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CONTACT

Editor.

Wayne Spencer

15 Ramsden Wood Rd

Walsden

Todmorden

Lancs

OL14 7UD

UK

e-mail.

w.spencer@saqnet.co.uk

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FROM THE EDITOR
Wayne Spencer

When the idea of the Skeptical Intelligencer was first conceived, we thought that it would serve simply as a vehicle for more or less informal communications between the members of ASKE and we intended to adopt a very laissez faire attitude to contributions. It has quickly become clear, however, that the Skeptical Intelligencer is rather more of a magazine than a newsletter. This, in my view, obliges us to introduce a measure of quality control so as to ensure that our readers can have some confidence in the material we publish. Accordingly, I am now making several changes to the editorial arrangements. These changes will begin in earnest with the next issue.

The first change I propose to make is to appoint a number of assistant editors who have reasonably broad knowledge of the range of subjects potentially addressed in the magazine. Along with myself, the assistant editors will critically scrutinise every article submitted to the Skeptical Intelligencer and make suggestions for improvements. The first two assistant editors I have appointed are Michael Stanwick and Stephan Matthiesen.

As it is unlikely that the editorial team will possess the technical expertise to appraise every last piece we receive, I propose to create a board of expert technical consultants to advise us from time to time on points or articles outside our competence. In addition, I shall ensure that every contribution intended to make a substantive contribution to the literature is peer-reviewed by recognised figures in the field concerned. All peer-reviewed material we publish will appear in a section reserved for such papers.

With effect from the next issue, we will also be introducing a standard system for citations. Details can be found in the Guidelines for Contributors printed in this issue.

At least some of the members of ASKE are relatively unfamiliar with the literature of skepticism. To assist these members and other readers, I should like to publish review articles that deal with particular areas of interest to skeptics. If any of our readers are willing and able to write an overview of a claim, field, investigative technique, evaluative tool, or any other relevant branch of knowledge, I should be very interested to hear from them.

The History and Psychology of Western Astrology

Wayne Spencer is a civil servant and editor of Skeptical Intelligencer

Written in the Stars?

The History and Psychology of Western Astrology

Introduction: The following paper is based on the text of a talk given by the author to the South Place Ethical Society, Conway Hall, London, on 29 June 1997.

In their recent review, Geoffrey Dean, Arthur Mather and Ivan Kelly (1996) state that:

"The astrological hypothesis is that the macrocosm (universe) and microcosm (man) are related. Just as man is contained within the universe, so he contains a universe within himself, the one reflection of the other [...] More specifically, whatever is born at a particular moment - be it a person, a company, an event, a nation, a question, or anything with a distinct moment of beginning - will manifest the quality of the moment. This momentary quality will exist everywhere but can be best seen in the heavens because they are visible. Thus there will be a correlation between the heavens and human affairs." (Dean, Mather and Kelly 1996, page 48)

The basic astrological proposition has given rise to a number of different schools and branches in a number of different parts of the world (see Dean, Mather and Kelly 1996, page 49 for a partial list). I do not have space to attempt an examination of astrology as a whole. Instead, I propose mainly to concentrate on mainstream astrology as it has traditionally been practised in the Western world. Discussion of such matters as traditional Chinese and Indian astrology (see Dean, Mather and Kelly 1996, pages 56-7; Pingree 1996; and Ronan 1996 for short descriptions), and non-traditional Western astrological thinking, will largely have to wait for another day.

I also shall not discuss in any detail the technical principles of contemporary astrology nor their historical development (for various books describing the former, see West 1991, page 509 and Dean, Mather and Kelly 1996, page 97). Suffice it to say that astrology generally involves the determination of the positions of the sun, moon and the planets of the solar system relative to the earth at a certain significant moment. The positions of these astronomical bodies are mapped onto a chart divided up in one of a number of ways. Information is

derived from the position of the astronomical bodies relative to various chart features and to each other.

I should stress that much of the history of astrology is highly uncertain. The sources that have come down to us are obviously not comprehensive, and much of the material that is available has not yet been subjected to scholarly scrutiny (Barton 1994, page 8; Dean, Mather and Kelly 1996, page 50; Tester 1987, page vii). Here, as elsewhere, our conclusions are necessarily tentative.

The available evidence indicates that the continuum of beliefs that make up traditional Western astrology had its origins in Western Asian world of the first few millennia BCE. In the ancient world, there was a difference of opinion as to whether astrology arose in Mesopotamia (the area between the Euphrates and Tigris rivers, now in Iraq) or Egypt (Barton 1994, page 9). The ancient Greeks tended to regard Egypt as the mother of astrology (Barton 1994, page 9). However, in this and other matters, they seem to have been unduly influenced by their great respect for the civilisation of Egypt (Barton 1994, pages 9-10 and Lefkowitz 1996, chapter 3), and the evidence suggests that the contribution of Ancient Egypt to the development of astrology was actually relatively small (Barton 1994, pages 19-21; Tester 1987, pages 19-20).

In the west, the earliest relevant evidence comprises documents from Mesopotamia dating from around the second millennium BCE (Barton 1994, pages 10-11). The Mesopotamians regarded the stars and planets as either gods themselves or manifestations of the gods, and the skies were studied for divine messages (Britton and Walker 1996, page 43-4). Examples of the omens produced are preserved in several compilations of tablets. These show that in addition to the stars, the planets and the moon, regard was had to meteors (Barton 1994, page 12) and even clouds and rainbows (Dean, Mather and Kelly, page 52). They also show that such factors as early or late rising and setting, position, size, colour and brightness were all taken into consideration (Barton 1994, page 12). The omens themselves can be illustrated by an example which most scholars date to 1646 BCE. This reads:

"[If] in the eighth month, on the eleventh day Istar disappeared in the East and stayed away from the sky for two months and ...days, and became visible in the West again in the tenth month on the ...day, the harvest of the land will prosper." (Barton 1994, page 12)

The Mesopotamians perceived communications from the gods in a number of different phenomena, including earthquakes, noises in the fields, the flight of birds, the pattern of oil poured on water, and the entrails of sacrificed animals. The study of the skies was only one of a number of techniques which they employed (Barton 1994, pages 11-13; Britton and Walker 1994, page 42; Tester 1987, page 13). Indeed, during the second millennium BCE celestial omens may even have been regarded as inferior to extispicy, or the inspection of entrails. Thus, in a letter dated to around 1780 BCE we

see a diviner refusing to accept a bad omen suggested to him by an eclipse of the moon until he had confirmed it by extispicy (Barton 1994, page 11).

The surviving materials indicate that prognostications mainly concerned affairs of state, the economy, and the king himself, and that they were produced for the exclusive consideration of the king and his court, or sometimes temples (Britton and Walker 1996, page 44). Whether or not divination for ordinary individuals also existed is largely a matter of conjecture (cf. Barton 1994, page 13). In any event, the signs discerned were not regarded as pointing out an unchangeable fate. They indicated future possibilities and divine intentions. Observance of proper ritual, prayers, offerings etc. could materially affect what subsequently transpired (Britton and Walker 1996, page 43; Dean, Mather and Kelly 1996, page 52).

Over the ensuing centuries Mesopotamian astronomy took remarkable strides forward, culminating in a seminal application of mathematical models to astronomical problems (Britton and Walker 1996; see also Barton 1994, pages 13-14). This astronomical endeavour was perhaps partially driven by a desire to develop an accurate calendar (Barton 1994, page 14; Tester 1987, page 11); but, in view of the importance of divination within Mesopotamian culture, it seems a plausible hypothesis that the requirements of astrology were a significant motivating factor (Britton and Walker 1994, page 42; Lindberg 1992, pages 16-17). Within the world of divination, sky omens increased in importance, gaining the ascendancy over extispicy in the seventh century BCE (Barton 1994, page 14); and in the fifth century BCE the new astronomical understanding was used as the basis of the earliest known horoscope. This was produced in Babylon for a birth which occurred on 13 January 410 BCE (Barton 1994, pages 14-15).

Notwithstanding the astronomical sophistication of the early Babylonian horoscopes, the interpretations offered were not dissimilar to those found in the old omen literature (Barton 1994, page 16). Subsequently, the Babylonians developed astrological theory in a number of respects, and some of their advances can later be found in the astrology of the Greeks (Barton 1994, pages 16-19).

In the fourth century BCE Alexander conquered Persia. In the ensuing cultural exchange, the Greeks absorbed astronomical and astrological methods and data from the Babylonians (Barton 1994, pages 19 and 23). The precise details of this migration of ideas are unclear, but at length the Greeks significantly altered Babylonian astronomy and astrology (Barton 1994, pages 18-19; Toomer 1996), and it is in the Greek world that something recognisably akin to the astrology still widely practised today begins to come into view (Tester 1987, page 12). The centre of astrological activity, and indeed of other learning, in the Greek world was evidently Alexandria, the Hellenised city established by Alexander in Egypt (Barton 1994, pages 23-29; Dean, Mather and Kelly 1986, pages 53-4).

The acceptance of astrology by many Greeks was doubtless facilitated by a number of cosmological and philosophical conceptions then current in Greek philosophy. One such congenial notion was Aristotle's view of the Universe. On this view, the Universe was intimately small and comprised a series of concentric spheres with the Earth at the centre; moreover, forces were regarded as propagating down through the outer extraterrestrial spheres to the earth (Barton, page 104; Lindberg 1993, page 275). Another belief supportive of astrology was the axiom, shared by a number of philosophical schools, that the Universe was a unity which exhibited correspondences between the macrocosmic Universe and microcosmic man (Barton 1994, pages 106-7). Yet other another position consistent in some measure with astrology was the widespread idea that certain beings and objects possessed quasi-causal "sympathies" or "antipathies" towards each other, which the Stoics developed into the idea that everything in the Universe was connected with everything else as part of an inexorable divine fate (Barton 1994, page 103-4).

In addition to these factors we might also draw attention to Plato's association of the soul and the stars (Barton 1994, page 109). We might also mention the Pythagoreans' conception of the Universe in terms of musical harmony (Barton 1994, page 113), and the notion of the four elements (see Barton 1994 page 104-7). What this shows is that the idea of astrological connections was consonant with many of the most sophisticated expressions of Greek culture, and for this and other reasons belief in astrology eventually became widespread amongst educated as well as uneducated Greeks. This is not to say that astrology went unopposed. In fact, from this time onwards there seems to have been no period in which astrology was universally accepted (Tester 1987, page 2). The point, however, is that astrology cannot fairly be regarded as some beastly superstition lurking at the fringes of a rationalistic classical world. Rather, it was an integral part of the most advanced civilisation in the West (cf. Tester 1987, pages 16-18).

The astrological theories that were developed in the Greek world and afterwards were not always internally coherent or consistent with each other; moreover, they developed over time (see Tester 1987, page 29). The reasons why the Greeks adopted the particular principles of chart interpretation they did are complex and obscure. In the case of the qualities associated with particular planets, it seems that the characteristics of the mythological or divine entities linked to them were important. For an example of this, I shall quote from historian Tamsyn Barton (1994, page 112):

"Mercury was Hermes, the wily messenger of the gods, who presided over intelligence and communication. The planet was cast in this role in astrology too; it was thought to make people good at mathematics, natural philosophy and using words. It was perhaps the speed of the planet's movements which led it to be identified with the messenger."

"Magical thinking" (Zusne and Jones 1989, pages 13-32) also seems to have played a vital role in the development of astrological principles. For instance, when planets were directly opposite each other on the chart, or in "opposition", they were considered to "have a baleful influence on each other" (Barton 1994, page 99).

Other factors that influenced astrologers may have included numerological ideas and unsystematic empirical observation (note here Barton 1994, pages 27-8, 108 and 187-8). There is no evidence in the extant texts that large, well-controlled tests were ever carried out in antiquity (see Kieckhefer 1989, page 26 for Cicero's skepticism regarding this). However, striking conjunctions of events and astronomical configurations may have been noted and general conclusions drawn from them (cf. Britton and Walker 1996, page 42). Certainly, confirmatory instances of astrological predictions were recorded in some astrological texts (see, for example, Barton 1994, page 59).

Although astrological ideas and symbolism entered ancient magic and influenced the cosmologies of a number of religious cults (Barton 1994, pages 191-206), in the ancient world the primary function of astrology was to provide predictions. In fact, astrology was used to try to predict just about every facet of individual and collective life, and to ascertain the most auspicious moment for an enterprise or act (Barton 1994, pages 1-2 and 114-78). However, not all astrology saw the future as fixed. Some astrologers subscribed to such a view, but others left room for human moral freedom. The attitude of this latter school of thought is encapsulated in the well-known maxim: "the stars incline, they do not compel" (Tester 1987, page 2).

Astrology passed from Greece to Rome as part of the Romans' general adoption of Greek learning from the third century BCE onwards, becoming part of the beliefs of many elite and educated Romans (Barton 1994, page 33). The successful transposition of astrology was surely aided by the widespread influence of the Stoical philosophy (Barton 1994, page 34; Tester 1987, page 32), and by the general prestige that Greek learning possessed in the Roman world (Barton 1994, 37). In addition, with the change from republican to imperial rule, the single ruler and his fate became of paramount importance. This was fertile and natural ground for astrology (Barton 1994, page 38).

Astrology was connected with Roman aristocratic leaders from at least the first century BCE onwards, and thereafter predictions appear to have been made concerning many contenders for power (Barton 1994, page 39 et seq.). When Augustine came to power, he seems to have employed the sign of Capricorn as his personal badge, and as such it appears on coins and other objects. He also seems to have had his horoscope promulgated by way of an edict (Barton 1994, pages 40-1). Not surprisingly, under Augustine astrology seems to have become fashionable in Court circles.

Beginning apparently with Tiberius, the Emperors came to have court astrologers to advise them on such matters as the timing of coronations and the

prospects of possible heirs (Barton 1994, pages 43 and 49). However, the imperial rulers of Rome also perceived that as well as supplying legitimation, astrology could pose dangers. As early as 139 BCE, astrologers had been expelled from Rome, and between 44 BCE and 180 CE, between eight and thirteen similar decrees were passed, often in response to unrest (Barton 1994, page 50). There were also other legal measures designed to curtail astrology. For example, late in his reign, Augustine banned astrological consultations held either in private or on the subject of anyone's death (Barton 1994, page 42). Five years later, the Senate passed two decrees against astrologers and other diviners in the wake of an allegation that astrologers had been consulted during a treasonous plot. Two persons, who may have been astrologers, were subsequently executed (Barton 1994, pages 43-4). By 296 CE astrology was banned across the whole Roman empire (Barton 1994, page 52).

In addition to occasional and not always rigorously enforced (Barton 1994, page 51) legal measures, there was a certain amount of sceptical opinion ranged against astrologers. In general, the opponents of the astrologers did not dispute that the stars exercised an influence on earthly affairs. Rather, they rejected the perceived fatalism in astrology, and questioned astrologers' pretensions to accuracy. As a specimen of the Roman sceptics' arguments, we might take a lecture by the philosopher Favorinus of Arles dating from early in the second century CE. According to the historian of astrology Tamsyn Barton, in this lecture:

"He expresses scepticism about the claims for astrology's great age, adding that human history is too short to allow for the necessary observation. He points to the fact that people born at the same time, as exemplified by twins, have different destinies, while those born at different times may have common destinies, and argues that astral influences, if they are all-pervasive, should affect all living things, not just humans. He denies the Chaldeans accuracy outside their own area, citing the fact that the stars oversee different weather in different places [...] He points out that the number of fixed stars and planets cannot be known, so not all influences can be understood. He also casts doubt on whether the moment of birth or of conception is the crucial one, and whether the times can be accurately established. He attacks the idea of a chain of causes; the very idea that all our most trivial actions are immutably predestined is ridiculous. What possible connection can our brief little lives have with the grandeur of the universe?" (Barton 1994, page 54)

Attacks on astrology seem to have come from a number of different perspectives, there being several philosophical schools, such as the Epicurians and Cynics, who were antagonistic to all varieties of divination (Barton 1994, page 52-7; see also Dean, Mather and Kelly 1996, page 63 for a summary of the much earlier (c.50 BCE) critique by the Roman philosopher and statesman Cicero). However, neither philosophical critique nor legal

harassment of astrologers greatly diminished astrology's popularity, and it remained deeply embedded in the world views of many elite and ordinary Romans.

In 312 CE the Emperor Constantine converted to Christianity, an event which marked the beginning of the transformation of the Roman world into a Christian empire. Under the Christian Emperors, further anti-astrological legal provisions were enacted as part of an attack on paganism. Thus, in 358 divination become formally associated with magic and in principle punishable by death (Barton 1994, page 68). Furthermore, in 409 astrologers were ordered to burn their books, while in 425 they were included in an expulsion decree aimed at heretics (Barton 1994, page 69). Fortunately for the community of astrologers, such harsh punishments were not always zealously enforced (Barton 1994, page 69).

The attitude of Christianity toward astrology appears to have varied over time. During the period when it was illegal, Christianity seems to have been little exercised by astrology (Barton 1994, page 71; Tester 1987, page 55-6). Indeed, the story of the Magi following the star to Bethlehem may even have encouraged a measure of acceptance of astrological claims on the part of some Christians (cf. Barton 1994, page 71; see also page 76). Later, however, such considerations as the association of astrology with Gnostic and other heresies, and astrology's potential to serve as an alternative to Christian prophecy, seem to have prompted the early church to regard it as a threat (Barton 1994, page 72). Astrology then became a subject of attack by Christian apologists.

The arguments used by Christian critics of astrology in part mirrored those employed by pagan philosophers. Astrology continued to be condemned as unpalatably or implausibly fatalistic, and traditional arguments, such as that from the divergent fates of twins, were widely used (Barton 1994, pages 74-7). In addition, certain more specifically Christian material was used. In regard to the Magi, some writers contended that although astrology used to be a source of knowledge, this had come to an end with the birth of Christ. Others argued that the so-called star was actually a special divine creation that merely looked like a star, or that the Magi were not Magi at all, but kings (Barton 1994, page 76-7).

At the end of the fourth century CE we find John Chryostom writing that: "...in truth, no doctrine is so depraved and bordering on incurable madness as the doctrine of Fate and astrology" (Barton 1994, page 77). We also find the influential Saint Augustine, himself a former astrologer, describing astrology as the work of lying demons. As such it was clearly an evil to be extirpated (Barton 1994, page 77-8; Tester 1987, pages 110-12).

This deepening antagonism to astrology was also manifested in Church law, which from the fourth century was used to proscribe the practice of astrology (Barton 1994, page 78-9). In its campaign the Church seems to have had unparalleled success, and by the sixth or seventh century the open practice of sophisticated

astrology had virtually disappeared (Barton 1994, page 79-80), if only because the decline of learning and education following the collapse of the Roman empire in the West had led to the disappearance of astrological textbooks (Tester 1987, pages 112-3 and 124).

There was almost no astrology proper in Western Europe between the early sixth and the late twelfth centuries (Tester 1987, page 200), although a primitive popular astrology, often based on the phases of the Moon alone, persisted (Kieckhefer 1989, page 86). Amongst learned Christians, Saint Augustine's view of astrology as demonic magic was dominant (Kieckhefer 1989, page 10).

Around the twelfth century various factors began to come together to promote a revival of astrology. Of central importance was the resurrection of classical learning. From the eleventh century the previously dominant monastic schools were supplemented by cathedral schools, which were in turn followed around the start of the twelfth century by the first universities. These institutions had broader educational aims, a more rationalistic emphasis, and, at least in the case of the universities, a greater atmosphere of intellectual freedom. The education they provided was available to both clergy and laymen and included the learning of the classical world (Lindberg 1993, pages 190-213; Kieckhefer 1989, page 117). Prior to the twelfth century, this learning had been represented mainly in various unsatisfactory Latin summaries. However, in the twelfth century there began a massive influx of translated material from the Islamic world, and this came to be studied in the new educational institutions. The newly available learning included both important Greek philosophical and scientific work and original material by Islamic scholars; astrology was to be found as an element of both (Huff 1993, pages 160-2 and 186-95; Kieckhefer 1989, page 118; Tester 1987, pages 147-75).

By the thirteenth century, astrology had again secured wide acceptance. Some measure of support for astrology had been supplied by certain aspects of the Platonism of the twelfth century (Kieckhefer 1989, page 130; Lindberg 1993, page 202). However, it was perhaps principally because the new material from the Islamic world provided astrology with an Aristotelian philosophical foundation that astrology came to be adopted in the new intellectual world of the universities (Kieckhefer 1989, page 130; Lindberg 1993, pages 270-80; Tester 1987, page 175). Of course, there was still opposition, particularly to anything that savoured of fatalism or a denial of human free will (Tester 1987, pages 178-83). However, apologists for astrology, aided by theologians such as Thomas Aquinas, generally argued that although the stars influenced the mind and body, the soul remained in principle free to counteract that influence (Kieckhefer 1989, pages 127-9). Moreover, it should be borne in mind that the late medieval critics of astrology, like their pagan and early Christian forebears, combined an acceptance of some celestial influences - especially in medicine, alchemy and meteorology - with their hostility to elements of astrology (Lindberg 1993, page 274; Tester 1987, page 183).

The uses to which astrology was put were the familiar ones. Obviously, individual horoscopes were produced, and the courts of kings had astrologers to advise them on the timing of events, even if in England they did not tend to listen very much to that advice, and everywhere they disliked predictions of their deaths (Kieckhefer 1989, pages 120-5; Tester 1987, pages 183-99). Astrology was particularly important for medicine. Even vigorous opponents of astrology such as Isidore of Seville conceded a connection between heavenly bodies and health, and in the medical schools astrology came to be studied particularly systematically. Each part of the body was considered to be governed by a particular sign of the zodiac, and this influenced when a patient was operated upon or bled. In addition, astrology entered into the preparation and administration of medicines, and served as an explanation of disease (Kieckhefer 1987, pages 120-4 and 127; Lindberg 1993, pages 338-9; Tester 1987, pages 183-9).

By the beginning of the fifteenth century, expressions of doubt concerning astrology seem to have been increasing in number (Tester 1987, page 199). In 1394 Giovanni Pico della Mirandola published a twelve book critique of judicial astrology. Pico's arguments were mostly traditional and saw him attacking such things as the arbitrary, absurd and inconsistent nature of astrological chart divisions and interpretations, and the inaccuracy of astrologers. He also added rather newer arguments. These included an early attack on the lack of a plausible mechanism for astrological effects, and an attempt to denigrate astrology on the characteristically Renaissance Humanist ground that astrology was not a product of the estimable Greeks but rather of the Egyptians and Chaldeans. Whatever the merits of Pico's views, his work had some impact (Tester 1987, pages 207-12. See also Dean, Mather and Kelly 1996 at page 63 for a useful short summary of Pico's work).

Notwithstanding attacks upon it, astrology remained vital and intellectually credible in the eyes of many down until perhaps the late seventeenth century (see Thomas 1971, pages 283-349 for a detailed account of astrology in Great Britain during part of this period). Several factors seem to have contributed to its decline at this time. Historian Keith Thomas (1971, pages 349-50) argues that one was the new conception of the cosmos fashioned in the Scientific Revolution:

"The old dichotomy between things sublunar and things celestial, which had been the very foundation of astrological theory, [...] became increasingly untenable. Once abandoned, it became impossible to define the nature of the one-way astrological influence which the stars had been supposed to exert upon the earth. Given time, astrology could have adapted itself to any number of new discoveries about the landscape of the universe, for these merely meant that the calculation of the manner in which the celestial bodies exerted their influence became more complicated. But the removal of the very idea of such an influence made the task impossible. The world could no longer be envisaged as a compact interlocking organism; it

was now a mechanism of infinite dimensions, from which the old subordination of earth to heavens had irretrievably disappeared." (Thomas 1971, page 350)

Another defect of astrology from the point of view of contemporary scientific thought was its incapacity to furnish cogent demonstrations in its support. This was not just a matter of the lack of actual evidence in favour of it; it also had to do with the vagueness of astrological doctrines and the difficulties of getting to grips with them through experimental methods. These were important disqualification's in the new "universe of precision" (Cohen 1994; page 510) created by the Scientific Revolution (Tester 1987, pages 222-3; Thomas 1971, page 352).

The Scientific Revolution did not precipitate an instantaneous disappearance of astrology; indeed one can point to a large number of early modern scientists who continued to subscribe to more or less of astrology. However, by around the beginning of the eighteenth century these transitional figures were dead, and their successors did not share their belief in astrology (Tester 1987, pages 228-9).

By the start of eighteenth century astrology had ceased to play a substantive role in the intellectual life of the advanced Western European nations (Tester 1987, pages 230 and 240; Thomas 1971, pages 351-7). To quote Keith Thomas (1971, page 356) again:

"The truth seems to be that astrology had ceased, in all but the most unsophisticated circles, to be regarded as either a science or a crime; it had become simply a joke."

As Jim Tester says, "...the world changed, under and round it and over it, and left it behind" (Tester 1987, page 240).

During the eighteenth and much of the nineteenth century a degraded astrology survived in popular almanacs and amongst amateur and fraudulent practitioners (Tester 1987, page 241). But in the late nineteenth and early twentieth centuries, astrology once again revived, assisted perhaps by wider literacy and contemporary interest in popular psychology, Eastern thought and the occult (Dean, Mather and Kelly 1996, page 57; Tester 1987, page 243). A significant figure in the revival was one Alan Leo, publisher of an astrological magazine and popular shilling horoscopes. It is said that "he converted a prediction-oriented tradition into a systematic method of psychological analysis with a strong spiritual basis" (Dean, Mather and Kelly 1986, pages 57-8).

The astrology of the twentieth century possessed a number of new features. Apart from various manifestations of the new orientation towards psychological analysis and counselling, a certain quantity of the complications and obscurity bequeathed by Greek astrology were discarded, and new principles of chart interpretation were introduced. Also, the 1930s saw the rise of newspaper astrology columns. The first was

published in the *Sunday Express* in 1930 and concerned the recently born Princess Margaret. The public response was considerable, and this seminal publication was soon followed by columns on other celebrities, and then forecasts for the general public (Dean and Mather 1996; Dean, Mather and Kelly 1996, page 67). By the 1980s there was some 1,200 newspaper horoscope columns in the United States alone (Dean, Kelly and Dean 1996, page 68).

Also new to the twentieth century was the proliferation of astrological readings based only on the so-called sun sign. The idea of sun sign readings was not entirely novel (Dean and Mather 1996), but the appearance of a veritable industry producing books etc. about the personalities and fortunes of those born under the signs of Capricorn, Taurus etc. was.

In the contemporary world, surveys evidently suggest that overall perhaps around a quarter of the population believe in astrology (Dean, Mather and Kelly 1996, page 60). However, much of this belief is superficial. For example, papers presented at a session on *Astrology and Other Pseudoscience* at the 1992 meeting of the American Association for the Advancement of Science indicated that only around 5% of the American population say that they change their lives in response to astrological guidance (Frazier 1992, page 34), and only 6% of the British public "claimed to take what horoscopes or personal astrology reports said either seriously or fairly seriously" (Durant and Bauer 1992). Furthermore, in a 1985 *New Scientist* poll of British adults, astrology came last in a list of 12 possible priorities for government research funding. It also came first in the list of research areas considered to merit reductions in government funding (*New Scientist* 1985; described in Kelly, Dean and Saklofske 1990, page 51. See also Dean, Mather and Kelly, page 60). As Dean, Mather and Kelly have observed, this result attests to a catastrophic decline in the status of astrology since its early days. Today, belief or involvement in astrology seem all too often to involve little more than a dilettantish dabbling in the debased popular forms that appear in the mass media (see also the comments on the "four levels of interest" by Dean, Mather and Kelly 1996, page 62).

The American Association for the Advancement of Science session *Astrology and Other Pseudoscience* also heard evidence on the characteristics of believers in astrology. Amongst other things, it was found that:

- Belief is not straightforwardly correlated with a lack of understanding of science or hostility to science (Frazier 1992, page 345). In a sample of British adults, it was only in the upper half of the scale of scientific understanding that greater knowledge was correlated with reduced belief (Durant and Bauer 1992, page 6¹)
 - Belief tends to be higher amongst the young (Frazier 1992, page 345)
 - At least in Britain, believers tend to score higher on a test of authoritarianism than non-believers (Durant and Bauer 1992, page 7).
 - At least in Britain, believers are more likely to be single than married (Durant and Bauer 1992, page 8).
- One interpretation of these results that has been suggested is that astrology is a "phenomena of particular social groups [...] which [...] may be experiencing some difficulty in accommodating their religious values to modern life in an industrial culture" (Durant and Bauer 1992, page 9).
- A not inconsiderable quantity of research has looked for evidence to confirm or disconfirm astrological hypotheses. This evidence relates to newspaper columns, sun sign readings, astrological predictions, and serious full chart astrology. I shall discuss each of these in turn.
- Newspaper astrology columns are one of the most popular manifestation of astrology in the contemporary Western world. Astrologers themselves are divided about the merits of such columns. Some see regard them as vulgar rubbish. Thus Dr Glenn Parry, President of the Association for Astrological Psychology referred to them as "half-baked, half-truth fortune cookies" (Dean and Mather 1996), while the Congress of Astrological Organisations denounced them as "utter nonsense and fraudulent endeavours" (Culver and Ianna 1988, page 136). Other astrologers, however, consider them to be valid or at least useful as a means of introducing the public to astrology (see Dean and Mather 1996; Culver and Ianna 1988, pages 136-7).
- Scientific studies have found that sun-sign columns are not accurate and do not agree with one another (Dean and Mather; Dean, Mather and Kelly 1996, page 67-8). This should come as no surprise. After all, such columns may on occasions be written by journalists with no acquaintance with astrology (Dean, Mather and Kelly 1996, page 67), or even by arrant sceptics such as the magician James Randi, who once assembled a regular and successful astrology column for a Canadian tabloid newspaper out of random sentences from other columns (Randi 1991, page 129). They can also be self-evidently absurd. For example, one Australian column once suggested that Libran women would be visiting their gynaecologists. An intrepid television reporter managed to find only 8 out of the 20,000 or so Librans expected at local gynaecologists (Dean, Mather and Kelly 1996, page 68).

Turning now to the more expansive sun-sign astrology that forms the basis of the delineation's that appear in many popular books and the like, the opinions of astrologers are again divided, with many holding it in complete contempt. As to scientific studies, the body of evidence is now quite large. Overall, the results of methodologically sound investigations have been fairly relentlessly negative, and the list of physical characteristics, occupations, personality traits, medical problems etc. that are not correlated with sun-signs is now of impressive length (for reviews see Dean and Mather 1977, pages 84-131; Culver and Ianna 1988, pages 122-138 and 214-5. For a recent test, see Dahlstrom et al 1996). One apparent exception to this unsupportive trend emerged in 1978 and 1979 when no less than three studies found a correlation between sun-sign predictions and scores on a test of extraversion. However, other research suggests that this *prima facie* astrological effect is attributable to a tendency on the part of people who know their sun sign to answer test questions in accordance with what astrology says their personalities should be (see Kelly and Saklofske 1986 for details and citations). Such a tendency to internalise astrological descriptions does not depend on strong astrological knowledge or belief (Hamilton 1995); when controlled for by using test subjects ignorant of sun sign astrology, the putative connection between extraversion and sun signs vanishes (Kelly and Saklofske 1986). On balance, this ability of astrology to recreate the world in its image seems by far the most parsimonious and credible explanation of the tiny correlation which exists between answers on extraversion tests and sun sign predictions (Dean, Mather and Kelly 1996, page 77. For an interesting of bogus personality readings affecting subsequent behaviour, see Petty and Brock 1979, described in Aronson 1995, pages 167-8).

As I mentioned earlier, down to the twentieth century astrology was used extensively to make predictions. As astrology has increasingly refocused itself on spiritual, therapeutic and psychological goals in the current century, the emphasis on prediction has diminished amongst serious astrologers to the point where many regard it as wholly inappropriate (see, for example, Ott 1996). However, there are still some astrologers who adhere to tradition and attempt to foretell the future.

There have been a number of studies of the accuracy of attempts to predict coming events using astrology forecasts. These studies have addressed: predictions of earthquakes submitted to the U.S Geological Survey; predictions published in American astrological magazines; and predictions made by certain individual famous astrologers. On analysis, the accuracy of the predictions proved dismal. Even when correct, there was nothing that could not be accounted for by either the imprecision of some predictions or the operation of chance, intelligent guessing and occasional privileged information about celebrity figures (For further details and citations, see Dean 1992, pages 282-3).

This leaves what has been called "the real thing": the serious astrological readings that are derived from an

examination of full and accurate birth charts and which are employed in individual astrological consultations and discussed in learned astrological journals (Dean 1992). Geoffrey Dean, Arthur Mather and Ivan Kelly (1996, pages 74-9) recently conducted a meta-analysis of the available studies of serious astrology. Their analysis of 40 studies involving 600 astrologers indicates that the level of accuracy of astrologers' judgements is not only radically inferior to personality tests and other existing methods but is also vanishingly small. Moreover, their analysis of 25 studies involving 488 astrologers discloses that "there is almost no agreement between astrologers on what a birth chart means" (Dean, Mather and Kelly 1996, page 74). These and other considerations (see, for example, Dean and Loptson 1996; Dean, Mather and Kelly 1996, pages 80-5; and Kelly 1997) force us to the view that the claims of serious astrology also do not appear to be true.

At this point some astrologers may wish to cite various pieces of evidence from outside the traditional astrology I have been considering. This evidence may include the ability of an engineer called John Nelson to forecast short wave radio interference from planetary configurations; the correlation between the phases of the moon and certain human behaviours such as crime and lunacy; and the work of Michel Gauquelin. In reply to the first point, I would suggest that Geoffrey Dean (1983) long ago demonstrated that the correlation claimed by Nelson cannot be shown to exist. In reply to the second, I would submit that reviews of the literature have repeatedly failed to find any reproducible correlation between lunar phase and human behaviour (see Kelly, Rotton and Culver 1996 and Rotton 1997 for recent comments, and Gutierrez-Garcia and Tusell 1997 and Wilkinson et al 1997 for recent negative studies). Michel Gauquelin, however, requires a slightly more expansive analysis.

Briefly, Gauquelin was a French researcher who published a number of studies which showed a correlation between the position of certain planets relative to the horizon and the births of various eminent professionals. One of these correlations is the famous "Mars Effect" for eminent sportsmen (see Ertel 1992 for a short sympathetic account of Gauquelin's studies). Gauquelin's work has led to a protracted, bitter and all too often tedious and illuminating controversy. In the latest round, a French skeptical group has reported that it has failed to find evidence of the Mars Effect in a large sample of sports champions (Benski et al 1996). In addition, Jan Willen Nienhuys, a Dutch mathematician, has examined Gauquelin's responses to the results of this French test, as well as other aspects of Gauquelin's work, and has found statistical anomalies which he construes as showing that Gauquelin's procedures were unconsciously biased in such a way as to produce positive results (see, for example, Nienhuys 1996 and in press). On the other side, Suitbert Ertel and Arno Mueller, two German psychologists, have recently completed a new test which they consider supports the existence of one effect claimed by Gauquelin (Mueller and Ertel 1994). Ertel, who may perhaps be fairly described as the leading supporter of Gauquelin's hypotheses since Gauquelin's death in 1991, has also re-examined at least the

preliminary data produced by the French skeptics and concluded that not only was their work itself biased or fraudulent but that when their data is purified it demonstrates the reality of the Mars Effect. Furthermore, he has made analogous claims in relation to an earlier negative test conducted by American skeptics (Kurtz, Zelen and Abell 1979-80): see Ertel and Irving 1996, 1997 and Ertel 1997. All of these counter-claims are themselves vigorously disputed (Kurtz, Nienhuys and Sandhu 1997; Nienhuys 1997; Wunder 1997).

In my view it is not yet possible to say that the correlation's found by Gauquelin and his supporters are anything other than artefacts of biased procedures. However, a proper discussion of the Gauquelin work is a whole paper in itself. Suffice it to say for present purposes that Gauquelin and his supporters may fairly be understood to be arguing for a species of astrology in the broad sense of the term, but their results are not those predicted by the traditional, mainstream astrology I am discussing today. As Ertel has said:

"The link between Gauquelin and astrology is usually overstated. Gauquelin has demolished most astrological claims, and the remaining link between astrology and planetary relationships is feeble. Astrology does not predict that only half the planets work for eminent people and none for ordinary people. Nor does it predict strength for the favoured positions - in fact, it predicts the exact opposite. The effect sizes are far too tiny to be of use, so the astrologers' propaganda (that the Gauquelin results support their ideas) is misleading." (Ertel 1992, page 158. See also Dean, Mather and Kelly 1996, page 96)

I would add that correlation does not prove causation. Even if Gauquelin's correlation's prove robust, it does not follow that the planets are causing the anomalous distribution of births. Dean, Mather and Kelly (1996, page 71) have advanced an intriguing hypothesis to account for Gauquelin's results that does not involve any direct planetary influences at all. This hypothesis is at least as plausible as the various theories of planetary influence, none of which can yet adduce convincing and replicable evidence in support of all of the links in their somewhat extraordinary causal chains (see Ertel 1992, page 155, for details and references).

To return to traditional, mainstream astrology, if this astrology is not true, why is it believed in? The factors that draw people to astrology are doubtless various, and probably include:

- The widespread misconception that astrology has some scientific standing (Frazier 1992, page 347; Kiernan 1995).
- The religious or spiritual resonance of the interconnections between man and the universe claimed by astrology (Dean, Mather and Kelly 1996, page 61).
- The aesthetic attraction of astrological language and symbolism (Dean, Mather and Kelly 1996, page 61).

- The lure of ancient wisdom.
- In the case of sun sign astrology, the promise of a gentle and understandable means of grasping ourselves and our world and talking about them with others (Dean, Mather and Kelly 1996, page 61).
However, the central reason why people believe astrology is true is probably that personal experience provides them with subjectively compelling validation of its claims. At work here are a number of important and powerful biases in everyday human judgement.

Some of the biases apply generally to human decision making. As Dean, Mather and Kelly (1996, page 90) have observed, once we go beyond mere counting and rely on memory, we are always liable to various errors. Thus:

"We attend more to vivid things, we ignore base rates, we have preconceptions (stereotypes), we forget that small samples have large sampling errors, we inflate coincidences, we see order where none exists, and we become overconfident in the outcome." (Dean, Mather and Kelly 1996, page 90. See also Dean, Kelly, Saklofske and Furnham 1992, pages 359-62)

In addition to these influences, there are a number of biases that enter into the evaluation of personality judgements. Perhaps most obviously, in face to face readings, a client's appearance, demeanour and comments can yield important information about his or her life and personality. As this exchange of information can be quite unnoticed by both the reader and the client, the result is a successful reading attributed by both to the efficacy of astrological techniques (Dean, Mather and Kelly 1996 page 91; Dean, Kelly, Saklofske and Furnham 1992, page 366-7).

However, while uncannily accurate readings are doubtless useful, they are by no means essential. One important bias, known as the "Barnum effect", is our tendency to accept imprecise and widely applicable statements as being specific to us. Experiments have shown that people will endorse prefabricated and bogus personality descriptions, and that this endorsement becomes stronger the more they are led to believe that the descriptions were composed specially for them. In one experiment, the same fake astrological sketch was given to three groups of subjects, who were asked to rate its accuracy on a scale of 1 to 5. The first group were merely advised that the sketch was "generally true of all people". They gave it a rating of 3.2. The second group were first asked to provide the non-existent astrologer with the month and year of their birth. They rated it at 3.76. The third group were asked to supply details of the day, month and year of their birth. This group rated the sketch at an astounding 4.38 (Snyder and Shenkel 1976; described in Hyman 1977).

Belief in astrological readings may also be fostered by other frailties in human judgement. When evaluating a claim, humans have a tendency to look for evidence consistent with the claim instead of evidence that is inconsistent with it (Dean, Mather and Kelly, page

90; Dean, Kelly, Saklofske and Furnham 1992, page 363; Gilovich 1991, pages 33-7). In the case of personality readings, such a strategy will soon encounter apparent confirmation somewhere within the diversity that makes up even a single individual's personality. Of course, evidence may also be available which does not support the existence of the correlation's astrology claims. However, not only will astrology's successes tend to more memorable to us than its failures (Dean, Mather and Kelly, page 92; Dean, Kelly, Saklofske and Furnham 1992, page 371; Gilovich 1991, pages 61-72, but we are also likely to give disproportionate weight to the apparently supportive evidence (Dean, Mather and Kelly, page 86; Dean, Kelly, Saklofske and Furnham 1992, pages 346-9; Gilovich 1991, pages 30-3). Furthermore, when making up our minds, we may also be influenced by impressive appearances, favourable traits or personal needs that are quite unconnected with the truth of astrology (Dean, Mather and Kelly, page 91).

There are yet other cognitive biases that may produce belief in astrology. For example, if a statement or reading by an astrologer is opaque or vague, this is by means fatal, for humans are meaning-seeking animals who are capable of finding significance in the most meaningless of material (Dean, Mather and Kelly, page 91; Dean, Kelly, Saklofske and Furnham 1992, page 370). Alternatively, if a reading is definite but wrong, it is possible that the persuasive influence of the astrologer will cause the client to change themselves over time so as to accord with the predictions of astrology (Dean, Mather and Dean 1996, page 91. See Aronson 1995 for comments on conformity, persuasion and other relevant phenomena).

Additional biases can come into play when some measure of acceptance is secured. One such bias is called the "I-knew-it-all-along-effect". This refers to the fact that when humans come to believe that something is the case, they are inclined to believe that they always knew it was so. This effect may operate to the benefit of astrology in that it will help to give an astrological reading a certain quality of inevitability (Dean, Mather and Kelly, page 91; Dean, Kelly, Saklofske and Furnham 1992, pages 367-8); it also does not require a deep commitment on the part of the client. However, if the client does eventually make such a commitment, then cogent criticism of astrology may represent a painful violation of the believer's self-concept (see Dean, Mather and Kelly 1996, pages 90-1; Aronson 1995, pages 175-245). The resulting desire to escape this "cognitive dissonance" may be a powerful motivation to select evidence and treat arguments in a biased fashion. Furthermore, whatever the level of belief, if astrology can ensure only intermittent successes for the believer, the mechanism of so-called "operant conditioning" will ensure that this serves to powerfully consolidate belief (Dean, Mather and Kelly, pages 84-5; Dean, Kelly, Saklofske and Furnham 1992, page 351-3).

This short account has not exhausted the list of relevant failures of everyday reasoning (see Dean, Mather and Dean 1996, pages 90-93. For general reviews see also Gilovich 1991, Piatelli-Palmerini 1994, Plous 1993, and Sutherland 1992). All in all, the shortcomings

of human judgement are such that even though the propositions of mainstream astrology may be false, people can derive from experience an abundance of grounds for belief. These grounds may not be cogent ones, but I would suggest that they are no worse than those which form the basis of many another belief we hold.

There is much more that could be said about astrology. Unfortunately, I do not have the space to do so here. If anyone wishes to explore the skeptical view of astrology further, I would recommend as a starting point the article by Dean, Mather and Kelly (1996). I am afraid that the book in which it appears is grotesquely expensive and, overall, something of a disappointment; however, if you can borrow a copy, you should not hesitate to do so, for apart from the Mars Effect the Dean, Mather and Kelly article is surely now the standard skeptical critique.

Note

1 Frazier's (1992) comment on the British sample is mistaken. The result he discusses relates to opinion as to the scientific status of astrology, and not belief as such. Cf. Durant and Bauer 1992, page 6. For depressing statistics as to how little even a university education reduces belief, see Gray 1986).

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SciTec '97

Tony Youens is a Health and Safety Officer at Nottingham University

Earlier this year I agreed to take part in a 'psychics versus skeptics' debate to be held during a science fair in Derby. It began on Friday 4th July with various events being held over the weekend, the theme being The Truth is out Where?. The Saturday session included a UFO debate with such dignitaries as Jenny Randles and Peter Hough, both firmly in the pro camp. I didn't notice the names of any skeptics, so who exactly they were debating with and what it was about I'm not sure.

My own debate took place on Friday evening. The psychics consisted of Dr David Cross and his wife Jenny Bright. For the skeptics there was myself and Ian Simmons, Director of Inspire and writer for Fortean Times. It was chaired by Jonathan Powers, Senior Pro Vice Chancellor at Derby University.

Places were put out for an expected audience of two hundred, although it was thought there might be more following a successful radio performance from Jenny earlier that day. (In the interest of broadcasting balance they only wanted to talk to the psychic of course.) The event was being sponsored by Dillons Bookstore and they had a stand with lots of books on UFO's and psychic powers etc. There was not one skeptical book in sight, a fact I drew to their attention. I think their idea of balance involved the inclusion a book on the Hubble Space Telescope. Instead of the hoped for two hundred plus, only about thirty people showed up. Perhaps Jenny's broadcast did some good after all. They looked a little lost with all those empty chairs but the show must go on. A straw poll indicated that virtually all the audience were believers.

Dr Cross opened for the defence with a polished performance. Naturally I thought the content was nonsense but it was well presented nonsense. He felt, predictably, that whilst today we regard psychic phenomena as strange and supernatural, eventually it

would come to be understood and accepted as the norm. In his words, "Today's magic is tomorrow's pocket calculator". He used hypnosis as an unfortunate example: "once viewed with suspicion but now common place and accepted". He covered the usual territory: dowsing, mediumship etc., along with anecdotes of successful predictions. He didn't mention any predictions still outstanding as this would contravene psychic prediction rule #1 that you only tell people after the event.

In one slide we were treated to a photograph showing a supernatural table levitation. This occurred during a session with Dr Cross, Jenny and a few psychic chums. All hands were in view so the obvious explanation (at least to Dr Cross) was that it must be paranormal. However a stern warning followed: "Don't try this at home!". Scary stuff indeed. He then moved on to mediumship and the pitiful explanations offered by skeptics. It seems we explain it away by ESP. The medium is picking up the thoughts of the sitter and feeding it back to them. I always thought some kind of trickery was involved, and now at last we have the explanation: they are psychic but not as we know it (Jim). However Dr Cross pointed out this can't explain how the medium comes up with information unknown to the sitter. Barely suppressing a smirk, Dr Cross said the skeptic's answer was that there is some sort of "Super ESP" at work wherein the crafty psychic tunes into the collective consciousness that is all around us. He felt this to be an implausible explanation. Agreement at last.

By way of a finish we saw footage of a newsclip telling how Jenny had successfully reunited a dog with its owner, Ahhh!

To complete the case for the psychics, Jenny Bright followed with a demonstration of (psychometry, the amazing power to determine information about someone by holding an item belonging to them). She began with a brief explanation of her extraordinary powers and wisely got in a few get out clauses. Firstly because objects might be handled by any number of people a reading may contain bits of everyone. Another problem was that men might have feminine feelings and thus cloud things further. I wondered that since she would of necessity be handling the items herself whether this might add to her confusion. We are, I feel, underestimating the powers required to carry out this remarkable feat.

Reasons for potential failure out of the way, Jenny began selecting a few objects, volunteered anonymously by members of the audience, from a tray. I have to say that what followed was a fairly average attempt at cold reading. When she was getting the subtle vibes (so subtle no-one else can feel them) from an object such as a belt she made very general comments: indeed but once onto a lipstick she became much more confident. Some of the things divined from this cosmetic: were; concern over weight; loss, asthma; thinking of getting their hair bleached; someone could be moving home; and skin allergy. Staggering. The owner of the lipstick was self-evident as she was, for the most part, frantically

nodding her head in agreement. Needless to say she had earlier declared herself a believer.

We all adjourned for a twenty minute break. During this time I asked one of the assistants to get a volunteer to place an article in a draw string bag. This was to be done while I was out of the room. Upon my return the assistant handed me an object in a bag which I then placed on the podium.

Once we had all reassembled it was my turn. I noted we had lost a couple of people during the break, including the owner of the lipstick.

I began by saying that although Jenny Bright felt her powers were 'paranormal' science had done valid research into this area and could, in fact, explain the phenomena in scientific terms. I explained about the object in the bag and that it had been chosen randomly without my presence. It turned out to be a wristwatch which obviously belonged to a woman (or a man with very feminine feelings). I proceeded to give a brief cold reading using the generalised twaddle characteristic of this type of thing and then said I would go one further and try to identify its owner by matching up the 'vibrations'. As I moved through the audience I eventually came to a young red haired woman and said to her, "I believe this is yours". I have to say the look on her face was a picture, especially as she was one of the few who had expressed reservations. Returning to the podium I suggested that it is even possible to sense information about people without touching their personal belongings. I pointed to a woman at the back and asked her if the name Nigel meant anything to her. Amazingly the man next to her was called Nigel. They were further unnerved later in the performance when I said that they would be getting a lift from Nigel's father. They, like the girl, looked baffled.

Putting my slide on the overhead projector I announced that I would give the accepted scientific explanation. My first viewfoil simply contained the words "I CHEATED" (perhaps this could be known as Project Beta!). I emphasised that everything that had transpired was phoney. True, I had never met or spoken to any of my 'victims' and they were not stooges; nonetheless all was fake. The rest of my talk then centred on the elements of cold reading and some of the strategies that make up this psychological illusion. (I would like to express my thanks at this point to Dr Chris Roe who very kindly sent me numerous notes on the subject which I have no doubt greatly improved the content of my presentation). I shall not go into the entire talk now but if anyone would like copies of my notes please contact me. If you have email this will be even easier.

After I had finished it was Ian Simmons' turn. I will admit to being somewhat confused by Ian's presentation. He seemed to be taking a middle ground position somewhere between skeptic and believer. In his words, he felt he was watching a game of tennis with the ball being batted to and fro. He saw his position, I suppose, as being that of umpire. At one point he suggested more resources should be used to establish if indeed there was something to psychic claims. I remember thinking at the time that maybe funds could be

make available to check out the tooth fairy while we're at it. Enough is being spent already, and so far psi looks as doubtful as ever.

Ian did make the point that we should be able to measure a form of energy that appeared to have so large an effect. Dr Cross later stated that he saw no reason why there should be such a mechanism. I suppose he thought that it might spoil things, but I'm sure he has no need to worry unduly.

Eventually we came to a lack lustre question and answer session. Most of the embarrassingly small audience kept quiet but a few braved a question or two. The most noteworthy of which was a woman obviously perplexed by my ability to 'sense' the owner of the watch. (I believe Nigel & Co were equally dumbfounded). She asked what were the chances of me getting it wrong. Even with my poor grasp of statistics I assured her the chances were zero because as I had already explained I cheated. She persisted by saying that if I was relying on intuition then how could I be sure that I wasn't psychic. BECAUSE I CHEATED. She asked if I knew the woman in question. I truthfully replied that I had never seen or spoken to her until tonight. Then she asked outright, "How did you do it?". My disappointing reply was that I wouldn't tell her. After all, why should I divulge the innermost secrets of mentalism? I did say, though, that next time she thinks something is inexplicable, at least to her, she should not jump to the conclusion that it is paranormal. She gave up.

I mentioned the James Randi Challenge which Dr Cross wriggled out of due to the unfair terms and conditions. He also said that he didn't see why psychometry was invalid because of the numerous generalisations. Both he and Jenny also admitted they were wrong from time to time. I wondered if Randi would accept 'generalised readings which aren't always correct', as sufficient to claim the \$1,100,000+.

To wrap things up the Chair then asked for a show of hands to see if anyone had changed their point of view because of the debate. No.

Finally, in addition to my thanks to Dr Chris Roe who I have already mentioned I would like to thank Mike Hutchinson who kindly suggested my name to SciTec in the first place and to James Randi for sending me a transcript of a psychic reading.

Whilst I am always available for talks I think SciTec '98 would be well advised to choose a different theme for next year.

For those of you wondering about the secret of my 'psychic' power I have to confess it is dreadfully mundane. Before I left the room I asked a friend of mine to watch and take note of who was asked to put something in the bag and tell me later. Another friend overheard the details about Nigel and his partner and likewise told me. Pathetically simple but seemingly quite convincing to some. Are psychic reputations this easy to achieve I wonder?

A STUDY OF NINETEENTH CENTURY SPIRITUALIST PHENOMENON

Charles P.L. Stewart BSc (Hons) graduated from Durham University/University College Stockton with a degree in Health and Human. He is currently studying for a Graduate Diploma in psychology.

One of the principal foundations of world religions is the postulate of everlasting life. However, the spiritualist movement takes this notion to the extreme, and contends that the souls of the deceased can communicate with the living by using individuals who are sensitive to these vibrations. This principal of the spiritualist movement is demonstrated at open circle meetings, where mediums convey spirit messages to their audience.

The spiritualist phenomenon originated in the United States of America in the nineteenth century. In March 1848 the Fox sisters heard inexplicable rappings emanating from somewhere inside their farmhouse. The Fox family decided to call in their neighbours to witness the noises. One of these was William Dusler who established that the mysterious sounds were from a spirit, later identified as Charles B. Rosma, a peddler who was murdered and buried in the basement of their farmhouse five years earlier (Wilson 1985; 84). More extraordinary was the ability the Fox sisters had to communicate with the rappings by clicking their fingers.

Following the noises it was decided to investigate the sounds to establish whether they were intentionally caused by the Fox sisters or were paranormal phenomena. It is interesting however, that the Fox sisters were related to the prominent Rochester Quaker abolitionists who investigated the rappings and concluded they were authentic (Coon 1992; 43-151.)

With the help of the Rochester Quaker abolitionists, the Fox sisters became notable in radical reform circles, moving from there to public lecture halls and private parlours. Interest in spiritualism spread, caused in part by the staggering death toll of the American civil war. Bereaved families hoped to communicate with their deceased sons and husbands. Moreover the invention of the wireless telegraph fuelled peoples' imagination into believing that there could also be a 'celestial wireless' (Coon 1992; 43-151.) Nevertheless, by the end of the nineteenth century, the Fox sisters had confessed to being cheats (Iverson 1992;20.)

An interesting aspect of nineteenth century spiritualist phenomena was the high proportion of middle-class women, who not only professed to be in contact with the dead, but also wrote books on spiritualism and paranormal phenomena (Wilson 1985; 84.)

My rationale for this enigma suggests that the nineteenth century was a social milieu where middle

class women were expected to remain at home and not involve themselves in anything but domestic activity (Owen in Alban, Vol. 24;153.) Furthermore, I would argue that women became absorbed with the spiritualist movement, not because of their abilities as mediums, but rather because it was environment that offered opportunities for power and respect for women, something that was lacking in the roles of housewife and mother (Owen in Alban, Vol. 24;153.)

Braude (1990; 156-157) takes a feminist perspective as her theory for the influx of middle class women, and argues that the spiritualist movement espoused a middle class Victorian ideology of femininity, emphasising characteristics such as passivity, frailty, moral & spiritual superiority, and passionlessness (Braude 1990; 156-157.) For these reasons, Braude submits, women were better qualified for the role of mediums. Besides, messages communicated by the deceased were 'nonconformist and socially transformative' (Braude 1990; 156-157.) Furthermore, according to Braude,

"Spiritualists involved themselves in every reformist 'ism' of the day, from abolitionism, and women's rights to communitarianism, socialism, health reform and free love" (Braude 1990; 156-157.)

Therefore one can view the spiritualist movement at that time in terms of an agency whereby middle class women expressed their aspirations under the aegis of spiritualist dogma.

However, paranormal claims made by mediums and corroborated by their followers - such as rappings, slate writing and levitation of objects - interested the new scientific discipline of experimental psychology. Clearly psychologists wanted to study the paranormal claims made by mediums, but were concerned that these investigations would damage the reputation of their new discipline, with the result that members would lose credibility.

In 1882 the Society for Physical Research was established in London, and a few years later the American Society for Physical Research was formed. Both organisations embraced experimental psychology and aimed to scientifically examine the authenticity of paranormal abilities claimed by mediums (Coon 1992; 43-151.)

One of the cases the Society for Physical Research analysed was that of the Creery sisters, who claimed to have mind [by then] reading powers. The sisters played a game in which one of them left a room, while the other sister chose a number of playing cards. When the sister entered the room she allegedly predicted the correct suit of cards. The psychologist who researched the case apparently claimed the sisters had a sixth sense (Wilson 1985; 117.) Six years later the Creery sister admitted they had devised various eye movements (upward glance for hearts, downward glance for diamonds, and so on) to aid their game (Wilson 1985; 117.)

This was one that were a number of paranormal phenomena investigated by The Societies for Physical Research and authenticated and yet which turned out to be no more than parlour games. According to Wilson (1985; 117), this caused the Society for Physical Research and the American Society for Physical Research to lose credibility, something that the psychologists of their parent discipline had warned may happen. By the end of the nineteenth century the spiritualist phenomenon was in decline, and the public were no longer curious in spiritualist activity.

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BEHAVIORAL OPTOMETRY: CURE OR CURSE?

Bruce Evans is a senior lecturer at the Institute of Optometry in London

Optometrists (previously called ophthalmic opticians) are the eyecare professionals who examine eyes, detect diseases, and treat visual problems with glasses, contact lenses, or eye exercises. Within this profession, there is what some perceive to be a problem with an American discipline called "Behavioural Optometry".

When asked what this term means most behavioural optometrists sound, initially at any rate, both sensible and convincing. They say that behavioural optometrists consider their patients not just as a pair of eyes but as a "whole person", taking account of home, school, and the workplace. I would argue that this is simple good practice for all healthcare professionals.

All optometrists should start their clinical investigations with a thorough eye examination and assessment of the functioning of the visual system. They concentrate on how well the eyes are co-ordinated together and their ability to focus accurately and comfortably. Anomalies of these "orthoptic functions" can be treated with eye exercises or glasses. These investigations and treatments are not controversial and are not by any means exclusive to a particular group of optometrists. Eye exercises for these problems are

supported by valid randomised double-blind placebo-controlled trials (RCTs).

Behavioural optometrists, however, tend to go much further and investigate areas such as memory, balance, general co-ordination, and language skills. These are important areas, but ones in which optometrists lack a detailed basic training. Maybe it would be better to leave investigation of these functions to the psychologists and speech and occupational therapists who have the appropriate expertise. The investigation of these functions by behavioural optometrists will not be covered by the NHS eye examination fee, so a private fee is usually charged.

Many behavioural optometrists prescribe low-powered glasses to virtually all the children they see. Commonly, these children do not have a refractive error which causes any blurring, nor which other eyecare practitioners would consider treating. Behavioural optometrists argue that the low-powered glasses that they prescribe prevent short-sightedness. The fact that the evidence from RCTs does not support this assertion does not deter them. Behavioural optometrists also prescribe eye exercises to a very high proportion of the children they see, even although these cases usually manifest no abnormality to conventional optometric or ophthalmological testing. A distinction needs to be drawn here between these new "vision therapies" and traditional orthoptic exercises that are prescribed by optometrists or hospital orthoptists to treat conventional well-accepted anomalies, as described above. The latter type, conventional orthoptic exercises, have mostly been validated by RCTs. Whilst there is no shortage of research on behavioural optometric "developmental vision therapies", there is a lack of RCTs. Often, behavioural optometrists respond to this criticism with the reply "I know my vision therapies work, I have X thousand patients who have benefited. If you doubt it then you prove it." It is hard to describe the vision therapies involved, since they vary from one behavioural optometrist to another. Some of the equipment that is used is, for optometrists, unconventional and includes trampolines, swinging balls, and balance beams. Behavioural optometry vision therapies all seem to have three features in common: they are expensive, give the patient a complex "hi-tech" explanation, and take a great deal of time. All these features might exacerbate a placebo effect, yet most behavioural optometrists do not seem to be concerned by the role of placebo effects in their treatments.

Dyslexia is frequently "treated" with eye exercises by behavioural optometrists. I wrote a series of articles a few years ago on reading problems and vision in which I dared to suggest that behavioural optometry was controversial and that many of its therapies needed RCTs to confirm whether they were placebos or not. The believers bombarded the letters column of the journal for some time and I received hate mail for daring to encourage scepticism.

It seems clear to me that many behavioural optometrists sincerely believe that their therapies are much more than placebos and many of their patients share this view. Personally, I am sure that placebo effects play an important, possibly exclusive, role in many of

these therapies. I also suspect that the resources of time and money would very often be better spent on other interventions (e.g., educational). I believe that it is in both the interest of the optometric profession and the patients that they serve for all clinical approaches to be "evidence-based". It may well be that behavioural optometry will be viewed, in the fullness of time, as yet another example of the need for healthcare practitioners to wait for RCTs before embarking on novel therapeutic approaches.

Irreducible Complexity; - biochemical Pathways, Michael Behe, and God("or some other higher intelligence.").

Michael Stanwick is an ex primary school teacher from New Zealand, and has just completed a BSc Honours Degree (1st) with the Open University.

This is not a direct review per se. Instead, it is an account of the nature of the main criticism of the main argument of the book, *Darwin's Black Box: The Biochemical Challenge to Evolution* by Michael J. Behe - a biochemist from Lehigh University in Pennsylvania in the United States. To this end I have drawn principally on a critical appraisal by Allen Orr (1996) - an evolutionary biologist - because it sums up many of the arguments presented in other papers written by either biochemists or other evolutionary biologists.

What has biochemistry to do with skepticism? It is Behe's (1996) reasoning, evident in his main argument as reported by several critics (Coyne, 1996; Doolittle, 1997; Futuyma, 1997; Gray, 1996; Orr, 1996, 1997) that is of relevance to scientific skepticism (skepticism that embraces the scientific method), because it is this very reasoning, applied to certain areas of biochemistry, that leads to the classic creationist 'argument from design' - a form of fallacious argument to which I shall return to shortly. But first, in order to recognise why Behe's (1996) argument is fallacious, that is, why his premise does not support his conclusion, it is necessary to understand a little of the concepts upon which his premise is built.

According to the critical reviews (Coyne, 1996; Doolittle, 1997; Futuyma, 1997; Gray, 1996; Orr, 1996, 1997) the main argument of the book is that certain biochemical pathways - deluges of interconnected, elaborate molecular reactions such as blood-clotting and the immune system are so complex that they are manifestations of a special kind of complexity - irreducible complexity. As Behe explains:

"By irreducible complexity I mean a single system composed of several well-attached, interacting parts that contribute to the basic function, herein the removal of any one of the parts causes the system to effectively stop functioning".(Behe, cited in Orr (1996) P. 4)

In this scenario then, each component is

indispensable. [A] plus [B] produces [C] which, with [D] and [E] produces [F] and so on, to the desired effect [Z]. Remove any component and the entire subsequent chain of reactions involved in producing [Z] do not occur. That is, no [Z].

From this initial observation Behe concludes that an irreducibly complex system:

"cannot be produced directly... by slight, successive modifications of a precursor system, because any precursor to an irreducibly complex system that is missing a part is by definition nonfunctional".(Behe, cited in Orr (1996) P. 4)

By "slight successive modifications to a precursor system" Behe is referring to a Darwinian mechanism. Thus, [A][B][C], which on hindsight we may regard as a precursor to [E][F][G][H][I] and so on, is useless because at that precursor stage it is missing the indispensable (in Behe's view) subsequent modification [D], and therefore at the particular stage that precursor cannot function. In other words, the reasoning in Behe's argument (from hindsight,) is that, because in an irreducibly complex system or pathway each interacting part (like [D] for example) is indispensable or essential, then each adaptation or addition (such as [D]) to a precursor was, at that stage, absolutely indispensable or essential and if the modification or adaptation was not there, then the system could not have functioned.

According to Orr (1996) therefore, Behe concludes that Darwinism cannot account for such a system, because it (Darwinism) requires that each step - each stage - in the construction of such a complex system be fully functional and adaptive, that is, each modification to a precursor system must be fully functional and adaptive. It is this conclusion says Orr (1997), that most illustrates Behe's misunderstanding of Darwinism.

Further, Behe then commits a logical fallacy - a non sequitur (meaning it does not follow - because his conclusion follows an irrelevant premise). According to Behe, because Darwinism cannot offer an explanation(the irrelevant premise) then such irreducibly complex systems imply, (cited in Coyne (1996)) conscious design and an intelligent designer. This, as Strahler (1987) asserts, is the creationist argument from design. It is supported by the argument from improbability (which is what Behe appeals to in his irrelevant premise) and results from a misunderstanding of Darwinism. I shall return to this misunderstanding shortly.

If this is indeed Behe's conclusion, then it is also fallacious because;

"The argument from design, taken by itself, is automatically invalidated on the grounds of being a tautology. The word design is defined... as a purposeful creation of an intelligent mind, which has to be either a human or a superhuman being. No other meaning is implicit in the definition. So "design" is already linked unambiguously to "designer" by definition--neither could exist in concept without the

other. To argue that the discovery of design is proof of the existence of a designer is therefore specious. If there is to be an effective argument favouring the existence of a designer, it must stem from the nature of the thing identified as the design--i.e., something that is so unique and so complex in its structure or organisation as to seem virtually impossible of arising through spontaneous and natural random processes. So we are back to the argument from improbability".(Strahler, (1987) P. 513)

Behe appears to have fulfilled Strahler's last criteria for an "effective argument favouring the existence of a designer", but as will be shown, his reasoning is erroneous because it is based on a misunderstanding of Darwinism.

But what are creationists? As a working definition, creationists can be considered as fundamentalist Christians (both scientists and non-scientists); that is, those Christians who consider the Bible to be literally correct and therefore, according to Strahler (1987), hold the view of a

"recent, special creation of the universe and everything in it...all of the universe was created out of nothing(ex nihilo) by an omnipotent and omniscient Creator. Supernatural creation occurred within a period of six days of mean solar time during one year approximately 6000 tropical years before present". (Strahler (1987) P. 59)

Because of this, "they are required to include as targets the prevailing scientific findings from geology, astronomy and cosmology" (Strahler (1987)). This is because those findings also embody evolution,(albeit non organic) as a core concept.

In this discussion I have alluded to adaptation - one of the central concepts of Darwinism or the theory of evolution by natural selection. Adaptation is a slippery concept because it is very plausible to infer that adaptations had been designed for some particular goal - bats evolved wings in order to fly, for example. However, this is a teleological argument, an argument which attempts to explain something in terms of its final cause. For this argument to work, it must assume that the variation upon which natural selection works is directed either by the organism or some supernatural power. Darwinism avoids this specious form of argument by stating that an adaptation arises from the natural selection of a random or chance inheritable variation that, at that point in time, happens to bestow an advantage on an organism by better adapting it to some condition of its way of life. So, bats wings evolved because, by enabling bats to fly, the wings or structures to be wings conferred an adaptive advantage at the time. Interestingly, even Orr (1996) in his critique falls into the teleological trap when he states "that some of the parts...evolved step by step for some other purpose."

Now, how has Behe misunderstood Darwinism? According to Allan Orr (1996), we must first rule out two

solutions that are not available to Darwinism. Firstly, all the essential parts of some biochemical pathway could not have appeared together as a result of mutation. Even Behe rules that out, because there is nothing to gain "by replacing a problem with a miracle"(Behe, cited in Orr, (1996). Secondly, says Orr (1996), perhaps some of the parts that were already adapted to some function were "recruited wholesale to a new function." He also rules this out as unlikely, using the analogy "you may as well hope that half your car's transmission will suddenly help out in the airbag department"(Orr 1996).

Here, however, Orr does not appear to be referring to pre-adaptive structures - such as the bony gill arches of jawless fish for example, which, on hindsight, just so happened to be by chance predisposed in the way they were built - preadapted - to be able to fulfil a new function, that of a jaw, which gives some advantage to the organism. Thus preadaptation simply means that although a particular structure(the bony gill arch) can alter its form a little, it can alter its function a great deal(to the function of a jaw bone) through the Darwinian process of step-by-step adaptations (see above). Instead, Orr is ruling out entire structures or pathways etc., so divergent in form or structure to what would be required in a sudden transformation to a new function. So, Behe misunderstands Darwinism says Orr (1997), because he failed to realise that according to Darwinism:

"all parts can change through time...no single current part can do the job, so none could possibly represent the ancestral system. Instead most or all of the parts likely changed through time, growing, in the process more interdependent.(Orr, 1997 P. 3)"

Thus remove a single current part from the system and that part stops functioning, as does the system, therefore no part represents the ancestral system. According to the Darwinian scenario, each part of the current system changed - adapted - to new conditions placed upon it and through time grew more interdependent with other parts.

Allen Orr answers Behe's argument then, by noting that;

"an irreducibly complex system can be built gradually by adding parts that, while initially just advantageous, become - because of later changes essential... Some part (A) initially does some job... Another part (B) later gets added because it helps A. This new part isn't essential, it merely improves things. But later on, A...may change in such a way that B now becomes indispensable. This process continues as further parts get folded into the system. At the end of the day, many parts may all be required." (Orr, 1996 P. 5)

Changes to the organism or the environment would open up new niches in which such improvements - the B's - would eventually become indispensable. In other words, because there can be improvements to particular stages of a functional system - stages that are already

doing some job, then the addition of later improvements can alter the earlier improvements to such an extent that they become essential. Natural selection then, builds on the enhanced functions performed by the system (enhancements due to the earlier improvements) or perhaps on adaptations elsewhere to the organism (adaptations that were perhaps the indirect result of the earlier improvements) because they bestow some advantage to the organism by better adapting it to some aspect of its environment.

Allen Orr (1996) also points out that it is also entirely possible that the history of a biochemical pathway may not be reconstructed because there is no guarantee of knowing the sequence of the modifications through time - which modification or stage was added last and that, in a previous version of the pathway, some other stage or step sat between any particular two.

The model outlined by Orr (1996) was in fact postulated eighty years before, by the geneticist H. J. Muller. According to Orr (1996), Muller suggested that genes (units or sets of instructions or a code which make up part of a chromosome and which control a particular inherited characteristic. A gene functions by controlling the production of proteins, such as globin for example.) which happened to;

"at first improve function, will routinely become essential parts of a pathway. So the gradual evolution of irreducibly complex systems is not only possible, it's expected."(Orr, (1996) P. 6)

From Muller's ideas Orr (1996) then highlights an important application, that of gene duplication, where at some time in the past an extra copy of a gene was produced. This extra copy is not indispensable and has no deleterious effects, but through time it became slightly altered such that it acquired a new but related function to the original gene. After further adaptations to the organism, this duplicate gene will have become essential. Natural selection builds on the raw material at hand and, in so doing cements earlier improvements into place such that they become essential.

Now the effects of duplicate genes should therefore be observable, they are predicted, because they give rise to families of related proteins. This is indeed the case. For example:

We're are loaded with duplicate genes that are required: myoglobin, for instance, which carries oxygen in muscles, is related to haemoglobin, which carries oxygen in blood. Both are now necessary.(Orr, (1996) P. 7)

In jawed vertebrates such as mammals for example, the protein globin in haemoglobin exists in two forms -alpha and beta. These two forms, according to Futuyma (1997), are "encoded by two genes with related sequences" which have arisen over the course of vertebrate evolution by gene duplication. This gene duplication

"has given rise to a family of haemoglobin genes

that have diverged in function..... In mammals, successive duplications of the beta gene gave rise to the gamma and epsilon chains which characterise the haemoglobin of the fetus and early embryo respectively, and enhance uptake of oxygen from the mother".(Futuyma, 1997 P. 2)

Thus, the gamma and epsilon chains are two forms of the globin protein and each form of the protein has its own 'set of instructions' or gene and both genes are related to one another.

Behe, says Orr (1996), refuses to recognise the idea of gene duplication for were he to do so, he would then have to recognise that at some point in the past a copy was made of a particular gene and that prior to that event the organism must have once got along perfectly adequately without it. It is this conclusion, were he to draw it, which "implies that such systems can arise step by step".(Orr, (1996)) That is, of course, by a Darwinian mechanism.

Finally, as Orr (1996) quite rightly asserts, "any would-be critic of Darwinism must know as much about evolution as any critic of biochemistry must know about molecules". Further, it is also vitally important that arguments be free from fallacious reasoning, something that we are all prone to commit and must be ever vigilant against repeating. Unfortunately it is often difficult to sharpen critical thinking skills, with reference to skeptical issues, in the absence of adequate reference material. However, one book that has recently come onto the market, may now go some way to fill that vacuum - How to Think About Weird Things: Critical Thinking for a New Age by Theodore Schick, Jr. and Lewis Vaughn.

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A SHORT SKEPTICAL CREATIONIST BIBLIOGRAPHY

Wayne Spencer is a civil servant and editor of Skeptical Intelligencer

Creationists have been studied by various social scientists. Thus, Numbers (1992) has written what is probably the standard history of the creationist movement, while Toumey (1994) has provided an anthropological study of modern creationists and Eve and Harrold (1991) have examined creationism from the perspective of social movement theory. A number of the contributors to Harrold and Eve (1995) also usefully address the question of who believes in creationism and why.

Examinations of the scientific claims of "creation science" are numerous. Perhaps the best single critique remains Strahler's (1987) enormous study. Other skeptical appraisals include Eldredge 1982, Kitcher 1982, Godfrey 1983, McGowan 1984, Montagu 1984, Berra 1990, Tiffin 1994 and Futuyma 1995.

Philosophical questions raised by the creationist stance are addressed in many of the scientific critiques (Kitcher, indeed, is a philosopher). For a volume dedicated to an examination of whether creation science is a science and other philosophical matters, see Ruse (1988).

For up to date information about creationism a very useful source is the American-based National Centre for Science Education (NCSE). In the United States creationists continue to attempt to influence the content of science education classes, and they remain a serious threat to the teaching of evolutionary biology and various other branches of science. NCSE and its members respond to this threat by providing accurate scientific and legal information to teachers, administrators, legislators and other targets of creationist efforts.

Membership of NCSE costs \$39 outside the United States. Members receive the bi-monthly Reports of the National Centre for Science Education, which combines news reports about creationist and anti-creationist activity and longer scientific, social scientific or philosophical examinations of creationists and their claims. Members are also entitled to savings of some 20% on the list prices of selected books on evolution.

For further information about NCSE, contact NCSE at P.O. Box 9477, Berkeley, CA 94709-0477, USA; tel: (510) 526-1674; e-mail: ncse@natcensied.org; or visit their website at <<http://www.natcensied.orgwww>>.

In addition to the NCSE website, there are a number of Internet sites that provide critiques of

creationist claims or other relevant information. One particularly useful site can be found at <www.talkorigins.org>.

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HOMOEOPATHY

Wayne Spencer is a civil servant and editor of Skeptical Intelligencer

History and basic principles

Homeopathy is a therapeutic method first proposed by the German physician Samuel Hahnemann at the end of the eighteenth century. The orthodox medicine of the time subscribed to the view that disease was the result of an imbalance of one or more of the four humours (blood, phlegm, yellow bile and black bile), and disorders were treated by applying "opposites" to the particular humoral imbalances thought to be responsible for them (National Council Against Health Fraud 1994: 51). In contrast, the defining principle of homeopathy is that diseases fall to be treated by "using preparation of substances whose effect on healthy subjects is SIMILAR to the manifestations of the disorder (symptoms, clinical signs, pathological states) in the individual patient" (Homeopathic Medicine Research Group 1996: 64).

In classical homeopathic research, substances are administered to healthy volunteers, and the ensuing symptoms are recorded (Schindler et al 1996: 29). From such "provings" (Homeopathic Medicine Research Group 1996: 98), as well as from clinical practice, associations are inferred between particular substances and symptoms. In practice, substances considered to provoke relevant symptoms are rendered into treatments through a process of successive dilution in water or other solvents known as "potentisation" (Homeopathic Medicine Research Group 1996: 95). This process may involve "succussion", a vigorous physical agitation at each stage of dilution thought to impart therapeutic potency to the preparation (Homeopathic Medicine Research Group 1996: 114). It may also be extended to a point where the solution in principle does not contain even a single molecule of the diluted substance (National Council Against Health Fraud 1994: 52; Schindler et al 1996: 30).

At the clinical level, classical homeopathic practice should involve ascertaining the individual patient's symptoms as well as the general symptoms caused by a disease (Schindler et al 1996: 29). The patient is prescribed treatments, at the appropriate dilution, derived from substances thought to give rise to the particular symptoms he or she is suffering from. However, over-the-counter homeopathic remedies are also now marketed that take no account of individuals' specific symptoms (see also Kron et al 1996: 115 regarding "pathological prescribing, an alternative approach to classical homeopathy").

Not all homeopaths adhere to the seminal teachings of Hahnemann, and there are currently a number of different branches of homeopathy (Schindler et al 1996: 31). One type of homeopathy has even rejected the use of highly diluted remedies on scientific grounds (Schindler et al 1996: 31).

Popularity

The popularity of homeopathy varies from country to country (Schindler et al 1996: 27; see also Goldbeck-Wood et al 1996). A 1994 review of public opinion data across Europe indicated that 16% of the public in the United Kingdom reported using homeopathic medicines (Fisher and Ward 1994: 107). A recent survey of Which? members in the United Kingdom found that 31% of respondents had used a practitioner of complementary medicine at some point in their lives, and that of these 16% had consulted a homeopath in the previous 12 months (Which? 1995, cited in Dickenson 1996: 152-3). A survey of cancer patients receiving conventional treatments in the U.K. found that 16% of respondents also used homeopathy (Downer et al 1994: 87).

According to a recent market research report, the total market for homeopathic remedies in the United Kingdom is worth around 20 million (FACT 1997). The British market for over the counter homeopathic products has been said to be increasing at the rate of 20% per year (Fisher and Ward 1994: 107).

In a 1986 survey of general practitioners, 5% of respondents declared that they had received training in homeopathy and 5% practised homeopathy (Wharton and Lewith 1986: 1499). The same survey also found that 42% of respondents referred patients to medically-qualified homeopaths and 13% to non-medical homeopathic practitioners (Wharton and Lewith 1986: 1500). More recently, 5.9% of the respondents in a survey of general practitioners had treated patients with homeopathy, while 4.6% had referred a patient for such treatment in the previous week (White, Resch and Ernst 1997). Comparison of the 1986 and 1997 surveys would seem to suggest that growth in general practitioners use of homeopathy and homeopaths may be growing only slowly. One reason for this sluggish expansion may be the limited opportunities doctors have to acquire knowledge of homeopathy during their basic training. For example, a survey of 24 of the 26 medical schools in the U.K. found that only two included homeopathy in the curriculum (Ramples et al 1997: 20). However, it should be noted that the same survey suggested that 40% of medical students would like practical training in homeopathy, while almost 60% would be interested in training in its principles (Ramples et al 1997: 21). Moreover, it appears that substantial numbers of qualified medical practitioners hold a positive attitude towards homeopathy (see, for example, Reilly 1983 and Wharton and Lewith 1986). Thus, in the survey of general practitioners conducted by White, Resch and Ernst (1997), 13.4% of respondents had endorsed or recommended homeopathy in the previous week.

The extent of NHS spending on homeopathy is unclear. According to White (1996: 89), "Homeopathy [is] available sporadically within the NHS, but accurate figures for total purchasing are not available". However the Royal London Homeopathic Hospital is an NHS trust, and in 1993 its "purchaser income" was 3 million (Ramples et al 1997: 19). Interestingly, Lambeth Southwark and Lewisham Health Authority has no

decided to stop purchasing homeopathic treatments for patients after a review of the literature by public health doctors at the authority concluded that there was no convincing evidence of clinical benefit from homeopathy (Wise 1997).

Furnham (1996) recently reviewed a number of studies that examined the reasons why people use complementary medicine. He concluded:

"The research of the reasons for medical practitioners/speciality choice has not yielded many counterintuitive findings. However, it has failed to confirm some rather simple-minded hypotheses, such as the idea that patients of complementary medicine have totally rejected orthodox medicine; that they have alternative lifestyles or cosmologies; or that they are mentally unstable. The results show that patients shop for health; they are often disappointed by specific experiences of orthodox medicine; and that many believe they are in charge of their health." (Furnham 1996: 86)

Safety

As yet, no definitive study of the adverse effects of homeopathic remedies appears to have been conducted (Ernst 1996: 113). However, it is not the case that the use of repeated dilution necessarily renders all homeopathic preparations safe. According to Ernst (1996: 113):

"After repeated dilution's, varying concentrations of the original substance can still remain. Potentially toxic concentrations of arsenic (Kerr and Saryan, 1986) and cadmium (De Smet, 1992) have been found in homeopathic preparations, and one case of an acute pancreatitis following the administration of a complex homeopathic remedy (Kerr, 1986) has been reported. Low potency preparations can also cause allergic reactions: several such reports have been published (e.g. Van Ulsen, Stolz and Joost, 1988; Forsman, 1991). In view of such findings interactions with other treatments are conceivable in concomitant drug treatments, although there is no published evidence for or against this occurring."

Even if homeopathic remedies are merely placebos, adverse reactions (known as "nocebo effects") can still ensue from their use (Ernst 1996: 112-3). In some instances, remedies labelled as homeopathic may not have been prepared in accordance with homeopathic principles. For example, when a surprisingly effective Pakistani "homeopathic" remedy for asthma was analysed it was found to contain the steroidal drugs prednisolone and batamethasone (Morice 1986).

Value for money

In his recent review, White (1996: 102) concluded that there is currently no hard evidence from rigorous cost-evaluation studies that any aspect of complementary medicine is cost-beneficial.

Efficacy

In the last seven years there have been three major reviews of the results by clinical trials of homeopathy. I shall summarise each of these reviews in turn. Hill and Doyen (1990) reviewed 40 randomised trials. They found that most of the trials had major flaws. The three largest trials, however, were well designed, conducted and analysed. Of these, two were negative and one positive. The authors concluded that they had failed to locate acceptable evidence that homeopathic treatments are effective (Hill and Doyen 1990; 141).

Kleijnen et al (1991) examined 107 trials in 96 published reports after a search seemingly somewhat more extensive than that done by Hill and Doyen (1990). The quality of each trial was scored according to a number of predetermined methodological criteria (e.g. whether the placebo control was described as indistinguishable from the substance being tested). Overall, the quality of the trials was found to be disappointing, yet even amongst the better trials a preponderance of positive results was found (15 positive and 7 negative). Notwithstanding this, the authors called for further evidence from large scale and rigorous double-blind trials. The central reason given for this reluctance to endorse homeopathy is interesting:

"The amount of positive evidence even among the best studies came as a surprise to us. Based on this evidence we would be ready to accept that homeopathy can be efficacious, if only the mechanism of action were plausible." (Kleijnen et al 1991: 321).

The third review is by Boissel et al (1996). Following a very thorough search, 184 placebo-controlled trials were examined. Most studies were of poor quality and only 20 trials were found that (a) were randomised; (b) had a clearly described primary outcome; and (c) had a curative intention. After further elimination's because data was unavailable or insufficient for the purpose at hand, results from 15 trials (17 comparisons) were pooled and employed.

The diversity of diseases and outcomes studied in the trials precluded a classical meta-analysis. Instead, Boissel et al (1996) applied a statistical test to the 17 eligible comparisons with a view to testing the hypothesis that "the treatment effect is not present in any of [the] trials pooled" (Boissel et al 1996: 208; see also 209). The result indicated that the probability that the results could be attributed to mere chance was less than 1 in a 1000 ($p < 0.001$). The authors explained:

"This means that, in at least one trial, the null hypothesis of the absence of effect can be rejected, namely that, in at least one trial, the experimental patients (i.e. those who were treated with homeopathic medicine) had some beneficial effects compared with the trial patients (i.e. those who received nothing, or a matching placebo), assuming that none of the pooled trials were biased in any way" (Boissel et al 1996: 209).

However, the authors added that they could not exclude the possibility that the trials were biased (Boissel et al 1996: 210). Indeed, their sensitivity analysis disclosed that the pooled results became less positive the more the quality of the trials included in the analysis was increased, and that when the analysis was confined to the trials of the highest quality, the results were not statistically significant (Boissel et al 1996: 209). As the authors pointed out, this supported the view that bias was present. The report also makes clear that:

◆ The strength of the evidence supporting the possibility that some of the studied homeopathic approaches had an effect is low because of the overall low quality of trial design, published data and reporting (Boissel et al 1996: 210).

◆ The number of patients involved in the pooled trials is small ($n=2001$; Boissel et al 1996: 208). If any of the tested treatments were effective, neither their identity nor their clinical effectiveness could be ascertained (Boissel et al 1996: 208 and 209). Boissel et al (1996: 210) concluded by calling for additional trials to support their findings.

There is more that could be said about the review by Boissel et al (1996). However, as factors identified within the report itself qualify its support for the claims of homeopathy virtually out of existence, little additional comment would seem to be necessary.

The most recent survey of the literature was conducted by Linde et al (1997). Following an extensive search, 186 trials were located. After eliminating studies that did not meet various criteria, 89 trials were included in the main meta-analysis. This analysis produced a significant result in favour of homeopathy. Further analyses were carried out on the trials remaining after studies with particular individual flaws¹ were eliminated, as well on those trials which the authors considered to be of high quality. In addition, the authors tested what they termed a "worst case scenario", which was limited to trials which satisfied certain narrow criteria². None of these analyses reduced the results in favour of homeopathy to non-significant levels.

Linde et al (1997) went to considerable lengths to identify a non-homeopathic interpretation for the results of the studies they considered. Nevertheless, I would suggest that their failure to find support for any such interpretation should not be taken as providing convincing support for the view that homeopathic remedies have an effect beyond that of placebos. In my view, the grounds for caution include the following:

◆ There are reasons to suspect that even the *prima facie* high quality trials supporting homeopathy may be methodological flawed (Sampson 1997: 36-7).

◆ Linde et al's conclusion that the very highest quality studies yield positive conflicts with that of Boissel et al (1996).

◆ Randomised trials as currently conducted may not adequately control for all biases (see, for example, Vanderbroucke 1997).

◆ No specific treatment is yet supported by an adequate series of independently conducted replications⁴ (Linde et al 1997: 839). Amongst other things, this precludes confidence that methodological errors and irregularities are not present in the current studies. In the case of so extraordinary a claim as that of homeopathy, only the most rigorous trials should be considered. In the case of Linde et al's "worst case scenario", only five trials met the required standard (Linde et al 1997: 838). This is an extremely small number.

◆ Since the Linde et al's (1997) search was conducted at least three major high quality trials have returned negative results (Hart et al 1997; Walach et al 1997; Whitmarsh et al 1997, cited in Linde et al 1997: 840).

But perhaps the most telling objection to acceptance of the homeopathic hypothesis is that there appears to be no cogent and independently supported mechanism, consistent with the well-established principles of physics and biomedicine, through which at least high dilution homeopathic preparations could exert a therapeutic effect⁵ (Schindler et al 1996: 31; Park 1997). In consequence, the hypothesis that the positive statistical results found by Boissel et al (1996) and Linde et al (1997) are attributable to mundane biases inevitably possesses far greater explanatory power than the mysterious and insubstantial notion that it is somehow or other connected with the operation of highly diluted substances. In short, one cannot explain a mystery by appealing to another mystery.

NOTES

1 That is, cases with inadequate reporting of concealment, double-blinding, follow-up, predetermined outcome-measures or critical peer-review.

2 Only high-quality studies of high or medium homeopathic dilution's that had been published in MEDLINE-listed journals and which were thought to have predefined measures of primary outcome were included.

3 The meta-analysis also included such features as a funnel plot and adjustments for presumed publication bias.

4 It should be noted that Linde et al (1997: 840) stated that their study "has no major implications for clinical practice because we found little evidence of effectiveness of any single homeopathic approach on any single clinical condition".

5 'In 1988 Jacques Benveniste published a paper in *Nature* claiming to demonstrate that highly dilute aqueous solutions have an effect on a process relating to certain white blood cells. This claim gave rise to an acrimonious controversy. For a succinct history and analysis see Friedlander 1995: 80-7. See also Sampson 1997: 35-6.

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FACT: FOCUS ON ALTERNATIVE AND COMPLEMENTARY THERAPIES

Wayne Spencer is a civil servant and editor of *Skeptical Intelligencer*

FACT: Focus on Alternative and Complementary Therapies is a new quarterly journal. It is published by the Department of Complementary Medicine at the University of Exeter and is edited by Professor Edzard Ernst, the holder of the United Kingdom's first university chair in Complementary Medicine.

Each issue of FACT has about 46 A4 sized pages. The largest section of the journal is made up of abstract-

style summaries of recent research papers and commentaries there on. In general, the commentaries assess the degree to which the study in question meets the methodological requirements of scientific to clinical trials, literature reviews etc. And, they may place the study in the context of other published papers. Other sections present conference reports, book reviews, bibliographies of recently published literature, details of the contents of selected journals in the field, and a list of complementary medicine-related websites.

The commitment of the editorial team of FACT to the application of rigorous scientific standards makes this journal an exciting and welcome addition to the literature on complementary medicine. I would suggest that it is essential reading for any skeptic who wishes to take an informed stance on such therapeutic claims.

To subscribe to FACT from the UK send a cheque for £40 (individuals) or £70 (institutions) to FACT Subscriptions, Department of Complementary Medicine, University of Exeter, 25 Victoria Park Road, Exeter, EX2 4NT.

Whither ASKE?

Dr Brian Robinson is a psychiatrist with a special interest in the application of hypnosis to cognitive behaviour therapy.

ASKE sounds a good idea, so long as the tone in which the enterprise is undertaken is not arrogant. In some journals dedicated to skepticism, a number of contributions have been intolerant and shown insufficient understanding of why people believe what they believe and how beliefs help some people simply to live.

Consider Richard Dawkins. In many ways one would think him just the right person to educate the public in how to evaluate ideas, to steer people away from millenarian mumbo-jumbo. But in another way perhaps his approach is exactly the wrong one. In *The Mind of God* another scientist with similar expository gifts to Dawkins, Paul Davies, refers to the latter's "triumphalism" when demolishing the argument, in natural history, for providential arrangement by an intelligent designer. He, and writers like him, do not net people down gently enough.

What is Dawkins - what are we - offering people in place of beliefs that keep them going? All the materialistic reductionism is rather jejune and arid when compared to all the power and glory of a great mystery - or even a trivially contrived one for Mulder and Scully! You can't bludgeon folk out of their beliefs simply by ridiculing them as delusions: people only cling more desperately to the only thing they have - and it's unlikely to be natural selection according to Father Dawkins!

The seventh item on ASKE's list of Aims and Principles seems to nod towards an understanding of this point, although it does strike me as something rather

jarringly added on to the previous six. I remember a colleague once taking me to task for considering a patient sectionable under the Mental Health Act for believing something really crazy. "It's not what people believe that matters", he said, "it's the behaviour that results from their beliefs which is important - what does their belief make them do?" Aside from that consideration, people can believe what they like (well, he was talking about psychiatric patients).

Whither ASKEII

Dr Trevor Jordan is a retired GP who is now living in Ashby de la Zouch and doing a part-time theology degree for fun.

When I heard from Mike Heap about the proposal to form a group for skeptics, I eagerly dashed off the following e-mail:

There are a couple of Internet newsgroups, though from a quick browse they seem preoccupied with proving/disproving (in about equal proportions) the existence/non-existence of UFO's/God/magnetism and the like. Usually with a good deal of invective. Tell me that ASKE won't be like that.

and Wayne Spencer was kind enough to ask if I would expand on that for this newsletter. Well, I'm not an expert, and I am acutely aware that many experts will read *The Skeptical Intelligencer*. But perhaps I might be permitted a couple of inexpert thoughts simply to provoke debate?

Skepticism can take several forms. We can frown deeply and say "I don't believe that" which is what many inexpert skeptics must often do: we know that we lack the detailed knowledge necessary to argue a case against something that seems unlikely. For example, today I saw claims for a diet that would enable a weight loss of 17lbs in a single week. My first reaction was that's impossible, followed shortly by well improbable, anyway. But to take it further I need more detailed information than I have readily to hand, so for now my skepticism is no more than a shrug of the shoulders.

Others have real, expert and evidentially-based information about the subject to hand, and such "skeptics" can contest similar false claims with some vigour and with authority.

It's the group in between which worries me: those who know a little - but not enough to argue a reasoned case. These are the ones who eventually adopt an "oh, no it isn't - oh, yes it is" style of argument, and it is that sort of pantomime (distressingly common in some Internet newsgroups) which I would prefer to avoid: it leads to ad hominem arguments which are a waste of time.

So one of the functions of ASKE might be to maintain a database of information which inexpert (and relatively inexpert) skeptics can access easily: a web site seems most appropriate, though it isn't accessible to all and

a printed format might also be necessary. This database might be built up through the submission of questions: my first would be - what is the likely weight loss in one week of someone who fasts totally?

Now that might be a trivial question compared with "is there a God?" or "do UFO's exist?" - but the diet "offer" which prompts the question is being sold and while it is one thing to shrug my shoulders over an outrageous improbable claim, it is harder to side-step the harm and untold misery which false claims like that engender. So another dimension of ASKE might be to promote skepticism of, and vigorous opposition to, not only the "big" issues of cosmic importance, but also the "heartaches and the thousand natural shocks" with which we gullible, inexperienced, people are daily bombarded.

So may I again stress what I believe must be the most potent weapon in any skeptics armoury, namely information. When I read an article in the press about which I have first-hand knowledge I can see the discrepancies, the errors, and the occasional downright misrepresentations which render the article a parody of reality: yet, for lack of knowledge, I uncritically accept as true everything else in the newspaper. It isn't enough to be a skeptic, we must be informed skeptics, and I hope that ASKE might fulfil that function.

ASKE ANNOUNCEMENTS

First Annual Conference and Annual General Meeting of ASKE

This will be held some time between April and June 1998 at one of the large city universities. The plan is to have a two-day meeting on a Friday (afternoon) and Saturday. The business meeting (AGM) will be held on Friday afternoon and it is planned to have a meeting in the evening open to all members of the public, including children, to promote the sceptical message in an instructive and entertaining way.

On the Saturday we plan to have papers and workshops, and ASKE members should let us know if they wish to contribute. One idea is to have a demonstration of perceptual illusions and related phenomena on a sceptical theme. Is anybody able to recommend anyone to present this?

If any members have any suggestions or wish to help in the planning of the conference, would they please contact: Mike Heap, 10 Woodholm Road, Sheffield, S11 9HT; tel: 0114-270 0619 (day) or 0114-262 0468 (evenings); e-mail: <m.heap@sheffield.ac.uk>.

Proposed Journal of Skeptical Enquiry

One of ASKE's aims is to establish a high quality learned journal with peer-reviewed papers. We envisage quarterly issues, an international editorial board, and articles such as reviews, reports of controlled experimental investigations of paranormal and unusual claims, studies of the personality characteristics of believers and sceptics, historical and comparative analyses of unusual beliefs, and discussions of the philosophy of scepticism.

We wish to create a committee of ASKE members to pursue this project of creating a skeptical academic journal. Members interested in joining this committee should contact: Mike Heap, [redacted] [redacted] (evenings); e-mail: <m.heap@sheffield.ac.uk>.

Critical Thinking Pack

Another ASKE aim that has been suggested is the development of a Critical Thinking Pack for schools. The purpose of this would be to help schoolchildren understand what sceptical thinking is and how to use it in judging unusual claims and beliefs, how we all can be deceived, and what other, more appropriate, explanations there are for commonly held paranormal ideas. As well as written material, the pack could include videotaped demonstrations. Wessex Films, the Southampton University Film Unit, have already indicated that they would be interested in collaborating in the production of such a video. We propose to delegate the exploration and pursuit of the project of creating an ASKE critical thinking pack to a committee of members. Any members who wish to participate in this committee should contact: Mike Heap, 10 Woodholm Road, Sheffield, S11 9HT; tel: 0114-270 0619 (day) or 0114-262 0468 (evenings); e-mail: <m.heap@sheffield.ac.uk>.

ASKE Special Interest Groups

It is expected that as ASKE develops, members will establish fairly informal special interest groups. These will consist of members who share specific interests such as astrology, ghosts, UFOs and alien abductions, and creationism. Members may communicate with one another (e.g. by e-mail) and through the Skeptical Intelligencer. Each group will be headed by a designated co-ordinator.

For a start, Wayne Spencer is interested in forming a Special Interest Group in Astrology. Anyone interesting in participating should contact Wayne at 15 Ramsden Wood Road, Walsden, Todmorden, Lancs, OL14 7UD; tel: 0113-232 4945 (day) or 01706-813 248 (evenings); e-mail: <w.spencer@saqnet.co.uk>.

If members are interested in forming special interest groups relating to other subjects, would they please contact Wayne Spencer.

Office Equipment

ASKE currently operates on a shoe string. Does anyone have any office equipment which they are willing to donate or sell at a reduced price.

Media directory

From time to time ASKE may be approached by the media to comment on certain issues or maybe to take part in radio/TV debates etc. To this end we would like to build a directory of those who would be prepared to take part in such activities.

We will need to know something about you such as;

- *Areas of expertise*
- *Type of broadcast (Live TV/Radio, academic discussions etc.)*
- *Any previous experience*

If you are interested please give me a call on 01773 744080. I'm available most evenings (except Wednesdays) or weekends. The more people we can get the better as past experience would indicate that we usually receive very little notice, so it would be nice to have a choice. I should point out that we are not exactly inundated with enquiries but opportunities have already been missed.

Tony Youens

Minutes of Steering Committee meeting held on Sunday 3rd August 1997.

Present:

Anne Corden
Mark Gould
Michael Heap
Barry Jones (guest)
Stephan Matthiesen (guest)
Wayne Spencer

Apologies for absence: Tony Youens

1. Membership. Anne reported that there are now 53 paid up members [since increased to 69] of ASKE. 10 applications remain outstanding. Enquiries and completed forms are still coming in but are beginning to dwindle.

2. Directory of members. Doug Bramwell's two suggested formats for the directory were circulated and discussed. A larger format was preferred and it was decided that the list of names should be alphabetical. Anne to ask Doug to produce a draft copy, with a cover showing the ASKE logo.

3. Conference. It was decided that this will take place in the spring of 1998, lasting from Friday afternoon until

Saturday evening. The AGM will be held on Friday afternoon and will be followed by a public event in the evening. Richard Wiseman is to be approached to see he is prepared to speak. Events on Saturday will include the presentation of papers and workshops. Michael agreed to organise this event and to investigate potential sources of funding. Barry agreed to assist.

4. Fund Raising. Wayne proposed that an application for a Development Grant be made to COPUS. Grants up to £20,000 are available but matching funding would need to be obtained. Grants can be paid for two successive years. Anne to check possibility of putting in bid to the National Lottery and also to look into funding from charities.

5. Stephan agreed to design a leaflet explaining the aim of the association. Five copies to be sent to each member with a request for them to circulate them among their colleagues. Agreed that names of potentially sympathetic academics and other public figures should be passed to Anne for a formal approach to be made. Doug Bramwell's press release was discussed and amended. Anne to send the amended text to Doug.

6. Academic Journal. A notice to be placed in the journal seeking interest from academic membership. Michael canvassed preliminary views of certain academic skeptics.

7. Increasing non-academic members. A list of target groups to be drawn up and to be sent to Doug. A pre mailing list to be kept to include interested/sympathetic journalists etc. Barry suggested targeting individuals. Everyone to look out for press cuttings. Names to be sent to Anne.

8. Skeptical Intelligencer. Mark reported that the production of the SI was going well given the early stage of the organisation. He identified the need for a desk to publish the journal. All contributions to be sent in plain text and Mark will format. If formatted text is being submitted this needs to be at least double spaced. It was agreed that an editorial team and an advisory board should be set up. Stephan and Barry offered to assist.

9. ASKE Website. Mark will E mail Dave Rogers to see if he is willing to design this. And/or get involved. Initial ideas for the content of this were: an index of areas of interest with reference pages; key articles from the SI; Aims and Principles.

10. European Council of Skeptical Organisations. Wayne to do an application subject to membership fees and also to ask about what support they can provide.

11. Developing connections with other skeptic and other sympathetic organisations. Wayne has written to CSICOP and requested that the association name be included in the list of organisations in the Skeptical Inquirer.

Wayne to contact Toby Howard and Mike Hutchinson request information on "The Skeptic" and Prometheus books to include in the SI. Stephan to contact the European rep. of the US Skeptic

see if they want a standing advert.

- Michael to contact the "New Humanist" and "Healthwatch".
- Wayne to investigate Copus.

12. Short term tactics. Already discussed.

13. Long term plans. The possibility of producing an educational pack was discussed. Stephan has a pack that we could look at. Barry suggested developing a general pack which could also be used by adults. Anne to obtain details of the course in critical thinking run by Leeds University. An announcement will be put in the SI about this..

14. Media appearances. GWUP's list of standard answers were looked at. Stephan will translate this and submit it for publication. It was thought that this could be handed out at conferences and sent out to enquirers. Accounts of all media appearances to be sent to Tony.

15. Any other business. Michael is keeping an E-mail network of all psychologists who have expressed an interest in skepticism. Also, the possibility of creating 'special interest groups' made up of members with particular common interest would be explored. The first would be on astrology and would be co-ordinated by Wayne. Barry will work on the production of an alternative logo. Michael will look into the possibility of obtaining a computer from Sheffield University for the use of the Secretary and Editor.

BOOK REVIEWS

Theodore Schick Jr. and Lewis Vaughn. *How to Think about Weird Things: Critical Thinking for a New Age*. Mayfield Publishing Company. 1995. \$19.95. ISBN: 1-55934-254-4.

Michael Stanwick is an ex primary school teacher from NZ, and has just completed a BSc Honours Degree (1st) with the Open University.

Contents: Forward by Martin Gardner/Preface/Introduction: Close Encounters with the Strange/The Possibility of the Impossible/Looking for Truth in Personal Experience/Relativism, Truth, and Reality/Knowledge, Belief, and Evidence/Mystical Knowing/How to Assess a "Miracle Cure"/Science and Its Pretenders/Case Studies in the Extraordinary/Appendix: Informal Fallacies/Credits/Index.

As the authors explain in the Preface, the emphasis of this book is to explain the principles of critical thinking in such a way that the reader will be able to evaluate any claim for either him or herself. They also explain why these principles themselves are valid and why the many alternatives to them are not. Further, they explore the "alleged sources of knowledge like faith, intuition, mysticism, perception, introspection, memory, reason, and science."

- Below is the authors' list, that appears in the preface, of the other important features of their book: Explanations of thirty-four principles of knowledge, reasoning, and evidence that you can use to enhance your problem-solving skills and sharpen your judgement.

- Discussions of over fifty paranormal, supernatural, or mysterious phenomena, including astrology, ghosts, ESP, psychokinesis, UFO abductions, channelling, water witching, near-death experiences, prophetic dreams, demon possession, time travel, parapsychology, and creationism.

- Details of a step-by-step procedure for evaluating any extraordinary claim. We call it the SEARCH formula and give several examples showing how it can be applied to some popular weird claims.

- Numerous boxes offering details on various offbeat beliefs, assessments by both true believers and skeptics of extraordinary claims, and reports of relevant scientific research. We think this material can stimulate discussion or serve as examples that can be assessed using the principles of critical thinking.

- A comprehensive treatment of different views about the nature of truth, including several forms of relativism and subjectivism.

- A detailed discussion of the characteristics, methodology, and limitations of science, illustrated with analyses of the claims of parapsychology and creationism. This includes a complete treatment of science's criteria of adequacy and how those criteria should be used to evaluate extraordinary claims.

- An in-depth treatment of various kinds of evidence appealed to in health issues, including personal experience, testimonials, case studies, and clinical trials. It covers several principles that will help you assess any health claim, including popular ones in alternative medicine and holistic health.

- An appendix that explores various informal logical fallacies. These fallacies are also explained in the text.

This thoroughly user-friendly book is highly recommended as required reading and reference material for all skeptics. It provides an excellent introduction, written in a lucid and unambiguous style, to the most important tool at the skeptics disposal - that of critical thinking.

Particularly relevant are chapters three and eight. Chapter three deals with perception and, most importantly, the biases in human judgement which lead to the incorrect assessment of probabilities. Chapter eight pays special attention to science, the scientific method and hypotheses. It is with the assessment of hypotheses that I find this book so invaluable, for in it the authors introduce the criteria of adequacy which enables us to

determine, as Schick and Vaughn put it, "how well a hypothesis accomplishes the goal of increasing our knowledge." This method is then tested by relating it to the 'theory' of creationism and the theory of evolution.

The only minor gripe I have with this book is that I would have liked to have seen the appendix - which deals with the fallacies approach to assessing arguments - expanded to cover the more positive criterial approach, which was only very briefly alluded to in the appendix's preamble. The three criteria for assessing a sound argument, in this approach, are that the premises must be acceptable, they must be relevant to the conclusion and they must provide adequate support for the conclusion. It would have been interesting to also have seen in the appendix, a discussion between the criteria of adequacy when assessing the hypotheses and the criteria of adequacy when assessing the logical strength of an argument.

All in all a book to be consulted and read by every skeptic. A must buy'.

This book is only published in the United States, However, it should be obtainable in this country through any good bookshop.

Galileo and the Dolphins;
Adrian Berry.

Amazing but true stories from science.

Batsford. 1996. 288 pages. £17.99 ISBN 0
7134 8067 X

Dave Rogers has worked in biochemistry, electronics design, music and programming. He has been a member of ASKE since its earliest days.

Anyone who buys this book on the strength of the title may be disappointed to find that it contains very little about either Dolphins or Galileo. The book consists of a compilation of 81 short articles, only the first of which has anything to do with the title. The other 80 articles range far and wide;- evolution, nanotechnology, medieval weaponry, archaeology, astronomy, dinosaurs, computers, medicine, maths, cryptography ... you name it, it's here, but not to any great depth, since the articles average just 2 or 3 pages per subject.

Despite the book's "stories from science" subtitle, the author often goes off on political, historical and mythological tangents, and there are some articles

with no science content at all, for example "Retire and be famous for it", which is about Mrs Thatcher and Roosevelt. I must say that given the choice, I prefer my science to be "undiluted", and if it wasn't for the fact that I was reviewing this book then I would have skipped over most of the above-mentioned digressions. For the general reader however, they would probably make the book more interesting and entertaining, and any book that makes science more palatable to the general public must be welcomed.

Astronomy and Cosmology receive the most substantial (and digression-free) coverage, not surprisingly, since the author is a Fellow of the Royal Astronomical Society and writes a regular column in Astronomy Now magazine. He is also the Science correspondent of the Daily Telegraph. In this book, he generally confines himself to reporting on the facts or on the opinions of others, and refrains from adding any opinions of his own. When he does so, however, I am pleased to report that he is a firm Skeptic!

For example, he attended a meeting of the Aetherius Society (a UFO group led by "sir" George King) in a London hotel. After eight hours of speeches, he reports that "It was depressing to listen to this farrago of nonsense. The meeting had started in a fairly scientific manner but as it proceeded the tone grew progressively more evangelical and intolerant." Other Skeptical articles include;- "Faking the shroud", in which he concludes "the theory that the shroud was a forgery ... accounts for all the known evidence", and "Faking the aliens", in which he completely dismisses the Roswell alien autopsy film as amateurish nonsense.

Also relevant to the Skeptical debate is "Backward Britain", an account of how poorly we regard Science in this country, and of how some brilliant British inventions have been "scorned at home but then exploited by foreigners" (one wonders what today's computer industry would be like if the British had not withheld support for Babbage and his early computers). British governments, he says, "seem to have developed a hatred of science", and "the policy of governments ... has been one of [scientific] philistinism". The futurist Herman Kahn once told him that Britain's most probable fate is to "decline slowly and genteely for the rest of history", a prediction that, to this reviewer at least, is looking depressingly more likely, as we continue to turn away from the real world towards the cloud-cuckoo-land of New Age irrationality.

The book also ends on a Skeptical note;- in the final paragraph he refers to a member of the Aetherius Society who pours scorn on debunkers "who wouldn't recognise a flying saucer if it landed". He replies, "in this he is wrong. That is about the only circumstance in which we would recognise it. It is the absence of any artefacts that makes it impossible to take these people seriously".

The book's illustrations mirror the eclectic style of the text, mixing together elements of science, art, history and mythology ... God wearing sunglasses, reaching out towards an exploding supernova An alchemist's den with modern chemical formulae on a blackboard ... A touched-up Rembrandt, with a group of

surgeons still in their 1600's garb but holding spanners and circuit diagrams, dissecting a robot.

For the average reader with a general interest in the universe around them, this book would be ideal, with it's short, easily digestible articles, friendly non-technical illustrations and complete absence of mathematical equations (the latter being crucial for mass appeal. Stephen Hawking, when writing A Brief History of Time, was told that every equation he included would halve his readership!). However, to anyone who keeps abreast of science, through the journals, etc., there will be little new to them in this book.

The Bible Code.

Michael Drosnin

Weidenfeld & Nicolson

ISBN 0 297 81995 X £20.00

Mark Gould is an Operating Dept Practitioner

According to the author of this work, the original Hebrew text of the Old Testament has a hidden code which reveals the future, and seems to be particularly good at predicting peoples' demise. Apparently the assassinations of Sadat, the Kennedy brothers and Yitzhak Rabin are in there and their untimely end. The "code" was "discovered" by Dr Eliyahu Rips an Israeli mathematician and one of the world's leading experts in group theory. The original paper was published in The Journal of Statistical Science in the USA. The code is revealed by Equidistant Letter Sequencing (ELS), and you need a computer to do it, which the author of the Bible supposedly didn't. Other events which appear are:- Edison, Aum Shinrikyo Hussien, Scud Missile Watergate, Economic Collapse, Timothy Veigh, Oswald, Arafat, Hitler and the Holocaust, and a hole host of really bad things. (Why do they never predict anything good, like your daughter doing well at school; or that your winning a fortune: or the world continuing to get more peaceful and the starving millions getting fed.)This book like all other predictive books conveys the message that unless we do something, all our woes of yesterday will be nothing compared to tomorrow. It doesn't of course say what we should do.

Dr Rips is devout in his religious faith and has no conflict with scientific method and his religion, unlike the author who remains "skeptical" and keeps saying "oh my God it's true" after the event of course. All the events foretold by the Bible are to be found in the 304.850 characters with spaces removed and placed on a cylindrical matrix. The computer runs its software to find what you are looking for. And when it seems to fail or gets vague or miss-times an event, we invoke Heisenberg's uncertainty principle and quantum Physics, which at that level gives us a multitude of outcomes.

As a comparison, Dr Rips and the author used 304.850 characters of War and Peace and the same number from Crime and punishment. No significant predictions were found, but there may have been substantive bias due to Dr Rips wanting it to work because of his religious beliefs. However other mathematicians have stated that the science behind the experiment is "on the level", although without committing themselves to actually believing in the code.

But now along comes Brendan McKay, an Australian Mathematician with the results of an analysis of Moby Dick I am indebted to Brendan for posting the following on the Web, with his permission, I quote.

The following challenge was made by Michael Drosnin:

"When my critics find a message about the assassination of a prime minister encrypted in Moby Dick, I'll believe them". Newsweek, Jun 9, 1997

Note that English with the vowels included is far less flexible than Hebrew when it comes to making letters into words. Nevertheless, without further ado, we present our answer to Mr Drosnin's challenge.

"Prime Minister Indira Gandhi Assassinated
crosses with the bloody deed.

President Rene Moawad Assassinated crosses
with burst open the door, an exploding car bomb.

Soviet exile Leon Trotsky Assassinated crosses
with executed the steel head of the lance ice hammer.

The Reverend Martin Luther King assassinated
crosses with to be killed by them, gun, prepare for death.

Chancellor Engelbert Dollfuss Assassinated crosses
with assassination of a good fellow Wien (the
place of his assassination).

The assassin Sirhan Sirhan Assassin. crosses with
sharpshooting butchery wounding and murdering
rifle holds the fatal powder shot RF Kennedy".

The page where this is posted also includes answers to many other codes with a biblical bent .You can verify the above messages, and find your own, using the public-domain text of Moby Dick. It can be downloaded from
<http://cs.anu.edu.au/~bdm/dilugim/moby.html>

After all this we must ask a question: If some benevolent omnipresent entity delivered the first five books of the Old Testament 'the Torah' to Moses with its code in place, then would it not have been easier just to tell us about the coming problems of the next several millennia, instead of writing it in a code which requires the advent of computers to decode it. The holocaust could have been averted and six million of Dr Rips fellows could have been saved, as could have many other catastrophes that have befallen us. If true, this is not a description of a benevolent entity, and if he ever sends his

son back he'd better have a big cheque book and a good lawyer.

In conclusion, you would be better off spending your £20.00 elsewhere: on socks, tee-shirts, music or The Physics of Star Trek by Lawrence M Krauss, would be a good start, anything but this book. The final word should go to Bernard Levin, "The Bible Code is - and I do not exaggerate - the greatest pile of nonsense I have ever seen in a book. Any book". And for once I am in complete agreement with Mr Levin.

I am indebted to Dr S Berger for having the benevolence to buy this book, and the courage to lend it to me: Sid, this is for you.