

The Phillipson Interview

Five leading researchers face 150 questions about scientific research into astrology

This is an expanded version of the collective interview by Garry Phillipson of astrology researchers Dean, Ertel, Kelly, Mather, and Smit, that appeared in his book *Astrology in the Year Zero*, Flare, London, September 2000. It took a full year to devise and answer the questions (and the questions raised by questions) in a way that was concise, readable, and complete. Issues normally evaded by astrologers are tackled head on.

Each researcher has been investigating astrology for at least twenty years. Two have been full-time astrologers and two are university professors. Between them they have written over 200 astrology articles and several books.

Questions marked “e” are *expanded* (11 questions), those marked “n” are *not in book* (64 questions). Unchanged *originals* (75 questions) are unmarked. A brief summary of answers is at 20.3 on page 66. Completed October 2000. Minor revisions and new figures June 2003.

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* Here the researchers continue the discussion of the book’s final topic (What is Astrology — Science or Magic?) and argue that astrology is most likely an artifact.

Part 1:

Background to scientific research into astrology

1. Introduction by Garry Phillipson

1.1 — In contemporary western society science is commonly seen as the final arbiter between reality and illusion, and this book would be incomplete if it did not represent the scientific view-point on astrology. I chose to approach Geoffrey Dean — an experienced researcher who is well-versed in scientific methodology, astrology, and what happens when the two collide. Dean suggested that he recruit others to help out, and the upshot was that I interviewed by email a team of five prominent researchers scattered across the globe. Their collective answers led to further questions, and also to changes and clarifications. To meet size constraints, we then collectively edited the entire interview down to the version that appears in Chapters 9 and 10 of *Astrology in the Year Zero*.

We have tried, in this interview, to cover the main issues which have arisen between astrology and science. Trying to accomplish this in a finite number of words made compromise inevitable — in the questions asked and not asked, the amount of discussion and illustration possible for any given topic. The researchers have asked me to point out that, although they are similar in their scientific approach, this does not mean they are incapable of disagreement. They report that some of my questions led to differences of opinion (for example on the relevance of religion to astrology), but that once these differences were explored they tended to disappear. These explorations do not appear in the interview, whose hard-won unanimity may therefore be deceptive. My sincere thanks and gratitude go to each researcher, and particularly to Geoffrey Dean for collating their input. [Photos and biographies of the researchers can be found on www.astrology-and-science.com/ by clicking “About Authors”]

2. How the researchers got involved in astrology

2.1 — It seems rare for scientists like yourselves to be involved with astrology, especially for more than twenty years. How did it happen?

Researchers: We were intrigued by astrological claims, and by the depth and complexity of the subject. Was astrology true? Could the stars really correlate with human affairs? How could it work? Scientists love challenges like that. The problem was the lack of evidence whether for or against (a situation no longer true). So we set out to explore the claims in depth. That was how our research started. Along the way some of us became practising astrologers, so we were able to approach the subject from both the inside and outside.

2.2 — How did the astrologers become astrologers, and what effect did your researches have on your astrological practices?

Researchers: One of us (Mather) was a self-taught student of astrology and was sufficiently impressed by results to become Research Co-ordinator for the Astrological Association 1971-1978. Two of us (Dean, Smit) were full-time practising astrologers and teachers of astrology. Dean was the founding president of the Federation of Australian Astrologers WA branch. Smit was the founder of NGPA, at the time the only Dutch society for professional astrologers, and while in Australia was the distributor for Matrix Astrological Software. Both

of us have lectured at international astrology conferences, and in 1988 we both received an AMR Commemorative Bi-Centennial Award for contributions to astrology, specifically for our work in research. (AMR = the Sydney-based *Astrological Monthly Review*. The Award was an international one, for example other recipients included Doris Chase Doane, Liz Greene, Robert Hand, Alan Oken, and Lois Rodden.)

We started in much the same way as any astrologer starts — we calculated charts, saw that they seemed to work, and were hooked. Astrology became our passion. Every spare moment became devoted to it. We read more and more books, we did more and more charts for more and more people, we went to meetings and talked to more and more astrologers (whose experience was much the same as ours), and we became more and more convinced that astrology worked. Nothing we saw or experienced told us otherwise. Astrologers were generally nice people, they seemed intelligent and well-educated, they spoke from the heart, and they based everything on practical experience. Other than sun sign columns, which most of them rejected, there seemed to be nothing for anyone to complain about. We did not understand why some people should be so hostile to astrology. Nevertheless problems remained, for example chart readings still seemed to fit when by accident the wrong chart was used.

2.3 — So what happened next?

Researchers: Those were the days when scientific tests of astrology were hard to come by. So we began to make our own tests. That is, we controlled for artifacts and other sources of error, something astrologers rarely did. (An artifact is something spurious that mimics a genuine effect, for example the varying number of days per month will mimic a dependence on month unless we adjust the arithmetic.)

We were dismayed to find that artifacts and errors seemed to explain everything. At which point our beautiful world of astrology began to collapse. For example when Mather used the data for 900 major earthquakes to test the claim that they tended to occur when Uranus was on the MC or IC, the claim could not be confirmed (95 earthquakes fitted but so did 91 out of 900 non-earthquakes). When Dean used volunteer clients to test charts that, unknown to the clients, had been altered to reverse their meaning, the reversed charts were accepted as readily as authentic charts. When Smit tested the main predictive techniques on people who had died an accidental death (nothing ambiguous here), the claims in astrology books could not be confirmed.

Ultimately we took heed of the mounting evidence and ceased actual practice, as did a few rare astrologers like David Hamblin (a former chairman of the Astrological Association), Terry Dwyer (a former tutor for the Mayo School of Astrology), and Jan Kampherbeek (a former editor of the Dutch magazine *Spica*). As Aristotle might have said, astrology is dear to us, but dearer still is truth. But we did not lose our interest in astrology.

Of course such U-turns can be personally traumatic. For example Smit was originally an amateur astronomer highly skeptical of astrology, so his conversion to astrologer was of momentous personal significance, making his unconversion even more so. When he realised that astrology seemed to have no basis in scientific fact, and probably never would, his rich and rewarding astrological life suddenly lost its meaning. He fell into a mental depression that lasted several years, and which was perhaps the main reason for the breakup of his marriage at the time. Even today he finds it painful to realise his initial skepticism of astrology had been justified, albeit for reasons more valid than those given in astronomy books, and that for over a decade he had been neglecting his original interests in favour of astrological ones.

If nothing else, his experience illustrates the passion that astrologers can have for astrology. To dismiss them as frauds (as some skeptics do) is to miss the point.

2.4 — How did the non-astrologers become involved?

Researchers: We had long been interested in related matters, namely solar effects on people (Ertel) and lunar effects on people (Kelly), so in due course we also became interested in how astrologers conceive of relationships between heavenly bodies and people.

2.5 — How did this new interest affect you?

Researchers: As with the others, we experienced a kind of conversion, not from science to astrology or vice versa, but from bad closed-minded science to good open-minded science. By forcing us to be neither believers nor disbelievers, astrology has helped us to be genuinely open-minded, so it is easier to be open-minded in other areas. In short, astrology has made us better able to observe the spirit of science, which ironically seems quite the opposite to its effect on astrologers.

3. Research methods, tests, what researchers investigate

3.1 — How would you define scientific research as applied to astrology?

Researchers: In astrology there are millions of opinions and we can have them for nothing. But for knowledge we must work. We must do research. Scientific research in astrology has the same aim as scientific research in general — to improve what we know and to improve what we do. To us it reduces to four simple guidelines: (1) Be careful because pitfalls are everywhere. (2) Consider other explanations for claimed astrological correspondences. (3) Investigate all promising ideas. (4) Follow wherever the results of sound investigation lead even if they conflict with existing beliefs.

3.2e — These four guidelines really look like applied commonsense. Are they really any different from what a competent astrologer would do?

Researchers: The four guidelines may look like applied commonsense but to our knowledge few astrologers actually follow them. Even the most competent astrologers seem unaware of pitfalls, they do not consider other explanations, and they do not follow where the results of sound investigation lead. In fact these are the main objections that scientists hold against astrologers. Nevertheless your point is true in one sense — researchers investigate the same testable claims as do astrologers. The crucial difference is that researchers are more careful and more rigorous. Researchers and astrologers differ not so much in their ideas as in the approaches used to test those ideas.

To put it another way, astrologers seem to see research as being consistent with a philosophy that says “We use X, therefore we need research to confirm X.” Here X might be anything from the most trivial of techniques to astrology itself. Or as Donald Bradley (then the leading US research astrologer) said in 1950, “It appears to be an unwritten article of faith ... that all improvements are welcome so long as the complacent surface of tradition is not disturbed.” But we see research as being consistent with a philosophy that says “Research by many people has shown that X works under conditions where alternative explanations can be ruled out, therefore we use X.”

3.3 — Are there different schools of thought advocating different methodologies for scientific research in astrology, or are researchers unanimous in their approach?

Researchers: Yes and no. Methodologies in science generally may differ in detail but all involve the critical examination of ideas. The same applies to scientific methodologies in astrology — nothing is accepted just because astrologers say it works. What matters is whether it stands up to critical examination, of which tests are an important part.

3.4 — So what is your own approach to scientific research? From start to finish, what do you actually do?

Researchers: Our own approach is quite ordinary. First, we survey the literature to determine what research already exists. Very little research into astrology by scientists existed before the 1950s. Today there is a great deal, although few astrologers seem to know about it.

Second, we perform tests of promising ideas according to our interests and resources. Thus we might test astrologers to see if they get the right answers, or we might test the charts of say extraverts to see if they differ from those of introverts, or we might re-examine old studies to see if they might provide new information.

Third, we submit the results to informed critics and act on their comments. If flaws are uncovered, or if we fail to follow up a promising line of enquiry, then we must try again. Science is a tough business. Finally, at the end of years of painstaking work (nobody said research had to be easy) we survey the totality of results to get an overall indication. No individual study stands alone.

3.5e — What types of test are there?

Researchers: Tests can be qualitative (what kind?) or quantitative (what amount?). A qualitative test involves categories (yes/no, male/female, Jupiter/Saturn), so shades of grey are not allowed. A quantitative test involves numbers that express position on a scale (20 kg, 50% certain, orb 5 degrees), so shades of grey are allowed. Which is best? Some astrologers say qualitative, but to us this applies only if people were never shades of grey.

Qualitative tests tend to be exploratory (finding out what might be present) rather than confirmatory (testing what is known to be present), so they tend to incorporate as many factors as possible, which might seem to make them well suited to astrology. But astrologers claim to know what is present (read any astrology book) so an exploratory method seems inappropriate. Furthermore, incorporating many factors greatly increases the chance of spurious interactions, which in effect makes qualitative tests incapable of detecting complex interactions of the kind said to be characteristic of astrology. They also tend to use small unrepresentative samples that are unable to detect weak effects (large samples are more sensitive than small samples). So once past any initial exploration stage, we prefer quantitative tests.

Indeed, much of astrology is already quantitative, as when astrologers use orbs or when they weight factors prior to chart synthesis, which they presumably would not do if qualitative really was better. But qualitative tests may be preferred by astrologers because they are easier to apply non-rigorously and are therefore more easily persuaded to give the desired outcome. Or because they are more open to creative interpretation, which amounts to the same thing.

3.6e — I'm not sure I can agree. Quantitative tests require using statistics, but many astrologers feel very strongly that the statistical approach is quite unsuited to astrology.

Researchers: There are two kinds of statistics. If astrologers mean *descriptive* statistics, as in births and deaths, their argument is that statistics deals with groups whereas astrology deals with individuals. That is, each chart is said to be unique, so the success or failure of judgements for other charts is irrelevant. But this is like saying each day is unique, so whether the sun rose on previous days is irrelevant. Those who depend on the sun might disagree.

Alternatively if astrologers mean *inferential* statistics, as in $p = 0.05$, their argument is invalid. Astrology is said to incline rather than compel, so we have no way of knowing whether a particular chart judgement is a hit or miss until after the event. Astrology works only sometimes. In other words it is essentially probabilistic, which means that probabilistic (i.e. Statistical) approaches could hardly be more suitable. Furthermore, whether we describe our observations qualitatively (e.g. by categories) or quantitatively (e.g. by scale positions), we still need to count their numbers, so we still need statistics to make sense of them. Calling our approach qualitative does not avoid the use of statistics.

Though astrologers and researchers both use qualitative approaches, only researchers follow them with quantitative checks to avoid being led astray by artifacts and reasoning errors.

3.7 — What sort of questions do researchers investigate?

Researchers: Is it true that positive signs are extraverted, that an elevated Neptune is musical, that adverse Mars transits indicate accidents, and that Bucket patterns become agitators? What is the best zodiac, house system, aspect system, dynamic technique? Does Saturn mean the mother, the father, or neither? Are sun sign columns plausible? Should the signs be reversed in the southern hemisphere? What about distance, latitude, the 99th harmonic? How important is experience, intuition, a friendly client, an accurate birth time? Do astrologers perform better than computers, graphologists, palmists, psychics, tossing a coin? Is X easy to see in charts? How strong are astrological effects? How important is the search for new techniques? What makes a good astrologer? How to choose an astrologer? And so on. But perhaps the most important question is one that astrologers rarely ask, namely could we be fooling ourselves? Could astrology seem to work for reasons that have nothing to do with astrology? This too has been carefully investigated.

3.8e — Are there some astrological claims to which scientific research might be irrelevant?

Researchers: Some astrologers claim that scientific research is impersonal or unspiritual or insensitive to deeper truths. For example they claim that the personal direction and purpose revealed by astrology cannot be tested. Or they claim that astrology involves subtle factors not yet known to science. In each case they conclude that science is unsuited to astrology, period. But apart from its emphasis on critical evaluation, science requires only that events be observable in some way. Astrology is the same, for example the *Larousse Encyclopedia of Astrology* (McGraw-Hill 1980) says the central tenet of astrology is that the heavens and their terrestrial counterparts “are related in a significant and observable manner” (p.19).

We recognise that astrological “observations” are often little more than mere impressions. Nevertheless if astrologers can observe the claimed correlations, so can scientific researchers, and vice versa.

In fact we all use scientific methods every day whether we realise it or not. Thus when our car won’t start we form likely hypotheses, all of them involving observables (such as blown fuse, flat battery, faulty starter), and then test them. If our hypotheses did not involve some observables then by definition we could never discover the problem and therefore we

could never fix it. Similarly if someone is ill, or if someone is said to match their chart, we use the same approach based on observables. We act like prototype scientists. It is unlikely that astrologers could survive if science did not apply to general everyday matters of the kind that clients consult astrologers about.

Does this mean that science must apply to all areas of astrology? Not at all. If no possible observation could rule out a particular claim, then the claim is untestable, and scientific research is irrelevant. It is as simple as that. We can test the idea that Leos are more generous than other signs, say by analysing the tips given in restaurants, but as yet we cannot test the idea that Leos were Cancerians in their previous life. Even so, we can still compare astrology to other systems that claim to give direction and purpose to our lives (astrology has no monopoly here), in the same way that we can compare the origin and maintenance of religious beliefs. Perhaps more importantly, we can explore the distinction between subjective and objective astrology.

4. Subjective and objective – two views of astrology

4.1 — Are you putting “subjective” and “objective” forward as distinct categories of astrology? I’m sure that many astrologers view astrology as existing half-way between subjectivity and objectivity.

Researchers: For such astrologers the distinction is a philosophical one, as for example in whether or not we create the world we live in. But this is not the distinction we mean. We use these words in a particular way, *so their definition is crucial!* For our purpose we can divide astrology, however defined, into subjective and objective components as shown in Figure 1. Figure 1 shows that subjective-objective is not a matter of black-white but of shades of grey. Nevertheless we can still describe what each dimension represents, as follows:

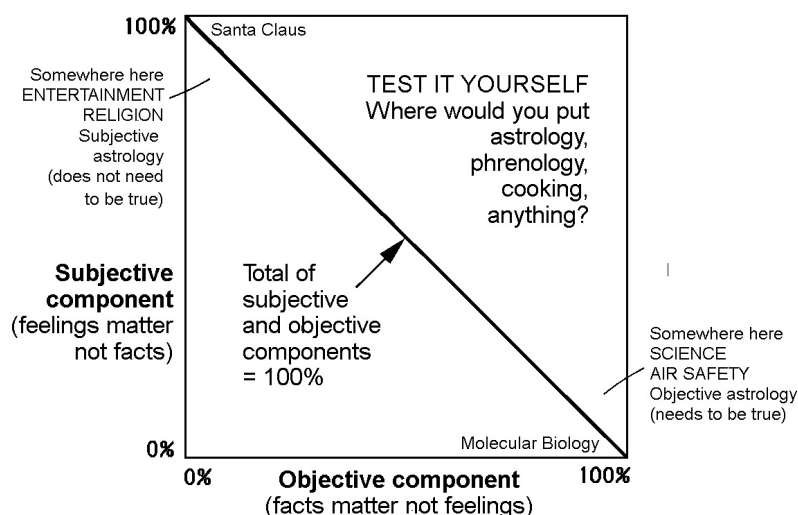


Figure 1

Subjective (vertical axis) vs objective (horizontal axis).

In principle we can take any practice and divide it roughly into two components, subjective and objective. If we make the total equal to 100%, the plot of one component against the other will then be a straight line as shown above. At the top, only feelings are important, as in pure faith-based religion. At the bottom, only facts are important,

as in pure science. In between are those practices that are nominally a bit of both, such as astrology, phrenology, and cooking. To illustrate the subjective-objective distinction we have aligned them with feelings-facts.

Alternatively we could have aligned them with say spiritual-material or benefit-truth or religion-science. Of course the terms are not strictly equivalent, but our aim is to illustrate the distinction without being dogmatic about what subjective-objective should mean.

In subjective astrology only subjective values matter. The correctness of a particular statement, or of a chart reading, or even of the chart itself, is of no direct concern. What matters are issues like: Does astrology give a direction and purpose to our life? Does it provide benefit, self-understanding, insight, empowerment? Do astrologers feel that it always works? Are clients always satisfied by astrology? Does it enrich our lives in ways that the rational cannot? As say religion, myth, poetry and fiction do? *To be accepted, subjective astrology does not need to be true.*

In objective astrology our subjective values do not matter. That millions of people may feel empowered or dismayed by astrology is of no direct concern. What matters are issues like: Are the statements of astrology true? Are Leos more Leonian than non-Leos? Which techniques are the most accurate? Do rectified times agree with actual times? Can astrologers pick the real chart from a control? Can clients pick their own interpretation from a control? Does astrology provide information not available from elsewhere? *To be accepted, objective astrology needs to be true.*

Figure 1 also shows how we cannot conclude that a false or problematic belief is due to nothing more than simple-minded gullibility. The belief might be due to an emotional value, its social value, or its cultural value. A material feast cannot appease a spiritual hunger, a point underlined by the sheer longevity of major religions. In other words there is more to astrology than being true or false. Let us look at this crucial point in another way:

The distinction between subjective and objective astrology reflects how believers and critics tend to view astrology differently. The typical believer is looking for a spiritual experience that transforms the self (does astrology give meaning, understanding, direction?), but the typical critic is looking only for material proof (is astrology true, what is the evidence, where are the tests?). So the believer sees the critic as having missed the point, and vice versa.

In summary, any particular astrological claim could fall anywhere on the straight line in Figure 1. If we do not make the distinction between its subjective component (sought by typical believers) and its objective component (sought by typical critics), we will be unable to choose the proper criteria for judging the claim, thus creating conflict where none may exist. Which is not helpful to either side.

4.2n — My concern is this: many astrologers believe that astrology works precisely because the subjective and objective domains interact. In this view, subjective qualities such as empathy might be necessary conditions for an astrologer to accurately answer a question such as ‘when will my daughter give birth?’ — objective information.

Researchers: There are two separate issues here. First, as shown in Figure 1, we are using the terms subjective-objective as a convenient label for a distinction that could also be seen as spiritual-material or benefit-truth or religion-science. But astrologers (and yourself) are using the terms subjective-objective in a different way. For example Rob Hand in his 1989 Carter Memorial Lecture says “astrology does not accept that subject and object are independent. If astrology did, how could one talk about someone’s spouse from a horoscope?” (*Astrological Journal* Nov-Dec 1989). Here his usage is grammatical — horoscope (subject) indicates (verb) spouse (object), which is the same as saying that everything (subjects, objects, apples, oranges, the above, the below) is linked to everything else. In principle we can tell what our fingers are doing by looking at our toes. Nothing here about spirit-benefit-religion being a necessary condition for an astrologer to deal with matter-truth-science, or about astrologers who want to be accurate having to be X rather than Y.

Nobody denies that empathy is important for astrologers to have, but this has nothing to do with the accuracy of astrology itself. No doubt hugely empathetic phrenologists existed, but so what? To imply that their empathy converted an untrue phrenology (see 6.3) into a true phrenology is like saying empathy will convert you into a person for whom a wrecked car or TV set will instantly work. Obviously the world does not work like that.

Second, we are merely dividing astrological claims into what for convenience we have called subjective (spirit-benefit-religion) components and objective (matter-truth-science) components to make sure we choose the proper criteria for testing them. If the claim is about spiritual matters then a material test is clearly inappropriate, and vice versa. To not make the distinction would be like dismissing Christianity because archbishops cannot walk on water.

4.3n — Another concern has to do with your reference to a ‘subjective astrology’, which ‘does not need to be true’. It seems to me that astrologers generally *need* to believe that they can access objective information from reading a chart. Those who lose this belief do the honourable thing and stop practising. Astrologers do not think of themselves as practising purely ‘subjective astrology’ — most would consider it to be fraud.

Researchers: Again there are two separate issues here. First, the need to believe that astrology is objectively true, which we will come back to in Part 2 when we discuss research outcomes (see 14.4). Second, the idea that a purely subjective astrology is a fraud, which is like saying spiritual astrologers are frauds but not archbishops.

4.4n — If I try to picture someone, who is not a fraud, practising ‘purely subjective astrology’, I have to see them as not saying anything which is falsifiable about the person, event, or whatever they are using astrology on. This seems to exclude virtually all statements of the form ‘You are like this’, and ‘You will experience this’.

Researchers: Exactly right. Nothing is falsifiable anyway, simply because astrology is said to only incline and not compel, or because contrary factors can always be found, or because the manifestation is not typical. So the statement can never be of the form ‘You are like this’, only of the form ‘You may or may not be like this’. Although astrologers and clients seem quite unaware of this non-falsifiability, it nevertheless implies that this part of their astrology is purely subjective as defined by us, but presumably they do not consider it to be fraud.

4.5n — I don’t see that such statements can be labelled ‘astrology’. Astrology is, by definition, about getting information from the positions of planets and stars; and if no information has been obtained, then no astrology has taken place.

Researchers: We do not see why charts containing opposing factors, or an astrology that only inclines, should deny the getting of information. No astrologer argues that non-falsifiability stops astrology taking place. Also, the information can be inaccurate, as research repeatedly confirms, but an astrologer’s reliance on mythology and reasoning by analogy is unable to detect error or to separate the wheat from the chaff, see 6.5-6.6. So the mere fact that astrology has taken place as opposed to not taken place is no guarantee of anything.

But many astrologers argue that astrology is about getting *meaning* rather than *information*, where (like religion, myth, poetry and fiction) it enriches our lives in ways that the rational cannot — a disagreement readily resolved by our subjective-objective distinction (meaning is subjective, information is objective). It also introduces another set of problems to do with meaning, but we have already touched on those in 4.1.

4.6n — Perhaps you could go ahead and explain something more about the uses of your subjective-objective distinction.

Researchers: Our subjective-objective distinction is especially helpful when we come to judge the relevance of science because it avoids any shouting match between astrologers and scientists. Where astrology limits itself to areas where only subjective or spiritual values are required, science hardly matters. But where astrology makes objective and testable statements such as those that fill astrology books, then science becomes essential, at least for those unwilling to accept everything on faith.

4.7 — How does this affect the aims of scientific researchers?

Researchers: It is not for researchers to dictate which kind of astrology (subjective or objective) is important. Their aim should be a more modest and respectful one — to point out for astrologers the need to be careful, and to show what happens when this need is neglected.

5. Do researchers differ from astrologers

5.1 — What do you think astrologers could learn from the discipline of the researcher?

Researchers: What we do is no different from what astrologers do in that we both make observations. But we are more careful. In fact hugely more careful.

5.2 — What does this mean in practice?

Researchers: Consider first how astrologers do things. Each time they erect a chart they see how remarkably it corresponds with the person or event. They see with their own eyes that astrology works even though science (apparently) cannot explain it. This is their everyday experience, and on this experience they rest their claims. What could be more fair, more reasonable, and more disarming of criticism? Who could argue against “it works”?

But consider what “it works” actually means. It means that *all non-astrological influences leading to the same result have been ruled out*. Astrologers seem to take this proviso for granted, but researchers have to be more careful. Ruling out non-astrological influences is harder than it might seem. We are too easily misled.

5.3n — Why is that?

Researchers: Throughout human evolution we have been deluged with incomplete and ambiguous information arriving via our senses. But survival required us to see, hear and move instantly in response to food or danger. To stop and reason carefully on every occasion, as when a predator was about to pounce, would have been disastrous. A man seeking the truth by reason did not live long. Today we have inherited the consequences — speedy sense perception as in recognising faces but poor reasoning skills as in assessing astrology. In short, when it comes to reasoning we are easily misled, a liability that went largely unnoticed until the rise of experimental and cognitive psychology in the early 1900s. So we have to look at astrology under conditions where we are less likely to be misled.

5.4 — And you see this as being where your approach differs from that of most astrologers?

Researchers: Yes. We want to avoid being misled, and avoiding being misled is part of what being scientific is about. Unless we are careful, unless we are aware of where we can go wrong, we can look at the Earth and conclude it is flat. Things are not always what they seem, a point most astrologers seem unaware of.

6. Reasoning errors and their disastrous effects

6.1 — Can you illustrate what you mean about “things not always being what they seem”?

Researchers: Here’s an example anyone can try. With a ruler draw a vertical line a few cm long, then close underneath draw a horizontal line of the same length. The vertical line looks distinctly longer. The illusion prevails even though many credible authorities might claim the lengths are equal. Worse, it prevails even though you re-measure the lines to check their accuracy. This example shows how, without measurement, without tests, the error would never become apparent. The thing is not what it seems.

The dangers of error become immensely greater at the higher levels of reasoning, i.e. at the levels where astrological ideas are formed, taught and applied, which is why we are so easily misled. Indeed, errors at these levels are as diverse as human experience itself.

6.2 — Can you give examples?

Researchers: Ordinary people have embraced countless things now known to be untrue, such as the belief that the Earth is the centre of the universe, or that the number 13 is unlucky, or that sleeping in moonlight sends you insane, or that rubbing frostbite with snow is helpful, or that the Moon is covered in ice 140 miles thick, or that bloodletting cures illness, or that the Fox sisters were genuinely psychic, or that the 23,28,33-day cycles of biorhythms work. Books such as Charles MacKay’s *Extraordinary Popular Delusions and the Madness of Crowds* (Noonday reprint 1977) and Martin Gardner’s *Fads and Fallacies in the Name of Science* (Dover 1957) attest to the pervasiveness and often amazing longevity of delusions (false beliefs). N-rays, polywater, and canals on Mars are examples where even scientists saw things that subsequent investigation showed not to exist. Cold fusion may be another. Such delusions (other than optical ones) are almost always due to our poor reasoning skills, and here the example closest to astrology is phrenology. A look at phrenology is enormously revealing about astrology.

6.3 — Tell me more.

Researchers: Phrenology is a system of philosophy based on reading character from brain development as shown by head shape, or in popular terms by the bumps on the skull. Phrenology is now effectively dead but in the 1830s its popularity exceeded that of astrology today. Thus in the UK one quarter of the then 25 million population was illiterate, and a phrenology book cost one quarter of the average weekly wage. Yet roughly 1 person in 3000 was practising or studying phrenology, roughly three times the proportion practising or studying astrology today. It was just as popular in Europe, the USA, and Australia. So in terms of popularity it compares more than favourably with astrology. No obscure restricted system here. Like astrology, phrenology predicts the general tone of life (albeit not specific events), and it encourages you to assess yourself and act on its findings to achieve harmony with the world. Like astrology, its ideas were expressed with complete authority, it lent itself to cookbook interpretations (just feel your bumps and look up the meanings), and it attracted people of intelligence and a vast literature wherein every criticism was furiously attacked. Most important of all, like astrology, phrenology flourished *because practitioners and clients saw that it worked*. Unlike their critics they had been there.

So believers in phrenology were unmoved by what the critics said, and for what seemed the best of reasons. As in astrology, their views exuded overwhelming confidence. For exam-

ple, according to the *1896 Year Book of the British Phrenological Association*, phrenology was “so plainly demonstrated that the non-acceptance of phrenology is next to impossible.” No ifs or buts here.

Nevertheless scientific research upset everything. The experience-based claims of phrenologists were shown to be completely wrong. Character was not indicated by brain size and shape because the brain did not work like that. Nor did character break down in the ways required by phrenological theory. So a certain head shape did not mean what it was supposed to mean, nor was there any way it could possibly do so. The system that millions of people passionately believed in, and passionately acted upon, was totally without foundation.

Note the problem: Experience led phrenologists and their clients to believe in phrenology, just as experience leads astrologers and their clients to believe in astrology. In each case the reasoning is the same — the interpretation seems to fit the client, therefore the system works. But the reasoning was wrong for phrenology, so why should it be any different for astrology? Might astrology be just a figment of our poor reasoning skills?

6.4n — One obvious distinction is that phrenology was around for not much over 100 years before its decline, whereas astrology has been around for thousands of years, continuing to appeal to people in a huge range of cultures. What would you say about this?

Researchers: One answer is that an idea has free reign only up to the point where scientific methods become capable of testing it, which gave astrology a head start. Thus much of the necessary methodology for testing astrology was not available until the 19th and 20th centuries, and the really decisive technology (computers) has been available for only two or three decades. An example similar to phrenology is that of Freudian ideas, whose initial untestability steadily disappeared as methods improved. Another answer is that physiognomy, the forerunner of phrenology, is as old as astrology. If we see the relation between modern astrology (say post Alan Leo) and traditional astrology as similar to that between phrenology and physiognomy, the comparison is almost exact. In any case longevity is irrelevant for our purpose — ideas just as old and stable as astrology, such as the geocentric view of the cosmos, the four elements, planetary gods, alkahest (universal solvent), and the philosopher’s stone, have now all been overturned.

6.5 — But if the claims of phrenology were wrong, how could experience lead to the opposite belief? How could the experience of practitioners and clients support non-existing effects?

Researchers: What matters here is that systems like phrenology and astrology rest on correspondences, otherwise known as reasoning by analogy, the assumption that things similar in some respects are also similar in other respects. Thus a high forehead or a strong Mercury indicates a strong intellect. The number four and the fourth planet have the same qualities. Big handwriting indicates power and dominance. Mars the red planet indicates blood, anger and war, and by extension anything vaguely red, hot, or aggressive.

Reasoning by analogy seems at first sight to be similar to ordinary reasoning. Size indicates strength, so a big man is stronger than a small man. Loudness indicates activity, so a loud noise suggests more danger than a faint noise. The difference is that these statements involve clear causal links, so we have reason to believe them. They do not claim to tell us anything new. By contrast, reasoning by analogy involves no causal links. It requires only that X correspond with Y in some way, from which correspondence we supposedly discover something new. The problems should be obvious.

6.6 — Such as?

Researchers: First, it is impossible to specify any two things, no matter how dissimilar, that do not show some kind of correspondence. A raven is like a writing desk because both cast shadows. But knowing something about ravens does not necessarily tell us anything about writing desks.

Second, we have no way of deciding between conflicting correspondences. Are black cats lucky as in ancient Egypt or unlucky as in medieval Europe? Is the keen edge of our intellect blunted by over-use or sharpened? Is Mars unfortunate because red = blood (war) or fortunate because red = blood (life)? Who can believe any correspondence when it is so easily contradicted by another?

Third, our chances of being correct are not good. No longer do we believe, as Aristotle did, that death can occur only at low tide. No longer do midwives open the door to ease a painful labour. No longer do doctors use the lungs of foxes, noted for strong respiration, to cure asthma. No longer do alchemical ideas appear in chemistry courses. In fact reasoning by analogy is generally so spectacularly wrong that it survives in scientific textbooks only as an example of fallacious reasoning.

6.7n — But doesn't much of scientific thinking depend on analogy?

Researchers: Analogy can be a wonderful source of insight and inspiration, and it can lead to exciting new ways of looking at things. In science it has been an invaluable guide to the discovery of new truth, as when Darwin was led to his theory of evolution by considering the analogy between what nature does and what animal breeders do, hence the name *natural selection*. But analogy is only suggestive. It is not an arbiter of truth. Analogy cannot decide the cause of AIDS, or the location of endangered whales, or the longevity of a new romance, or whether the Earth is flat, square or circular. For this we need an independent investigation.

6.8 — But what if the correspondence actually exists?

Researchers: We still have problems because we are so bad at judging correspondences. Even if the correspondence is strong, as between human height and weight, we are still bad at judging it accurately. We can also see correspondences where none actually exist, so a system such as phrenology can seem to work even though it does not. This is why researchers have to be so careful. They cannot afford to be misled.

6.9 — Please explain how we can see correspondences where none actually exist.

Researchers: Consider the Draw-A-Person test. You draw a person on a sheet of blank paper, and the person's size, detail, clothing, and so on, supposedly reveal your inner conflicts. This is reasoning by analogy. Close-set eyes mean you have a suspicious nature. Big eyes indicate paranoia. A big head means you worry about being clever. This is an example of the correspondences that have been widely accepted. Nearly everyone believes these particular ones. It is also an example of the correspondences that have been critically examined, and in this case dozens of studies have found them to be wrong — people with such features do not draw such pictures. But it does not end there.

In one famous set of studies, groups of 56 college students were given 45 drawings of a person from a Draw-A-Person test. Each drawing was accompanied by six personality statements about the drawer from which each student had to work out the meaning of features

such as head size. So they were rather like astrologers trying to work out the meaning of a new chart factor, say a new asteroid, using the traditional method of comparing charts with their owners. But unknown to the students the personality statements were deliberately unrelated to the drawings. For example the statement “worried about being clever” appeared just as often for small heads as for big heads.

So did the students see what was actually in the data, namely nothing? Not at all. Nearly every student saw the correspondences even though they did not exist in the data. Worse, they continued to see them despite corrective strategies such as repeating the exercise, sorting the drawings into piles for closer study, and even when offered money for accuracy. Worst of all, when the statements totally opposed the correspondences, so that “worried about being clever” appeared only for small heads, never for big heads, the students still saw them, albeit to a lesser extent.

In other words the students saw only what they expected to see. They reasoned by analogy. The actual data (the only thing that mattered) had almost no effect. Or as the late Professor Eysenck would say, “my mind is made up, don’t confuse me with facts.” The important point is that these studies could not have made it easier to avoid seeing non-existent correspondences, yet the students still failed miserably. So there is no reason to suppose that astrologers do any better once their minds are focussed on astro symbolism — and this process is only one of the many ways we make errors in our reasoning.

6.10 — Can you say something about these other errors?

Researchers: Reasoning errors are the focus of dozens of books and thousands of published studies, where they are given intriguing names like anchoring, Barnum effect, cognitive dissonance, confirmation bias, Dr Fox effect, halo effect, hindsight bias, illusory correlation (this is the one we just described), misattribution, placebo effect, Pollyanna principle, Rumpelstiltskin effect, regression effect, stacking the deck, and vividness heuristic. And a fascinating lot they are.

For example the Dr Fox effect involves blinding you with style and jargon rather than content (we just did exactly that). Cognitive dissonance is the painful consequence of holding incompatible views — if we are committed to astrology then it is painful to find evidence against it, so we search for confirmation, almost anything will do, and ignore the painful bits. The Barnum effect is where we read specifics into generalities, and is often thought to be the most important error in astrology. But other errors can be just as important, such as the placebo effect (it does us good if we think it does), the Pollyanna principle (the power of positive thinking), hindsight bias (afterwards we knew it all along), stacking the deck (ask only confirming questions), safety in complexity (so even the wrong chart fits), and vividness heuristic (judging by vividness not content).

There are many more, all of them leading us to believe in seemingly spot-on correspondences where none actually exist. They prevent us learning from experience, a result that says it all. Perhaps the cruellest blow is the absence of errors leading in the opposite direction, which means we are stuck in a one-way street — a point to keep in mind when reading what astrologers say in your other interviews.

6.11 — But wouldn’t prejudice, the rejection of astrology for emotional reasons, be an error leading in the opposite direction?

Researchers: No, because we are talking about the reasoning errors made by astrologers, who presumably are not prejudiced against astrology. The only thing that might persuade astrologers to disbelieve in astrology is the informed critical mind, which of course is not a reasoning error but rather a defence against reasoning errors. Fortunately anyone can have an informed critical mind.

6.12n — But don't you think it's a bit of a jump to then conclude that everything in astrology can be attributed to reasoning errors? As the great 19th century psychologist Herbert Spencer said, a belief may appear entirely wrong, but nevertheless its very existence implies that it contained (and might still contain) some small amount of truth. Might you be in danger, as Johannes Kepler said, of throwing out the baby with the bathwater?

Researchers: This is always a concern. But we still have to find that small amount of truth, and we can only do that by being properly critical. Ironically those who complain about throwing out the baby tend to be those who offer no hints on how it might be rescued from the bathwater. Not for them the grubby business of being practical. Furthermore the cautious attitude prescribed by Kepler is rarely present in astrology. Even supposedly serious astrological publications like *The Mountain Astrologer* never hint that astrology has severe problems. They give the impression that all is well and that only prejudice stands in the way of astrology being recognised. In their world bathwater does not even exist. However, note how our subjective-objective distinction sorts out the mess — the baby is objective astrology (which needs to be true) and the bathwater is subjective astrology (which does not need to be true). But to return to your question:

Obviously no scientist wishes to reject an idea that later turns out to be right. But it does happen. Nobody is infallible. The history of science is as much the history of mistakes as of successes, as when the idea of continental drift was initially rejected. But ultimately mistakes are of no consequence because they are corrected by other scientists and other studies. It may take time but it happens in the end. Which is why science changes over time and astrology generally does not.

6.13n — Be that as it may, this still carries the implication that science as it is right now contains mistaken views which are currently seen as true. The ramifications of that are probably obvious enough.

Researchers: More misleading than obvious. Your argument seems to be that “science contains mistakes, therefore science cannot be trusted”, which is like saying “the sea contains gold, therefore we can all be rich” or “ideas about electrons have changed, therefore power stations will no longer work.” What matters here are not mistakes as such but:

- (1) The ability to find and correct mistakes. Scientific method ensures that mistakes are recognised and corrected, whereas present astrological method is nonfalsifiable (see 3.6, 4.4, 17.5) and therefore ensures the opposite. By definition, no astrology book could give agreed procedures for finding errors.
- (2) Their magnitude. What matters is not whether science contains mistakes, or whether the sea contains gold, or whether ideas about electrons have changed, but whether the outcome is enough to decisively affect our trust in science, or our becoming rich, or our being suddenly without electricity. Here the outcome in each case does not start to be even weakly decisive. Compare this with objective astrology, where so much has been disconfirmed that we might reasonably distrust all of it. Nobody denies the practical success of science, but plenty of people deny the practical success of astrology

6.14n — But how does this self-correcting tendency of science help the individual, fallible, scientist right now?

Researchers: It helps in two ways.

- (1) By ensuring that current information is the best available until replaced by something better. Current information may be perfectly adequate (Newton got us to the moon) even though a better theory (Einstein) came along.
- (2) By increasing their confidence in the collective effort, where other scientists act as quality controllers (which is how we identified problems in cold fusion). The problem faced by each individual scientist is how best to choose a path between the Scylla of embracing falsity and the Charybdis of rejecting truth. In practice the only solution is to be as good a researcher as possible. Be hugely careful, consider alternatives, and act on criticism. This will not prevent mistakes but it will make them much less likely. Of course, if a claim has failed our most careful scrutiny, then we are obliged to say so, just as we would be obliged to change our views if better scrutinies than ours showed us to be mistaken. Scientists are just as interested as astrologers in possible links between cosmic conditions and terrestrial life even though such links might well have a non-astrological basis.

To return to your earlier point (6.12), researchers supposedly in danger of throwing out the baby with the bathwater might also hold that it is up to astrologers to show (as opposed to merely speculate) that the baby actually exists. To merely speculate that the baby exists is of course futile because we need only speculate the opposite to create a gridlock. On the other hand, others might feel that the existence of a possible baby is a challenge to be addressed, which is fine if they then take up the challenge rather than blame others for not doing so.

Unfortunately this is invariably what astrologers do. When faced with negative findings they are quick to invent faults, for example they may claim that the test was inappropriate or not sensitive enough, but they never spell out what an appropriate or sensitive test should consist of. They curse the darkness but seem incapable of lighting candles. Note the problem — until astrologers generally make an effort to overcome this entrenched occupational hazard they can hardly expect to be taken seriously.

7. Intuition, unconscious processes, ESP

7.1 — You have focussed on reasoning errors. But many astrologers would claim that successful chart reading isn't possible without some degree of intuition. Might this avoid reasoning errors?

Researchers: No, intuition has been a rich source of inspiration in all fields of human endeavour including science. Yet it can be totally unreliable simply because it is not self-verifying. We have no way of resolving opposing intuitions except by reasoning. So intuition does not avoid reasoning errors. Furthermore, the golden rule to consider the whole chart is immediately broken if we select a focus, yet this is what intuition encourages us to do. Astrologers generally seem unaware of this conflict. (See also 7.8)

7.2 — But is intuition really so unreliable? I know quite a few astrologers who would disagree with you.

Researchers: Their disagreement with us might be more persuasive if they did not disagree so spectacularly among themselves. If their intuitions were in fact reliable, the disagreement between astrologers, between astrological schools, and between traditions (Arabian, Aztec, Burmese, Chinese, Hindu, Jewish, Mayan, Tibetan, Western and so on, excluding purely cultural differences), should not exist.

But astrologers are here in the same boat as palmists, phrenologists, physiognomists, numerologists, and the readers of cards, colours, tea leaves, and so on. Such people frequently claim to rely on intuition, as if this somehow allowed them to home in on the truth despite the disagreement between astrologers on how to read charts, between palmists on how to read hands, between numerologists on how to read numbers, and so on. They are like mechanics who claim that intuition allows successful repairs to cars despite having no workshop manuals.

To be sure, our intuitions, for all their unreliability, serve us well in everyday life. To adopt alternatives would be unrealistic. Nobody seeks formal arguments to decide between strawberry and vanilla ice cream, and most errors are of little consequence. It would also be incapacitating — life is simply too short. But this does not alter the fact that intuitions are unreliable. Just take a look at selection interviews, which rely for their success on the interviewer's intuition. Here many hundreds of studies are virtually unanimous in their findings — interviewers frequently disagree completely with each other, e.g. the same candidate can be rated top by one and bottom by another. So much for the supposed benefits of intuition.

7.3 — The word “intuition” is often used quite loosely, so maybe we should define exactly what we are talking about.

Researchers: In psychology the word “intuition”, also called insight or hunch or gut feeling, refers to the method of arriving at a conclusion, not to any property of the conclusion itself. The key features of intuition are: (1) Everything happens in our head. (2) Answers pop up out of nowhere, especially after a rest period, so we end up knowing but without knowing how. (3) We are usually confident of being right. (4) We may be right but we can also be spectacularly wrong, even though it still feels right.

However, there is no reason to believe that an answer which pops up has actually come from nowhere, or that ESP is involved (at least not during a chart reading). Instead the evidence suggests that such answers are largely based on previous experience. The relevant experience may not be quickly remembered or even remembered at all, so the rest period in (2) can be essential to allow for unconscious retrieval and unconscious processing of possibilities. Thus the supposedly effortless and unanalysable nature of intuition means nothing — driving a car requires endless decisions of exactly this nature, but judged by our first fumbling steps at learning to drive they clearly owe little if anything to intuition as traditionally conceived as “knowing without knowing how.”

More on the unconscious. Due to a process known as priming, things not important enough to form a conscious memory can still affect our later actions, so they work without us knowing. We see or hear something that seems trivial, so we forget it (that is, we have no conscious memory of it), nevertheless it can stay behind the scenes to subtly affect our later judgement and decisions. So we end up being affected but without knowing how. Priming is probably behind much of what is traditionally seen as intuition.

Conscious problem solving (i.e. high cortical arousal) narrows the pool of possible ideas and suppresses our unconscious workings, which is another reason why the rest period (i.e.

low cortical arousal) can be essential. If having gone to sleep on a problem we wake up to find the answer mysteriously before us without effort, this is intuition at work. Sleeping, or doing nothing, has worked better than thinking furiously. Most scientists including ourselves have had many such experiences.

7.4 — What if there is no rest period, as in a chart reading?

Researchers: If there is no rest period, intuition can still apply, the main feature here being a quick confident conclusion based on a small (and therefore seemingly inadequate) number of clues. Studies using problems with known clues and known answers have revealed two underlying dimensions, namely clues (few-many) and answers (correct-incorrect). The dimensions are independent, so correctness is generally unrelated to number of clues, which is not what we might expect. Getting the right answer also increases with IQ but only slightly.

Interestingly, a person's position on these two dimensions seems to be inherent. Thus a person can be few-correct or many-correct, or few-incorrect or many-incorrect, just like any personality trait, where correct = intuitive and incorrect = non-intuitive. These are not rigid categories, so most people are a shade of grey. Intuition is not a yes/no quantity but something we have more of or less of.

These two dimensions also align with the personality dimensions of tough-tender mindedness (few-many clues), and emotionally stable-anxious (correct-incorrect answers). Non-intuitives tend to be tender-anxious. Intuitives tend to be tough-stable (also creative and unconventional). On this basis the genuinely intuitive chart reader is tough, unemotional, and uses only a few chart factors. This is so different from the warm caring emotional (and therefore non-intuitive) stereotype using the whole chart that we might doubt whether intuition really does play a part in chart reading. Even if it did, it could only work if the chart factors thereby selected actually had the meanings they are said to have, which (given the research results to date) seems doubtful.

In any case, the bottom line is that unconscious processes are as fallible as conscious processes, which is why intuition (despite our confidence) is not necessarily correct. Even self-proclaimed psychics cannot tell when their intuitions are correct, otherwise they would rule the world. No wonder that intuition has been defined as the strange instinct that can tell us we are right even when we are wrong.

7.5n — You mentioned the need for prior experience, and that people rarely have intuitions about things they have no experience of such as the moons of Saturn. But quite a few people have confidently predicted and described life on other planets on the basis of what would seem to be “leaps of intuition.” What (if anything) do you think this tells us about the need for prior experience?

Researchers: Since the time of the visionary scientist Emanuel Swedenborg (1688-1772), many hundreds of intuitives, psychics and mediums have documented such leaps in hundreds of books — see Martin Gardner's *The New Age: Notes of a Fringe Watcher* (Prometheus Books 1988), pages 252-263 on Psychic Astronomy. The results are generally glowing descriptions of exotic landscapes, undiscovered moons, and abundant life (usually hominoid), most of them conflicting and all of them wrong. We now know that the other planets are not like that. The supposed leaps of intuition were to no avail. They produced only heroic delusions. So in this case the results amply confirm the need for prior experience.

7.6n — Has any research been done into the reliance of astrologers on intuition?

Researchers: The use of intuition by astrologers has not been systematically studied. One 1960 survey of 250 professional or semi-professional astrologers (mostly in the USA) found that over half claimed to use intuition in their chart readings, which of course does not prove that they did or that it was useful or accurate. Nevertheless this still leaves a substantial proportion who claimed not to use intuition.

7.7n — You have argued that the astrologer's reasoning errors make it unlikely that they will learn anything valid from doing chart readings for clients. But surely this experience has to be good for something.

Researchers: Experience of people can make us more astute, and more aware of cold-reading cues, allowing us to make better judgements in ways that have nothing to do with astrology. Experience can also bring insight, and the bigger the similarity between problem and experience the better the insight. Consider this interesting test made in 1945:

Six laboratory-raised chimpanzees are put one at a time into a cage containing a stick. Outside beyond reach there is food. Will they use the stick to get it? Each animal is given half an hour. The first four have no history of stick-using, and in each case the answer is no. The fifth has used sticks before and gets the food within 12 seconds. The sixth has no history of stick-using and reaches for the food without success. After four minutes his thrashing arm brushes the stick and moves the food slightly. He stops, pushes the stick against the food, and sees it move. A few more trials and the food is his. The four unsuccessful animals are then given sticks to play with for the first time in their lives. After three days the use of sticks is old hat. The food test is then repeated, and all get the food within seconds. Conclusion: there is no insight that does not go back to actual experience.

Of course if our experience is illusory due to our reasoning errors, then so is our insight. Furthermore, the insight that brings a truly creative achievement may come only after months or years of uneventful labour and general floundering. Thus Newton did not suddenly happen on the law of gravitation by lolling around in his mother's orchard. Instead it came "by thinking on it continually."

7.8n — All of which actually suggests an important role for unconscious processes.

Researchers: Yes, just as in intuition. But we should remember that, as in intuition, unconscious processes are just as fallible as conscious ones. The role of unconscious processes was shown by an ingenious study in 1990 in which subjects were presented with numerous items like the following. Imagine you are doing a crossword puzzle. You have to guess a certain word, for which you are given two sets of clues:

(1) Bird. Pipe. Road. (2) Goat. Pass. Green.

Only one of the sets is correct. What is the word? If you cannot guess the word, which is the correct set of clues? (We tell you the answers in a moment.)

The test seems completely bizarre and meaningless. Unsurprisingly, only 4% of subjects could guess the word, yet (and this is the interesting part) no less than 67% picked the correct set. Why? In each case the correct set of clues had an association with the target word, so it was coherent, and the other set had no association with the target word, so it was incoherent. It seems that the subjects perceived the coherence unconsciously, which activated the relevant mnemonic networks, which kept on working until the outcome reached awareness as an intuition or gut feeling. They knew without knowing why. In this case the correct set of clues is (2) and the word is *Mountain*.

The same principle suggests that an astrologer will select from a chart those factors that are the most coherent, which in effect could mean ignoring the whole chart in favour of isolated factors. To the extent that different schools disagree on what factors to use they will also tend to disagree on what is most coherent, in which case their respective intuitions are likely to be unhelpful. PS. If you are among those who cannot see any connection between *Mountain* and *Green*, think of alpine meadows and mountain greenery

7.9n — Does this mean, do you think, that astrologers should try to interpret charts on a purely linear non-intuitive basis, as a computer program might?

Researchers: Not necessarily. It would depend on whether the aim was subjective astrology or objective astrology. If the former, then coherence (which in effect would narrow the range of options shown by the chart) might in some cases be counter-productive. It might stifle discussion. But what astrologers could do is look at the strategies used by top experts in other fields. Various studies have found that ordinary people tend to use intuition and naive reasoning, whereas experts gather information systematically, use systematic decision rules, use sound foundations such as empirical evidence and empirical equations, keep careful track of hits and misses, and remain alert for improvements.

For example one recent study looked at experts recognized by their peers as being the best in auditing, business management, livestock judging, nursing, personnel selection, or soil judging, all areas where there are well-known proven principles and systematic feedback, which is not true of astrology. These top experts had several characteristics that set them apart from lesser experts. They could home in on the relevant information, were always up to date with the latest developments, and knew which problems to tackle and which to avoid. More importantly, they also used strategies designed to overcome reasoning errors. For example they sought feedback from associates, learnt from past successes and failures, used aids such as written records to avoid judgement biases, focussed on avoiding really bad mistakes rather than on being exactly right, and solved large problems by dividing into parts and then reassembling the partial solutions.

7.10 — You mentioned (in 7.3) there are reasons for believing that ESP is unlikely to be involved in a chart reading.

Researchers: At first sight it might seem that ESP (if it exists) could account for all astrological predictions that are difficult to explain yet appear to be correct, whether personal, electional, horary, or whatever. Similarly it might seem that ESP could also explain any successes due to palmistry, tea leaf reading, and so on. But if ESP was really responsible, planets would be interchangeable with tea leaves, and we would have no grounds for claiming that such methods are valid in themselves. In fact the study of astrology would become irrelevant, which presumably is not a view supported by astrologers. This alone is good reason for believing that astrology is not merely ESP in disguise.

Furthermore we should recognise that ESP can be defined as *not the result of any means we know of*. So if an outcome can be explained by normal intuitive processes in the brain, no matter how mysterious they may seem, we are not entitled to invoke ESP. We can invoke ESP only if all other explanations can be ruled out, which would require safeguards that are generally never present during a chart reading.

7.11 — Are you saying that ESP could never be involved in a chart reading?

Researchers: Parapsychologists have explained such ESP effects as may occur in terms of two models. In the *reduction of sensory-noise model*, the key is relaxation and a constant low-level sensory input. If the subject is relaxed, hears white noise, and sees only a featureless warm glow, sensitivity to ESP (should it occur) begins only after 15-20 minutes of habituation to these conditions. That is, under conditions of unvarying sensory input it takes 15-20 minutes for the brain to stop attending to the senses and become attentive to internal mental events instead. But if the astrologer is having sensory inputs, as is necessarily the case when reading charts for clients, habituation cannot occur and ESP is unlikely to manifest.

Alternatively, in the *reduction of bias-and-rigidity model*, the key is the absence of preoccupations and constraints. ESP can then be triggered by need, e.g. to avoid a not-consciously recognised hazard, but not too much need, which produces stress and impairs performance. If the subject is preoccupied, e.g. with finishing before the next client arrives, or is constrained, as is necessarily the case when addressing particular issues, ESP is unlikely to manifest.

In both cases, contrary to what some astrologers have claimed, the process of reading charts, or focussing on mandalas, seems not conducive to ESP, at least not in the presence of clients. Nevertheless, if astrologers could consistently score above chance under conditions where ordinary explanations could be ruled out, then ESP would have to be considered, even though we have no reason to suppose that ESP would be any less fallible than our ordinary senses. But the prospects do not seem promising, given that a direct test of top psychic readers found them to be no more accurate than matched non-psychics.

7.12 — Could you describe this test?

Researchers: It was a remarkable study finished in 1988 that took five years. It monitored a total of more than 130 readings by the top 12 counselling psychics in the Netherlands, and then rated their accuracy against matched groups of non-psychics. Typically each reading involved 60-90 statements spread over personality (35%), general circumstances including occupation (25%), relationships (15%), and physical matters such as health (25%), much the same as for a typical astrology reading. Over 10,000 statements were obtained, of which 10% were sufficiently specific to be tested, of which 14% turned out to be correct, i.e. only 1.4% of all statements were both specific and correct. No difference in hit rate was observed between psychics or between psychics and non-psychics. It was concluded that psychics were no more accurate than non-psychics, but their sensitivity to human ills and their huge experience (their own lives were often traumatic) still made them useful counsellors.

7.13e — What might this mean for astrology?

Researchers: It would seem to deny that intuition and ESP (or at least claimed ESP) could play a useful role in the reading of *charts*, though intuition might play a useful role in the reading of *clients*. But regardless of whether astrologers use intuition, they are in effect claiming that chart factors have real intrinsic meanings as opposed to ones imagined by the ancient Greeks, and that their permutations can be accurately disentangled by astrologers as opposed to the mere appearance of disentangling.

In fact some astrologers leave us in no doubt that chart factors have real intrinsic meanings. For example Charles Carter, the leading British astrologer of the 1930s, says “Practical experiment will soon convince the most sceptical that the bodies of the solar system indicate, if they do not actually produce, changes in: (1) Our minds. (2) Our feelings and emotions. (3)

Our physical bodies. (4) Our external affairs and relationships with the world at large” (*Principles of Astrology* 1925 page 14). Similarly Julia and Derek Parker tell students that “over the years ... your own files will increasingly convince you ... of the basic and valuable truths to be found in the birth chart” (*Parker’s Astrology: The Definitive Guide to Using Astrology in Every Aspect of Your Life* 1991 page 9). Nothing here about astrology needing intuition before it can work.

But we need not rely on selected quotes. You have interviewed many astrologers. Generally speaking, did they have any doubts that chart factors have real intrinsic meanings?

7.14 — There is a range of opinion. Certainly, all the astrologers I interviewed believe that they can access real information from the chart, but views differ as to how this happens. Some see astrology as an empirical science where each chart factor has an intrinsic meaning, much as H₂O always means water to a chemist. Others consider that meaning does not inhere in chart factors per se, but is created by the coming together of chart factors with the astrologer’s mind, so H₂O could mean Antarctica, emotion, making tea, ships, or anything else with watery connections. These are extreme positions, with most astrologers existing at points on the spectrum between them. So do astrologers think that chart factors have real intrinsic meanings? Some do, some don’t, and most are somewhere in the middle.

Researchers: The issue boils down to our distinction between objective and subjective astrology, so it is good to see how well it agrees with your astrologers’ responses. Some believe that chart factors have real meanings, so theirs is objective astrology. Some do not, so theirs is subjective astrology. Others try for both, quoting scientific evidence if positive but ignoring it if negative. Astrologers can check their position by asking the questions listed in the discussion of Figure 1.

7.15 — Part 1 has looked at questions that science raises about astrology in principle. Part 2 will look at some of the research that has been carried out to test astrology in practice.

Part 2 — Results of scientific research into astrology

8. The picture emerging from research

8.1 — What has been going on in the world of astrological research, and what kind of picture is emerging?

Researchers: If only subjective values matter, see Figure 1 again, the objective results that have been reported to date will be irrelevant whether positive or negative, as will much of this interview. Otherwise we can summarise the emerging picture as follows:

If we are to accept the claim that astrology provides reliable knowledge and accurate diagnoses, it has to do this under conditions where errors in our reasoning cannot intrude. Yes, the chart may fit the person, but does it fit better than other charts? Yes, clients may identify with their reading, but can they pick their own reading out of several? Yes, the prediction was a hit, but how many were misses, and is the hit rate better than that achieved by tossing a coin or by informed guessing?

Many such tests have been made, some by scientists, some by astrologers, and some by scientists and astrologers working together. Many have been made by ourselves since the 1970s when we first started our researches. But over the whole range of approaches the answer has been generally negative. The occasional promising result has not been confirmed, which illustrates the importance of not depending on just one study. Half a century of research into astrology, using techniques incomparably more powerful than those available to the Babylonians and Greeks, has failed to reveal effects (or at least effects commensurate with astrological claims) beyond those due to ordinary causes such as errors in reasoning. Which of course is very disappointing to those of us who have been astrologers. On the other hand it does not deny that future tests may be more positive, or that astrology may be fruitful in subjective ways.

8.2e — Could you give an example of a promising result that was not confirmed?

Researchers: What got newspaper astrology columns off the ground was the apparently amazing accuracy of the British columnist R H Naylor. Unlike columns today, his column included predictions of national and world events as well as birthday predictions, then made by birth date rather than by sun sign. In the 5 October 1930 edition of the London *Sunday Express*, he made this prediction among several others:

“Earthquakes will occur, mostly near deep-sea levels, and affecting peninsulas, in the autumn quarter of 1930. They may not actually occur in October — though from the 8th to the 15th this is a real danger point — but they will be exceedingly likely in November or December. British aircraft will be in danger about the same date.”

On 5 October 1930 the great British airship R101 crashed in a storm near Paris. There were 46 dead and 8 survivors. Newspapers showed pictures of terrible wreckage. Naylor said this about his success:

“My prediction last week was based on a very simple observation. It can be proved that, whenever the new moon or full moon falls at a certain angle to the planet Uranus, aircraft accidents, electrical storms, and sometimes earthquakes follow. Now ... the configuration referred to [Full Moon conjunct Uranus] occurred as on October 7; the destruction of the R101, therefore, prematurely fulfilled the indication.”

At first sight Naylor's hit seems quite amazing. Which is why his column took off. But the hit is ambiguous. Naylor's forecast said 8-15 October, during which time no aircraft crashes, electrical storms or earthquakes were reported by British newspapers, so no hits can be counted there. The crash occurred when the Moon was 33 degrees from conjunction, a long way from modern orbs of a degree or so. And later studies of air disasters did not confirm any link with the Moon and Uranus. So was it a hit or a coincidence? In fact an isolated hit is no more meaningful than an isolated chart factor. It is the totality of research which matters.

Less ambiguous were the forecasts of Edward Lyndoe, Naylor's rival in *The People*, who in 1939 consistently saw no war, e.g. "I see absolutely no signs of a Great War during 1939" (1 January), "The Nazis attacking Britain? Don't make me laugh! Not a sign in my charts" (25 June), "Hitler will not do it!" (27 August). Then, ingeniously, after war was declared, "A madman against the stars!" (3 September).

So were the columnists accurate or not? To find out, the London investigative magazine *Picture Post* tested the accuracy of the top five newspaper astrologers (including Naylor and Lyndoe) against nine outstanding events of 1939-1941 such as the German invasion of Poland and the collapse of France. Bear in mind that these astrologers were specialists in event prediction, so for events as momentous as these their accuracy should be as good as it gets. But they scored no better than informed guessing, the most notable result being "that the astrologer so often fails to make any reference whatever to the event in question" (from the 6 September 1941 issue).

Later, the issue of 27 September 1941 contained this letter from the predictive astrologer P J Harwood: "Like other astrologers, I have made my mistakes ... but, on the other hand, a large number of very close hits have been scored. I am sending you a copy of my booklet, *When the War Will End*, and if you are really interested in it I should be obliged if you could give it some publicity." To which the editor pithily replied: "Readers would be wise not to make their plans for peace celebrations too definite. Mr Harwood's booklet foretold invasion in May 1941, a separate peace with Italy in July 1941, and considered Russia unlikely to be implicated seriously in war" (all wrong, including his prediction that the war would end on Christmas Eve 1941).

Interestingly, in the days when few tests existed, most astrologers held that astrology was demonstrable and therefore testable. Just try it, they said, and you will experience for yourself how well it works. In fact those of us who were astrologers said exactly the same — it was how we got hooked in the first place. But the advent of scientific tests and their predominantly negative results has caused a U-turn. Today many astrologers hold that astrology is not testable after all, thus denying the bad news, as if this did not also deny that astrological correspondences could be confirmed by experience or even discovered in the first place.

8.3 — Astrologers who say astrology is not testable may do so because they see it as a divinatory tool more akin to a ritual that prepares the mind to intuit what needs to be said. In their view the working of this tool is not necessarily testable in a scientific way.

Researchers: Their view is hard to understand. It is like saying we don't know how gravity works, therefore we cannot test the fall of apples. The issue is whether the astrology ritual works better than a control ritual, e.g. by providing new information or by improving the client's self-esteem. Much is testable here.

8.4n — Alternatively astrologers who say astrology is not testable may be referring to astrology as a world view. They may simply mean that an entire world view is not testable.

Researchers: This hardly helps. There are very many world views available in philosophy and religion, all of them untestable. But as shown in the journals devoted to metaphysics and the philosophy of religion, they can still be critically examined for consistency and how well they fit with the observed world. At the end of the day we may have many reasons, some of them empirical, for preferring one over another. We do not have to buy a flight ticket without knowing the destination.

Furthermore, astrologers in their daily practice do not invoke an entire world view. Nor do they agree on what this view is. Instead they invoke various sub-views, or what we called “real intrinsic meanings” such as Leos are generous or squares are difficult. If astrologers cannot test these sub-views, nothing about them can be discovered including their truth or falsity. To hide this awkward point some astrologers have retreated into obscurity, for example by defining astrology as a sacred science or as the language of individuality or as the study of potentials. Their obscurity also hides the underlying distinction between subjective and objective astrology, which (once again) is essential to avoid confusion.

9. Gauquelin, sun signs, the whole chart

9.1 — You are certainly painting a gloomy picture. What would you consider to be the most convincing research in favour of astrology, and what are the weaknesses in it?

Researchers: Astrologers tend to quote the Gauquelin results as the most convincing evidence in support of astrological claims. (These results showed that eminent professionals tended to be born when the planet relevant to their occupation was just past rise or culmination; this tendency was later called the Mars effect, but depending on the occupation it could equally well have been called the Moon, Venus, Jupiter, or Saturn effect.) Indeed, two of us have worked for some years following them up.

Gauquelin’s work was certainly the most rigorous of its time. But his planetary effects, even though independently confirmed by us, are too tiny to be of the slightest practical value. For example, given that Mars tends to be just past rising or culminating in the charts of eminent sports champions, this information is of no practical value unless your client is eminent (say 1 in 20,000 of the population), in which case the information is already superfluous.

Furthermore, Gauquelin’s other results showed no effect for half the planets, or for signs, or for aspects, and work by one of us (Ertel) has disconfirmed initial hints of a planetary link with character traits, all of which is contrary to astrological claims. So the relevance of the Gauquelin results tends to be overstated. On the other hand some astrologers claim that the Gauquelin results are at best peripheral to astrology. Here again our subjective-objective distinction resolves the conflict.

9.2 — But doesn’t the Gauquelin research deserve more acknowledgement of its implications? Such as the statement made in *Recent Advances* that the Gauquelin results “provide, for the first time, rigorous and objective evidence about the basic fundamentals of astrology, upon which everything else depends ... something that astrologers themselves, despite millennia of study, have consistently failed to do” (page 394).

Researchers: A lot of research has occurred since that statement was made in 1977, and the results require it to be modified. There are two separate issues at stake here. First is the reality of the Gauquelin findings. Research by one of us (Ertel) has found that, despite some deficiencies, the basic findings withstand rigorous tests. Second is their relevance to astrology. Research by another of us (Dean) has found that they may have an ordinary explanation, hitherto unsuspected, in which case it would be premature to conclude that they are relevant to astrology. Real yes, relevant perhaps not. The reason is a simple one — the Gauquelin data show evidence of manipulation by parents, for example there is a consistent deficit of births on the 13th. But if parents can manipulate dates then why not hours and thus planetary risings and culminations? So the Gauquelin findings might be due to parents, not planets.

9.3 — Are there no other promising areas of research?

Researchers: Twenty years ago they seemed quite numerous. There was John Addey's harmonics ("promises to revolutionise astrology" said *Recent Advances*), Donald Bradley's Jupiter Pluvius (the tendency for heavy rainfall to occur if Jupiter aspected the local meridian when the Moon entered sidereal Capricorn), John Nelson's radio propagation quality (worsened by hard heliocentric aspects), the Mayo-Eysenck sun sign zigzag ("possibly the most important development for astrology in this century" said *Phenomena*), and Vernon Clark's matching experiments (see later). Even the mathematics (of aspects, of orbs, of probabilities, and so on) seemed promising.

Interest in research grew accordingly, only to fade away as artifacts were discovered. As in the above cases, once artifacts were controlled the supposed astrological effects disap-

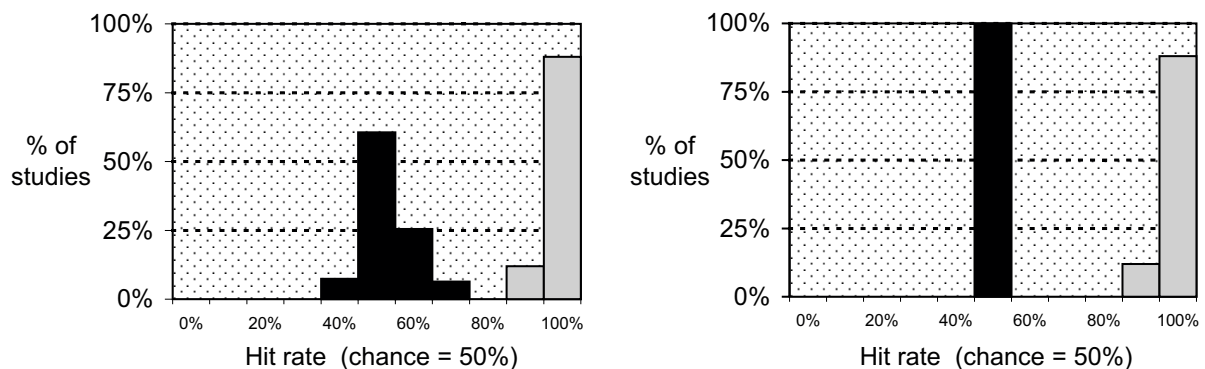


Figure 2. How astrologers (left) and clients (right) performed when put to the test.

Left. According to astrology books, birth charts accurately match their owners. So in studies where astrologers have to match charts to owners, the hit rates should pile up close to 100% (the hit rate is the proportion of correct matches), perhaps something like that shown in grey. But in 47 studies made during 1950-1998 totalling 700 astrologers and 1200 charts, the hit rates were more like 50% as shown in black, or not usefully better than tossing a coin. Included are studies where only top astrologers were used, or where more information was given than in a normal consultation, or where artifacts might reasonably be suspected, so the results are optimistic. Nevertheless the astrologers could not usefully tell the difference between authentic charts and controls.

Right. Similarly, in studies where clients have to pick their own chart reading out of several, the hit rates should pile up close to 100%, perhaps as shown in grey. But in 10 studies totalling 300 clients where we can be reasonably sure that cues such as sun sign were absent, the mean hit rate was only 50.1% as shown in black. The client's own chart reading fitted them no better than somebody else's.

Figures 2, 3, 4 are easier versions of the *Year Zero* figure (p.147). See also Dean & Kelly in Kurtz P (ed), *Skeptical Odysseys*, Prometheus 2001, pp.191-207.

peared. The most recent example is Gunther Sachs's best-selling book *The Astrology File* (Orion 1998), a supposed proof of sun sign effects. One of us re-analysed his results but found only artifacts. The whole massive study (it involved several millions of cases) was not careful enough.

9.4 — Let me come back to some of the research areas you mentioned right at the start, starting with sun sign columns. What work has been done here?

Researchers: Lots. When labels and other cues are removed, people cannot pick the sign that is supposedly theirs. Yes, some columns might be uplifting, but the point is: Does the use of sun signs add otherwise unattainable truth and uplift to sun sign columns? Or do they merely con columnists and readers into believing that their “twelve thoughts for the day” are more meaningful than if they appeared in say Kahlil Gibran or a desk calendar? Research supports the latter explanation.

Sun sign delineations have the distinction of being more widely tested by astrologers and researchers than any other factor in astrology. Altogether something like a hundred tests have been made involving a total of several millions of cases. The usual approach is to compare the distribution of births (of bakers, bankers, extraverts, and so on) across sun signs with that expected by chance. Unfortunately the latter is affected by astronomical and demographic variables to such an extent that the expected distribution can vary a great deal from country to country, from year to year, from place to place within the same country, and from one social group to another. When these variations are not recognised (as is usual), they are easily mistaken for sun sign effects. But once they are controlled no evidence for sun signs is found.

For example, in 1980 Michel Gauquelin compared the biographical details of famous people with their Sun, Moon and Ascending signs. He searched thousands of biographies to find people who had the qualities attributed to sign X, but they showed no tendency for their Sun, Moon or Ascendant to be in X rather than in any other sign. Other controlled studies have consistently supported this finding. In short, tests more rigorous and sensitive than any

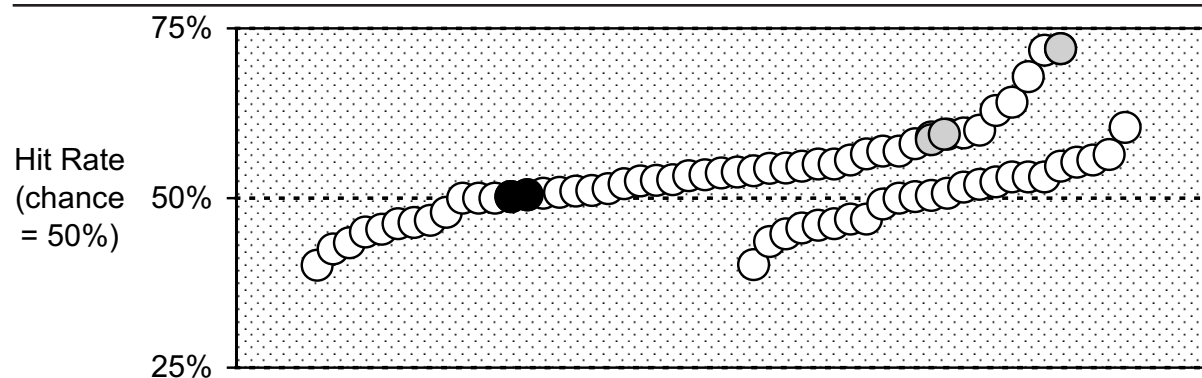


Figure 3. How a small sample size scatters the hit rate

The **upper curve** shows the hit rates from 47 studies of astrologers matching birth charts to their owners. The hit rates show a marked scatter from a low of 40.1% to a high of 72.0% (grey dots = Vernon Clark's results). At first sight the higher values seem encouraging, but as we shall see, the scatter is due to small sample sizes, typically 10 birth charts or pairs of birth charts per study (the range is 4-120, Vernon Clark used 10).

The **lower curve** shows what happens when the studies using 120 birth charts (black dots) are subdivided into 24 studies of 10 charts each. The same marked scatter emerges even though the original hit rates (50.2% and 50.5%) are close to 50%. Further subdivision increases the scatter. Even worse, if we now report only the higher hit rates and ignore the rest (astrology editors dislike negative results), we will be creating support for astrology where none actually exists.

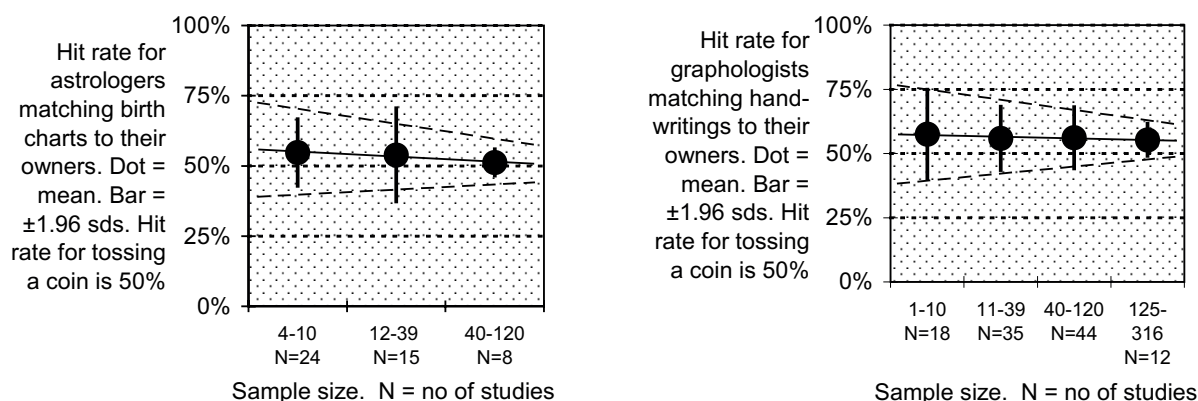


Figure 4. How large sample sizes home in on the truth for astrology (left) and graphology (right)

Left. Hit rates for 47 studies of astrologers matching birth charts to their owners, grouped by sample size (number of birth charts or pairs of birth charts per study). As the sample size increases from left to right, the hit rates show a general decrease in scatter as shown by the trend in bar lengths, and a closer approach to the truth. The length of each bar is ± 1.96 standard deviations, which is the range within which 95% of the results from a large number of repeat studies are expected to fall. In each case the chance level of 50% falls well inside each range, which suggests that these astrologers were generally unable to match charts usefully better than tossing a coin, a point confirmed below. **Right.** Decreasing scatter and increasing accuracy is a general consequence of increasing sample size. Thus the same trend is shown by 109 studies of graphologists matching handwritings to their owners, but this time the trend is more uniform due to the larger number of studies. Mean hit rate for the 109 studies (55.8% sd 5.6%) is higher than for the 47 astrology studies (52.5% sd 5.8%) due to personal information inadvertently present in some handwriting samples, which the graphologists took into account even though they are supposed to ignore content. But neither mean differs significantly from 50% ($p = 0.30$ for graphology and 0.67 for astrology). Tossing a coin would be easier, quicker, and generally just as accurate.

astrologer's experience have consistently provided no evidence whatsoever that signs mean what they are supposed to mean.

Interestingly, a weak but statistically significant link between sun sign delineations and extraversion scores was reported in 1978 by Mayo, White and Eysenck (*Social Psychology* 105, 229-236), advance notice of which was hailed by astrologers as "possibly the most important development for astrology in this century" (*Phenomena* 1977, 1.1, 1). The effect disappeared when people unfamiliar with sun signs were tested, so it had a simple explanation — prior knowledge of astrology. Ask Sagittarians (who are supposedly sociable and outgoing) whether they like going to parties, and their answer might be tipped by astrology in favour of yes rather than no. The bias may be unconscious and very slight but in large samples it can become surprisingly consistent. Of course it has nothing to do with sun signs as normally conceived.

9.5 — Moving to the whole chart, has any work been done to test the accuracy of individual astrologers and their procedures?

Researchers: Again, lots. Can astrologers match cases to authentic charts better than to control charts? Can subjects pick their own chart interpretation out of several? In each case the results have been no better than chance, see Figure 2.

9.6 — I thought some early results, namely those of Vernon Clark, were dramatically better than chance.

Researchers: Vernon Clark's results are in the upper third of the results shown in Figure 2 left. However, his results and those of most other matching tests have fatal problems due to their small sample sizes, typically 10 birth charts or pairs of birth charts. Imagine a hand of 10 playing cards picked at random. Even though there are equal numbers of red and black in the pack, we seldom end up with equal proportions in our hand. Our hand has been affected by sampling variations. Of course the bigger our hand the closer we get to the proportions that exist in the pack.

The same with birth charts. Given that the stars only incline, charts will tend to be of two kinds, those that fit their owners (call these red) and those that don't (call these black). Suppose like Vernon Clark we want to know the proportion of owners with red charts. So we collect ten owners and send them to astrologers. If the astrologers know their stuff they will quickly discover which charts are red and which are black. But the reds in such a small sample will be determined much more by sampling variations than by the proportion in the population (which is what we want to know). Worse, for any given study we cannot remove the sampling variations, just as we cannot remove the sampling variations for any given hand of cards. They are there to stay. So our results will not tell us what we want to know. Yes, we may have three or seven reds instead of the five predicted, but so what?

Vernon Clark and nearly everyone else used few birth charts and many astrologers, which is precisely the combination guaranteed to produce this kind of uninformative outcome. Figures 3 and 4 show why such results cannot be taken at their face value.

So what can be done? The solution is either to use many charts, as for the rightmost dot in Figure 4 left, or to submit the collective studies to what is known as meta-analysis. Meta-analysis subtracts the sampling variations to see if there is anything left (something not possible with an individual study), and therefore reaches sounder conclusions.

In this case meta-analysis of the 47 studies confirms what we already know from Figures 3 and 4 — the sampling variations are so massive that there is nothing left for astrology to explain including the apparently encouraging results of Vernon Clark. Yes, the differences between results might seem to reflect differences in test quality, but such a view is mistaken. Here the differences between results reflect only sampling variations. Differences due to test quality may exist but they are swamped by sampling variations. In other words the reported hit rates offer no support whatever for the accuracy of judgements based on birth charts. Tossing a coin would be just as accurate.

(An earlier meta-analysis when the number of studies was 43 is given in visual form in *Astrology in the Year Zero* pages 146-147 and in *Correlation* Northern Winter 1998 page 75, but is not included here because Figures 3 and 4 are less technical and easier to understand. However, it suggests that future studies will show no improvement in hit rate, and that a publication bias exists against negative results.)

9.7n — Have any tests been made of horary astrologers, medical, or business astrologers?

Researchers: Not systematically, but the isolated tests that have been made have not been encouraging. To be sure, some successes have been claimed, but on inspection the methodology has proved to be suspect. Tests of money market astrologers are particularly suspect because there is no way of knowing how many market investors are actually using astrology, so we cannot decide whether successes are due to astrology or to investors using astrology. Ironically, once a majority of investors are using astrology, the market cannot fail to contradict astrology. Thus if astrology says sell on the expectation that the market will go up, and all the astro investors sell, the market is likely to go any way but up.

At first sight horary astrology seems ideal for testing because it is supposed to give clear-cut yes or no answers. Thus Charles Carter could say of horary charts cast for him that “they have usually been downright wrong and never strikingly right” (*Astrological Journal* December 1962, a quote we repeat later in 18.12). But as noted by Koen Van de moortel (*Astro-Logics* 1997/2002, self-published), horary astrology has so many conflicting opinions about technique that “it’s much easier to toss for it, if you really want a cosmic answer” (page 102). Koen points out that each opinion is based on years of experience, so if horary astrology actually worked the opinions should agree. But they generally disagree, often spectacularly. In other words researchers have no clear place to start, so perhaps it is best to wait until horary astrologers put their house in order.

9.8n — Have any astrologers challenged scientists to test them?

Researchers: Such cases are not numerous but they have happened. For example one US astrologer was so confident he could match chart to appearance that he ran a newspaper ad challenging scientists to test him. Which they did, not once but twice, under conditions he was completely satisfied with. But each time he scored no better than chance. One French astrologer was confident he could pick cause of death but again the results were no better than chance. The crucial point here is not the poor results but how the astrologers could be so confident of having a skill they did not in fact possess. Reasoning errors score yet again.

10. Are questions of mind and reality relevant?

10.1n — Tests of one, or just a few, isolated factors have always seemed problematic, simply because they do not reflect the way in which astrologers read charts. Any competent astrologer will avoid using factors in isolation, and will try to look at each in terms of its relationship to the rest of the chart.

Researchers: But sun sign astrologers by definition never do this, and they might not agree that they are not competent. In fact even the most aggressive advocates of the everything-is-affected-by-everything-else viewpoint, such as the US astrologer Dr Glenn Perry, can still fill their writings with statements such as “individuals with Venus square Pluto are distrustful of love.” The same is true of every astrology textbook, as shown by the following examples from reputable authors:

- Aquarians are gregarious and enjoy social interactions.
- Leos have yellow bushy hair, Aquarians are never short.
- Positive signs are characterised by extraversion.
- Planets mostly below the horizon indicate introversion.
- Saturn rising indicates an inhibited personality.
- Neptune in fourth house is artistic and musical.
- Easy Mercury-Mars aspects have good eyesight and hearing.
- Hard Moon-Uranus aspects incline men to divorce.
- Adverse Mars transits incline to accidents and injuries.
- Bucket patterns inspire or teach or become an agitator.
- Progressed Sun-Venus contacts usually indicate marriage.

The statements are respectively from Hand's *Horoscope Symbols* page 236, Mann's *Round Art* pages 147 and 159, *Larousse Encyclopedia* page 223, ditto page 133, Ebertin's *Combination of Stellar Influences* page 192, March and McEvers' *The Only Way to Learn Astrology* Volume 1 page 261, Hone's *Modern Textbook* page 189, Llewellyn George's *A to Z* page 153, ditto page 465, March and McEvers' Volume 2 page 118, and Davison's *Technique of Prediction* page 55.

Ironically Perry claims that testing such statements is meaningless, but evidently it is not considered meaningless for textbooks to publish such statements in the first place. Nor is it considered meaningless to welcome positive evidence for isolated factors, e.g. Gauquelin. In our view whatever is good enough for textbooks is good enough for testing.

10.2n — Has anyone tested a large database, say one of sports champions showing a Mars effect, to see if invoking additional factors such as midpoints and dignities makes it stronger?

Researchers: Yes, and no it didn't. Invoking additional factors necessarily reduces the hits because the frequency of having A and B is always less than the frequency of having A alone (unless of course all have B, in which case adding B accomplishes nothing).

If we make it A *or* B instead of A *and* B, the problem is that, given enough additional factors, some can always be found that will make the effect stronger purely by chance, in the same way that shuffling cards enough times will sooner or later give you a full house. So we need to divide the sample in half to allow the results from one half to be tested on the other half. Unfortunately this immediately increases the sampling variations, whose effect was so decisive in Figure 2.

Even if we stay with the Gauquelin factors the outcomes are no more promising. Thus one of us found that the probability of an eminent birth did not increase when two or more relevant planets were in Gauquelin sensitive zones, or when the birth time was more precise, or when the planets were closer to the earth, all of which is contrary to what might be expected (but not if the effects are due to parents not planets, see 9.2).

In general the utility of any chart indication depends on two things, namely (1) the effect size, the correlation between the indication and reality, and (2) the base rate, the rate of occurrence in the general population. For areas of client interest such as illness or managerial ability or musical ability or lack of confidence, the base rate in the general population is typically 10% or less. For such low base rates the indication (whether by astrology, graphology, palmistry or whatever) will increase accuracy above the base rate only if the effect size exceeds about 0.4 or 0.5.

Otherwise using the indication will make the prediction worse. But Figure 2 indicates a mean (and statistically nonsignificant) effect size for the whole chart of only 0.05, which also happens to be the effect size for Mars and eminent sports champions. So the chances of exceeding 0.4 or 0.5 do not seem good.

10.3n — This seems to be an argument against ever using multiple factors.

Researchers: The argument here is only that the effect size for factors A *and* B will be less than for factor A alone. But there are many other ways in which multiple factors could operate such as A *or* B, or *if A then B else C*. If collective multiple factor X gave an effect size of 1, the effect size for X *and* B would still be less, but then B would not be needed. The real argument is not against using multiple factors but against using not-needed factors, which in the case of eminent sports champions seems (as far as we know) to be everything except

Mars in key sectors. Incidentally the last is what might be predicted if the effects were due to parents and not planets.

10.4 — Perhaps a refined and balanced technique is the only one which will work.

Researchers: The idea that only a refined and balanced technique will work seems incompatible with the high level of disagreement about techniques, all of which are claimed to work. If they actually work, the technique is evidently unimportant, and astrologers should be piling up hits in Vernon Clark experiments instead of scoring at chance level. But if they actually do not work, astrologers are evidently unable to tell. So the supposedly uniquely-true technique referred to in your question would be either redundant or unidentifiable. Nevertheless let us speculate to the contrary. Let us say okay, so elephants don't fly, but given the right conditions maybe tigers might fly, or maybe giraffes might fly. Clearly this won't do. There comes a time when we have to grasp the nettle.

10.5 — And conclude that nothing in the jungle can fly?

Researchers: The point is that nothing in the jungle is flying. Maybe many things can fly, but this is back to speculating forever. We still have to grasp the nettle, namely that when nothing is actually flying, nothing is actually flying. People do not travel to Heathrow on the off-chance that somebody will suddenly discover aeroplanes.

10.6e — How complex does your research get? Is it possible to design tests of sufficient complexity to allow for all the permutations of meaning between the various chart factors?

Researchers: Your question implies that astrologers are somehow better equipped to deal with complexity than scientific researchers are. But because researchers are more careful than astrologers, this is like saying that only sloppiness produces good astrology, which seems ludicrous. It will certainly be news to those who set astrology exams. Indeed, the inability of astrologers to agree over most things would seem to arise directly from their inability to deal with complexity.

Actually the complexity issue is a non-issue because (1) it has never stopped astrologers from practising, and (2) we can test astrologers directly as in Vernon Clark tests. If astrologers cannot perform better than chance then the complexity said to be responsible for their success (but which is supposedly beyond the grasp of scientific researchers) does not exist. Before we worry about complexity or any other detail we need to know if it actually delivers, else we end up chasing phantoms.

Nevertheless imagine that a level of complexity exists as yet undreamt of, and that it actually does deliver. Can tests be designed to cope with it? The answer is yes. Examples of approaches that take any complexity in their stride are multiple discriminant analysis, which finds the factors that discriminate best between a set of charts and controls, and probabilistic modelling using item response theory, which does everything an astrologer can do short of using ESP but includes what no astrologer can do, namely address astrology's inherent uncertainty directly. Both techniques require a computer. A scan through back issues of *Correlation* will lead directly or indirectly to examples of tests that address the complexity issue.

Another approach is to bypass complexity issues altogether, notably by a test of time twins (persons born close together in time and place), which avoids all problems of how the various chart factors should be interpreted and combined. A failure to validate sun signs might be dismissed as a failure to use the correct interpretation or to properly allow for com-

peting chart factors, but a failure to show that time twins are significantly alike is less easily dismissed. In a city of one million people about 40,000 will have a time twin within 1 minute, so time twins are numerous enough. Here is the calculation:

The occurrence of time twins follows what is known as a Poisson distribution, see any statistics textbook. Once we know the mean number of births in a given interval, say ten minutes, for a particular location, say London, the number of births with at least one other birth in that interval can be obtained using a hand calculator. Time twins are surprisingly numerous. Thus in a city of one or ten million people with a typical birthrate of 2% per year, about 4% or 32% of the people will have at least one other person born there within one minute, and 32% or 98% will have at least one born within ten minutes.

10.7e — Some striking cases of time twins have been reported, such as Samuel Hemmings and King George III. Have you looked into these?

Researchers: One of us has. Legend says that the prosperous London ironmonger Samuel Hemmings and King George III were born at the same hour and died at the same hour after lives showing striking similarities such as being married on the same day. But a careful check of contemporary records showed that the ironmonger's name was not Samuel Hemmings but Richard Speer, and of the events only the simultaneous death could be verified, the rest being most likely fabricated. Several other well-known cases of time twins could not be verified, either through lack of records or evident fabrication. But the number of exact time twins existing even in Western history is so enormous (hundreds of millions) that many striking cases are to be expected by chance alone, so the reported cases are unremarkable.

More systematic tests of time twins have recently been made. For example Roberts and Greengrass, in their *The Astrology of Time Twins* (Pentland 1994), collected a total of 128 people born on six dates, but they found no clear parallels in personality scores, appearance, handwriting, names, interests, occupation, or life events. The strong similarities predicted by astrology were simply not there. Even so, they claimed that the proportion of "close resemblers" increased as the birth interval decreased, which would provide some support for astrology. But an independent re-analysis (*Journal of Scientific Exploration* 1997, 11, 147-155) found that their division of the data had given samples very uneven in size, a point concealed by their use of proportions, which violated the technical requirements of their test. When the data were divided more evenly, or when tests were applied that did not require dividing the data, the effect disappeared. Roberts and Greengrass also claimed that personality differences measured within dates were smaller than the same differences measured between dates, which would again provide some support for astrology. But the re-analysis found they had overlooked the natural changes in personality with age, which immediately explained their result. Furthermore their data showed evidence of contamination by prior knowledge of astrology. In other words, any apparent time-twin effect was clearly an artifact. It was another case of astrologers being insufficiently careful.

Now look at ordinary twins. The time interval between births is much the same whether the twins are identical or non-identical. Therefore according to astrology they should be equally alike. But they are not. Identical twins are very alike, but non-identical twins are generally no more alike than ordinary siblings. This is one of the oldest arguments against astrology, but it is generally ignored by astrologers.

10.8n — Although similarities should be found in twins if astrology means anything, how widely do you cast your net in defining similarity? For instance, if one twin is an athlete and the other is a welder, is this allowed as a “hit” since both are expressions of Mars?

Researchers: It does not matter how we define a hit because we can always generate controls (e.g. by computer) to suit our definition. What matters is not the definition but the difference between twins and controls. But time twins lead to another problem, namely the way astrologers explain misses by appealing to birth time errors. For example an error of one minute can affect the exactness of aspects to angles and house cusps, and therefore can in principle explain differences between supposed time twins. The argument is that, if the birth times were known accurately enough, the misses would disappear. But then so would the rationale for applying astrology to the average client, whose birth time would rarely be known to this suddenly-necessary level of accuracy, let alone to the readers of sun sign columns. Astrologers seem to want it both ways, which along with the practical difficulty of finding exact time twins may explain why the area is relatively neglected — it requires too much work and produces too much embarrassment.

11. Open-mindedness, influence of world views

11.1 — The subject of open-mindedness came up earlier (in 2.5). What is it, and how is it cultivated?

Researchers: Open-mindedness means a willingness to explore new ideas and arguments. Everyone (especially scientists) thinks they are open-minded, in the same way that everyone thinks they have a sense of humour. But when evidence exists both for and against a belief, most people do not show low levels of conviction, which logically they should, but high levels of conviction either for or against, which logically is indefensible. Logically they should have open minds but in fact they have the opposite. Open minds, like the Scarlet Pimpernel, are damned elusive.

So what is happening? An open mind requires us to embrace uncertainty. But for most of us uncertainty is something we hate. Our need to avoid uncertainty explains the popularity of superstitious beliefs, which can be seen as attempts to reduce anxiety using ineffective techniques when effective ones are unavailable. Or as Bertrand Russell said, “What men want is not knowledge but certainty.” No wonder astrologers are amazed when we express no interest in where the astrological chips fall. To them it seems inconceivable that we should not be either for or against.

How to cultivate open-mindedness? (1) Explore new ideas and arguments. (2) Have critical colleagues watch over you and act on their criticisms.

11.2n — What you say seems to imply that it’s impossible for a group of people to share the same prejudices, and to reinforce those prejudices in one another. Which is — obviously, I think — implausible.

Researchers: You are right. Which is why it is so important to avoid cliques of yes-persons and to place ideas in the open marketplace for examination, as science does but astrology rarely does. Whereas science reserves its highest praise for those who prove their predecessors wrong, astrology drums critics out of the corps. Criticism in astrology is simply not welcome. In our case we try to avoid prejudice by sending our pre-publication material to as-

trologers for critical comment, but in most cases the response is a deafening silence. For example we invited four astrologers with research experience to check our answers to your questions, just in case we were missing something, but without success.

11.3n — Would you agree that, if people who think of themselves as scientists consider astrology at all, they tend to feel hostility towards it?

Researchers: No. We certainly don't feel hostility towards astrology. True scientists will consider many things during their professional lifetime, and they have to consider them dispassionately, otherwise there is no point. But scientists, like the rest of us, are likely to show a wide range of attitudes towards astrology, just as they would towards religion, medicine, or politics. So if they do feel hostility, we might ask why. Is it because they see it as involving a commercial exploitation of untruths such as sun sign astrology? Or because they see astrology as the opposite of good science, a closed system impervious to disconfirming evidence? Or because they cannot abide ideas contrary to their own? Their hostility (except in the last case) might be justified. But as scientists it is their job to rise above it.

11.4n — And you believe that it is possible to have a genuinely disinterested approach to the subject of astrology's validity?

Researchers: Yes, it is certainly possible, as shown by Gauquelin and Eysenck. That is the short answer. But as we said in reply to an earlier question (11.1), the open-mindedness required to be disinterested (i.e. not taking sides) is elusive. It requires constant vigilance. People who investigate astrology often hold strong views otherwise they might have no motivation, but what matters is whether they are willing to consider other views, and to change their own views according to the evidence. Here is an example:

For decades Fred Hoyle strongly advocated the steady-state theory of the universe, but when the accumulating evidence supported the rival Big Bang theory, he changed over. He followed where the evidence led. End of story. Unfortunately astrologers tend to see research that supports their beliefs as okay no matter how badly done. They also tend to see research that contradicts their beliefs as incompetent or misconceived or simply stupid, no matter how well done. It seems difficult if not impossible for astrologers to be disinterested and open-minded. Very few are like Fred Hoyle.

11.5 — Perhaps it is still necessary to question the underlying world views of researchers. How would you describe your own world views and how they fit in with astrology?

Researchers: As scientific researchers our world views (e.g. the view that being careful will be productive) are only tentative. Show us a better way of doing things and we will explore it regardless of our world views. Success is the arbiter, but so far astrology has failed to deliver. It has not delivered the results promised by astrologers, nor has it provided the evidence required for careful people to adopt an astrological world view.

Astrology may of course be more compatible with some world views than with others, but by itself this means little. For eighteen centuries the doctrine of the four elements was compatible with prevailing world views, but the doctrine is now known to be wrong. Astrology (like UFOs, channelling, hobgoblins or magic spells) still has to make its own case regardless of its compatibility with a particular world view. Make a convincing case and we will explore it.

11.6n — But this would not deny the possibility that astrology might change present beliefs about the world?

Researchers: Absolutely, just as we cannot deny the possibility that the discovery of elves might change present beliefs about the world, or that a gust of wind might save us if we jumped off a cliff. But for astrology to change present beliefs about the world will require an objective astrology based on sound arguments, convincing evidence, and an underlying theory agreed to by astrologers worldwide, which are precisely the things it presently lacks. At the moment claims such as “astrology is the science of the future” are a clear contradiction in terms. A subjective astrology is of course incapable by definition of changing science-based beliefs about the world. However, this might no longer apply if the beliefs became religion-based as in the Middle Ages, as might happen if islamic fundamentalists were to realise their aim of conquering the world.

11.7 — How can you be sure that the results of research aren’t just reflecting your world views back at you?

Researchers: Presumably an example might be researchers whose world view requires isolated factors to be meaningful, so they test only isolated factors despite protests from astrologers. The answer to your question is easy — we use as many approaches as possible regardless of what a particular world view might dictate. As we said before, show us a better way and we will explore it. But turn your question around — how can astrologers be sure their claims are not just reflecting their own world views back at them? An example might be astrologers who ignore reasoning errors despite protests from scientists. The question is one that only research can resolve (and in our view has probably already resolved), using as many approaches as possible, yet astrologers show little interest in such research.

12. Reactions of astrologers to research outcomes

12.1n — In the discussion so far, you keep returning to the theme that astrology fails to deliver. As far as I can see, the Gauquelin findings do not support claims that astrology, as practised, is true. But they also close off the option of concluding that all ideas of astrological influence are false. Surely this is a significant point?

Researchers: We don’t see why. One swallow does not make a summer. The fact that Claim A seems to be supported does not mean it is useful or beyond ordinary explanation, or that Claims B-Z have to be true. The fact that flying elephants might conceivably exist, say in tornado areas, does not improve our chances of catching the next flying elephant shuttle to Heathrow. Similarly, we cannot deny the possibility that surfing in Hawaii affects the waves in Australia, but would we bet on it? Until astrologers can replace their ten-a-penny (see 1.3) armchair proclamations with good empirical evidence, or engage in rigorous debates like this one, why should we believe any of it?

Nevertheless, suppose that all the research ever done has got it wrong, and that we have a world where astrology works to the extent claimed in astrology books. Hunger and hardship have disappeared because economic trends and climate are predictable. Science has disappeared because horary astrology answers any question. So has competitive sport for the same reason. Cars and planes are hazard-free because assembly times conducive to accidents are routinely avoided. Crime, war, illness and divorce are unknown because predictable. Every

person is empowered, self-actualised, spiritually enlightened, and knows their individual purpose and direction. Abuse of astrological knowledge is prevented by restricting it to those whose charts reveal due merit. This is astrology world. Now compare astrology world with the actual world. Bearing in mind that astrology has had two thousand years to get it right, can we conclude that it really does deliver? Probably not.

12.2n — Perhaps there are only two possibilities: either astrology is bunk, or it is a subtle and elusive art. Hopefully readers of this interview will be gathering some basis upon which to form their own conclusions.

Researchers: There could be more than two possibilities. Thus astrology could act as a focus for discussion without any claim to validity, or it could act as a projective tool like inkblots, neither of which would be bunk or elusive. But the straightforward claims made in astrology books contradict the idea that astrology is a “subtle and elusive art”, always assuming that there is a single such art that astrologers would agree on. For example the rear cover of the reprint of Ronald Davison’s best-selling book *Astrology* (CRCS 1987) says that its simple keyword system “allows even beginners to start interpreting charts immediately with great accuracy.” Nothing subtle or elusive here, not even for beginners.

12.3n — I wonder how well the book would have sold if the back cover had promised, “this subject baffles people who have studied it for years, and you have no chance of ever understanding it fully”!

Researchers: Presumably not well at all even though it might be less misleading. But the point is, this is not just another astrology book. Ronald Davison (1914-1985) was a highly respected British astrologer. He succeeded Charles Carter in 1952 as president of the Astrological Lodge, serving in that position until 1982, and was editor of *Astrology: The Astrologer’s Quarterly* from 1959 to 1983. A review of his book in the *Astrological Journal* for 1963 comments “But the test of a first-class production perhaps is that it should have something to teach the experienced student too, and here again Mr Davison scores some very good points. There is in his descriptions a great fund of original observation and the maturity of judgement of one who has listened attentively to many viewpoints and separated the wheat from the chaff.”

Furthermore, in the CRCS reprint, the US psychologist and astrologer Stephen Arroyo describes how, in the 1960s, he and his friends would look up their chart factors: “In an amazing percentage of cases, we would find reliable descriptions of the person I was talking with, and in fact I well remember the looks of fascination and reflection on people’s faces as they revealed how impressed they were with the accuracy that this kind of astrology could provide. In fact, in numerous cases, they could not hide the strong impact made from insights into their motives and needs that they had never really considered before in that light. I have continually recommended Ronald Davison’s Planets in the Signs keyword system for over twenty years to those ... who want to develop astrology as a reliable science of human nature.” Again, nothing subtle or elusive here.

Indeed, almost every astrological textbook makes it clear that astrology is not an occult subject, and that anyone with diligence and application can learn to set up and interpret birth charts. Complicated and demanding yes, subtle and elusive no. Or so we are told.

12.4n — If astrology fails to deliver, it means that all the astrology books ever printed, all the magazines, and all the claims, arguments and speculations therein, to say nothing of astrological organisations, conferences, meetings, lectures and courses — that all this could be completely without foundation. Do you really think this could be the case?

Researchers: We think such a view is simplistic. To start with, it ignores the distinction between subjective and objective astrology. If we prefer subjective astrology, then astrology does not need to be true, in the same way that a religion does not need to be true (although we may need to believe it is true). In this case the emerging picture is hardly relevant.

But if we prefer objective astrology, then you could be right. Of course, until many more astrologers investigate astrology with proper care, or put themselves forward for testing, we should not be too hasty. We must wait and see. Nevertheless the emerging picture does suggest that people can justifiably discount the objective claims of astrologers in the same way that they can justifiably discount the objective claims of phrenologists. Which of course is not exactly good news for the writers of astrology books.

12.5 — How do astrologers generally react to the picture that is emerging from research?

Researchers: Most astrologers seem unaware of it. Those who are aware of it either (1) dismiss it on the grounds that scientific research is irrelevant to astrology, or (2) they admit its relevance but claim its methods are presently inadequate for unravelling astrology's secrets.

Re (1), the philosopher Thomas Kuhn noted that when an idea is in crisis, its supporters retreat behind a smokescreen of speculation that sounds good but is actually empty. This is precisely the situation with modern astrology. Rather than demonstrate their claims under artifact-free conditions, or specify what research would be relevant or how controversies and disagreements might be dealt with, astrologers retreat behind a smokescreen of speculation about the nature of truth, reality, perception, language, etc. Talk yes, actual progress no.

Re (2), recall that the claims of astrology are grandiose, and that almost no area of human affairs (individual, collective, past, present, future) is supposed to be exempt. In other words we are supposed to believe simultaneously that astrology, like gravity, is writ most exceedingly large, while its influence is most exceedingly difficult to demonstrate. Scientists tend to part company with astrologers at this point. How can astrology be so difficult to demonstrate when astrologers are so readily convinced that it works?

12.6e — One answer might be as given by Stephen Arroyo in his *Chart Interpretation Handbook* (CRCS 1989). He says “statistical studies in astrology have been almost universally pointless” because “only experiments with living people in a clinical situation can fully show astrology's value and validity in its guidance, counselling and psychotherapy applications.”

Researchers: Arroyo does not give examples of such experiments for others to try out, nor does he show how they have resolved conflicting claims, so we have no reason to believe him. Arroyo seems unaware that phrenologists said the same thing about an actually invalid phrenology, and that “living people in a clinical situation” is precisely the situation where reasoning errors (Barnum, Dr Fox, hindsight, placebo, Polyanna, and so on) rage most out of control. In fact clinical studies of the kind he advocates have been made, but they have revealed nothing not explainable by reasoning errors and other artifacts.

Indeed, scattered throughout the astrological literature are accounts by astrologers who had accidentally used the wrong chart during a client consultation. One of us (Smit) had the same experience, and another of us (Dean) deliberately used wrong charts. According to Arroyo,

because “living people in a clinical situation” fully demonstrate astrology’s validity, the error should have been instantly apparent. In fact nobody noticed. In Smit’s case he had always been told that charts uniquely fitted their owners, so he was profoundly shocked — it showed that “astrology’s validity” was effectively meaningless.

On this point, listen to what Donald Bradley said in a 1964 issue of *American Astrology*: “How many times have you worked with erroneous birth data and found admirably apt indications for everything that happened in the native’s lifetime? We’ve all had this jarring experience ... Give me some false data and ... the chances are good that I’ll be able to find a convincing configuration, progression, transit, key cycle, revolution, direction or dasa that is appropriate ... with multiple confirmation too, making everybody cluck about how marvelous astrology is. Too many times have we found that somebody was really born in 1923 and not 1924; or a rural doctor ... wrote pm instead of am on a birth certificate; or someone ... was still using an Old-Style birthdate; or a birth hour should have been recorded in daylight-saving time — and so forth. But even though the information was seriously in error, the gears of the chartwork seemed to click off just fine. ... But is it science? That’s the big question, and on this question hangs the whole disposition of astrology’s worthwhileness.”

Or as Rob Hand says in the Nov-Dec 1989 issue of the *Astrological Journal*, “I’m sure you’ve all experienced, those of you who do any number of consultations, the horrible and demoralising phenomenon of giving a brilliant reading from the wrong birth data! It’s one of those little classic embarrassments we don’t like to talk about ... nevertheless, we have to agree that convincing readings of the wrong birth data are a real phenomenon.” Or as Geoffrey Cornelius says in his book *The Moment of Astrology* 1994, “The entirely ‘wrong’ horoscope produced by misinformation or gross error not infrequently (but not always) works just as if it is a ‘right’ horoscope” (page 259).

12.7n — Some astrologers claim that the lack of proof for astrological effects has shown only the ineffectiveness of the measuring tools. They claim that the tools used to test astrology are like trying to catch plankton with a shark net. Scientists draw in the net, but it reveals nothing. Which is proof that plankton don’t exist, right?

Researchers: This is a classic example of woolly thinking. Scientists would conclude that objects above the mesh size did not exist, not that objects below the mesh size did not exist. Furthermore they would be careful to use the same nets as astrologers and in the same way. If the nets reveal nothing, how can astrologers claim the opposite? This is basically the bottom line. It bears thinking about.

13. White crows, prestige, resources, could results improve?

13.1 — Do you see any ways in which the scientific approach might be modified to increase the possibility of detecting genuine astrological effects?

Researchers: Increasing the sensitivity is straightforward – just increase the sample size. Alternatively we can increase the signal to be detected, say by testing only the best astrologers, or by selecting only extreme cases so they are unambiguous. But such approaches have already been well explored without success. In fact the variety and extent of studies to date is seldom appreciated. To be sure, the original studies can be hard to find, but plenty of reviews now exist. Ignorance is no longer an excuse.

13.2 — How likely is it that the emerging picture will become more favourable to astrology?

Researchers: The totality of research results to date involves hundreds of diverse studies, some positive but mostly negative. Even the positive studies tend to be incommensurate with astrological claims, for example a positive study in which astrologers scored 55% hits vs 50% expected by chance is incommensurate with the near-100% expected on the basis of what we read in astrology books. To overturn such a weight of negative evidence would require an avalanche of new studies where the results were consistently and dramatically positive. If Figure 2 is anything to go by, this is not going to happen.

Nevertheless could astrology deliver the necessary goods? For twenty-five years we have tried to find out. We have ransacked the literature and tested the most promising claims, both as astrologers and scientists. We have gathered our own data and analysed it using the most powerful methods available. We have looked at related areas in astronomy, philosophy, psychology, parapsychology, sociology, and statistics, in each case going back to the original academic literature, something that astrologers rarely do. We have lectured at conferences, run critical debates, issued challenges, and held prize competitions (all now closed) with prizes up to \$US5000 for evidence in support of astrological claims. As far as we know nobody else has been as systematic or as thorough. The point is, if astrology could deliver the necessary goods then somewhere in all this it should be shining through. But we found nothing that could not be explained by reasoning errors and other artifacts. Yes, a great way to spend twenty-five years!

13.3 — Were you disappointed?

Researchers: To some extent. But had we been working for a research institute, we would have been more than disappointed, we would have been fired, or at least diverted to more productive areas. Negative results means no grant money, little contribution to knowledge, little chance of publication, and no academic advancement. So nobody could have wanted positive results more than us. Which is not to say that negative findings are unimportant, for example it is useful to know that eating lettuce does not send you mad. But to continue pursuing a topic with grave theoretical difficulties and grave lack of supporting evidence does seem rather futile.

But before we slash our wrists there is one beacon of hope. Many of these hundreds of negative studies would be instantly overturned if an astrologer could be found who delivered the goods under conditions where reasoning errors and other artifacts did not apply. In short, all it needs is one white crow. As the famous psychologist William James said in 1897, “If you wish to upset the law that all crows are black, you must not seek to show that no crows are; it is enough to prove one single crow to be white.” Of course the research studies in astrology collectively cover a wider field than could be overturned by a single white crow, but it would be a good start.

For twenty-five years we have tried our best to find a white crow, as have those skeptic groups around the world who are currently offering a total of over one million dollars to anyone who can demonstrate genuine paranormal powers, astrology included, but without success. (For how to apply, visit the websites www.csicop.org and www.randi.org.) There are many tens of thousands of astrologer crows but few seem willing to be proven white — and the few who have come forward have so far proven to be black. This might seem remarkable in view of the whiteness that shines out of astrology books, but such is the case. It might of course seem unremarkable to anyone familiar with phrenology.

Recently one of us (Smit) discovered a rare Dutch book describing a test of Leo Knegt (1882-1957), one of the Netherlands' most famous astrologers. Knegt was given the anonymous birth data of ten people and had to describe their character and circumstances. Because he was given no details whatever, this was far harder than a matching test — he had to describe each person from scratch. Unknown to Knegt each person had a distinctive life, e.g. a university professor, a fantastic swindler, and an unsuccessful job-seeker, so to achieve a hit he would have to be very specific. And he was, ten times out of ten. For the professor Knegt correctly predicted an emotional but pioneering intellectual, for the swindler he correctly predicted fraud and an unexpected scary end (it was actually suicide), and for the unsuccessful job-seeker he correctly predicted she would eventually find a job on a passenger ship.

Not only was this the kind of specificity that many modern astrologers claim is impossible, it was achieved using only nine planets (the year was 1933 and Pluto had only just been discovered). Unfortunately the test had none of the features such as controls that we would consider essential today, so these results are difficult to assess. So we have only one option — we must try and repeat the test.

13.4 — Did you try to do this?

Researchers: Yes. Smit compiled a new test using five of the ten cases for which Knegt had been successful. This new test asked astrologers to match case histories to birth data, a much easier task than the one given to Knegt even without the fewer number of charts. Furthermore, because Knegt had been successful, it could not be argued that the new test was poorly designed — the charts had clearly delivered the goods that astrologers want. If Knegt could succeed in such a difficult task, other astrologers should succeed in this much easier task using the same data. You could hardly get a fairer test!

13.5 — Sounds reasonable enough. What happened?

Researchers: In order to reach as large an audience as possible, the entire membership and council of the Astrological Association (over 1500 astrologers and students) were canvassed through the AA's newsletter *Transit*. Only two astrologers responded, so readers of the smaller but more active international monthly *Astrologers' Forum* were canvassed, which increased the total to 23. Their performance was poor (this is the result labelled Smit in Figure 2) and their agreement was even slightly worse than expected by chance. Astrologers will have to do better than this if they are to stop high-profile skeptics concluding publicly that white crows do not exist, and that astrology has nothing to contribute to science or philosophy. So, to answer your original question, is it likely that the emerging picture will change? Don't ask us, ask astrologers about white crows. The ball is firmly in their court.

3.6e — The conclusion that astrology has nothing to contribute to science or philosophy would no doubt be disputed by astrologers.

Researchers: The problem here is the spectacular never-ending disagreement among astrologers on techniques, validity, and how astrology works. This enduring disagreement says that astrology has nothing to contribute to science and philosophy except enduring incoherence. Indeed, the most plausible reason for this enduring disagreement is that there is no real phenomena to be explained, as would be the case if astrology was the result of reasoning errors. Such an astrology could never contribute to science and philosophy except as an example of how not to do it. And this seems to be precisely its present status:

Go to any university library or large public library and look at modern works of science or philosophy. They almost never mention astrology. This is true even in the two fields closest to astrology, namely psychology and astronomy. Of the two dozen histories of psychology published since 1970, only two mention astrology, and even then only as an example of pseudoscience. No modern astronomical theory has been even slightly influenced by astrology. Astrologers do not even pose meaningful questions for astronomers to investigate. Evidently astrology, despite having ridden for eighteen centuries into the hearts and minds of learned people on the unity of Greek ideas, is seen as having made no contributions to psychology or astronomy worth mentioning.

The same is true of philosophy. Astrology either receives no mention, as in *The Oxford Dictionary of Philosophy* (OUP 1994), or is mentioned as an example of superstition, as in Bertrand Russell's classic *History of Western Philosophy* (Allen & Unwin 1961), where in the Renaissance "the first effect of emancipation from the Church was not to make men think rationally, but to open their minds to every sort of antique nonsense [like astrology]" (p.489). Evidently in philosophy, as in psychology and astronomy, astrology is considered worthless by people looking for productive ideas. The reason is simple.

13.7e — Prejudice?

Researchers: No, track record. Astrology has been spectacularly unfruitful in guiding enquiry, mainly because it makes much less sense than existing theories. Which is why scientists and philosophers ignore astrology except for historical purposes. Nevertheless if astrology explained things for which there was no other conceivable explanation, or if it led to useful new discoveries such as new energies or channels of communication, they would immediately become interested.

Similarly, if cosmic connections with human mental processes were ever discovered, we might find astrology being treated in textbooks as an ancient belief with some kernel of truth. But for the moment there is not even that.

13.8n — The popularity of astrology shows that many people see it as interesting, even uplifting, and worth spending time on. So how can it not be a productive field of study?

Researchers: Astrology is certainly productive in the sense you mention. For that matter so is flower arranging, guitar playing, and pottery. But we meant productive in the sense used by scientists and philosophers.

A good example is Darwin's theory of evolution, which has been quite spectacularly productive. It not only provides a scheme for unifying the diversity of life, it also raises clear questions for research to address. How do new characteristics arise in populations? What are the mechanisms of inheritance? What criteria decide when a characteristic confers advantage? These and many other questions make Darwin's theory vulnerable from many directions, for example the mechanisms of heredity might have made it impossible for advantages to arise and spread. Yet attacks by armies of biologists, geneticists, morphologists, physiologists, ecologists and others have revealed the need for only minor departures from Darwin's original theory.

By contrast, astrology has been spectacularly unproductive in guiding inquiry. This does not deny that astrology may be productive in other ways, but these other ways are of little interest to scientists and philosophers.

13.9n — Perhaps the problem here is a lack of resources. Most serious astrologers are simply too busy making a living to devote time to research, or to gaining the interest of scientists or philosophers.

Researchers: But astrologers have had more than two thousand years to prove their value. How much longer do they want? Furthermore, as we already noted (13.1), there now exists a large amount of research conducted by astrologers, sympathetic scientists, and critics. If astrology really was productive it would be more than apparent by now.

13.10n — Recently in both the UK and USA there have been discussions about the possibility of introducing astrology into university courses. Despite what you say, this seems to indicate that astrology now has some academic respectability, or even prestige.

Researchers: This “academic respectability” might be misleading. First, undergraduate courses in astrology would most likely be very profitable. It is easy to miss the financial motive and see the outcome as an academic seal of approval. Second, the blessings might be decidedly mixed. Unlike ordinary schools, universities are at the top of the intellectual ladder. They set the standards. Standards mean rigour, and rigour means requiring students to be critical. Liabilities now hidden would be minutely explored on a scale never experienced before. Astrologers would be in a court ruled by empirical evidence and critical thinking skills, i.e. precisely those areas where they are most disadvantaged. Academic staff would not only have to respond publicly to criticism, they would also have to propose a research agenda, supervise research students, and publish positive test results in high-quality journals (weak or negative results might be fatal). A teaching position could be the hottest of seats. Who would be brave enough to accept?

That said, courses could still escape the requirements of critical thinking and empirical testing if they focussed on history, or religion, or philosophy, or counselling, or any other area of astrology that does not require it to be true. Interestingly the courses you refer to seem to do just that, so it would be quite wrong to suppose that astrology is now about to acquire “academic respectability.”

As for “prestige”, there is a problem here because real prestige is deserved. It is the result of disciplined work, of critical thought, of willingness to put beliefs to the test, and of following where the chips fall, none of which is presently true of astrology. Prestige cannot be created out of nothing. Astrology cannot aspire to prestige without striving for the virtues on which it is based.

13.11n — Whilst I wouldn’t want to claim that all astrologers possess the virtues you mention, I certainly believe that I have met a number who do. So what you say on this point strikes me as one-sided.

Researchers: Some astrologers do have those virtues in a general sense, for example astrologers such as John Addey were extremely hard working and certainly willing to put beliefs to the test. But what is missing is a good grasp of what scientific discipline demands. Being hard working and being scientific are not necessarily the same thing, and being the former does not make up for not being the latter. In our experience very few astrologers have those virtues in a scientific sense, which is what matters. After all, we can have all the right virtues for the history and philosophy of phrenology, but this does not make the practice of phrenology respectable and prestigious. The same applies here.

13.12n — In general terms, many astrologers might see what you have been saying as less a statement of impartial evidence and more a statement of evidence for the prosecution. Of course I accept that you may sometimes choose provocative language in order to get a response. Nevertheless the one-sidedness seems out of place at times.

Researchers: Our focus is scientific research, and our standards are scientific ones. Our aim is not to defeat astrologers or their system but merely to point out the need to be careful and to show what happens when this need is neglected. We agree that our comments may seem somewhat provocative. They might even seem prosecutory to those inclined to feel guilt. But given the huge neglect by astrologers of scientific caution, and the disastrous effect of this on their credibility, we think our comments are justified. In fact many scientists might find our attitude towards astrology to be overly charitable. They would note how the grandiose claims of astrology far outweigh the flimsy observations, ill-considered speculations and armchair proclamations offered in lieu of evidence, and how the general ignorance of reasoning errors can explain everything. So they would see no reason to elevate astrology beyond pseudo-scientific piffle. If you find *us* one-sided, you should try the others!

14. Parallels between astrology and poetry

14.1 — Perhaps we might look again at what you have defined as “subjective astrology.” Could you give an example of research into this?

Researchers: In subjective astrology we are concerned with astrology as the language of images, metaphors and similes. The art form closest to astrology is poetry because both rely on words whereas music and pictures do not. Indeed, some astrologers hold that astrology is a form of poetry in disguise. So our example involves poetry.

We can describe the best poetry quite simply. It is beautiful, it conveys the poet’s passion and feeling, and it reveals inner meaning. The same is true of the best astrology. It is beautiful, it makes us care, and it reveals inner meaning. But note how subjective everything is. Who is to say what is beautiful, worthy of passion, and meaningful? But this is art, not science. Here we are concerned only with feeling. What matters is that our hearts are moved. Now the logical next step:

Could an understanding of poetry improve the practice of astrology? If poetry moves hearts better than prose does, could we improve a chart interpretation by writing it as a poem? These are the questions some of us looked at. The results were rather fruitful. For astrologers they suggested three useful things: (1) If your technique *feels* right, be it ever so humble, then for you it *is* right. (2) By the same token, it will not feel right for clients unless they share your particular sensitivities and understanding. (3) Good poetry takes time. Before making an interpretation you should allow the chart to incubate in your unconscious, allowing its factors to translate spontaneously into poetry.

14.2n — Could you give more details? This certainly throws a new light on your researches.

Researchers: To start with, we compared various poetic descriptions with the keywords pioneered by the famous British astrologer Margaret Hone, as in Table 1.

Table 1. Astrological keywords vs poetic descriptions.

	Hone Keywords	Poetic descriptions with apologies to Byron, Tennyson, Shelly, Wordsworth et al.
Sun	Power, vitality	The sun, bright eye of your universe
Moon	Response, fluctuation	A faded Moon in dim, silver twilight. Azure Moon, rippling in verdant skies.
Mercury	Communication	Nor all your tears wash out a word of it.
Mars	Energy, heat	Mars, hectic red and pestilence stricken. The Martian came down like a wolf on the fold.
Jupiter	Expansion	In fair round belly with good capon lined.
Neptune	Nebulousness	Neptune, brackish with the salt of human tears. The still, sad music of humanity.
8th Solar House		Setting sail beyond the sunset.
Conjunct Venus		That deep in sweet embraces dwell.
Unaspected Moon		Alone and palely loitering.

For the present purpose (i.e. stirring the emotions) the accuracy of these poetic descriptions is of little consequence. What matters is what our imagination can do with them. They do not have to make sense to make sense. Which is bad news for hard-nosed objective researchers, but good news if you are into writing subjective astrology books. Any use of poetic descriptions would of course be as an addition to existing keywords, not as a replacement. Thus to describe the Sun as “bright eye of your universe” will be ambiguous without the context of power and vitality. Otherwise it could mean the telly.

14.3n — How could this provide useful insights into the consultation?

Researchers: When groups of people are asked to rank various poems in order of appeal, it is usual to find that the same poem can be ranked top by some and bottom by others. This is not something peculiar to poetry — it is true also of pictures and music. In other words there are marked individual differences in taste, which means you cannot possibly please all the people all the time.

Research by others has found that the main factors influencing the appeal of a poem are as follows: (1) Its merit. Good poems are more popular than bad poems, for example a poem may scan so badly that nobody likes it. Of course merit may be strongly decided by culture, in the same way as we may prefer Gershwin to a Zulu war chant, or vice versa if we are Zulu warriors. (2) IQ, especially verbal IQ. Poetry is more popular with bright people. (3) Personality. Particular personalities tend to prefer particular types of poem as shown in Table 2, which to be reliable would need to be much longer but it gives you the idea.

Table 2. The types of poem preferred by particular personalities.

Extraverts prefer simplicity:	Into the silence of an empty night I went, And took my scorned heart with me.
Introverts prefer complexity:	Thou art not more lovelier than lilacs Nor more fair than single white poppies.
Unstables prefer emotion:	Come, let us make love deathless, thou and I, Seeing that our footing on the Earth is brief.
Stables prefer restraint:	Here lies a most beautiful lady, Light of step and heart was she.

In our experience much the same applies to the appeal of astrology. For example, other things being equal (which they rarely are), we have found that stable extraverts tend to prefer the direct simplicity of Margaret Hone whereas unstable introverts tend to prefer the obscure complexity of Dane Rudhyar. So when astrologers promote this or that amazing new method, they have to take into account the personality of the astrologer or client. Otherwise they will be performing a mischief in areas where astrologers, if anyone, should know better. To feel the poetry in a chart the astrologer should not be hindered by technique.

14.4 — What of those clients who come to an astrologer seeking straightforward answers to questions on health, wealth and romance? How would your poetry findings apply to them?

Researchers: Probably not at all, because this would no longer be subjective astrology. It would no doubt be okay if clients wanted only sympathy or spiritual uplift, but if they also wanted something factual then we are back to objective astrology and the dismal emerging picture. Poetry might only annoy them.

Actually your question uncovers a fundamental dilemma. Astrology seems unlikely to feel right unless astrologers and clients share a belief in objective astrology. Otherwise why bother with accurate charts? The same dilemma applied in phrenology. Phrenology worked because people believed (incorrectly) that it worked. If phrenologists had said (correctly) that “phrenology uses interesting superstitions to stimulate self examination”, or that “phrenology is basically tea and sympathy”, would clients have bothered?

14.5 — How would you resolve this dilemma?

Researchers: The dilemma is without doubt an agonising one. But it is one that only astrologers, not researchers, can resolve.

15. Credibility problems, education, critical thinking skills

15.1 — What would you consider to be the most harmful things to astrology’s credibility?

Researchers: We see five things as severely reducing astrology’s credibility: First is refusing to acknowledge the disconfirmation of claims. For example, without doubt the most disconfirmed claim in astrology is that of sun signs, yet the outpouring of fiction disguised as sun sign books seems unending.

Second is the dramatic disagreement on fundamentals such as which zodiac, which house system if any, what planets once past the first seven, what aspects, what orbs, what methods of direction, and so on. Surely after several millennia there should be better agreement than this. There is not even agreement on how the fundamentals are supposed to work: In public it is asserted that the stars only incline and only acausally, but this conflicts with the conversation at any astrology conference — yes, I gesture a lot but that’s because I’m a Gemini, or I have a strong Jupiter so I’m very religious, or we get on (or don’t get on) because our Suns are in opposition, or Uranus always brings accidents, or Saturn is retrograde making financial markets unsettled. No acausal inclination here.

Third is the poor agreement between astrologers judging the same chart. For example various astrologers have worked backwards from the life events of Ronald Reagan to produce over 30 different birth times spanning 15 hours, each one supposedly definitive according to the astrologer concerned. Even for a simple chart reading the agreement between astrologers

is generally so poor that it is scarcely better than tossing a coin — a finding confirmed by more than two dozen studies (the mean correlation was 0.10) including those made by some of us. What price astrology if astrologers cannot even agree on what a chart means?

Fourth is the stagnation of astrology. When we look at psychology or sociology we find disciplines that have advanced because workers have been responsive to disconfirming evidence and alternative ideas. Their textbooks are packed with research studies and critical comparisons of competing theories, often with emphasis on areas needing investigation. Not so in astrology. Except in very rare cases, there is no critical evaluation of ideas and claims, no basing of theory on empirical results, and no mention of negative evidence except to explain it away. Instead astrology has stagnated into a continuing war between one untested idea and another. In 1973 the US astrologer Dr Zip Dobyns could complain that “astrology is almost as confused as the earthly chaos it is supposed to clarify.” Today it is even worse. Which is hardly a sound basis for a profession or even a religion. Nevertheless astrology books still read as if they have the Rosetta stone for life on Earth.

Fifth, perhaps worst of all, is ignorance of existing research and of problems due to errors in human reasoning. This leads to making claims at variance with the evidence. Astrologers need to be more careful. Which is nothing not already required of any ethical discipline.

Our five points would of course be weakened to the extent that white crows could be found. They might disappear altogether if astrologers were to publicly define astrology as a religion, and then refrain (as priests do) from making claims that could be contradicted by scientific enquiry.

15.2n — Don’t some of your objections also apply to psychotherapy? When it comes to dealing with people, the range of schools with differing views — Freudian, Jungian, Adlerian, Psycho-dynamic, Humanistic, Existentialist — seems to be proliferating, with plenty of contradiction and disagreement between them, including disagreement on what is important.

Researchers: The supposed contradictions arise only because the ideas are generally described without mentioning the empirical evidence for their validity. As shown by H J Eysenck and M W Eysenck in their pioneering book *Personality and Individual Differences: A Natural Science Approach* (Plenum Press 1985), when the ideas are examined in their historical context together with all the empirical studies, there emerge striking commonalities. Far from exhibiting “plenty of contradiction and disagreement”, they all boil down to essentially the same things. The contradictions are not supported by evidence, the agreements are.

15.3n — Surely the point here is that any model of human psychology is of limited relevance when it comes to actually dealing with people.

Researchers: This will be news to psychologists such as Freud and Rogers who based their models on their work with individual clients. Furthermore, the search for general models is conducted in order to understand the individual members, and the ultimate test of a model is whether or not it explains individual events. For example a model of learning might predict that Joe Bloggs will learn better under the conditions specified by the model. If he does not then we reject or revise the model. In fact a long-established part of psychology is the study of individual differences, i.e. the characteristics, qualities or traits by which one individual may be distinguished from another. Individual differences were central to the investigations of Sir Francis Galton in the late 1800s, and today they are the focus of major publications such as the journal *Personality and Individual Differences*.

Of course there can still be apparent disagreements about application, as when the Freudian school says that the therapist's role is to interpret and explain the client's world, while the Existential school says that the therapist's role is to avoid interpretation and to accept the client's way of seeing things. But such disagreements arise largely for the same reason as before — because the schools have not approached the topic with due caution. When cautious scientists discover that interpretation is beneficial for type A clients but is best avoided for type B clients, the disagreements tend to disappear.

Similarly, whenever psychotherapy has been approached with due caution, the general outcome (with the notable exception of behavioural therapy) has been that all psychotherapies seem to be roughly equally effective and little better than no psychotherapy. So the supposedly fundamental disagreements are of little or no consequence. In fact what really matters has little to do with the kind of therapy, namely that the practitioner and client should like each other, and that both should have faith in the therapy. The actual therapy seems to be of little consequence provided there is faith in it. The relevance of this to astrology should be apparent.

15.4n — To which discipline should astrology be compared — psychology or psychotherapy? Is the diversity of astrological practices a sign of problems, a sign that at least some people are getting it wrong? That is the way it looks if the comparison is with psychology. Or is the subjective element sufficiently important that there can be different ways of working which suit different circumstances? That is the way it looks if the comparison is with psychotherapy, in which case the diverse approaches within astrology would be inevitable.

Researchers: To ask if astrology is like psychology (the study of mental processes and behaviour) or psychotherapy (the treatment of mental disorders usually by personal consultation) is to take a very narrow view of astrology, one from which say mundane or horary are excluded, and one that does not fit our own wide view. Nevertheless your comparison comes back to our subjective-objective distinction, the distinction between the underlying objective ideas in astrology (as in psychology) and their subjective application (as in psychotherapy). We should expect to find agreement on what a cake is, as opposed to what a stew is, but not on how to serve it, which is a matter of personal choice. But even then, both the ideas and their application would be amenable to scientific study, which is presently lacking in astrology.

15.5 — What in the world of astrology do you see as helpful or beneficial to people?

Researchers: Good persons. A warm and sympathetic astrologer provides non-threatening therapy that is sometimes hard to come by, especially as no admission of some physical, mental, or moral weakness is required, as with a doctor or psychiatrist or priest.

15.6 — And what do you see as unhelpful or harmful?

Researchers: Bad persons. Donna Cunningham in her book *An Astrological Guide to Self-Awareness* (CRCS 1978) suggests we avoid the guru, the power-hungry, the astro-junkie, the totally negative, the totally positive, the prurient peeping tom, and the spotlight seeker.

15.7 — Earlier (10.6 and 15.1) you felt that the failure of astrologers to “be careful” was one of their main faults. How might this be addressed?

Researchers: The single most important factor in helping astrologers generally to be careful might be an improvement in their general education. This would be a necessary first step in correcting the five harmful influences on astrology's credibility that we talked about. (15.1)

15.8 — And what should this improved general education for astrologers include?

Researchers: To be adequately educated astrologers need to be informed about *all* aspects of applied astrology. Not just astrology but also related disciplines; not just counselling skills but also religion, philosophy, psychology, statistics (because astrology is probabilistic) and research methods. They need to be aware of the errors in reasoning to which they seem so abundantly prone. If they advocate subjective astrology then they need to refrain from making statements open to scientific challenge. If they advocate objective astrology then they need to be familiar with research results (all of them, not just the ones selected to support a particular view) and with informed criticisms of astrology (not just the nonsense put out by hostile debunkers). And before anyone starts to study any kind of astrology they need to acquire the critical thinking skills that today are part of any university course in the social sciences. Until they do such things, astrologers cannot expect to know what they are talking about nor can they expect educated people to listen. To be sure, this may seem like a harsh view, but if first-year psychology students can do these things as part of their training then so can first-year astrology students.

15.9 — What do you mean by “critical thinking skills”?

Researchers: Critical thinking is about evaluating evidence, judging conclusions, and considering alternatives. It gives teeth to rigour. Consider psychology, perhaps the single discipline nearest to astrology. In 1998 a survey of the 37 current introductory psychology texts found that 25 treated critical thinking in some detail, typically 1000-2000 words. This is in addition to the entire books that already exist on critical thinking. By contrast none of the hundreds of introductory astrology texts examined by us over the years give any hint that critical thinking even exists, even though it could hardly be more relevant to their implied invitation to “test astrology for yourself.”

Indeed, even for astrologers, “Anyone used to reading books on or around our subject must have a mind which positively aches with the effort of keeping it open: a reader put off by *non sequiturs*, evidence which isn’t evidence at all, irrationality and eccentricity will not get halfway along the first shelf [at any astrology bookshop]” (Derek Parker, *Astrological Journal* 1991, pp 264-265). So nobody should blame psychologists for reading astrology books and then dismissing astrology out of hand.

16. Does modern science support astrology?

16.1 — Are there developments in modern science which weaken the case against astrology as being intrinsically impossible?

Researchers: Nothing that we know of. If by astrology we mean the ideas found in astrology books, such as Saturn rising signifies an inhibited personality or adverse Mars transits incline to accidents, then in our opinion there are no developments in modern science that would support such ideas.

But if by astrology we mean “the way most astrologers behave”, i.e. with no basing of theory on empirical results, no consideration of negative evidence except to explain it away, and no serious verification of a continuing profusion of claims, there would seem to be no developments in modern science, even in principle, that could possibly restore the feasibility of such sloppiness. Only a more disciplined approach by astrologers could succeed here.

16.2 — This seems dismissive. Astrologers have pointed to numerous developments that supposedly make astrology more plausible, such as fractals, interconnectedness, the theories of Bohm, Pribram, Sheldrake, and so on. Are these of no relevance?

Researchers: Even if science did turn out to be based on say interconnectedness, astrologers have not explained how this would support the idea that the heavens reflect what happens on Earth, let alone ideas such as Leos are generous. It is like saying astrology involves books, cooking involves books, therefore cooking makes astrology more plausible. Crucial steps in the argument are missing. But they really are crucial and cannot be ignored.

The theories are physicist David Bohm's idea of implicate order, where connections between things can exist independent of space and time, neuropsychologist Karl Pribram's idea of holographic order, where time and space are collapsed into a single frequency so that normal causality (which requires time and space for its operation) no longer applies, and plant physiologist Rupert Sheldrake's idea of morphic resonance, where the form of past systems has a cumulative effect on the form of subsequent similar systems. But astrologers do not erect charts by ignoring space and time or by collapsing them into a single frequency or by assuming they all have the same form. Indeed, the idea of morphic resonance suggests that, over the centuries, astrologies around the world should have become more similar, and astrological effects should have become more noticeable, but neither seems to be the case.

Claiming that such ideas make astrology more plausible, or that they explain why Leos are generous, is like claiming that rhubarb explains why airplanes fly. Until the steps in the argument are spelled out, it remains circular — astrology is made feasible by the kind of thing that, if it existed, would make astrology feasible. To bring support to astrology we need to know *exactly* how astrology is supported, but astrologers never tell us. Their arguments never even get started.

16.3 — There seems no doubt that various modern theories such as quantum mechanics are attempts to explain real phenomena, and that these phenomena do not fit within the Newtonian model which is often blamed (or praised) for undermining belief in astrology. If a model that undermines astrology is flawed, surely the undermining is also flawed, which might conceivably restore feasibility to astrology?

Researchers: It does not follow. The discovery that quantum phenomena are real and undermine Newton's ideas does not necessarily restore the feasibility of astrology, just as the discovery that atoms are mostly empty space undermined Dalton's idea of oxygen but did not restore the feasibility of phlogiston. Nor does the undermining of one theory necessarily have any effect on the many other theories (in astronomy, in psychology, in medicine, in statistics) that are equally incompatible with astrology. As before, crucial steps in the argument are missing. In any case, how can any theory restore feasibility to something for which there is no convincing evidence to start with? It is like asking for a theory to explain flying elephants.

16.4n — What about claims that known extraterrestrial influences provide support for astrological claims?

Researchers: Astrologers frequently argue that the existence of say lunar effects on oysters proves that astrology is credible, which is like arguing that money exists, therefore everyone is rich. But how can oysters explain why only Leos are generous? It is a huge leap of faith from such effects to the claims of astrologers. Crucial steps in the argument are again missing. If a connection existed then we might expect planets to have added to our understanding

of living organisms in the same way that genes have, but such is not the case. In fact lunar effects on the spawning cycles of marine species such as the Palolo worm are well established, but lunar effects on oysters may be an illusion, see a long article in *Journal of Theoretical Biology* 1965, 8, 426-468.

16.5 — We ought not to omit a mention of Jung's synchronicity. In the past it was perhaps the idea that astrologers most often quoted in support of astrology. Is there anything you can say about it?

Researchers: Astrologers see synchronicity as a *meaningful coincidence*, but Jung saw it as more than that. Among other things he held that it was unlikely to occur unless the observer was experiencing strong archetypal emotions (see his *Letters* 1976 volume 2 page 537). So it would require the chart reader to experience the most intense archetypal fear, anger, joy, sor-

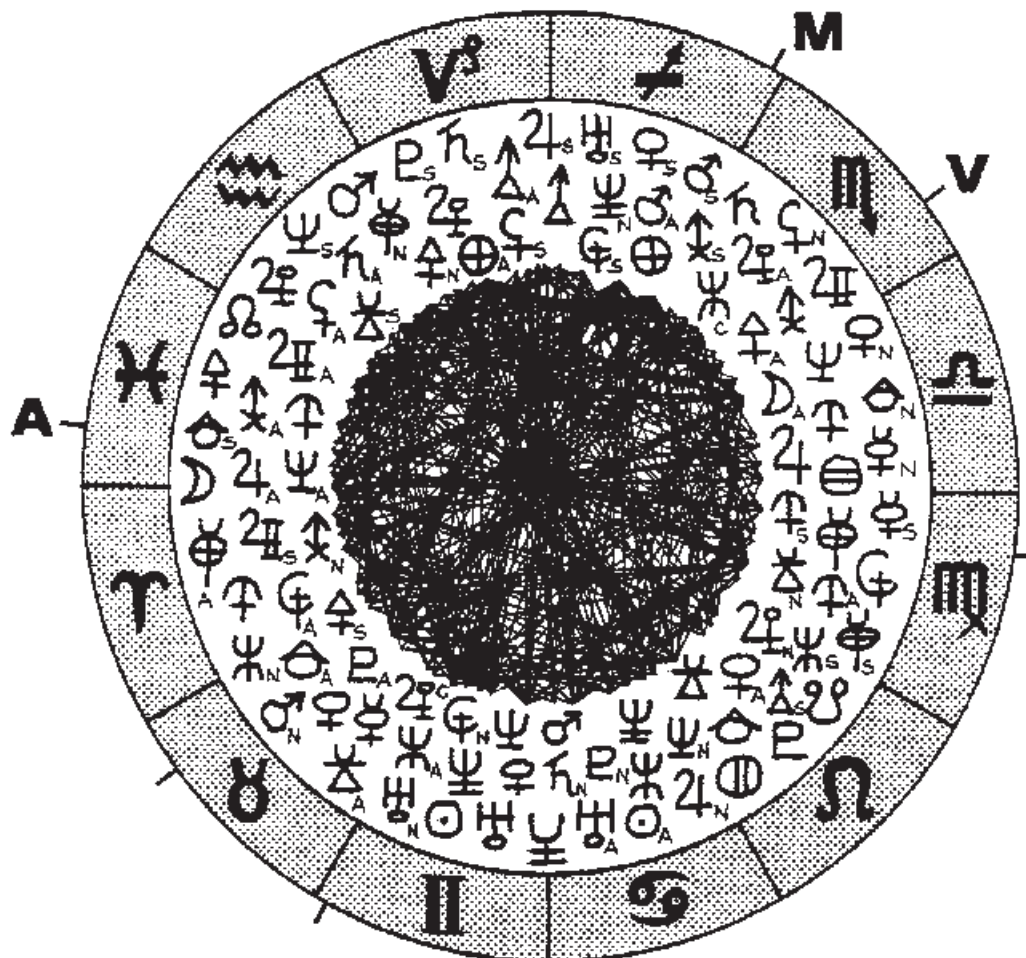


Figure 5. The superchart.

It contains only those factors proposed and testified to by astrologers of some standing. With only 20 words of delineation per sign position, aspect, etc., each reading would be longer than the London or New York telephone directory. (All you need is one client and you have enough work for the rest of your life, forecasts extra). But even this is a drop in the ocean compared to what a genuine whole chart would contain. Reproduced with permission from *Recent Advances* page 35.

row, love, hatred, etc., in rapid succession. No reader or client could stand it. And even if they could, such intense emotions would impair their reasoning. (Try and see!) So synchronicity is not the answer.

In 1931, before he invented synchronicity, Jung had his famous idea that “whatever is born or done in this moment of time has the quality of this moment of time”, which of course seems perfectly matched to astrological claims. But there are problems. To start with, his idea implies that time quality is the same instantaneously throughout the universe, which is no help at all (light travels too slowly for us to ever know what that instantaneous condition is). So if time quality is to explain astrology, it has to be localised. In which case the relevance of the outer planets (even all the planets) might be denied, which presumably is not what astrologers have in mind. So time quality is probably not the answer either.

In any case, both synchronicity and time quality are examples of circular reasoning, as in “astrology is explained by X, which, if it exists, explains astrology.” It is like claiming that levitation is explained by mysterious forces that, if they exist, explain levitation. Which is hardly a reason to be confident when jumping off a cliff.

17. Our inability to cope with complexity

17.1 — An alternative view is that it is not possible to talk about astrology as a single, coherent technique. Instead, each astrologer necessarily forges their own approach (e.g. by using midpoints or not), in which case there could be as many different astrologies as there are astrologers.

Researchers: To obtain a judgement from a given chart, astrologers have to juggle many factors at once, typically 40 for the traditional natal chart and 60 for an Ebertin midpoint chart. And that is just for starters; a genuine whole chart is immeasurably more complex, see Figure 5. But our short-term memory cannot juggle more than about 7 ± 2 chunks of information at a time, as is apparent whenever we try dialling an unfamiliar 10-digit telephone number. As a result the information content of the chart *always* exceeds our capacity to handle it.

This means that astrologers cannot do what they say they do, namely juggle unaided every chart factor simultaneously. Instead they are forced to focus on whatever tiny subset of factors their experience or their teacher’s experience has shown to “work.” But the subset that “works” is rarely the same from one astrologer to another, for example one astrologer may use factors such as midpoints or asteroids that the other rejects, which has led to the idea that every astrologer forges their own approach — and of course to the idea that astrology is even more mysterious (or perhaps even more problematic and implausible) than we might think. Exactly what are we talking about if every astrologers’ definition of astrology is different?

17.2 — Surely the situation is not unique to astrology?

Researchers: It applies quite generally where variables are numerous and ill-defined. For example, when people judge the aesthetic quality of artworks, the number of possible criteria is so large that they are forced to consider only a subset. But the subsets differ between persons and between occasions, leading to spectacular disagreement. Thus a given work may be top-rated by one and bottom-rated by another. Contrary to expectation, training in art reduces disagreement only slightly and may even increase it, so perhaps we should not be surprised by the disagreement among astrologers despite their training in astrology.

However, as noted by the psychologist David Perkins in Nodine C & Fisher D (eds), *Perception and pictorial representation* (Praeger 1979, pages 301-314), training in *art criticism* does tend to reduce disagreement, which suggests that training in *astrology criticism* (i.e. critical thinking) should have similar beneficial effects. His subsequent comments are worth quoting because they seem equally applicable to astrology:

“For there to be any hope of finding, or, one might better say, constructing, a common aesthetic reality [i.e. reaching agreement on artworks], viewers would need to look more carefully and thoroughly at works, trust initial perceptions less, cross-check them more with other individuals, attempt alternative perceptions of the work, determine from others what significant features might have been missed, locate and recognise ambiguities of a work’s appearance, set aside first conclusions that turn out to be attributable to personal idiosyncrasies, and so on. [Note how this agrees with the strategies used by top experts as discussed by us earlier in 7.9.]

“Such strategies rely heavily on communication between individuals, and that points to another difficulty. Not only the individual encounter with the work, but also discourse about works, suffers from many problems that interfere with constructing an aesthetic reality [i.e. reaching agreement]. For instance, people often neglect to answer one another’s points, do not clarify whether evaluative claims assert goodness or preference, fail to pursue claims back into reasons supporting them, deliberately censor their points or adopt defensive attitudes. All these, and other factors too, confuse talk about art.” (pages 313-314).

In short, reaching better agreement on artworks will be difficult but seems feasible via scientific approaches and hard work. There will still exist legitimate differences due to differences in personality and so on, which affect the appreciation of artworks in the same way as they affect the appreciation of poetry, but in principle there is nothing that cannot be allowed for. As Perkins says, “we know what to do” if we want to reach better agreement on artworks. The same would seem to apply to astrologers and birth charts — if they want to reach better agreement, we know what they should do.

17.3n — I wonder whether the problem of remembering ten digits which you mention actually reveals anything about the difficulty of reading a chart. Surely there is a much greater level of complexity in (for instance) playing chess to a high standard, which people seem to be perfectly capable of doing.

Researchers: To chess masters, a chess board and chess games are not just a collection of positions, as they might be to most people. They acquire individuality. Thus when chess pieces are distributed at random, chess masters are no better than ordinary people at remembering them. But if the pieces are in actually meaningful positions, chess masters do hugely better. They see them as being the combination arrived at say after 25 moves in the Capablanca-Tartakover match of 1925, so all they have to remember is one item, not hundreds as must the ordinary person. In technical terms their expertise in memory span is obtained not by increasing short-term memory but by invoking long-term memory encoding processes and permanent knowledge during encoding. With enough practice (hundreds of practice sessions) this can increase memory span by a factor of ten or more. Which is crucial in helping chess masters win.

No doubt much the same applies to expert astrologers. Chart factors and entire charts acquire individuality and are remembered and used as such, in much the same way that chess masters remember entire boards. Even so, the number of possible chart positions is almost in-

finitely more than the number of possible chess positions. Chess has 64 squares and 12 kinds of pieces, astrology has say 360 squares and 10 kinds of pieces, so the maximum number of combinations is chess $12^{64} = 10^{69}$ vs astrology 10^{360} . In chess only some of these combinations could occur in actual games, but in astrology nearly all could occur in actual charts, thus making the disparity even greater. So even an increased memory span is still not enough to cope with chart complexity. It might produce astrologers whose grasp of charts seems astonishing to ordinary people, but the information content of the whole chart still exceeds human capacity to handle it. It will always exceed human capacity.

There is a further point. Consider what our observations would entail if we knew nothing about astrology and wanted to set it up from scratch. For one planet enjoying just 12 signs, 12 houses, and 9 kinds of aspect (5 major, 4 minor) to 9 other planets, there are $12 \times 12 \times 9 \times 9 = 11664$ unique combinations without even taking the sign and house position of the other planet into account. For ten planets this gives a total of $(11664^{10})/2 = 2 \times 10^{40}$ unique combinations (we divide by 2 to avoid double counting). The total is somewhat less than our previous 10^{360} but is still so huge that merely writing down one keyword per combination would require a stack of paper heavier than a million Suns. If we are forbidden to consider factors in isolation, we are now obliged to match this huge number of combinations directly to the almost infinite variety of human behaviour. It would be like matching stars in the sky to grains of sand in the Sahara and claiming we had got it right. Even without reasoning errors our capacity could not possibly cope, let alone our supply of paper. Which brings us to our further point — that astrological theory could not be based on observation. Armchair proclamation yes, observation no.

In case you wondered where the “million Suns” comes from, assume that each A4 80gsm page weighing 5 grams can record 50 keywords i.e. each line has one keyword plus list-of-factors-comprising-the-combination. Weight of paper required is then more than $5 \times (2 \times 10^{40})/50 = \text{more than } 2 \times 10^{39}$ grams. The Sun weighs about 2×10^{33} grams. So the weight of paper required is more than $(2 \times 10^{39})/(2 \times 10^{33}) = \text{more than a million Suns}$, to which might be added the weight of folders/binders needed to contain and index them. Purists who insisted on allowing for the sign and house position of the other planet would need to increase their paper supply (or alternatively decrease the size of their handwriting) by a factor of about 10^{22} .

17.4 — I understand that only a minute fraction of the information which the senses send to the brain actually appears in consciousness. But this doesn't prevent us from getting along in everyday life, basing our actions on simplified versions of ‘what is really going on’. So why should the complexity of the chart preclude the discovery and application of patterns at a relatively simple level — that of ten planets and twelve signs, for instance?

Researchers: In 10.1 you pointed out that a competent astrologer will avoid using simple patterns, i.e. factors in isolation, because everything depends on the rest of the chart. Because all possible factors are not considered, and because the stars only incline, the outcome might not be true to type. So you have already answered the question — complexity precludes the application of simple patterns because astrologers say so.

Alternatively, it is a property of correlation that, as the number of factors increases, the correlation between any one of them and behaviour must decrease to leave room for the others, in the same way that having dinner cannot be entirely determined by time if it is also determined by hunger. When the number of factors is large, as in astrology, the maximum possible correlation between any single factor and behaviour ends up well below our ability

to detect it. Hardly anybody can detect unaided a correlation of 0.4, and 0.7 is still missed by one person in four. The number of charts required (at least ten times the number of factors) may also end up well beyond our resources.

This is why complexity precludes the discovery of simple patterns. It means that a correlation could be detected unaided by three out of four astrologers only if the complexity involved no more than two factors, say one planet x two signs, which is not even sun sign astrology. For something more complex it could not be done. Ironically, we can cope with what tradition forbids (simplicity), but we cannot cope with what tradition requires (complexity).

17.5n — You say it could not be done. Which is to say that research into astrology is impossible. So what have we been talking about?

Researchers: We have been talking about determining factor meanings from scratch. This has nothing to do with testing the meanings claimed by astrologers. It does not follow that research into astrology is impossible. It is true that researchers might collect say 1000 Cancerians to see if they reflect the alleged characteristics of Cancer, the assumption being that in a large enough sample the other chart factors (including their ability to only incline) will cancel out. But it does not work in reverse. We can collect 1000 orange fruit cakes to see if they really do contain orange, but we cannot tell which of the countless attributes of cakes (such as flour, eggs, butter, sugar, fruit, nuts, candied peel, milk, salt, baking powder, spices, wine, spirits, juices, essences, shape, size, baking time, temperature, type of container, type of oven) is the one that is unique to our particular cakes, especially as we have no way of telling whether the cook actually followed the recipe. Similarly, we cannot tell which of the countless attributes of people is the one that is unique to Cancer, especially when charts only incline. It could not be done.

This allows astrologers a convenient double standard — positive results can be shouted from the rooftops, negative results can be brushed aside as the consequence of chart complexity or fickle inclination. The problem of course is that the resulting nonfalsifiable astrology could not be based on observation. For if no observation could prove astrology false, astrologers could never be wrong even when using the wrong chart. So we think it is far more plausible to say that our own inability to confirm astrological claims is not because charts are too complex, but because charts do not actually work. If they did then we would not be getting the dismal Vernon Clark results shown in Figures 2, 3, and 4, see 9.6.

17.6 — Astrologers have different opinions about what constitutes the “whole chart”, and how much is needed for an acceptable reading — it being, as you illustrated with Figure 5, possible to delve into the minutiae of a chart ad infinitum. These differences seem to explain much of the mystery, and the confusion, which surrounds the practise of astrology.

Researchers: But the mystery and confusion might be an illusion. As far as we know the perceived chart correspondences arise only through reasoning errors. So the different approaches confidently adopted by different astrologers are precisely equivalent to the different poses confidently adopted by Skinner’s pigeons. (Their pose was whatever it was when food was first delivered into their individual feeding tray, which led them to believe their pose brought food, so they stayed with that pose, which then necessarily confirmed their belief even though the subsequent deliveries were actually at random, hence their confident but completely different poses.) That is, the diversity of approaches confidently adopted by astrologers is more plausibly explained by reasoning errors than by invoking mysteries.

Again, because reasoning errors can lead astrologers to believe in correspondences that do not actually exist, we can hardly view the conflict between approaches as something special. Indeed, conflict would be predicted, just as the pigeons' differing poses would be predicted. Of course this explanation rather brutally de-mystifies the chart reading process, but the chips fall where they may.

18. Reasoning errors make mind/reality/etc issues premature

18.1n — William Lilly wrote, “The more holy thou art, and more neer to God, the purer judgement thou shalt give.” Do you have any comment on this idea that — all considerations of technical knowledge aside — the mind of the astrologer is a relevant factor in the quality of an astrological judgement, in the way that Lilly states?

Researchers: The quote is from Lilly's message “To the Student in Astrology” in his famous textbook *Christian Astrology* (1647). Astrology's then main problem was its early grounding in astral determinism, a problem that persisted despite unending disclaimers such as Lilly's motto *non cogunt*, or the stars do not compel. An astrologer's main battle was therefore to prove that astrology was compatible with Christianity, which explains Lilly's choice of title. In other words the quote may be more to help the battle than to provide actual hints for purer judgement. This view is supported by the rest of Lilly's message, which is basically a list of Christian virtues to be adhered to, ending with “be not dismayed if ill spoken of ... God suffers no sin unpunished, no lie unrevenge.” But back to your question:

If being “neer to God” makes the astrologer more warm, more sympathetic, more wise, and more sensitive to body language, then in a counselling situation it has to be an advantage. But outside of counselling and other face-to-face situations, studies have so far revealed no advantage in being “neer to God.” As far as we can tell, holier or more intuitive astrologers make judgements that are no different in accuracy from those made by other astrologers. In fact nothing seems to make much difference, not even personality, technique, or experience, which is not to say that clients won't have preferences. Historically some astrologers such as William Lilly and Leo Knecht have had an impressive reputation for accuracy, but until their modern equivalents (which earlier we called white crows) come forward for testing, we have nothing to go on.

18.2 — Staying with the issue of mind and its relevance in astrology, I imagine that what many astrologers will find surprising, and perhaps disappointing, about your approach is that there is no real debate about the nature of mind, the nature of reality, and the way in which we perceive reality.

Researchers: We find this hard to understand. First, our concern for reasoning errors is in effect precisely about such topics. Second, astrology books do not hedge their bets with such debates, so how are they suddenly relevant? Third, “real debate” seems premature until astrology has been shown to work under conditions where reasoning errors are controlled. In short, what has mind-reality-perception to do with testing whether astrologers can pick correct charts from controls? How can it be relevant when astrologers give readings without worrying whether client and chart are real, or a figment of the mind, or a misperception?

18.3 — Astrologers might claim that it is impossible to test or evaluate astrology without first addressing questions about the nature of subject and object, the nature of perception, and the nature of truth and its relativity.

Researchers: We don't see how. If you check the psychological and philosophical literature you will find these questions are discussed at great length without any mention of astrology. And with good reason. Why should a process heavily prone to reasoning errors raise questions about the nature of truth? It is like claiming the nature of piano playing is questioned by wearing boxing gloves.

18.4n — To illustrate the point, let's go back to your earlier example (6.1) of equal lines being perceived as unequal. You used this to show that we may misperceive 'real reality' (to coin a term); but it could also be used to suggest that human perception is inherently interpretative, and that the reality of 'reality' is only relative. After all, if we saw reality directly then we could never be deluded.

Researchers: You are right. The idea that perception is modelling arose from the cognitive revolution of the 1950s and the birth of artificial intelligence. Before then the talk was on stimulus and response. Now it is on things like the selective filtering of experience and strategies for handling information. Perception is seen as a set of ideas and models on which we act until they are proved wrong, in which case we change them. That is, we do not merely receive experience, we use it to selectively test models. These models are basically labour-saving devices that collapse the information into manageable chunks. They determine to some extent what we see and how much. For example, in a given landscape the geologist will see rocks, the developer will see building sites, and the artist will see metaphors and meaning.

So what is more important in determining perception, the model or the information input? The answer is the model. For example, suppose we see a slippery wet road ahead. Because the image on our retina is neither slippery nor three-dimensional, the perception must be generated by choosing the model that best fits the cues. So perception is not simply seeing. It is a matter of guessing followed by adjustments if we choose the wrong model, as for example when the shadowy figure in our bedroom turns out to be a coat hanging behind the door. This explains the reasoning error known as hindsight bias (where afterwards we knew it all along) — once the choice of models has been biased by the experience, it reintroduces itself into the original perception.

The problem is that guessing from inadequate data can go off the rails, because wrong guesses are not easily dispelled by knowing the truth. Although we may know when our perception is wrong, this does not correct the perception, as in our example of equal lines. In other words intellect and perception are almost separate processes. No wonder we need the scientific approach to keep us on the rails.

18.5n — That analogy is a telling one, I think. Isn't the question really whether there are any rails to keep on? There are two extreme philosophical positions: *realism*, where we simply observe a 'master reality'; and *idealism*, where we create our own reality. The article on 'Realism and anti-realism' in the 'Oxford Companion to Philosophy' says "no sane position is reached at either extreme." It is a commonplace of philosophy that we create our own reality to some degree.

Researchers: Does it matter? Like clients, we are concerned only with whether astrologers can do what they claim to do. How is reality relevant?

18.6n — How could reality not be relevant? Different astrologers claim to do different things, which rest on different interpretations of reality. We already touched on this at 7.13-7.14. Some hold a ‘realist’ position; in their view, the laws of astrology are similar to the law of gravity — objective, quantifiable laws which work regardless of any mental involvement by astrologers or anyone else. This position is easy to understand. Its chief problem is that the laws which are supposed to be there have yet to be isolated and defined — a point which you have mentioned already in this interview.

The other positions held by astrologers — the majority, in my experience — depart from the ‘realist’ position to varying degrees. Under these views, astrology involves an element of art as well as of science; several astrologers used the analogy of playing music — the point being that it is necessary to know the basics, but that a mental quality (‘inspiration’, for want of a better word) is required in order for an astrologer to do their best work. The mental attitude of the client is also sometimes brought in as a factor which has to be ‘right’.

Researchers: A problem with both the above views is that the claimed success is most readily explained by reasoning errors. There is no need for alternative realities or mental attitudes or other mysteries. It is like invoking the end of the world to explain a power cut.

18.7n — I disagree, and would suggest that it is worth looking at the consequences which follow from the approach I am talking about. Under this system — sometimes labelled ‘divinatory astrology’ — two things in particular require comment:

(1) Apparently contradictory systems of astrological interpretation (such as tropical and sidereal zodiacs) might work for different individuals (as, say, be-bop and hip-hop might suit different musicians). If that were so, it would make no sense to try and evaluate whether an astrological technique worked as a general principle, only whether it worked for a particular person. (2) Another plausible inference would be that nearly all research into astrology has been unsuited to its subject — the knowledge ‘this is a test’ being sufficient to destroy the attitude of genuine enquiry needed for synergy between astrologer, chart, and client. This interpretation, of course, would make astrology almost impossible to test.

Researchers: Almost all astrology books and journals claim that astrological effects hold for everybody, whether or not they believe in astrology, and are consistent. So (1) cannot be right. Similarly, a responsible astrologer will always test the chart to the client’s satisfaction before proceeding to matters of importance. So (2) cannot be right.

In any case, (1) and (2) do not provide grounds for disagreeing with our point that “reasoning errors can explain the claimed success.” Both involve situations where there is no control over reasoning errors, so reasoning errors can still explain the claimed success.

18.8n — I can’t disagree with your point about reasoning errors, but would add that reasoning errors *can* explain anything we care to think of; for example our belief that the world exists may be one huge reasoning error.

Researchers: Which would leave nothing to do the believing. Could we make that kind of mistake? We might mistake a pen for a pencil or by mistake forget to order lunch, but could we be mistaken that other people exist or that the world exists?

Your comment implies that our reasoning is always so faulty that we can reach any conclusion we like, in which case car repairs would be effectively denied. Obviously this is not so. With care we can avoid reasoning errors, repair cars, and reach sound conclusions. More to the point, if astrology really did work, it would work even when we avoided reasoning errors. So they could not be an explanation.

18.9n — The interesting thing, surely, is whether reasoning errors provide the most consistent and comprehensive explanation of a given phenomenon. But before this can be assessed, we have to be clear about what the alternative explanation to reasoning errors is, and how it is supposed to operate.

Researchers: The alternative being that an astrology with disagreement all along the line is actually true? Such special pleading would not be accepted in other areas, so why should we allow it for astrology? To put it another way, if we are careful to always avoid reasoning errors and find after much research that there is little or nothing left to explain (which situation is now as true of astrology as it was for phrenology), it seems pointless to seek explanations for likely non-existent effects, a point also covered in 16.3 and later in 18.12. It would be like seeking explanations for flying elephants. But tell us anyway.

18.10n — Here is a brief overview of the alternative way of seeing astrology — the divinatory approach. In this, astrology is seen as similar to the I Ching or tarot. There are two consequences of this which may be worth dwelling on. The first is that the significance of chart factors *in themselves* is taken away. Mars near the ascendant does not make things happen, any more than the fall of yarrow stalks causes things to happen. (“we would do better to look at the nature of the act of imaginative assignation by which we make time itself significant” — Geoffrey Cornelius, ‘The Moment of Astrology’ 1994, p.255).

Researchers: Divination uses a chance process (shuffling cards, casting dice, throwing yarrow stalks) to eliminate human interference so the will of the deity can be discerned. The outcome has to be vague to avoid falsification, and to allow the seeing (like faces in clouds) of whatever seems appropriate, so divination actually encourages human interference rather than eliminate it. It also denies the relevance of accurate birth charts — why bother when we can pick one at random, just like throwing stalks?

Such a picture is quite contrary to the one given in astrology textbooks. Thus in his review of Cornelius’s book, Charles Harvey (*Astrological Journal* Nov-Dec 1994) accepts that divination can play a role in astrology. But he rejects the idea that all of astrology is divinatory because it would deny a secure basis to chart interpretation, thus wiping out astrology textbooks overnight. It would also deny the improvements actually achieved by astrologers such as Addey, Ebertin, and Lewis, and by some computer programs, and it would deny the cyclicity on which many successful mundane forecasts are based. In short, astrology as practised by most astrologers could not be divinatory. But let us continue the discussion anyway.

18.11n — The involvement of an act of imagination on the part of the astrologer effectively means that a chart reading is not repeatable (because it is impossible to repeat all the conditions which lead Astrologer X to apply their imagination in a particular way at a particular time). Non-repeatability would make many types of test inapplicable to astrology, albeit not the Vernon-Clark approach. The second consequence, which emerges particularly from the analogy between astrology and the I Ching, is that the intention to make a test, on the part of astrologer or client, would prevent an accurate reading from being produced.

Researchers: So an astrologer could never get the same reading twice, nor could any other astrologer, nor could they discover whether one approach worked better than another, or even whether anything worked in the first place. Indeed, to repeat the reading must necessarily prove one of the readings wrong. Compare this with faith healing — if you have faith you will be healed, but if you are not healed then you have insufficient faith. Why bother with tests when the whole process so readily self-destructs?

18.12n — The attitude of the I Ching to being tested is given in hexagram 4: “It is not I who seek the young fool; the young fool seeks me. At the first oracle I inform him. If he asks two or three times, it is importunity. If he importunes, I give him no information.” It adds: “If mistrustful or unintelligent questioning is kept up, it serves only to annoy the teacher. He does well to ignore it in silence.” (I Ching — Richard Wilhelm translation, pp.20-21). The point is that questions based in doubt about that which one consults are invalid; the doubt becomes a self-fulfilling prophecy. Under this view, Vernon-Clark type tests would also be unsuitable. So there may be no such thing as suitable research, making divinatory astrology almost impossible to test.

Researchers: The outcome is thus true by definition, which puts all the blame for a faulty reading on the client. How very convenient.

To consult the I Ching we choose our moment and toss a set of yarrow stalks. But according to hexagram 4, if we simultaneously toss *two* sets of yarrow stalks, or two pennies as in the Australian and New Zealand gambling game of two-up, their agreement should be affected by the degree of mistrust we assume. But as anyone can discover for themselves, no connection actually exists, so we have no reason to believe that mistrust has any effect.

More to the point, if astrology is almost impossible to test then it is almost impossible to discover in the first place, or to claim that some techniques work better than others, which (as noted by Charles Harvey in 18.11) would wipe out astrology textbooks and deny the improvements actually achieved. Furthermore, as we showed in 12.5, the idea that astrology is almost impossible to test cannot be true when astrologers are so readily convinced that it works (or not, thus Charles Carter says “my own experience with figures cast for me by horarists has been unfortunate. In fact they have usually been downright wrong and never strikingly right” *Astrological Journal* December 1962).

Interestingly, we seem here to be in precisely the sort of situation where failure to observe our subjective-objective distinction (see 4.1) can send us off the rails. Before we can judge whether the claims of divinatory astrologers are impossible to test, we need to know precisely what claims they are making. If they cannot be specific then it is like asking us to debate the merits of flying elephants without regard for whether they actually exist.

18.13n — To answer the first part of your question: So far as I am aware, the prevailing view amongst divinatory astrologers is that astrology — and other modes of ‘symbolic perception’ — are innate. Turtles are born knowing how to dig their way out of the sand, walk down the beach, get into the sea and swim away; similarly (these astrologers might argue), humans are born knowing how to derive information about the world from the way their minds respond to symbols.

Researchers: Astrologers have to do more than just argue. After all, there is no evidence that what they say is true. Otherwise astrologers would not disagree on nearly everything, the skeptics’ million dollar prize in 13.3 would have been snapped up long ago, and science would be redundant. Our world would resemble astrology world (see 12.1). And how does it explain the existence of skeptics?

18.14n — On the second part of your question: I don’t think divinatory astrologers would have too much difficulty in being specific about what they claim to do: they might say something like, ‘we provide the information which it is right to provide at the time’. Since the model here is one of participating in an order which transcends the individual, the individual wishes of client or astrologer will not necessarily be met. Sometimes, therefore, it may not be

appropriate for a question to be answered; perhaps the client will get the answer to a question other than the one they came for. But, usually, information is provided which will have meaning for the client. This includes specific information about objective things in the world, such as ‘Is this boat, which I am thinking of buying, damaged below the water line?’.

Researchers: This seems testable to us. But whether the astrology is divinatory or ordinary, the issue boils down to the same thing: Does it deliver results beyond those explainable by non-astrological factors? There is nothing here to say that divination should be any less immune to reasoning errors than non-divination. In fact, given that it encourages human intervention (see 18.11), one might expect the reverse to apply.

18.15n — The physicist Niels Bohr once remarked to a colleague, “Your theory is crazy, but it’s not crazy enough to be true.” Perhaps the only frame of reference which could begin to explain astrological phenomena would be entirely crazy from a commonsense point of view. Suggestions such as this may, as you have suggested, be smoke-screens which only serve to obscure scientific truth. I only want to make the point that, whatever conclusions people draw, those conclusions will be based on assumptions about the world.

Researchers: If we developed even crazier theories than astrology, would this increase their chance of being true? Presumably not. Bohr still thought the truth of a crazy theory could be determined, which is said to not apply to divinatory astrology. As for assumptions, they provide a framework (just as talk of a reality does) for testing claims. Your comment implies that just picking the right assumptions will validate astrology, but it does not follow, any more than picking the right assumptions validated phrenology. Indeed, astrologers do not even agree about their own assumptions, as in divinatory vs ordinary astrology, so the problem also applies to them. But does it apply to researchers? After all, assumptions never stopped scientists making tests. If astrologers claim to see X in charts under conditions Y and Z, then this is the claim we test. To argue that the outcome depends on our assumptions is like saying a change in our assumptions can turn a losing lottery ticket into a winner.

18.16n — Other assumptions which come into play in evaluating astrology’s truth are these: Do we understand nearly all of the world, or hardly anything? What is the scope, and what are the limits, of the scientific method? Do we play an active role in the creation of the world in which we live? Since such questions are the domain of philosophy rather than science, I stand by the point made earlier (in 18.6) — that our view of reality is relevant to the interpretation and understanding of astrology.

Researchers: We don’t see how. Astrology books and journals, and client consultations, generally deal in straightforward things like health, wealth and relationships without ever worrying about the nature of reality or the limits of science. So how can they be suddenly relevant? They seem to arise only when research results are negative, never when they are positive. In any case, we are merely testing the claims of astrologers to see X in charts. Why should a process heavily prone to reasoning errors raise questions about the nature of reality or the validity of research? It is like arguing that the Cottingley fairies have invalidated science.

To be sure, if astrology really did deliver results beyond those explainable by artifacts, reasoning errors, and other non-astrological factors, it would show that our science-based understanding of the world is incomplete. In which case your points would be relevant, and we would be the first to debate them. But half a century of systematic enquiry has consistently found no useful effects beyond non-astrological ones. Until the situation changes, debate seems premature. As Mrs Beeton might say, first catch your rabbit before printing the menu.

But over to you. Given the idea that astrology delivers results beyond those explained by non-astrological factors, what approach would you recommend for testing this idea? Interestingly, when we put this question to astrologers, we generally receive no response, which suggests they have no interest in finding out if they might be fooling themselves. Note that our own views and assumptions are deliberately excluded here, so their merits or flaws have no bearing on the issue.

18.17n — Before addressing your question I should say that, in order to answer it, I have to step outside the role which I have tried to take in this interview of an astrological everyman, and answer in terms of my own approach and understanding of astrology. There are many people in the astrological community who would answer differently, many of whom are better-qualified than I am to reply. I hope that some of them will in fact feel moved to respond. Now, to my reply: You ask for an approach capable of testing astrology. Despite your best efforts to exclude all views or assumptions, this does not get beyond the assumption that astrology should function irrespective of the attitude and motivation of those who try to use it. That this does not fit with the divinatory model of astrology has already been discussed at 18.11-18.12. From that perspective, your question could be rendered as, ‘Show us a test which is not a test’. Unsurprisingly, I do not have an answer which meets your criteria. What I can offer is three suggestions which — though hardly conclusive in your terms — seem at least to be relevant, and promising areas for research: (1) Research into the influence of researchers on findings — is there any difference in the results obtained from two sets of identical tests which are run (a) by sceptics, (b) by believers in astrology? If (as suggested), the mental attitude of those involved is important, it might be expected that experiments run by believers would be more favourable to astrology than those run by non-believers (2) Time twins. As noted earlier, research in this area seems as if it should avoid most of the objections to which research into astrology is generally subject. In order to allow astrology to perform under its own terms, studies should focus not only on parallels which are obvious to all (such as time-twins getting married on the same day), but also parallels which exist only in terms of astrological symbolism (for example lead poisoning and promotion could both be expressions of Saturn). (3) In addition, I believe there is room for anthropological fieldwork: talking to scientists and astrologers to elucidate and clarify the ways in which astrology can be seen; and talking to astrologers (ideally their clients as well, though confidentiality issues make this problematic) to get specific information/advice arrived at from chart readings. This approach has, I think, a part to play in establishing whether astrologers are getting significant-looking results in their daily practice, whether there are identifiable conditions applying in those cases, and what kind of phenomenon astrology might actually be. This, of course, is the approach taken in “Astrology in the Year Zero”, including this interview.

Researchers: Your suggested “promising areas for research” have already been looked at by researchers, but with unpromising results. Tests by believers have not been more positive than those by skeptics, for example in 1987 German astrologer Peter Niehenke obtained only negative results after comparing over 3000 charts with their owner’s responses to a 16-page questionnaire, while the results most generally hailed by astrologers are those of arch-skeptic Gauquelin. Time twins (see 10.7) have so far shown no similarities commensurate with astrological claims. Analysis of consultations has found only reasoning errors and nonfalsifiability (see 4.4). Whether or not all this is bad news will depend on our subjective-objective distinction as shown in 4.1.

Might others have better ideas? This was essentially the focus of the \$US5000 prize mentioned in 13.2, which in 1983 challenged astrologers to provide “evidence that the accuracy of chart interpretations cannot be explained by non-astrological factors.” The 34 entries totaling 1500 pages from around the world were agreeably diverse, being spread roughly equally over personality, events, and other (e.g. synastry, horary), but 16 did not address the issue and 3 produced only negative results. Of the remaining 15 entries only one was successful, but this was a bogus study entered to counter allegations that the prize was unwinnable because appropriate tests could not be designed and the panel of eight judges was not impartial. For details see *Astrological Journal* 1986 and 1987, most issues.

18.18n — Staying with the topic of reality, what is your view of the idea that, in principle, different views of reality can result in the world being experienced differently?

Researchers: Just proclaiming that different realities exist is no argument in favour of their existence. We need to know exactly what they entail, how we can tell one from another, and whether there are many realities or a single complex one. Nevertheless the idea of alternative realities (or truths or world views or paradigms) is popular among some astrologers on the basis that we need only find the right reality and astrology is proven beyond all possible doubt. Which is like claiming we could fly if only we could find the right reality.

However, although ideas about alternative *perceptions* are straightforward (some people see Joe as a nice guy, others see him as a bully), ideas about alternative *realities* are problematic. Instead of solving problems for astrology they create new ones. For example, how many alternative realities are there? How can we tell if they actually exist? Are they really alternatives or are they just another complexity of everyday reality? Astrologers never tell us.

More to the point, how could these alternatives upset scientific research but not the everyday experience of astrologers? (Recall that if astrologers can study it then so can researchers.) How could failure to choose the right reality upset our testing an astrologer’s claim to see X in charts? A particular reality might be more congruent with astrology (e.g. by involving holism) but it does not mean that astrology is automatically supported, any more than a congruent reality (normal science) supported phrenology. In short, we have no reason to view astrology differently just because an alternative reality might happen to be congruent with it. The idea confuses more than it clarifies.

18.19n — In the Autumn 1997 issue of *Noetic Sciences Review* there is what its editor calls a “spirited debate” on astrology between the US physicist Dr Will Keepin (for) and the US psychologist Professor Roger Walsh (against). One passage that interests me is by Keepin, who says: “If the [Gauquelin findings] can be substantiated, the implications are dumbfounding. Borrowing on Wilber’s concepts [Wilber is a US philosopher], astrology can be viewed as a transrational discipline — epistemologically rooted in “vision-logic” and intuition — that points toward a vast “holarchy” which not only unifies the physiosphere, biosphere, and noosphere, as Wilber calls for, but does so in a larger celestial context that “transcends but includes” the Gaian system. ... Astrology does not preclude free will. ... Astrological correlations are perhaps the consequence of a unitive cosmic process that unfolds holographically at multiple levels of reality simultaneously.” (p.34) Walsh’s response is that “since astrologers don’t usually undertake transpersonal transformative disciplines”, Keepin’s argument begs the question, so “the unreliability and invalidity of traditional astrological readings would still remain.” I realise that Keepin’s jargon is rather daunting but I think his gist is clear enough. Any comments on what Keepin is saying?

Researchers: Keepin makes a leap of faith from “Gauquelin findings” to “astrology.” Fortunately we do not have to deal with Keepin’s jargon because Wilber himself, in his *One Taste: The Journals of Ken Wilber* (Shambala 1999), has commented on this passage. Wilber is generally critical of astrology. He confirms that Keepin has used his [Wilber’s] concepts correctly and then comes straight to the point: “The question is, are we working with upward or downward causation?” (p.179). Wilber notes that Keepin has opted for downwards astrology, where higher- order influences at the level of the universe or World Soul filter down to lower-order people. This process inevitably gets degraded by free will, birth time errors, interpretive errors, and so on, so the weak correlations that Gauquelin observed give a misleading picture of the true influence of astrology.

18.20n — It’s an interesting perspective. Keepin is saying that an underlying Greater Truth exists but it gets more or less lost in the translation because astrology, the means of translation, is prone to so many complicating factors and errors.

Researchers: But did you notice how an underlying Greater Truth is compatible with all possible situations? Even if astrologers were always wrong, the Greater Truth could still be true. The problem is, we have no idea how to confirm or disconfirm such speculations, and neither do astrologers. The same with Keepin’s unifying holarchies and Wilber’s World Soul, which is why we prefer to let these two fight it out rather than deal with their speculations:

Wilber notes that astrology could be working upwards rather than downwards. Physical planets could be affecting the physical body directly, with subsequent upward influence on the emotions, mind, and higher levels. So Wilbur asks the question: Is astrology upwards or downwards? He then argues in favour of upwards, because anything downwards is usually very strong. Thus when we will our arm to move, all of it moves, not just 5% of it. Similarly a World Soul that could not downwards override a Caesarian birth or a non-eminent birth is not much of a World Soul. By contrast, anything upwards is usually very weak because the lower has to struggle very hard to decisively affect the higher. This means that upwards astrological influences would not survive unless they were initially really strong. But as far as we know they are so weak as to be effectively non-existent. Or so Wilber argues.

He concludes: “For the average person, who is presumably not getting a huge dose of what was already very weak astral forces, these tepid influences would wash out entirely.” In short he is arguing that, contrary to Keepin’s view, Gauquelin’s weak effects correspond to upwards astrology, not downwards astrology. Keepin 0, Wilber 1.

Our own comment is that neither Keepin nor Wilber have taken into consideration the role of reasoning errors. In our view, what astrologers think they observe corresponds most likely to reasoning errors, not to upwards or downwards astrology. Is that shadowy figure haunting the church at midnight really a ghost, or is it a hallucination, or is it just a coat hanging behind the vestry door? Keepin and Wilber have assumed the former without considering the others. Nor have they considered the possible role of parents, outlined in 9.2, which would of course pull the plug on their philosophising. Their views seem to be a good example of how not being careful can lead you astray.

18.21 — Much of this discussion has been about “objective astrology”, as you have characterised it. But supposing that every astrologer in the world held up their hands tomorrow and said, “We admit it — astrology is an entirely subjective art.” What then?

Researchers: If their astrology is subjective (no need to be true) and not objective (needs to be true) the research implications are then rather different. Subjective astrology is more like a

religion, and researching it would be like researching a religion, where we examine its effects on people rather than its content. Research would focus not on the actual beliefs but on how people use them and are affected by them. For example to study how astrological counselling works we could apply the same procedures used to study ordinary psychological counselling. The problem is that if you believe it is all foolish nonsense then by its own rules you are right. The implication is that subjective astrology should compete with other forms of counselling on an effectiveness scale determined by scientific investigation.

At the same time we should not make the mistake of treating astrology as if astrologers did not matter. For example it is a common experience that clients (unless suffering from a genuine organic condition) prefer astrologers to psychiatrists because they find the former more caring, or more approachable, or more sympathetic to their religious views, and so on, all of which are attributes of the astrologer rather than of astrology. On this basis, whatever our views of astrology, if it encourages people to explore and express humane and spiritual values or to examine the problems of mankind's existence, if it does so in ways that are gentle and respectful or inspiring and uplifting, if in a chaotic world it provides individual retreat or support, if it helps provide a bridge between a person of wisdom and a person in need, then these qualities deserve study as much as any objective claim. Our respect for these qualities should not be diminished by our rejecting, at the same time, astrology as a source of scientific knowledge. There is more to astrology than being true or false.

19. Sources of research information

19.1n — Most popular works on astrology do not defend it but simply teach how to use it. Anyone who has read only such works might be unaware of the research that has been conducted into astrology. Where can they find the other side of the story?

Researchers: There is a surprisingly large number of books that give the other side of the story. The problem is that they tend to be out of print, or out of date, or unavailable in public libraries. For every such book there are dozens of articles that are generally even harder to find. The main thing is whether the material is up to date, simply because the pace of recent work has been rapid and many previous gaps have now been filled. So rather than nominate specific titles (which is no use if you cannot get them) we have annotated the more important or more recent titles in our list.

[The list can be seen on our website by clicking "Guide to Sources". The interview contains no cross-references to our website because the interview was completed before the website began. Nevertheless most of the articles on our website address issues raised in the interview, for example sun signs, reasoning errors, Gauquelin planetary effects, tests, and test results. To date the researchers' arguments and conclusions remain unaffected.— *webmaster*]

To give you an idea of what to expect from critical psychologists, other than a scrutiny of the evidence, here are some quotes from Leahey & Leahey's *Psychology's Occult Doubles: Psychology and the Problem of Pseudoscience* (Nelson-Hall 1983), which devotes a dozen pages to astrology: They note that astrology conjures up a "universe where nothing is meaningless. ... This beats the hell (quite literally) out of a meaningless, absurd universe composed solely of atoms and the void" (p.32). "Moreover, even if it [astrology] had no practical use in pursuing wealth and fame, it would still have some of the same improving virtues as philosophy" (p.37). "It is less a pursuit of truth than a pursuit of happiness". Believers in astrology want to look into their souls — but as safely and sanely as the Fourth of July without fire-

works. Not for them the dark night of the soul, the assumption of responsibility for all aspects of one's being" (p.41). "For those with only slight religious needs, the astrology column in your newspaper may well be as satisfying as lighting a candle to a saint or saying grace before eating" (p.42).

20. Summing up

20.1 — Why are you still interested in astrology? Why haven't you just given up hope and turned your backs on it?

Researchers: No matter what attitude we might have towards astrology, the experiences of astrologers and their clients are themselves fascinating, whether or not they prove to be astrological. Similarly, something that so many people believe in has to be worthy of study, whether or not the reasons prove to be astrological. Of course, study may not be easy or quick or financially rewarding, but with skill, care and knowledge we can do it. If we want to — and surely we should. As for your second question, none of us have vested interests in astrology, so there are no particular results we could "hope" for. If we do turn our backs on astrology it will be because we have finished our researches, not because we have given up hope.

20.2 — So would you recommend anyone to take up astrological research?

Researchers: If the aim is to prove that astrological claims are true, the chance of a positive result strong enough to overturn the present predominantly negative evidence seems remote. There is no case for the investment of research dollars because the competition from other more profitable areas is simply too great. But as mentioned in our previous answer, the picture improves if the aim is no longer to prove astrology. The area remains worthy of study. Even so, students who hope it will open the door to research grants may be disappointed.

20.3 — One last question. For the benefit of readers who may feel overwhelmed, could you provide a summary of your position?

Researchers: Four things. First, astrology is no longer the mystery it used to be. Most of the important questions that can be asked now have answers that are generally consistent.

Second, the claim that astrology works implies that all non-astrological influences leading to the same result have been ruled out. Don't accept the first unless you can be sure of the second. The second is *never* true of your typical astrology reading.

Third, ask yourself if your kind of astrology needs to be true. If no, you are safe. If yes, you are on shaky ground, in which case ask yourself which alternative seems more likely: (1) that pervasive astrological influences exist which contradict known science yet on whose nature astrologers spectacularly disagree, or (2) that the many known errors in human reasoning of which most astrologers are spectacularly unaware, can explain astrological beliefs.

Fourth, whatever our views of astrology, they cannot deny its historical importance, nor should they deny our open-mindedness to possible future discoveries in astrology and in extraterrestrial influences.

[The answers that best summarise the researchers' main points are to questions 8.1 (emerging picture), 15.1 (credibility problems), and 6.2-6.3 (pitfalls of experience). The best general overview of topics is given by the section headings listed on page 1.]

20.4 — This ends the collective interview. I asked each researcher if they would like to add a personal view. They replied as follows:

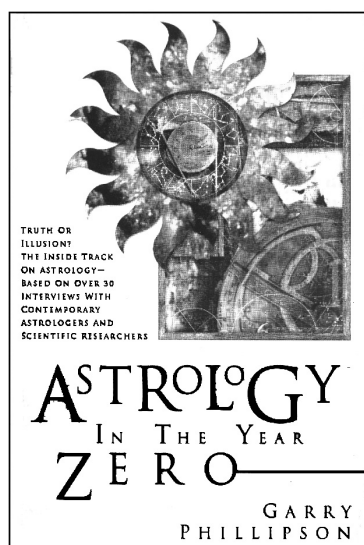
Dean: Readers' comments are most welcome. Send them by email to the addresses given below. We want to hear from you.

Ertel: Despite our refuting astrology as a source of knowledge we should acknowledge the stimulating effect of the Gauquelins' prolific research. Although some of their purported discoveries have been disconfirmed there remains a core that has withstood my own and other researchers' independent tests. If this core cannot be explained by parental tampering of birth data, we would need some more demanding explanation which, in my view, might eventually help to improve our understanding of mankind's place in the universe. Such understanding would differ considerably from astrology's historical intuitions. Rather, it would have to be consistent with existing astronomical knowledge and with models of cosmological evolution.

Mather: Astrology has been of major historical significance. The resistance so far to its disproof continues to pose a challenge.

Smit: Despite my changed views of astrology, I still cherish very fond memories of my dealings with my then fellow astrologers.

Kelly: On behalf of the group I would like to thank you for focussing on problematic areas that astrologers themselves tend to ignore. We hope your readers will explore these areas further. We also thank Geoffrey Dean for synthesising our diverse views into a mutually agreeable framework. The end result has been one of satisfaction to all of us.



Postscript June 2003: This interview is an expanded version of the interview in Garry Phillipson's *Astrology in the Year Zero*, Flare, London, Sept 2000, pp.124-166, ISBN 0-9530261-9-1. For more information on *Astrology in the Year Zero*, see:

www.flareuk.com and **www.astrozero.btinternet.co.uk**.

Responses from readers have ranged from claiming the researchers were paid \$400,000 by an evil organisation to hide the truth about astrology, to seeing the researchers's rigour as putting astrologers to shame. An update is planned for 2004 that will summarise responses from readers and provide answers to further questions.

For more on scientific research into astrology including articles, references, sources, websites, and non-technical overviews, visit **www.astrology-and-science.com/**

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