

<http://www.astrologer.com/tests/basisofastrology.htm>

Why it is no longer acceptable to say astrology is rubbish on a scientific basis

Wonders of our solar system [We may not own it, but we are part of it.]

We don't own our solar system but it shapes our consciousness.

On 6th April 2010, I posted a note on the Equinox Facebook Page stating my objection to a well-respected scientist declaring that "astrology is complete rubbish" on a spectacular BBC TV series "Wonders of the Solar System". I strongly feel that his comment was not based on any investigation into astrology, was unfounded and was not appropriate in an educational program about astronomy.

Since then, I have answered a huge number of posts from sceptics who disagreed with me. As the same points and questions are now being repeated, I want to set out my position. This is not an attempt at an academic treatise. I can't speak on behalf of all astrologers and I am not here to defend the work of every astrologer or the motives behind every follower of astrology.

Here's my case:

Though we don't know how it works physically, astrology is not a faith. You can experience, observe and know how it applies first hand. There are sound reasons why it has proved so difficult to test the real practice of astrology under scientific conditions and why so many tests have been flawed. However, some simple experiments have yielded results that are consistent with a scientific basis to the fundamental premise of astrology even though the practice is an art rather than a science.

What is astrology?

Astrology is the study of the correlation between the positions and movements of celestial bodies and life and physical processes on Earth. Though some astrologers work with stars and constellations, western astrologers work with the Sun, the Moon and the planets (including Pluto) within the Solar System.

Astrology goes far beyond the popularized Sun-Sign columns published in newspapers and magazines. Astrology should not be confused with fortune telling, palmistry, psychic or tarot reading. Nor is modern western astrology a belief system like a religion.

These are the main arguments put forward as to why astrology is rubbish.

It's just plain common sense!

The Signs of the Zodiac are wrong!

Astrologers work from the moment of birth and not the time of conception?

No one knows how astrology works!

Scientific tests show astrology doesn't work.

Where's the scientific evidence for astrology?

Astrology is at odds with scientific knowledge & modern philosophy.

Astrologers defend astrology to protect their vested interests.

Astrology is not a science.

I will address each point. If you disagree, please state your case. If I find it persuasive, I will modify, edit or even delete my points. [\[Click to discuss this on Facebook\]](#)

Proof by assertion:

In response to my post, a great number of sceptics have asserted that astrology is rubbish (or words to that effect). Most were unable to back this up with sound arguments or empirical study or show an understanding of what astrology is. Some declare, why bother as it is common-sense? Maybe this prejudice by self-styled 'rational sceptics' is based on feelings or intuition or divine faith as it is not based on reason. Depending on the manner of presentation, these type of arguments without facts or correct facts fail on a number of basic logical fallacies: appeal to emotion, proof by assertion, argument from ignorance and straw man fallacy.

Flying spaghetti monster or a straw man fallacy?

Some critics argued that it would be non-sensical to do an empirical study simply to prove that the existence of a Flying Spaghetti Monster or another imaginary creature or that a tea-pot orbits the Sun^[1] (Russell 1958) is false - so why the fuss about astrology? An argument based around this type of analogy is known as a straw-man fallacy. There are two points to consider why these are prime examples of false analogy.

Astrology is not a belief system - the claims can be tested in individual cases and even professional sceptics from CSICOP believe that it can be tested objectively. [see (Carlson 1985)]

Astrology is not some arbitrary New Age theory. Astrology has existed for over five thousand years. Thousands of book titles, dissertations and journal articles in major academic libraries, conferences, schools, post-graduate studies, practitioners and businesses are dedicated to astrology.^[2] Astrology is considered of value to millions of individuals around the world. Before anyone misunderstands this argument as an appeal to tradition or appeal to popularity, these facts do not make astrology valid. However, this alone makes a compelling case that astrology deserves investigation before being written off.

Even if astrology were one of these unfalsifiable myths (which it is not), it is not good science, nor good sense, nor good humanity to ridicule myths or rule out cherished beliefs or deny experiences of others. It is hubris.^[3] A Black Swan was once considered a mythical creature and used as a metaphor for

something that was ridiculous and impossible. In 1797, black swans (*Cygnus Atratus*) were first discovered by Europeans in Western Australia.[4]

Some fields that were once dismissed as being unworthy of study by the scientific community are now established within hard science. The belief that rocks could hit the Earth from space was widely ridiculed by eminent scientists of the Enlightenment.[5] Now the study of meteorites is an important scientific field revealing insight into the nature and history of the Earth and Solar System.

Opinion without knowledge:

Many who dismiss astrology know nothing of the subject. This is immediately evident when they use terminology such as the word astrologists or argue irrelevant points such as how the constellations have moved or the limits of planetary gravity or the false belief that astrologers claim that people are controlled by the stars. At best, this known as Argument By Laziness - the arguer hasn't bothered to learn anything about the topic. Ignorance is no basis for opinion. At worst, it is prejudice and bigotry.

"It is impossible for anyone to begin to learn what he thinks he already knows"

~ Epictetus (AD 55 - AD 135)[6]

Faith in the Heavens?:

Many people have claimed that astrology is a belief. That is largely true for many readers of newspaper horoscopes. It's also true for those who believe astrology to be false without any knowledge. However, for those who have studied it, astrology is a knowledge and one that can be tested and verified - unlike a belief in a divine creator that cannot be tested.

Experience:

Many people feel that they have a right to dismiss astrology as rubbish without any experience or observation of how it works in practice. This evasion of empirical study is reminiscent of Cremonini and Libri's refusal to look through Galileo's telescope.

Unnecessary for impossible or harmful practices:

Some have rightly argued that you don't have to smoke tobacco or experience slavery or even commit suicide to be able to make strong comments about the practice. True! However, studying an analysis of your character (like reviewing the results of a psychological test) is not a risk to health or life. Would you rank the opinion of a travel writer who has never left home over someone who has? A doctor should, where possible, examine his or her patient to help reach a diagnosis.

How can you experience astrology?

Since some of the free horoscopes on the web are not ideal examples, you would need to select a professional service who will charge a fee (equivalent to the cost of a shirt) for a computer generated report or a higher fee (equivalent to a jacket or even a suit) for a live reading of your birth chart from a

top astrologer. [Please do not use my services as I don't want you to think this is a sales pitch.] Yes, it is a cost, but this is a small price to add to your experience. You can also study astrology through library books.

Why should I pay to have an opinion?

Unfortunately, to enjoy the luxury of dismissing an entire field of study, you have to invest in personal research. Experiencing astrology first hand, will be good value and you might even learn something. Astrologers have to pay to download data or subscribe to Journals or purchase books so they can review flawed research papers that claim to debunk astrology.

Objective Data:

Your personal horoscope is totally subjective. But why rely on the evidence of personal experience when you can also obtain objective data? It is possible to analyze the charts of other people and compare it to your knowledge of their lives. Though this is best done professionally, it is possible to do some basic interpretations by referring to astrology books.

Is the twelve sign Zodiac a viable model?

Some critics claim that the signs of the zodiac are wrong as they have shifted and some signs are missing. This article shows how there are three zodiacs - the Western Tropical Zodiac (based on seasons), the Indian Sidereal Zodiac (based on stars) and the Astronomical Zodiac (based on constellations). The key point is that all three systems are viable models of the solar system and that the Signs of the Zodiac are not the same as the Constellations of the Zodiac. [Explanation of Precession]

Why time of birth and not time of conception?

Both critics and the curious frequently ask "Why do astrologers work from the moment of birth rather than use the seminal moment, the time of conception?" The simplest answer is that we can know the time of birth, but we cannot know the time of conception.

As you can imagine, there are plenty of conjectures. The Hellenistic Stoics believed that the spirit or spark (pneuma) became ensouled with the first breath. (Long 2001) Some astrologers see the ante-natal period as developmental and the physical separation from the mother as the start of consciousness of self as an entity. Others speculate that at the birth moment there is a celestial imprint of an energy field - with various models such as the auric field[7] or Sheldrake's morphic field proposed.

A recent study led by Douglas McMahon, Professor of Biological Sciences at Vanderbilt University has shown that seasonal imprinting at or around the moment of birth in mammals affects both subsequent behaviour and "the cycling of the neurons in the master biological clock in its brain". (Mahon 2011) So we now have evidence that the time of birth (and not conception) has an impact on personality. Whether this imprinting is limited to the effect of the solar cycle or whether there is also an imprint from the Moon and the planets at birth remains open - perhaps until the mechanisms for astrology are better understood. (see next section)

Though I disagree with Richard Dawkins' personal beliefs, his expertise as an evolutionary biologist gives his opinion on human gestation some authority. Even though the arch-sceptic did not have astrology in mind, he was unequivocal on the topic in the God Delusion: "The moment of birth provides a natural Rubicon for defining rules, and one could argue that it is hard to find another one earlier in embryonic development." (Dawkins 2006)

Mechanism:

One of the core objections to astrology is that there is no known scientific mechanism to account for how it all works. [Mechanism]

Is the lack of a mechanism justification for dismissing a phenomenon?

Several examples make the point that a lack of known mechanism is never a reason to dismiss evidence [see point 4.]

The lodestone (compass) was used successfully for two millennia. Yet, no one understood the Earth's magnetic field until the 20th century.

Semmelweis (1818-1865) introduced hygienic practices like hand washing in obstetric clinics. He was ridiculed by other scientists as he could not provide a mechanism, even though he reduced the mortality rate. Yet, it became accepted practice years after he died when Pasteur confirmed germ theory.

"That we can now think of no mechanism for astrology is relevant but unconvincing. No mechanism was known, for example, for continental drift when it was proposed by Wegener. Nevertheless, we see that Wegener was right, and those who objected on the grounds of unavailable mechanism were wrong."

~ Carl Sagan, astronomer, author, cosmologist, broadcaster & astrology sceptic.

So to use a lack of known mechanism to reject a demonstrable effect [see point 4.] is to abuse science in an obstructive rather than use science in a constructive way.

Possible Mechanisms:

Astrology may work by several mechanisms. Here are some hypotheses:

Gravitational Resonance:

Many critics of astrology have repeated the story that the gravity of the midwife has more effect on the newborn baby than the planets. However, astrologers don't claim that gravity is the basis for natal astrology.

However, it is universally accepted that gravity and orbital resonance of the Sun and the Moon affects the Earth's oceanic tides and the Earth tide (body tide). Studies have proposed that the tidal forces also affect the Earth's plate tectonics (Continental drift). (Moore 1973) (Scoppola 2006) The tidal

force is part of what some astrologers call natural astrology which also includes the study of the coincidence of seismic activity with celestial positions, harvests and weather.

I believe it is premature to set limits on the effect of gravity and orbital resonance on Earth as there is much we don't understand. For example, gravity is the one known force that does not yet fit into a Unified Field Theory.

Correlation precedes possible Causation:

Dr Percy Seymour, former principal lecturer in astronomy and astrophysics at Plymouth University and previously a researcher at the Royal Observatory in Greenwich, has developed a model to describe the mechanism behind astrology. It is outlined in his title "Astrology: The evidence of Science". This interview from 1989 may not include his more recent research. In outline, his model is based on the tidal tugs of all the planets in addition to the Sun and Moon which disrupt the Earth's magnetosphere (magnetic field) which affects the human neural network. It works through the gravitational effects of the planets which are magnified by what Seymour calls 'magneto tidal resonance' to affect the sunspot cycle. [more]

Planetary alignments correlate with Sunspot cycles which impact the Earth:

In separate studies, there are peaks within the Sun spot cycle coinciding with the Jupiter/Saturn [helio] conjunction 11.86 years, Jupiter's perihelion 9.93 years and what astrologer's call a Sun/Venus conjunction 11.08 years. Solar output (including heat, light, radio, x-rays, neutrinos, solar wind and possibly more) is extremely important as regards all life on Earth (not just climate). Some of these outputs directly affect human behaviour through interactions with the Earth's electromagnetic field. For example, there are studies showing significant correlations between events such as wars on Earth and the 11 and 22 year sunspot cycle.

Chin Cheh Hung Apparent Relations Between Solar Activity & Solar Tides caused by Planetary Activity [2007 NASA]

Glyn Wainright Jupiter's Influence [2004 New Scientist]

Ian Wilson Planetary Tidal Forces [University of Southern Queensland, Aus 2008]

Four proposals that attempt to account for this planetary/sunspot correlation.

Causal or acausal relationship:

Many astrologers believe that the observed (terrestrial/extra-terrestrial) correlation reflects an acausal connecting principle or 'synchronicity' as proposed by Swiss psychiatrist and founder of analytical psychology, Dr Carl Gustav Jung. Jung refined his concept with the help of one of the pioneers of quantum physics, inventor of the neutrino and Nobel prize-winner, Wolfgang Pauli Synchronicity is a belief, but not an article of faith.

Frontiers of Science.

As I wrote above, I believe it is unwise and premature to use the current model of the four fundamental interactions (fundamental forces) as a basis to rule out possibilities for several reasons. First, within this model, quantum mechanics and gravity are not yet reconciled. Scientists are still struggling to develop a theory of Quantum Gravity and as a result a Grand Unified Field Theory. In addition, several discoveries within quantum physics suggests that this could in the future become a fertile area for research into a possible mechanism. [more]

Flawed Tests:

In the field of astrology, there are many more fatally flawed tests than real evidence. There are many reasons for this. There is no budget for testing astrology and most astrologers are more motivated by the study and application of astrology than in addressing the challenge of providing and defending scientific proof. So most tests are run by sceptics with budgets in fields like psychology who design quantitative tests when the data requires qualitative analysis that would be better addressed by those who understand astrology. There are also real procedural hurdles to jump.

Problems testing astrological practice under strict scientific methods:

It is extremely difficult to obtain sufficient fresh accurate objective data

Isolating the huge number of variables involving human behaviour and astrology is an immense challenge.

Replicating the unique conditions is almost impossible. For example, each human being is unique and identical planetary positions are never repeated within recorded human history.

The Experimenter Effect is potentially stronger than in a chemistry experiment as the human experimenter is part of an experiment involving human behaviour. So the criteria used, the data selected, the format and the results are particularly open to reflecting the conscious and unconscious bias of the experimenter rather than providing objective data.

Statistics perform well in physics, chemistry or molecular biology. However, when you work with more varied and complex data, results can be skewed, misrepresented and manipulated. You'd think with all the objective climate data and vast resources, we would have less controversy about the projections for climate change.

How a test might be improved. [more ...]

Professor Hans Eysenck states that 'testing astrology is a complex and difficult field, as indeed all fields relating to psychological variables'.

Myth of Flawed Experiments being passed off as Failed Experiments.

Yet, many sceptics claim that astrology has consistently failed over many years in 'thousands of scientific tests'. This is a very popular myth that has been duplicated in many websites. I have asked numerous critics of astrology to cite their best single test. This is the list of the 'best'. I invite anyone

reading this to produce or even devise a test of astrological practice that is not fundamentally flawed. [I don't have the time and resources to evaluate more than one test at a time].

The Carlson Double Blind Astrology test

has been cited many times by sceptics. The study, published in Nature in 1985 claimed to show that qualified astrologers could not match test subject's charts with their self-reported results of the California Psychological Inventory (CPI) any better than chance. (Carlson 1985) It received much Press attention and is still published extensively on the web as the strongest evidence that natal astrology is no better than chance. However, at the time, Carlson's conclusions received criticism from a number of authoritative sources including Professor Hans Eysenck of London University. (Eysenck 1985) Recent analysis of the data by Professor Suitbert Ertel and others has revealed that this test actually shows support for astrology (see scientific evidence). [more...]

Geoffrey Dean's Analyses

Many sceptical websites cite the work of Dr Geoffrey Dean, a one-time astrologer, and now astrology's most ardent critic. Dean is very charming, diligent and persuasive. He accepts that astrology works and that it can even be helpful, but in his opinion the reason it works is more down to illusion and artifacts than astrology. However, his attempts to prove his belief through tests leave much to be desired: [More]

Unpublished Study of Unaspected Planets (1975)

A two-year study at a time when Dean was an astrologer involving over 200 cases initially showed strong support for astrology with independent replicated results, still remains unpublished.

Dean's Phantom Time-Twin Study (2003)

A study of 2,101 people born in London between 3-9 May 1958 also sounds promising. Though he announced his provisional results in a paper in 2003 (reiterated in 2013) and it is widely cited by skeptical websites, Dr Dean is yet to publish the research in a journal over a decade later.

Test of Extraversion & Neuroticism (1985-6)

Dean's biggest experiment involved 1,198 subjects (mostly from the Southern hemisphere) who had completed their Eysenck Personality Inventory (EPI). He selected and studied the charts of 288 extremes of Extraversion (E) and Neuroticism (N). He then had 45 astrologers attempt to blind match a smaller selection of 160 extreme cases. In both tests, he claimed not to have found any result that was better than chance. However, his tests again failed to test the practice of astrology:

The EPI is one of many psychological tests from Eysenck and other psychologists. It was not exactly a gold-standard for reliability - most especially for comparison with astrology. For example, the more popular Myers Briggs Type Indicator is closer to astrology with scope for both extraversion and

introversion rather than a polarity and originated from the writings of Carl Jung who had studied astrology.

Though the EPI claims stability, the actual results varied considerably by culture (New Zealand v Australian subjects) and by age. The young students high on hormones scored about double that of the oldest subjects in both E and N! So any subjective age and culture-dependent psychological profile based on self-reporting will be an unsuitable match with an objective, life-time, cross-cultural astrological analysis.

Eysenck's definition of Extraversion and Neuroticism differed greatly from astrological tradition and the four temperaments. For example a careful examination of Eysenck's traits reveals that Earth can be neurotic (N-) and Air can be introvert (E-). Since Dean assumed the opposite, this fundamental misattribution also undoubtedly misled the astrologers.

By testing only the extreme results (1/15th) in a large sample of self-completed personality questionnaires instead of the standard 1/3rd, the remaining sample was the result of exclusion bias. These resulting small groups comprised mainly of anomalies and outliers and were beyond the scope of standard astrological practice.

This research was designed as a test the validity of astrology. However, there had been no prior research or study of the EPI and no astrologer had made any claims relating to it. And despite his initial failure to find results, Dean persisted in setting up the astrologers to do what he was unable to do.

Dean's Meta Analyses (1986-2001)

A meta-analysis enables a quantitative review and synthesis of the multiple studies. However Dean's meta-analysis flouts all the guidelines for this type of study. (Glass 1983) First, by mixing western astrology with fundamentally different techniques (Chinese Divination and Vedic Astrology), the study compares 'apples with oranges'. Though the hypothesis (and conclusion) is to test the claims of typical practicing astrologers, the analysis includes studies of disability, suicide, inclination to murder and accidental death. This is exploratory research. Such extremes are simply not part of typical practice or typical claims. His selection of tests includes much duplication - 36% of the 69 results are from the same studies (mostly at least 30 years old). Many of the tests listed are known, even by Dean, to be flawed resulting in GIGO. Some of the data (such as the Carlson test) are misreported to favour the null hypothesis. Many of the test results are based on personal communication or anecdotal evidence. Dean discounts the positive trend in favour of astrology as down to sampling error and bias. Yet, given the history of scientific misconduct by CSICOP and Dean's withheld tests, publication bias may work against astrology. In spite of all the data corruption, Dean brazenly concludes that astrologers are unable to match birth charts to owners in blind tests. This is a classic demonstration how what starts out as healthy scepticism can easily decline into confirmation bias.[8]

Why does Dr Dean need to abandon scientific rigour and objectivity in order to debunk what sceptics consider to be flimsy evidence?

Magic Tricks

When a sceptic has to cite a magic trick to support his or her argument, they have abandoned all scientific arguments. They are good reasons why these 'performances' cannot be replicated under scientific conditions.

Test of Astrology by illusionist Derren Brown:

One sceptic was disillusioned with astrology largely as a result of a 'test' by magician Derren Brown. The illusionist presented the same horoscope to a group of carefully selected individuals. They all claimed it was accurate and personal to them. Though this appeared to be very damning for astrology, it was a trick designed to create this illusion. I hope that I am not breaking any magician's secrets by revealing the techniques. [more ...]

Why I distrust magician, James Randi.

Another sceptic suggested that I attempt to claim the million dollar prize offered by James Randi 'Educational' Foundation for showing evidence of powers that cannot be explained by known scientific laws. Though I had had an encounter with James Randi that left me with the impression that he could not be trusted to be impartial, I did look into his challenge. However, it's not an option for astrologers as according to Randi, who is by his own admission mathematically-challenged[9], the statistical evidence required creates 'procedural problems' with his performance-oriented testing. It's also impossible as the odds required were unintentionally 'upgraded' to 1 in 10 million ($p < 0.0000001$)! But what mystifies me is that if the paranormal is such obvious bunkum as Randi claims, why has he gone to such extraordinary lengths to make it so difficult to present evidence that supposedly does not exist? [Why Randi's challenge is a charade ...]

Dawkins Sun-Sign Test & throwing stones from a glass house.

One sceptic cited Richard Dawkins' test on Sun Sign astrology in his TV series "Enemies of Reason" (Dawkins 2007). As stated earlier, I am not here to defend this popular media-friendly adaptation of astrology. Why did Dawkins choose to criticise astrology as a field and then only present and caricature newspaper astrology in his TV series? Was he so ignorant that he confused a recent off-shoot with a four thousand year old practice? Or was he attempting to misrepresent the case for astrology to make it easier to attack? Dawkins thrives on ranting against soft targets like militant fundamentalism or religious abuse in his book *The God Delusion* book. But like any proselytizing preacher, Dawkins is only effective when pushing a straw man fallacy from his pulpit.

Before moralizing about the evils of astrology, Dawkins needs to keep his own avid disciples in order. Former Enron CEO, Jeffrey Skilling convicted of multiple federal felony charges relating to the Texan energy giant's financial collapse claimed to have been inspired by Dawkins' book *The Selfish Gene*. (Dawkins 2007) His selfish policy caused great harm. Every year he fired the bottom 5% of his team in a humiliating way. Twenty thousand staff were impacted by the bankruptcy which included at least one suicide. Millions in California were affected by Enron's forced rolling black-outs which led to exponential

price rises for energy and contributed to the state's energy crisis. (Egan 2005) So ironically when Dawkins' social darwinism was applied in the real world it resulted in 'mass extinction' - damage of a different magnitude to that of the worst example of an astrologer! (see How bad biology killed the economy)

Scientific Evidence:

Many sceptics insist on 'irrefutable scientific proof' before they can entertain the possibility of a connection between the celestial and the terrestrial. On the other hand, a few researchers believe they can 'prove astrology' with a single dramatic study. As will become evident both these positions are more about protecting their belief systems than investigative science.

While in mathematics, you can deduce a proof to show that a proposition is always true, you cannot prove a hypothesis in the natural sciences. Scientific theories require the accumulation of empirical evidence that is consistent with a hypothesis. With each replication, the theory becomes more persuasive and established, but since new evidence can show it to be false or that it requires modification at any time, it remains a theory and can never become an eternal proof or a universal law.[10]

Over the past fifty years, scientists and astrological researchers are discovering a growing body of objective evidence of correlations between celestial positions and terrestrial life. These statistically significant results have been published in peer reviewed journals (including Correlation, a specialist astrological journal). Ironically, some of the strongest evidence has come from experiments backed by sceptical groups including CSICOP.

Vernon Clark's Blind Tests (1951-1970)

Between 1951 and 1970, US psychologist Vernon Clark performed a series of blind matching tests involving a total of 50 professional astrologers. While a control group of 20 psychologists and social workers matched 10 pairs of charts with professions to a level of 50% as expected by chance, the astrologers successfully matched 65%. (Clark 1961) Though this result may not sound significant, the odds of this being a chance event is 1 in one in ten thousand. ($p=0.0001$) In a later study, Clark removed any possible cues from self-attribution from knowing sun sign traits, by using matched pairs with the same sun sign. The astrologers matched charts to case histories 72% of the time. An even more significant result. ($p=.00001$) In the final experiment, 59% astrologers were able to distinguish between an individual with a high IQ and one with cerebral palsy. Even this lower result was significant ($p=.002$) Overall out of 700 judgments the astrologers matched correctly 64% of the time. ($p=0.00000000000005$ or 5 in 10 trillion). (Clark 1970)

French psychologist and statistician, Michel Gauquelin (1955-1991)

Supported by his wife Francois, Michel Gauquelin conducted the most famous research into astrology. Though he was interested in astrology, he did not consider himself an astrologer and dismissed much of it including zodiac signs. His tests focussed on the correlation between the positions

of the planets at an individual's birth, his or her psychological nature and how this manifested in measurable ways such as choice of profession or independent biographical descriptions.

Gauquelin's Data

Gauquelin collected data from over 20,000 professional celebrities from various European countries and the United States. Gauquelin's research detected statistically abnormal diurnal positions of the planet Mars at birth in athletes, Jupiter in actors, Saturn in scientists and the Moon in writers. His tests confirmed an ancient claim of astrologers that planets posited around the four angles are stronger and the characteristics associated with the planet manifests prominently in the individual.

Naturally Gauquelin's tests attracted much controversy.

He allowed independent sceptical researchers to scrutinize his original data. Three committees of rationalist scientists Belgian (LERRCP), American (CSICOP), and French (CFEPP), reviewed and independently replicated Gauquelin's results. CSICOP published their results in *The Humanist*. The Belgian group refused to publish their study for eight years, in the vain hope of finding a logical explanation for their positive result. The French took a full 14 years. In the end the group dissolved and the work was completed by Jan Willem Nienhuys from the Netherlands. All groups made their data available, but the CFEPP was the only one to publish the full data. The book outlining the study (*The "Mars Effect", A French Test of Over 1,000 Sports Champions*) [Review].(Gauquelin 1988) (Ertel 1988) (Müller 1990) (Ertel 1990) (Ertel 1992) (Müller 1992) (Ertel 1993)

'The Tenacious Mars Effect' (1996)

by Suitbert Ertel and Kenneth Irving (Urania Trust) "describes the Gauquelin's pioneering work and analyses in detail the attempts by sceptic committees in Belgium, the USA and France to disprove their results. The book highlights the often dubious methods by which hostile sceptics have sought to discredit the Gauquelin's uncomfortable findings and shows that, in fact, much of the evidence is even stronger than previously claimed." (Ertel & Irving 1997) (Ertel & Irving 2000)

New York Suicide Test Press (1977)

Not all valid astrology tests have demonstrated evidence for astrology, but astrologers have been willing to publish these results. Nona Press and two other astrologers gathered 311 records of birth data of subjects who committed suicide in New York between 1969-73 who were also born in the five boroughs of New York City. Despite statistical comparison with a multitude of astrological conventional and unconventional techniques such as asteroids and minor aspects, they were unable to find significant results that related to suicide. However, their results (Press 1977) were duly published in an *Astrological Journal*. Some astrologers have argued that there may not be an astrological signature for suicide (since this is not part of normal astrological practice) or that astrology is divination and cannot be objectively demonstrated by empirical studies.(Cornelius 2003)

Gauquelin & Eysenck (1979-1981)

An empirical study of personality and the position of the planets at birth. (Gauquelin 1979)

The birth data and personality descriptions of several thousand famous French scientists, sportsmen, and actors were obtained from biographies. The rising and culminating positions of Mars, Jupiter and Saturn were calculated and the personality measured according to Hans Eysenck's scales. It was predicted and found that introverts are very significantly more frequently born when Saturn had just risen or just passed its upper culmination; extraverts when Mars and Jupiter had just risen, or just passed their upper culminations.

Eysenck's personality analysis and position of the planets at birth: A replication on American subjects. (Gauquelin 1981)

Personality descriptions of 500 successful American professionals were compiled from their biographies and birth data collected. The precise positions of the planets Mars, Jupiter, and Saturn at birth correlated with H. J. Eysenck's (1967) personality dimensions. Extraverts were significantly more frequently born when Mars and Jupiter had just risen or just passed their upper culmination; introverts when Saturn had just risen or had just passed their upper culmination.

Professor Müller's Studies (1986)

A study by Arno Müller, Professor of Psychology at the University of Saarland, Germany of the lives of 1,145 German nobility over five centuries where records were kept meticulously, showed a significantly higher frequency in infant mortality within the first 15 months ($p=0.0004$) of birth when Saturn was rising or culminating (Gauquelin sectors) at birth. (Müller & Menzer 1986) [This fits with a traditional interpretation of Saturn rising as difficulties early on in life.] This study might be applied to help understand the mysteries of present day cot-death syndrome.

Timm & Köberl: A re-analysis of a study by Hans Bender (1986)

A re-analysis of a study in 1952-55 on 178 German Astrologers showed that astrologers were able to match descriptions of 3 people to 3 natal charts to a significant level. ($p=0.026$). (Timm & Köberl 1986) However, researchers could not rule out the results being attributed to ESP.

Sara Ridgley: Astrologically Predictable Patterns In Work Related Injuries. (1993)

In her Phd. study of 1023 workers in California who were disabled for at least 3 months as a result of accidents at work between 1987-1991, Dr Ridgley found a correlation ($p<0.00000001$) between the Sun position at birth in a 'hard' aspect ($0^\circ, 90^\circ, 180^\circ$) to the transiting Sun and the frequency of accidents. (Ridgley 1993) This study was replication of data from 55 subjects from C.E.O. Carter's book The Astrology of Accidents (1932) which resulted in a high significance ($p<0.00016$) for such a small sample. However, a study by Dobyns and Pottenger (1996-1999) were unable to replicate the results using critical work related accidents to 2,865 workers in Sweden in 1993.

Judith Hill: Redheads and Mars Rising (1996)

In a 1988 study of 500 redheads a remarkably significant (27.2%) were born within 30° of the Ascendant ($p < 0.000001$) and a low 9.8% <30° of the Descendant ($p < 0.000035$) when compared with control groups. A follow-up replication in 1996 of 479 American and Canadian and 473 British redheads (N=952) showed significance ($p = 0.007$ and $p = 0.015$) for Mars rising when compared with two control groups. (Hill 1988) (Hill 1996)

Clarke: Sun & Moon in Positive Signs and Extraversion (E) (1996)

In 1978 Mayo, White and Eysenck (Mayo 1978) published a test (N=2324) that appeared to show that positive (odd numbered) sun signs were significantly more extraverted [E+] than negative signs [E-] and that water signs were higher on the Eysenck Personality Inventory (EPI) Neuroticism [N] scale. These stark results have since been accounted for by self-attribution (Eysenck 1982) - these participants were predisposed to astrology and may have defined themselves using prior knowledge of their Sun Sign.

Two decades later, the Journal of Psychology published a more objective study involving 190 students mostly born in the southern hemisphere (Clarke 1996). The subjects had no special interest in astrology and were given no clues that the test involved astrology. After completing the EPI Form B, they were asked to supply their birth details. While those with the Sun or with the Moon in positive signs had a higher mean E score than those in negative signs, the difference was not significant possibly due to small sample sizes. However, 36 subjects with both the Sun and the Moon in positive signs had a significantly higher mean E score ($M = 16.56$ $SD = 2.66$) than 36 with the luminaries in negative signs ($M = 14.89$ $SD = 3.66$) ($p < .05$)

Didier Castille: La Population Française au Rythme du zodiaque (1999)

Stats for birth distribution in France. Tests on the Sun Signs (6.7% signs are estimated as all times of birth were unknown) and large populations (6.4m & 10m) in France show significant sign correspondence between marital partners (12/12 significant v 1/12 in the control), between Birth Sign with Sign position on Death Date (9/12 significant v 0/12 in the control) but rejected the null hypothesis for a correspondence between birth and death on the same day of the week (i.e. no significance found in the non-astrological test). Castille poses the similarity of these results suggests the possibility of an artefact, but to date none has been discovered.

Bernadette Brady: The Australian Parent-Child Research Project (2002)

Dr Brady (currently with the University of Wales, Trinity Saint David) demonstrates a series of significant correlations between the natal horoscopes of parents and their children. Most notable correlations involved the Moon, the first-born child and the angles. (Brady 2002)

Kathy Yuan +: Are investors moonstruck? Lunar phases & stock returns (2006)

A study in 48 countries over 32 years (402 lunar months) where data is available, showed that stock returns are lower on days around the Full Moon than on days around the New Moon. This result is statistically significant on both a 7 day window (6.9%) and on a 15 day window 5.4% ($p = .0009$). Another study by Pelc and Bondar (2010), analysts at RBS show among other results that by "moon trading", £

1,000 in 1928 invested in S&P 500 would be worth £ 1,502,689 in 2010 compared to £ 63,894 if they had tracked the index.

Suzel Fuzeau-Braesch & Jean-Baptiste Denis (2007)

In an empirical study of 500 pedigree dogs in the Paris region, significant correlations were found in seven angular planets and anthropomorphic traits including two highly significant ones: Jupiter with extraversion and sociability ($p < .000001$) and the Sun with strong personality. ($p = 0.00002$) (Fuzeau-Braesch 2007)

U-Turn in Carlson's Double-Blind Astrology Test (2009 & 2011)

While Carlson in his famous study published in Nature claimed astrology was no better than chance (Carlson 1985), Professor Eysenck (London University) and other reviewers found that Carlson's original sceptical conclusion was not supported by the evidence. Professor Ertel's (Göttingen University, Germany) re-analysis of the data compiled shows that astrologers were able to rate authentic psychological profiles significantly higher than unauthentic profiles in a blind test to a statistically significant level ($p = 0.037$). (Ertel 2009) (Currey 2011)

Jan Ruis: The Birth Charts of Male Serial Killers: Evidence of Astrological Effects? (2012)

In response to criticism of Dr Ruis' initial study 293 serial killers published in 2008, the researcher was able to demonstrate convincingly that the deviation of the test group from the control is highly significant both by Zodiac Signs ($p = .0002$) and by Placidus Houses/Gauquelin sectors ($p < .005$). There was a particular emphasis on mutable signs and the '12th principle'. Also, the Moon was significantly conjunct and opposite the MC ($p = 0.03$). (Ruis 2012)

Christian Cajochen: Evidence that Lunar Cycle Influences Human Sleep (2013)

Sleep Patterns & Moon Phase

Professor Cajochen and his team at Basel University, Switzerland conducted a retrospective study of the data records of the sleep patterns of 33 subjects tested in a darkened room in the lab ten years previously. They found that on a full moon, subjects took 5 minutes longer to fall asleep, had 20 minutes less sleep, spent 30% less time in deep sleep and had diminished melatonin levels. (Cajochen 2013)

Kyosti Tarvainen (2011-2014)

Finnish researcher and mathematician, Dr Kyosti Tarvainen published a series of studies from research into the massive on-line database containing the Gauquelins' meticulous birth records ($n > 23,000$). Tarvainen discovered that while single astrological factors show positive correlations, they are often not statistically significant. This finding is in line with Gauquelin. However, when the factors are synthesized as is the practice of astrologers, the results become significant. An example is Mercury, Gemini and the third house are significant in the charts of Journalists ($p = .03$) (Tarvainen 2012)

Tarvainen's studies also found that certain astrological techniques could not be verified, and other techniques such as synastry produced significant results. (Tarvainen 2011) (Tarvainen 2012a) He later tested out 316 planetary interpretations that were claimed to apply to 11 professions published in a popular astrological text book (known as a 'cook book'). Though Tarvainen found that a minority were not accurate a significant number of traditional claims were supported when tested against 18,000 subjects versus controls. (Overall significance $p=.001$) (Tarvainen 2012b) In 2013, he investigated the prominence of 25 textbook signficators in the charts of 2,759 mathematicians and found significant correlations. ($p=.001$) (Tarvainen 2013). In studying 20,892 families, Tarvainen also found a correlation between a wider marital age gap in the charts of husbands with Venus/Saturn natal aspects (74 days $p=.002$) and a delay to marriage where both partners have Venus/Saturn aspects. (Men 92 days $p=.008$ and women 62 days $p=.04$) (Tarvainen 2014)

Since I started compiling this list, the number of studies (currently around 40) has doubled. See a more extensive list of studies or a list of over a hundred studies published in scientific journals on the correlation between animal behavior including primates and moon phase.

Is astrology anti-scientific? ...

If not, why isn't astrology at the heart of mainstream thinking & education?

Over 500 years astrology drifted from being central to the academic system to an outcast on the fringe. How? Radical new discoveries of the mechanics of the solar system appeared to refute an ancient system developed under the previous paradigm. As the academic world polarized, astrology was not considered an objective science nor an art or a religion. So the real question is how did astrology survive at a time when so much superstition was jettisoned. [For a fuller explanation ...]

The Causes of the Decline:

Four major astronomical discoveries appeared to break the astrological model:

Precession of the Equinox

The Copernican (Heliocentric) System

Discovery of the Outer Planets

The vast distances in space

However, only one discovery forced astrologers to rethink the model. The discovery of Uranus (and later Neptune and Pluto) led some astrologers to review the ancient attribution of sign rulerships. After much trial and error, these new planets took western astrology to a far more sophisticated and complex level mirroring the changes in our evolving consciousness on Earth. Find out why the astrological model survived intact.

Prediction to protect kings and nobles was at odds with a world liberated by free-will, republicanism and democracy during the Age of Enlightenment.

18th century astrology did not fit into a new academic curriculum increasingly divided into humanities (theology & the arts) and sciences. The Church had long seen Astrology as subversive and early science was not compatible with deductive theories about the complexities of the human psyche and patterns of behaviour.

The Legacy of this Decline:

Isolated from the academic environment for over two centuries, astrology is increasingly judged from a position of ignorance. Such prejudice is unquestioningly passed onto the next generation of students so that astrologers are seen by as heretics.

Media distortion and regulation. The tabloid press presents astrology in a sensationalist manner with unsupportable predictions. Pressure groups like CSICOP's (now CSI) "Council for Media Integrity" push their point of view onto the broadsheet press and mainstream media to encourage criticism or ridicule.

Historic bias now masquerades as scepticism and can infect top scientists. Mainstream scientific journals will not publish an astrology paper as it is not their field and they cannot peer review it. Yet, flawed experiments supporting a sceptical agenda that would not pass peer review in journals like *Correlation*, sneak into 'respectable' journals. For many, especially older, male, white scientists, the subject is taboo unless like Professor Hans Eysenck, you get tenure and can indulge your hidden interest. [More ...]

Astrology has not only survived these crises, but with the discovery of additional planets and the growth in knowledge including psychology, the field has transformed into a much more powerful system. Yet, conventional wisdom dismisses it as a product of the dark ages.

Astrologers only defend astrology to protect their vested interests.

To try to undermine an argument by claiming that the proponent has financial, psychological or other motives rather than address the merits of the argument is an ad hominem and psychogenic fallacy. Many sceptics claim that astrologers make a lot of money. This may be true of a few Sun-Sign columnists who are more like media celebrities than typical astrologers. The fact is that most astrologers devote much of their life to studying their subject and still struggle to make a living or supplement their income with better paid work. Their motivation is the pursuit of knowledge rather than money.

Those at the top of the multi-million dollar "Skeptical Industry" make a comfortable living and notoriety through popularizing their beliefs. There are lucrative conferences, lecture circuits, books, magazines and journals to promote and like an evangelical church, donations are encouraged by playing on the fears of the faithful. Their tax-exempt organizations are in a different league to their astrological equivalents: CSICOP (CSI) [2011 expenditure ca.\$2 million] or the JREF [2009 expenditure ca.\$1 million] (JREF 2009)

Is astrology a science and does it matter?

The short answer to both is no. However, much depends on your definition of science. If you are looking for laws, objectivity and predictability, then science is really confined to physics, chemistry and molecular biology. The scientific part of astrology: tidal, seismic and meteorological correlations are an ancient and important part of astrology, but not enough to classify astrology as a hard science.

The same argument applies to many other so-called sciences: such as climatology and meteorology. Most scientists argue that fields that involve human consciousness and behaviour such as psychology, sociology, economics or human senses such as nutrition or music are not science. It is arguable that evolution is not scientific under this strict definition. The nearest equivalents to astrology are cooking or horticulture which are both a mix of art, science and craft.

Science has greatly improved the quality of our lives and enhanced our understanding of nature, but many fields that really matter to our lives are not scientific. Those who dismiss these alternative viewpoints support scientism, Such fundamental beliefs are counter to the open inquiring spirit of science. In scientism a claim is false until proven. In science a claim is unproven until proven.

Some argue that using certain dictionary definitions of science, there's a case that astrology is a science as there is a body of knowledge that can be taught. (OED 1996) However, the practice of astrology by most astrologers is better defined as an art or a craft than as a science and it would be wrong for these type of astrologers to claim to be scientists. As such it would also be equally wrong for a scientist who has not studied astrology, to consider him or herself qualified to judge such practices since they are outside the realm of science.

If you have read this far, you will now know there are no grounds to dismiss astrology as complete rubbish from a scientific point of view. If you still believe astrology to be rubbish, ask yourself, is your belief based on astrological knowledge and actual experience? Or is it blind faith inspired by feelings? Or were you won-over by an illusionist's trick? Or were you informed by a second-hand opinion that appears authoritative, but is based on an ill-informed, outdated or prejudiced view of astrology? Those who have studied astrology are the best authorities on the subject.

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test involved ranking rather than yes/no. Sceptical authors have considered the VC tests to be thorough (Dean p.544) and clear-cut (Eysenck p.84). Professor Eysenck did comment that one of the professions was a prostitute and it was possible to assume that she was on the younger end of the 45 to 60 age range! However, this potentially misleading cue was also available to the control group who performed no better than chance.

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Footnotes

^ In 1958 Bertrand Russell wrote "Nobody can prove that there is not between the Earth and Mars a china teapot revolving in an elliptical orbit, but nobody thinks this sufficiently likely to be taken into account in practice." Letter to Mr Major. In *Dear Bertrand Russell: A Selection of his Correspondence with the General Public, 1950 - 1968* (London: Allen & Unwin, 1969). Bertrand Russell makes the valid point that the burden of proof for any belief is on the proponent. However, the nonsense of the China Teapot believed by no-one and unsupported by evidence does not equate to a widespread claim of correlation supported by evidence. Russell never intended this analogy to be used an excuse to ignore evidence to make prejudicial assertions.

^ There are 4067 physical astrology books registered at the libraries of Oxford University, 4622 astrology books registered at the libraries of Cambridge University and 2260 astrology books, dissertations and journal titles in the libraries of the University of London, which includes the prestigious Warburg Institute. These are not all history books. For example, a search on *Astrology & Science* shows 351 titles at the Oxford Library Collections. Source: personal correspondence, Philip Graves, April 2013

Astrology books are not confined to University Libraries, Dr David Juste, eminent researcher and historian says that the Vatican Library contains a substantial collection of astrological works, some of which are only extant there.

^ Hubris or hybris ('hju:bris) denotes excessive pride or a lack of humililty resulting in ill-treatment of others to enhance the transgressor's superiority which ultimately invites his or her ruin.

"Hubris consists in doing and saying things that cause shame to the victim ... simply for the pleasure of it." ~ Aristotle

"Hesiod (7th century bc) and Aeschylus (5th century bc) - used hubris to describe wrongful action against the divine order. From this usage modern thinkers developed the idea that hubris meant overweening presumption leading to an impious disregard of the divinely fixed limits on human action in an ordered cosmos." *Encyclopedia Britannica, Hubris*

^ John Stuart Mill, classical economist and philosopher, rephrased David Hume (Hume 1888): "No amount of observations of white swans can allow the inference that all swans are white, but the observation of a single black swan is sufficient to refute that conclusion."

^ *History of Meteoritics* (retrieved 2012) *Meteorite.fr* - All about Meteorites "Until the early 19th century, most scientists shared Isaac Newton's view that no small objects could exist in the interplanetary space - an assumption leaving no room for stones falling from the sky."

^ Full quotation: "What is the first business of one who studies philosophy? To part with self-conceit. For it is impossible for any one to begin to learn what he thinks that he already knows." Epictetus

Discourses Book II, Ch. XVII How to apply general Principles to particular Cases. from Epictetus, The Works of Epictetus. Consisting of His Discourses, in Four Books, The Enchiridion, and Fragments. Translation from the Greek based on that of Elizabeth Carter, by Thomas Wentworth Higginson (Boston: Little, Brown, and Co., 1865).

^ The aura is considered a subtle translucent lustre that surrounds living objects. Only a few people, notably spiritualists, mystics, psychics and healers claim to have 'seen' an aura in the form of light radiating from the body. Some believe there is a correspondence between the colours within the light and the planets, though the aura is not part of astrology. The concept traces back to Zoroastrianism and manifests in Buddhism, Kabbalah, Neoplatonism and Christianity [e.g. Luke 11:36] and popularised in books by Carlos Castaneda. In religious art it is depicted as a halo. There are very few scientific papers on the topic. A five-year study conducted by Dr. Valerie Hunt and Dr. Wayne Massey at the UCLA Department of Kinesiology (1977) entitled A study of structural integration from neuromuscular energy field and emotional approaches. measured auric fields in relation to Rolfing. The researchers claimed that after Rolfing "Electronic auric studies showed progressive change from a random low frequency field to a coherent high frequency, classically interpreted to indicate high consciousness."

These comments are here for background information only and there is no claim as to the existence or non-existence of the auric field.

^ For at least seven years, Dean's Meta-Analysis was published without any references. Eventually a list of the 69 results from 44 studies was published in Astrology Under Scrutiny (2013) by Dean et al. Besides the inclusion of flawed tests as anticipated, one third of the tests were duplications, many were anecdotal, misreported and a large number were not relevant to the hypothesis and conclusion. [More about the Meta Analysis]

^ After widespread criticism that the odds in the Randi challenge were unreasonable even by the standards of physics, James Randi was forced to revise the required probability levels. Randi admitted "My abysmal ignorance of statistics requires that I frequently appeal to statistician Chip Denman of the University of Maryland for frequently sobering advice and counsel." 28 February 2008. Wayback Machine record from randi.org

^ At any stage a theory can be disproved. In an attempt to account for Gauquelin's apparently irrefutable statistical results, Geoffrey Dean dreamed up a highly implausible claim that a century ago parents falsified the birth registration times to optimise their offspring's charts! It is hard to see how any parent would want what was considered a malefic planet, Mars in a prominent position. But since a reasonable conventional explanation (artifact) can never be ruled out in the future, Gauquelin's data no matter how solid is no more than an astrological theory. It cannot become proof or a so-called 'scientific law'.

Kepler's third law was shown to be incomplete and inaccurate by Newton's laws of gravity which were later shown to be imprecise and incomplete by Einstein's Theories of General and Special Relativity. In the same way, even though the evidence appears overwhelming, it remains Darwin's theory of evolution rather than his law of evolution.