully conforms to the parameters of Bell's Theorem and the insights of quantum theory. In my own astrological work I place a great emphasis on intricate planetary patterns, and the underlying theory of this pattern analysis is wave theory and symmetry. Wave theory is a fundamental underlying principle of both the physics of the 19th and 20th centuries, and symmetry has become increasingly emphasized in quantum theory and super string theory. Mario Livio's book *Symmetry* is highly recommended for a non-technical introduction to the importance of symmetry in modern science. The compatibility of these emerging astrological methods in very high consonance with the thinking of modern physics is not, in my opinion, a coincidence, but rather is an indication that the first few emerging baby steps of astrology out of its ancient cocoon of Platonic thinking into a bright new world of relevance and importance in the modern world has just begun. Although currently at astrological conferences and in astrological literature an increasing emphasis is being placed on the revival of ancient

astrological methods, I sense that in the coming decades it will be these cutting edge modern developments in astrology that will have the most lasting and important impact.

SORTING OUT THE NATURE OF ANCIENT AND MODERN ASTROLOGY

In the study of astrology one encounters confusing and contradictory statements from astrologers and non-astrologers. Two individuals who have made a fair and honest assessment of astrology are Garry Phillipson in his book *Astrology in the Year Zero* and Kenneth Irving in the book *The Tenacious Mars Effect* co-authored with Ertel Suibert. There are also many cases of confusing and erroneous statements, a few of which are given below:

The Magi Society has written several books on astrology and in these works there are references to the extensive systematic empirical research of the Babylonians. There is, to my knowledge, no research indicating that the Babylonians engaged in systematic empirical research. Observational evidence was certainly not completely ignored, but historians from the historical overview given in this article, and the overwhelming evidence of research to date, it is unlikely that the Babylonians were carefully recording and comparing their theories regarding correlations of celestial events with human behavior. There is also little evidence to suggest that they measured angular relationships as precisely as the Magi Society states. Any statement that contradicts the historical evidence should be supported by a statement of the sources for this evidence, and the Magi Society does not provide this.

Robert Zoller in his book *The Arabic Parts - Lost Key to Prediction* states that arabic parts have no mathematical basis, when, in fact, they do, as explained in other articles I have written on this website. Zoller also encourages a return to the ancient roots of astrology and the wisdom gained by the enlightened perceptions of the ancient astrologers. The notion of ancient enlightened astrologers is romantic and inspiring, but the historical evidence suggests that the ancient astrology is inspired more by Platonic idealism and idealistic vision, with no doubt some highly inspired wisdom as well, but Zoller goes even further in suggesting that Kepler derailed astrology from its true roots with his introduction of minor aspects.

John Frawley, in his book *The Real Astrology*, joins Zoller in the lament of astrology's downfall via Kepler, but both Zoller and Frawley ignore the rich tradition of seeing harmonics inherent in the cosmos dating back to arguably the most powerful original force behind cosmological thought: Pythagoras. Nicomachus and other Pythagoreans continued the tradition of Pythagorean thinking and the pursuit of a harmony of the spheres. To my knowledge there is no evidence that Pythagoras practiced or studied astrology, and the Pythagoreans were more concerned with the concept that there is a harmony of the spheres and a similar principle of harmonic sound relationships between the cosmos and earthly life, but without explicating any specific astrological rules by which such a similarity might influence the lives of people.

At the opposite extreme of Zoller and Frawley, who ignore the rich harmonic tradition of intellectual thought are astrologers who claim that Pythagoras was an astrologer and/or

numerologist practicing the form of numerology practiced today, but there is, to my knowledge, no evidence of this, although Pythagoreans did see anthropomorphic associations in numbers.

In short, we must honestly appraise the historical evidence and not selectively focus on particular historical traditions, while ignoring others. This is another aspect of honesty and integrity that is so important for us to sort out what the nature of astrology really is.

Astrologers sometimes discount the relevance of science to astrology, noting the limiting Newtonian perspective of most science, or the inability of science to assess complex combinations of variables. Some astrologers have even stated that science can only study one variable at a time. These views of science harken back over 100 years to the science of the 18th and 19th centuries. They are anachronisms and science is far more subtle, sophisticated, flexible, intuitive, and holistic in its potential than such notions of a primitive, blunt, and limited science suggest. Interestingly, astrologers who feel that science is so very limited in its capacity to encompass complex systems often employ a fairly simple system of astrological analysis while, ironically, my own approach to astrological interpretation is extremely complex and intricate compared to most astrologers, and yet I am a proponent of the ability of science to be effectively applied to astrology. Research in astrology is not simple, and we need a great amount of creativity and hard work to make progress, but I think it is possible, and, in fact, progress has already begun, as discussed in other articles on this website.

Astrologer Jeffrey Wolf Green has suggested that modern approaches to understanding are patriarchal and his evolutionary approach to astrology, with its emphasis on incarnation and the evolution of the human soul, could be better appreciated with the more feminine sensitivity that was employed in some ancient cultures. There is some truth to this historical perspective in that rational empiricism has gained the upper hand in recent times, but it is more helpful to cite specific historical events, thinkers, cultures, and their accomplishments in order to obtain a realistic appraisal of the value of various ancient and modern methodologies in astrology. Otherwise, we are likely to end up in a polarized battle between believers and unbelievers in astrology as we stay entrenched in our views. A careful and honest study of the history of astrology is likely to reveal good and bad guys appearing in all historical periods, and each historical period having its benefits as well as limitations.

A careful study of the historical tradition, reveals a male-dominated emphasis in all periods of astrology and perhaps more so in ancient times, with Platonic idealism dominating in the past, while psychological, wholistic, and compassionate, supportive approaches to astrology are stronger in the current time period. I am planning at some point to also write an article on the psychological paradigms employed in ancient western and Vedic astrology, and I do believe these ancient systems have some advantages, as well as disadvantages, as compared to modern astrological systems, but a clear division of ancient feminine versus modern masculine, or ancient inspired wisdom versus modern mechanical thinking, is not, in my opinion, supported by a thorough study of these systems of astrology.

When I was giving seminars in Mexico city in 2006 I was told that a lady had not attended the lecture because her husband had discouraged her from doing so because astrology was just a lot of medieval thinking. Actually, I agree with the husband in that astrology can sometimes regress a person's thinking patterns back to medieval times and dissociate the person from the wonderful developments of modern thoughts, all of the benefits, both material and spiritual, of the paradigm shift around the year 1900, and the cutting edge advancements of our times. It is important that our study of astrology is enriched by the understanding of medievalists, Vedic astrologers, and others at that we can incorporate this understanding into a higher synthesis and greater wisdom and understanding than we can otherwise have. To regress back to medieval thinking is not the goal of astrology, but in some cases can be the result. The husband of this person, of course, did not know exactly where I would lead the attendees, but every teacher does lead the audience down a path, and it is the responsibility of teachers to be well-informed, to develop a comprehensive understanding of the subject, and strive to lead the students along a path that will move them forward.

FINAL POINT

A final point of interest to astrologers: the major paradigm shifts in scientific thinking have coincided with conjunctions of Neptune and Pluto and the interested student of astrology can read an article regarding this subject, which is also on this website.

Arguments for and Against Astrology, and How to Effectively Communicating with the Public

I hope that this article has helped the reader gain a greater appreciation of the ways in which historical movements, and, in particular, the 3 massive paradigm shifts mentioned in this article, have shaped the development of astrological thinking as well as the overall development and direction of science and culture.

Many arguments for, and against, astrology are made by astrologers and non-astrologers. When the subject of astrology is mentioned, one of the very first thoughts that arises in the minds of people is "Do you believe in it?" or "Is it valid?". I have been lecturing about, discussing, and writing about astrology for over 3 decades, and I have found that invariably the question of what validity, if any, astrology has, is always brought to my attention. In order to communicate effectively with the public, astrologers must have a grasp of relevant issues regarding the subject of whether astrology is valid. Given below is a brief summary of two cally important items that I believe every astrologer needs to master in order to discuss the validity of astrology intelligently:

1. **Quote Sources!!!** In this article I have referenced Thomas Kuhn and Karl Popper, two of the most important philosophers of science in teh 20th century. Kuhn and Popper are invariably mentioned in any discussion of the nature of science. I am not being original in referencing these authorities, but I am building upon the base of knowledge and information that is widely accepted, and that I also personally accept, as a basis for understanding what science is and how truth is discovered. The overview of historical

periods that I have presented is based on scholarly historical works and will be respected by historians and other academicians. To simply present your own personal view of the relationship of astrology to science, without having studied the ideas of leading thinkers on this subject, and without having made an honest attempt to incorporate and intelligently respond to these ideas is unacceptable. Astrology is not a subject that can be mastered in a few months. I am Curriculum Director at The Avalon School of Astrology, and we have developed a comprehensive curriculum to ensure that astrologers have the knowledge and competency to communicate about astrology intelligently and effectively, as well as apply astrology in an ethical and competent manner.

2. Be intellectually honest! Richard Feynman's suggestions on how to properly pursue science are very important, and whether you regard astrology as a science, superstition, divination, or anything else, Feynman's advice is tremendously important. In the field of astrology we have a great amount of cargo cult science. Feynman ended his commencement speech with this statement: "So I have just one wish for you--the good luck to be somewhere where you are free to maintain the kind of integrity I have described, and where you do not feel forced by a need to maintain your position in the organization, or financial support, or so on, to lose your integrity. May you have that freedom.". This is a powerful statement that drives to the very heart of what is most important.

For example, astrologers often mention Mercury retrograde whenever communications go awry, there are computer breakdowns, etc. but research indicates that Mercury retrograde has very little, if any, effect, on mass communications. It may be possible that Mercury retrograde is important in some way, but to ignore the research is intellectually dishonest. In an article entitled "Yes, Mercury Is in Retrograde. So What?" in the New York Times (November 11, 2006) Andy Newman and other New York Times staff did research on Mercury retrograde and this research appears to not have been done previously: they gathered data to verify whether Mercury retrograde does correlate with communication problems. They found out that Transcom, a regional traffic monitoring company, reported 41.9 major events during the Spring 2005 and 2006 seasons there were 41.9 incidents reported daily. In comparable nonretrograde periods there were 42.4 per day, indicating very slightly fewer problems during the retrograde periods. Also, Metro-North and New Jersey transit trains were 0.4 percent less likely to arrive late when Mercury is Rx. In both cases very slightly better results occurred when Mercury was retrograde. However, the Federal Bureau of Transportation Statistics that the percentage of late flights in and out of LaGuardia airport went up from 22.8% to 24.6% during retrograde periods. Claims of mishandled luggage went up a very tiny amount. The results of this research, therefore, do not show any clear pattern for communications to break down during Mercury retrograde periods. Communication may be affected by Mercury retrograde but the data indicates that the manner in which this may happen is not simple and simply expecting communication breakdowns during Mercury retrograde periods is not realistic or accurate.

The Gauquelin studies are not free from controversy and debate. We have no completely solid proof of any ideas in astrology. Some astrologers have adopted the position that astrology has only truth within a divinatory context, and astrology cannot be validated scientifically. This is intellectually honest and is a reasonable argument, but some of these same astrologers then make statements of an objective nature, statements that are falsifiable. An example of such a statement is "with his Libra and Gemini he talks a lot", "no wonder he is stubborn with a stellium in Taurus", etc. etc. etc. These statements imply a correlation of celestial events with behavior, and the statement is often made as objective statements that are true outside of any particular single moment of engagement by the astrologer, such as is done in a divinatory exercise of reading tarot cards or the I Ching. The correlation of zodiac sign placements and aspects between planets is a falsifiable correlation, and it needs to be held to the standards of falsifiable statements, and regarded as purely conjectural at best until validated.

In astrology we have an especially difficult time being intellectually honest because we are faced with the extreme cognitive dissonance of experiencing that astrology works in actual practice but is not validated by research. Every astrologer must find his or her own way of resolving this seeming contradiction. Skeptics of astrology must also resolve this contradiction. Sometimes skeptics claim that astrologers are charlatans using astrology to make money or have poor critical thinking skills, without having any experience with leading astrologers or their writings. By the way, this is not true of Richard Feynman, who did research new age alternative thinking before commenting on it.

Resolving cognitive dissonance by honest study and the courage to admit where one is unsure or undecided is a sign of inner strength and fortitude, not weakness, and can ultimately enable one to resolve the contradictions by discovering the truth. Ignoring, or accepting overly simplistic resolutions to cognitive dissonance, can simply keep one's intellectual development stagnant as one acquiesces to the impasse. I see the elevation of astrology to a vastly more sophisticated system of analysis than is currently widely practiced as the future of astrology as the path of the future of astrology. The success of exploratory research into astrological factors that discriminate professions in the Gauquelin data and in gold prices in articles to be put on this website soon, and the successes of pilot studies which are described in other articles on this website demonstrate that this vision of a metamorphosis of astrology from its current level to a very different and more sophisticated level is not just philosophical speculation, but a work already in progress.