Journal of Scientific Exploration, Vol. 2, No. 1 pp. 29–51, 1988
Pergamon Press plc. Printed in the USA

0892-3310/88 $3.00+.00

Is There a Mars Effect?

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Abstract—The so-called "Mars Effect" is discussed in a larger context. The phenomenon refers to a significant tendency for champion athletes to have been born at the time of either the rise or the upper culmination of the planet Mars. The populations and samples, methodology and its development are described along with earlier and more recent findings. Control studies and replications by others are reported in some detail. Particular attention is paid to certain basic and procedural criticisms and the problem of bias or artifacts. The current scientific status of the issue is reviewed in light of several kinds of empirical evidence that has accumulated over the past three decades. The question raised in the title of the paper is answered in the affirmative.

Introduction

I began empirical studies in the 1940s, initially focusing on the claims of astrology. The verdict of my statistical evaluations was not at all favorable to those claims. Thus I found no truth whatever behind certain major tenets of the horoscope, including the alleged influence of the signs of the zodiac, the reality of the astrological "aspects," the reported role of the "houses," or the prediction of future events. I also analysed in detail the statistical evidence offered by some well-publicized astrologers (e.g., Paul Choisnard, Karl E. Krafft); was forced to emphasize the lack of a sound methodology, and was generally unable to replicate their findings (Gauquelin, 1955, 1978). Over the years, and even recently, I made further attempts to test the validity of zodiacal signs or "aspects." In spite of more refined approaches and larger samples I still failed to obtain positive results (Gauquelin, 1980, 1981, 1982, 1985).

Nevertheless my labors were not entirely in vain: In the process, from 1951 on, I recorded the birth times of French men and women who were particularly successful in a variety of occupations or professions, and it became obvious to me that the distribution of certain associated planetary positions diverged sharply from the averages. These results could not just be written off as chance, and would be deemed "very significant" by statisticians as well.

I published my observations in a first book, *L'Influence des Astres*, complete with the 6,000 birth data items on which they were based (Gauquelin,

1955). It was in this book—unfortunately not yet available in English—that I described what has become known as the "Mars effect." This is the marked tendency for champion athletes to be born when the planet Mars has either risen over the horizon or passed its upper culmination. This particular pattern is seen far more frequently around the birth of outstanding athletes than for low ranking ones. As some readers are aware, the Mars effect referred to here has been under skeptical scrutiny by experts for many years. Additional details regarding this two-decade long controversy are summarized later.

It is important to emphasize, however, that the Mars effect for sports champions is merely one among my many findings concerning famous individuals. For instance, Jupiter, in analogous fashion, was found linked to success in politics, cinema, theater, and journalism; Saturn, with accomplishment in science; the moon, "favorable" in the case of writers. Besides athletes Mars also played much the same role for military leaders, chief executives, physicians, and so forth. Very generally, planetary position at birth—in term of the rise and upper culmination—was found associated with outstanding professional accomplishment. Results obtained in France have been successfully replicated through records of 18,000 other notable Europeans. Details were given in my second book, ***Les Hommes et les Astres*** (Gauquelin, 1960). In 1970 my laboratory published six volumes comprising all the birth and planetary data assembled since 1949 (Gauquelin, 1970). This enables interested scientists to verify the materials and the conclusions. Recently, I carried out additional replications, with positive outcome, on 1,400 eminent Americans (Gauquelin, 1982) and on new European samples, mostly French (Gauquelin, 1979, 1984), again making available the data base for inspection.

It is logical that scientists are most reluctant to accept findings of such an extraordinary nature. Indeed, biases or errors seem the most reasonable explanation. It is, therefore, necessary to describe my methodology in greater detail.

Methods and Procedure

My chief purpose was establishing an objective method that could be verified at every step: (1) the gathering of data; (2) astronomical computations; (3) statistical analysis. This seems to be the only way to establish the validity of the observations. The main problems to be solved here are discussed in what follows.

1. Gathering Birth Data

Biographical Dictionaries. The names of eminent individuals were culled from biographical directories and similar sources. These publications commonly list the date and place of birth of everyone included. In the framework of my research, they satisfy three important criteria:

- Objectivity: The dictionaries were compiled by individuals other than myself and for a different purpose;
- Homogeneity: All members of the group listed have in common that they had achieved success in the same occupation or profession;
- Large number of cases: Directories tend to afford access to the names of many hundred or thousands of successful individuals.

However, as I have been pointing out since the beginning of my work, success in a professional activity is merely a convenient criterion of analysis and cannot figure in the direct explanation of the observed statistical relationships (Gauquelin, 1955, 1960, 1973).

The search for biographical works, whether in France, other European countries, or in the United States, often entailed serious difficulties. Therefore, the relative abundance or paucity of data in respect to specific professional groups also reflect the relative comprehensiveness of the sources I was able to locate. Whatever was found was used, and none was arbitrarily omitted.

It was also necessary to avoid an arbitrary selection among the records collected. Whenever possible, all Subjects listed in the dictionaries were included in my investigations. Some of these sources, however, contained so many entries that the criterion of true notability or renown could not have been met. In such instances, clearly outstanding individuals had to be differentiated from the more obscure. Objective criteria of selection were accordingly defined and, once adopted, were maintained throughout the research phase in question.

Information from Birth Registries. The observed statistical relationships evidently involve the planets' movement and position at birth. It was, therefore, necessary also to know the hour of each birth. This information together with the date and place is recorded in the official birth registries. I would, therefore, write to the registry office of each place of birth given in the directories in order to confirm the date and to obtain the precise hour. All the responses received are kept in files in my laboratory and in their original envelopes. There they are available for inspection (Kurtz & Gauquelin, 1977; Dean, 1987; Ertel, 1987). Of course, I did not receive the information in every instance, but in each case where the record was thus incomplete, an explanation or justification is added (for additional details see Gauquelin, 1955, 1960, 1970, 1979, 1982, 1984). The chief limitations were due to the following:

- Incomplete documentation (generally omission of the hour of birth);
- Name of the individual sought is not on record in the registry office of the birth place listed in the directory;
- Refusal to give out information (seldom, except in West Germany and, even more so, in the U.S.A.);
- No reply from the office (very rare).

Let me finally note that the relative degree of confidence in the information obtained from registries in Europe was the subject of a special study by historical epoch and country. The associated reliability was proven to be sufficient; that is, it would permit statistical effects like the ones I observed to be manifested, provided such did exist. For example, as far as birth hours are concerned, a study of data originating between 1850 and 1940 revealed a margin of error of only 20 minutes (Gauquelin, 1959, 1960, 1971; Reverchon, 1967). In the U.S.A. the corresponding precision tended to exceed that of the European records (Gauquelin, 1982).

The Data Base. The number of Subjects overall is in excess of 30,000. The records were gathered in France, Italy, Germany, Belgium, and the Netherlands; and later, in the United States. They span the time from 1793 to 1950, with the majority of births dating to the second half of the 19th and the beginning of the 20th century, respectively. The time when the registries were first established (and birth hours becoming a matter of record) varies from country to country. In France it was 1793; Napoleon also introduced the system, within a few years, in Belgium, the Netherlands, the West bank of the Rhine (Germany) and Naples and Sicily in Italy, respectively. On the other hand, in most of Italy the system was not put into effect until 1866; and in most of Germany, not until 1876. In the United States considerable variation existed across the states. Of course, the more recent the records, the fewer relevant data one can expect to gather for the present purpose. (For specifics, see Gauquelin, 1955, 1960, 1970, 1982.)

2. Astronomical Data

Correlations I observed here involve the position of bodies of the solar system relative to the terrestrial horizon and meridian, that is, two selected positions of the daily movement.

Daily Movement

The celestial bodies appear, over the same period of time and with a uniform movement, to describe a circle parallel to the celestial equator, with the axis defined by the geographic poles.

As seen from the earth those bodies always rise on the Eastern horizon, reach their culmination, and set on the West. They thus occupy all the possible positions on their circular path (e.g., like the sun). This apparent motion is due to the 24-hour rotation of the earth on its axis. I examined the positions of those various bodies during the daily movement in relation to the birth time of each Subject of the professional groups mentioned earlier. Calculating these positions does not present fundamental difficulties. Indeed they have long been available as tabulations or in yearbook format.

Thus, assuming we wish to know the trajectory of Mars in the sky over Paris on 24th of May, 1956, we need only consult a yearbook to find that on

this date the planet rose at 0:44, reached its highest point at 05:33, and set at 10:22. Determinations like these are readily available. Let us now imagine that a certain child was born in Paris on May 24th, 1956. If he was born at 1 a.m., then Mars would just have appeared on the horizon. If birth occurred at 6 a.m., Mars would just have culminated in the sky of the city and begun its descent.

Dividing the Planetary Trajectory Into Sectors

In our circumstances we cannot. however, be content with such general descriptions. In order to assign usable probabilities to the planet's positions we will in practice divide its daily path into sectors which can serve as reference. In my research I have employed a division into 36, 18, or 12 sectors, respectively (Figure 1). In a sense, this creates a cosmic roulette wheel numbered from 1 to 36 (or I to 18, or 1 to 12), always counted from the planet's rise. At the time of a person's birth, each planet is located in one

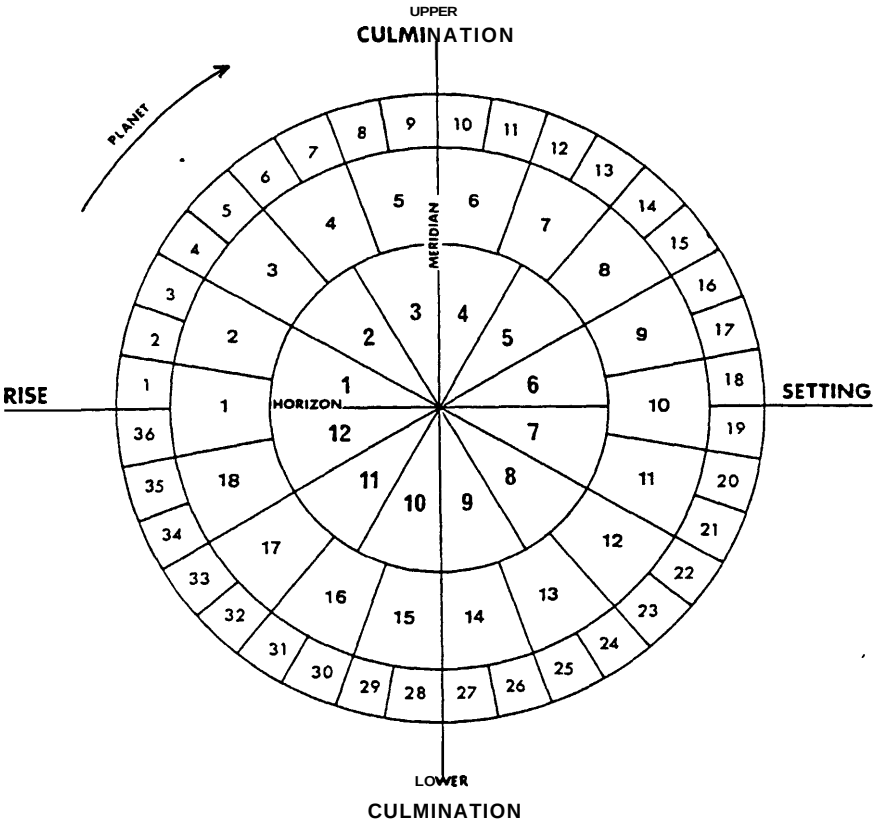

Fig. I. The three divisions of the daily movement.

of the 36 sectors on the celestial "dial." If we have a hundred or a thousand birth records, we can quite reliably estimate probabilities from the frequency with which a planet had appeared in sectors No. 1, 2, . . . , 36. Indeed there is a resemblance to the situation at a casino table where the gambler makes note of the numbers that come up after each spin of the roulette wheel. In this manner we can generate distributions for each planet and each population of Subjects. Thus the distribution of Mars across the 12 sectors has been determined for the time of birth of 2,088 sports champions (Gauquelin, 1972).

Calculating Expected Frequencies

At first thought, the mapping of the sky I adopted might make it appear as if each planetary body would be found equally likely in any one of the N sectors defined. In general, however, the figure differs from such an average. The actual incidence for each sector is, to a greater or lesser degree, a function of specific astronomical and demographic factors. The demographic variance, for example, is primarily accounted for by the nonrandom distribution of births over the 24 hours (see Section B, below). Therefore, it is necessary for a statistical analysis to calculate the expected frequencies taking those factors into account. Numerous problems arise in these calculations, and a thorough individual analysis is required for each planet and each Subject population.

Consider, for example, the planet Mars and the 2,088 European champion athletes born between 1880 and 1945 (Gauquelin, 1972):

(A) The daily movement of Mars during that period, given a mean Northern European latitude of 47°N, was such that:

1. The probability for Mars to occupy either a diurnal or a nocturnal sector was nearly the same; $\sum$ diurnal arcs/$\sum$ nocturnal arcs = 1.02, slightly favoring the day time segments over the night. The minor difference is primarily due to the eccentricity of the Mars orbit and interacting zodiacal parameters (Gauquelin, 1957).
2. Mars is observed four times as frequently in conjunction with the sun as in opposition, which plays an important part in (B), below.

(B) Births are not evenly distributed over the 24 hours of the day. Rather, there is a maximum in the morning and a minimum in the afternoon. Furthermore, and referring to (2) above, Mars had a slightly greater probability (by 4%) to occupy a sector near its rise than near its setting, with culmination intermediate (−1%) (Gauquelin, 1955, 1957). Given a large number of births, distributed over a long period of time—as is the case with the athletes—the above analysis will enable us to create, in approximation, a "model sample" for the expected probability of Mars to occupy each of the sectors, and as determined by the several relevant astronomical and demo-

graphic conditions noted (Gauquelin, 1957, 1960, 1988). On the other hand, when the actual distribution of sector appearances and transitions differs substantially from the expected pattern—and this, again, is the case with the champion athletes—it is advisable to examine the circumstances surrounding every birth so as to ascertain whether idiosyncratic or "Subject variables" could account for the findings. We employ, therefore, the following procedure (Gauquelin, 1957, 1960, 1972, 1979, 1988).

Individual Births. For a given day and geographic locale the expected incidence for a planet to be in a specific sector is determined by several parameters, primarily:

1. The length of the semidiurnal arc (or semi-nocturnal arc as the case may be) which is itself a function of the planet's declination and the geographic latitude; "semidiurnal" or "semi-nocturnal" naturally refer to the distance between the rise and relevant (upper or lower) culmination.
2. The incidence of births from the moment of the planet's entry into, and until, its exit from that sector. ***Example:*** What is the probability for Mars to be in some specified sector on the day of birth of the sports champion, Robert Accard? The Subject was born in Lisieux, France, on November 26, 1897. On that day and in the particular location Mars rose at 7:27 a.m.; culminated at 11:41 a.m.; and set at 3:56 p.m. We can describe the planet's apparent movement on that date in terms of the times of its crossing each of the (here 12) sector boundaries. On the 24-hour clock we have, for Accard's birth specifications:

Sector No.	1	2	3	4	5	6	7	8	9	10	11	12
Mars entering sector at	0727	0852	1017	1141	1306	1431	1556	1831	2106	2341	0216	0452

The times spent in the respective sectors correspond to the associated astronomical probabilities. Taking into account as we need to do, the daily distribution of birth as such, we obtain the results of Table 1. This outcome is based upon many thousand births and the percentages with which "notable" persons were born over the 24 hours, each hour broken down into six-minute intervals. These figures, then, are the demographic probabilities in question. We can also make use of the table for determining the percentage of births normally occumng during the time that Mars occupied a specified sector. Again with Accard's birth data and place we have:

Sector No.	1	2	3	4	5	6	7	8	9	10	11	12
Expected percentage of births	6.25	6.10	6.62	5.67	4.94	5.33	9.94	9.62	10.46	10.19	12.46	12.34

The tabled outcome requires no further explanation. It indicates the astronomical and demographic likelihood for Mars to be in the various sectors, for every person—including Robert Accard—who was born in Lisieux on November 26th, 1897.

Aggregate Births. The procedure is repeated for all 2,088 sports champions. The expected probabilities for Mars to be in a given sector are obtained by summing the 2,088 individual probabilities calculated for that sector. The expected 12-sector distribution of Mars is the result of these calculations (Table 2).

It is also necessary, however, to ascertain that the 24 hour-pattern of births in the sports champions corresponds to the natural (general population) demographics. Actually, the more recent obstetric procedures tend to modify the natural (circadian) cycle of labor and birth (Gauquelin, 1959, 1971). Fortunately, the athletes were not born that recently, and their births still reflect a spontaneous pattern (Gauquelin, 1957, 1972).

TABLE 1

Cumulative percentage of births of notable individuals during 24 hours. by six-minute intervals

	Minutes									
Hours	0	6	12	18	24	30	36	42	48	54
0	0	0.15	0.29	0.44	0.59	0.74	0.88	1.03	1.18	1.32
1	1.47	2.05	2.63	3.22	3.80	4.38	4.97	5.55	6.13	6.71
2	7.29	7.81	8.32	8.83	9.35	9.86	10.37	10.88	11.40	11.91
3	12.42	12.88	13.34	13.80	14.25	14.71	15.17	15.63	16.09	16.55
4	17.00	17.47	17.95	18.42	18.90	19.37	19.85	20.32	20.80	21.27
5	21.75	22.24	22.73	23.22	23.71	24.20	24.69	25.17	25.66	26.15
6	26.64	27.13	27.61	28.09	28.58	29.06	29.55	30.03	30.51	31.00
7	31.48	31.92	32.36	32.80	33.24	33.68	34.12	34.56	35.00	35.44
8	35.88	36.32	36.77	37.21	37.65	38.09	38.54	38.98	39.42	39.86
9	40.30	40.72	41.14	41.56	41.97	42.39	42.81	43.23	43.65	44.06
10	44.48	44.96	45.43	45.91	46.39	46.86	47.34	47.81	48.29	48.77
11	49.24	49.71	50.17	50.64	51.11	51.57	52.04	52.51	52.97	53.44
12	53.91	54.30	54.69	55.08	55.48	55.87	56.26	56.65	57.04	57.44
13	57.83	58.16	58.50	58.83	59.17	59.50	59.83	60.17	60.50	60.84
14	61.17	61.54	61.92	62.29	62.66	63.04	63.41	63.78	64.16	64.53
15	64.90	65.28	65.66	66.04	66.42	66.79	67.17	67.55	67.93	68.31
16	68.68	69.09	69.49	69.89	70.30	70.70	71.10	71.50	71.91	72.31
17	72.71	73.09	73.46	73.83	74.21	74.58	74.96	75.33	75.71	76.08
18	76.46	76.83	77.21	77.58	77.96	78.33	78.71	79.08	79.46	79.83
19	80.21	80.56	80.91	81.26	81.61	81.96	82.31	82.66	83.01	83.36
20	83.71	84.10	84.50	84.89	85.28	85.67	86.06	86.46	86.85	87.24
21	87.63	88.01	88.38	88.75	89.13	89.50	89.87	90.25	90.62	91.00
22	91.37	91.75	92.13	92.52	92.90	93.28	93.66	94.04	94.43	94.81
23	95.19	95.67	96.15	96.63	97.11	97.59	98.07	98.55	99.03	99.51

It was empirically demonstrated that the daily distribution for ordinary people is quite similar to the distribution for notables. No appreciable difference in percentages is found between the two distributions (Gauquelin, 1972, p. 47).

Control Groups

Of course, the expected sector frequencies of Mars can be determined rationally (theoretically) as well as estimated empirically. For the latter purpose, we gathered 24,961 records of ordinary births from the same countries and time periods as the sports champions. These data have been published in their entirety as well (Gauquelin, 1970, 1972). The observed distribution of Mars for these control births does not significantly differ from the expected frequencies calculated by the procedure described above (Table 2).

Results

1. Statistical Evidence

The evidence for a "Mars effect," that is, the tendency for sports champions to be born more frequently when Mars is in Sector 1 (rise) and in Sector 4 (culmination) of the 12-sector division, can be cast in the form of a 2×2 contingency table (number obtained from Table 2):

	Mars in Sectors 1 & 4	Mars in Sectors Other Than 1 & 4
Champion births	452	1,636
Control births	4,296	20,665

For this table, $\chi^2 = 26.2$ which with one degree of freedom, yields $p < 10^{-6}$. Figure 2 is a graphic illustration of this highly significant result. (Note that this is the equivalent 18-sector mapping.)

This observation pertains to Mars and sports champions only; yet, however significant, it would not have been sufficient by itself to conclude that there is a correlation between planetary motion and time of birth of famous individuals. In fact, as briefly mentioned in the introduction, several other statistical analyses showed significant results not only for Mars but also for Jupiter, Saturn, and the moon.

As Prof. I. J. Good, Dept. of Statistics, Virginia Polytechnic Institute, remarks in the review of my account (Gauquelin, 1983):

> **Among other striking results, $\chi^2 = 24.4$ for the birth times of outstanding physicians and men of science during the rise and culmination of Saturn, $\chi^2 = 29.2$ for military leaders and Jupiter, and $\chi^2 = 21.6$ for outstanding writers and the moon. In Good (1982) I tried to dwindle the Mars effect, partly by allowing for "special selection" of planet and attributes, and managed to get Bayes' factor down to about 60; but faced with the Saturn, Jupiter, and moon effects, the approach will clearly not undermine Gauquelin's results. (Good, 1987)**

TABLE 2
Mars: Control group versus sports champions, 12-sector distribution

SECT	Obs	Exp	Obs	Exp
1	2234	2224.0	240	186,0
2	2210	2171.6	173	181,7
3	2116	2134.2	163	178,5
4	2062	2061.8	212	172,5
5	2113	2029.3	152	169,8
6	2025	1994.4	135	166,8
7	1886	1959.4	162	163,9
8	2023	1961.3	176	164,1
9	1975	2031.8	185	170,0
10	2017	2084.2	165	174,3
11	2214	2151.6	158	180,0
12	2086	2156.6	167	180,4
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Left: Observed and expected frequencies of Mars at the birth of 24,961 ordinary individuals. Right: Observed and expected frequencies of Mars at the birth of 2,088 sports champions (from Gauquelin, 1972).

As a matter of fact, the results mentioned by Good are extremely significant, and there are additional observations, not mentioned by him, that have emerged in the course of my studies (see Figure 3).

2. "Key Sector" Boundaries

I am frequently being asked in correspondence about the more precise pattern of "influence" of a planet along its path of motion. For instance, how does the effect increase with the births' proximity to the rise, or to culmination? At my request, Thomas Shanks, Research Director, Astro-Computing-Services, San Diego, computed the distribution of planets in 72 sectors for each professional group (my previous publications listed distribution primarily for 36 sectors).

The results published (Gauquelin, 1984) show that the two significant zones of the sky (insofar as the relationships are concerned) begin about 10° before the rise or the upper culmination; extend through the ends of sectors 1 and 4 (in the 12-sector mapping) and even slightly beyond, then rapidly lose their prominence. Since the significant zones exceed somewhat the Sector 1 and 4 boundaries, I now speak of "enlarged key sectors" or "plus zones." In the 36-sector arrangement these comprise four sectors surrounding the rise (nos. 36, 1, 2, and 3) and four at the upper culmination (nos. 9, 10, 11, and 12), respectively. Figure 1 should be self-explanatory. Investigators who have been examining my findings more recently generally work with the "enlarged key sector" definition for good reason since this procedure accounts for a greater proportion of the variance (Ertel, 1986, 1987, 1988; Müller, 1986).

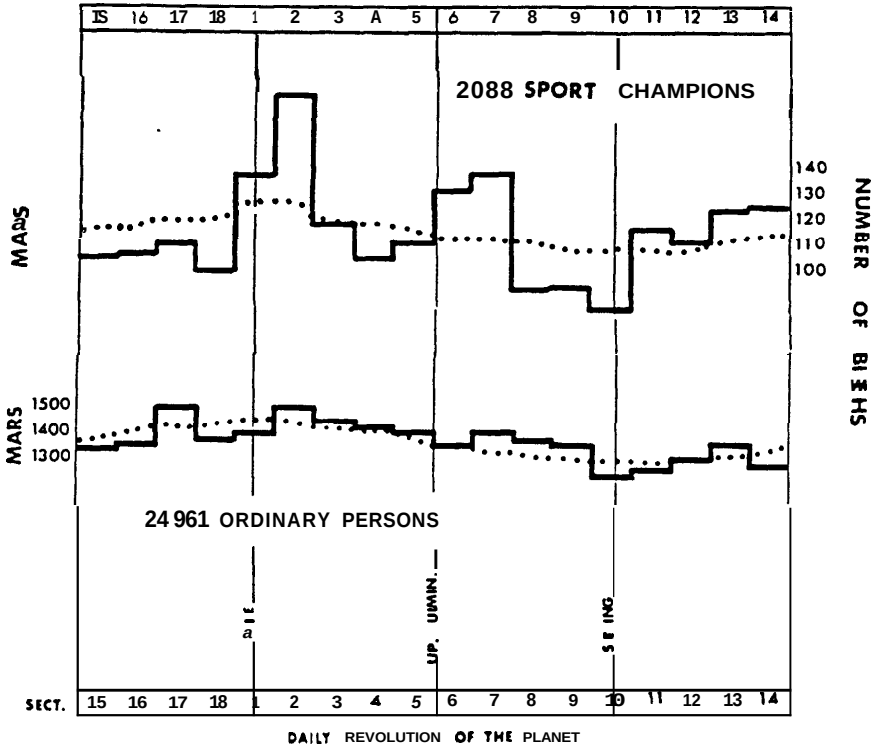

Fig. 2. Mars' distribution in 18 sectors for 2,088 sports champions (top) and 24,961 ordinary persons (bottom). Solid line: observed frequencies; dotted line: expected frequencies. Sports Champions were born significantly more often after the rise and the upper culmination of Mars; ordinary persons were not (from Gauquelin, 1972).

3. *The Eminence Effect*

Another fundamental finding discussed, as early as in my first book of 1955 might be referred to as the "eminence effect." For example (Gauquelin, 1973), I stated, "It is essential that a certain measure of success be achieved, that a certain threshold of fame be reached before positive results can be observed. Moreover, the greater the heights reached by an individual in his chosen profession, the more likely he is to have been born in 'planetary conformity' with his peers." As a case in point, consider the athletes. Along with the material on 2,088 sports champions, I assembled 717 lesser known athletes who were born during the same period of time. This group is comprised primarily of Italian soccer players who had participated in First Division games ("calcio Italiano") but never played in the national league. For this population Mars was calculated to have been in sectors 1 and 4, at birth, 124 times instead of 121.2 theoretically expected, and extremely close fit to the latter value. Athletes then who are not actually of champion caliber, even professionals like the Italian soccer team, cannot be distin-

guished from ordinary individuals insofar as the Mars phenomenon is concerned (Gauquelin, 1960, 1988). In another replication I arrived at the same type of result: The Mars effect in a newly identified group of athletes who had attained fame; and no effect whatever in a group of lesser known athletes who were otherwise comparable and whose records were obtained at the same time (Gauquelin, 1979).

Similarly, there have been only nonsignificant findings for lower ranking military, less distinguished scientists, "minor artists," and for actors and politicians not enjoying a major reputation. (Relevent details are given—in French—by Gauquelin, 1955, 1960; more recently in English, 1973, 1988.)

It is worth stressing that the "eminence effect" in particular is prone to raise suspicions. The criteria employed in distinguishing the "famous" from "nonfamous" professionals might be subject to biases on my part even though the procedures are well documented in my publications. As a case in point, my selection of famous athletes has been put in question (Kurtz, Zelen, & Abell, 1980). It is therefore a very positive step that Professor Ertel of Gottingen University (West Germany) has recently taken by a thorough examination of the "eminence effect." His results tend to confirm its reality. I am most grateful to this colleague for his efforts toward resolving that crucial and controversial issue (Ertel, 1987, 1988).

4. Meaningful Structure of Overall Results

Another important feature of the findings lies in the fact that the "profession versus planet" relationships are not scattered about in some "anarchic" fashion, as it were, but exhibit an internal or underlying "structure" that must be taken into consideration for a proper understanding of these results. (The existence of such a structure has been independently demonstrated by Ertel, 1986.) Figure 3 gives an overview of what is meant here by structure of results. Intuitively "similar" professions or activities tend to manifest comparable planetary arrangements as well. "Antagonistic" professions tend to have opposing planetary arrangements. For example, the "artists" can be contrasted with the "scientists"; scientists here are physicians, physicists, astronomers, chemists, and so forth. As a group, they tend to be born when Mars, or Saturn, had just risen or culminated. The artists comprise painters, musicians, actors and, to an extent, writers. As a group the eventual artists tend *not* to be born when Mars or Saturn are in the positions noted. Other traditionally antagonistic groups are soldiers and musicians, respectively. In our statistics, there are no other distributions of Mars so distinctly opposed as those of soldiers and musicians. On the other hand, there are professional populations which are mutually compatible in our sense. Such is the case with sports champions and soldiers. Consider that, in every area, sports has served in a somewhat preparatory function for war: Boxing, javelin throw, and archery remain popular evidence of the connection to this day. Now we find that champion athletes and soldiers are born under the same conditions

of Mars' progression as well. Similarly, actors and politicians, both of whom function in a "representing" capacity and make headlines particularly often, tend to exhibit much the same, in this case Jovian birth schedules. Such a patterning of the results does seem to be meaningful although hardly transparent. In fact, it is necessary to examine the mentalities behind the simple occupation labels.

There is an interrelationship between personality and success. Many psychologists have made note of this connection. Character is an important part of success, and every profession has a typical psychological profile.

It would therefore, be fruitful to search for a connection between planetary position and personality traits which are typical of successful people. We know that folklore has Mars associated with energy and war. Folklore also associates Jupiter with extroversion. Such a correlation then would not surprise the believers of traditional astrology. On the other hand, I "wanted to prove scientifically that the true correlation lay not in the relation between planet and profession, but in the relation between planet and personality; and I also needed to find a scientific way of describing these planetary personality factors. To achieve this twofold goal, I intended using biographies of the outstanding professional people, from whom I had already collected all the birth and planetary position" (Gauquelin, 1983). I called

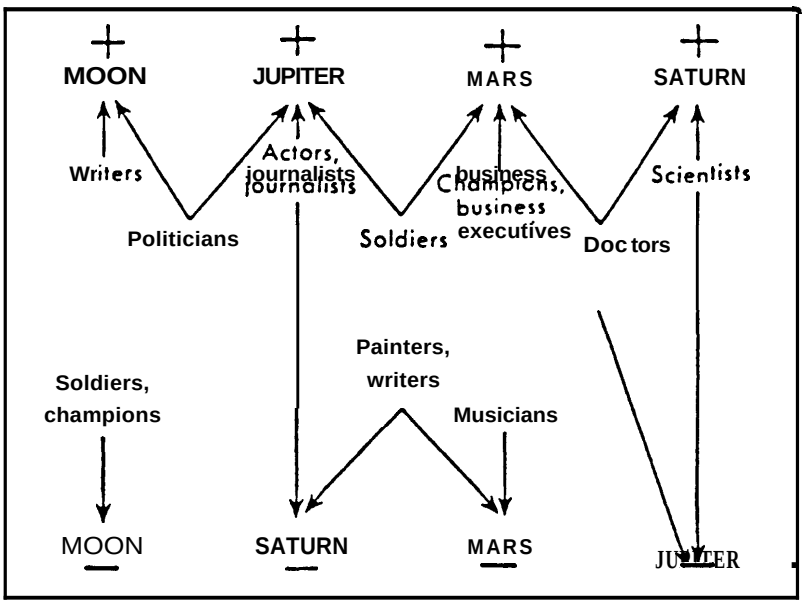

Fig. 3. Structure of the planet ≠ profession results. Plus signs (+): *maximum* incidence of births in the sectors after rise and culmination. Minus signs (–): *minimum* incidence of birth in those sectors. Arrows depict the characteristic bonds observed between professions and planets, respectively (from Gauquelin, 1955, 1973, 1988).

the methodology which I gradually developed from 1967 on, the "character trait method."

It is not the purpose of the present article to describe this method and its results. That would necessitate a separate paper. Suffice it to say that a 10-year study enabled us to create a catalogue or inventory of more than 50,000 personality trait units, specified item by item in our *Psychological Monograph Series* (Gauquelin, 1973–1977). The analysis based on this material reveals that the correlations between planets and personality traits exceed in strength these between planets and professions (Gauquelin, 1972, 1975, 1980, 1983; Gauquelin et al., 1979, 1981).

Response of the Scientific Community and Control Studies

Two general questions could be raised concerning my work: First, is the methodology sound? Second, do the results replicate? Over the years, and with few exceptions, control studies centered on the much-discussed Mars effect at the birth of champions athletes. Let me pursue this topic further in what follows.

Birth Data

These data have been scutinized several times, since the files of my laboratory are open to inspection. The observers concerned were apparently satisfied. Let me quote:

—Professors Abell, Kurtz, and Zelen: "One of us (Kurtz) did spot-check the data Gauquelin presented for the champions . . . Kurtz found that Gauquelin's files were meticulous and well organized, and on June 24, 1977 Gauquelin and Kurtz signed a statement to the effect that the files had been examined and found in good order" (Abell, Kurtz, & Zelen, 1983).

—Dr. Geoffrey Dean: "I personally visited Gauquelin's laboratory in Paris for a couple of days in 1981 and again in 1983 and was most impressed by the excellence and organisation of his records" (Dean, 1987).

—Professor Suitbert Ertel: "The author spent three days and nights in the Paris laboratory. Gauquelin was absent about half the time. *All* data files were accessible. Additional files were looked for in Gauquelin's absence, as he himself might not have recalled the location of everything at the moment. (None were found.) Circumstances are regarded as sufficiently conducive to discovering fraud or bias if something of the sort had occurred" (Ertel, 1987).

Note that data on groups other than sports champions have been submitted to scientific scrutiny as well. For instance, Professor Arno Miiller of Saarland University (West Germany) carefully checked our records of German physicians. He wrote directly to the original registry offices, once again requesting the birth times in question. According to his results (the evident precision of the match) the possibility of fraud on my part—that is, a "manufacturing" of records-can be ruled out (Miiller, 1986).

Computation of Parameters

The results released until 1972 were based upon planetary positions calculated manually since computers were not then available to me. Under the circumstances, of course, mistakes would be all too easy to make. Was I, then making such mistakes? In fact there have been several independent checks of such a possibility.

The Belgian Para Committee carried out computer checks of my (hand) calculations for their independently selected 535 champion athletes (see below); and "was unable to discover any mistake or error in Gauquelin's calculations nor [sic] the results he claimed" (De Marré, Comité Para member, 1982).

An American astronomer, Owen Gingerich, had my Mars calculations spot-checked for about 2,000 of the 16,756 nonchampion controls in the Zelen test (discussed later); and "no discrepancy was found" (Abell, Kurtz, & Zelen, 1983).

In 1980, Professor Abell, with the assistance of Albert Lee, calculated the Mars sector positions for our experimental population of 2,088 sports champions. Their finding was that "we differ from you only slightly, and the Mars effect clearly shows up on both sets of data" (Abell, 1980).

This suggests that, if I did make any errors, those are not major and cannot really affect the results. I recently carried out a complete check of my hand calculations on computer and again found no appreciable discrepancies (Gauquelin, 1984).

Expected Frequencies

Some critics have claimed that my results, the Mars effect in particular, merely reflect some astronomical or demographic artifact (e.g., Jerome, 1973). However, independent assessments of this issue, too, have taken place over the years at the hands of a number of investigators. These can be divided into theoretical analysis and empirical tests, respectively.

Two skeptics reviewed my methodology from a theoretical perspective:

—Dr. Jean Porte, Administrator at the Institut National de la Statistique et des Études Economiques (INSEE), Paris, carefully examined my approach to the problem for Mars and sports champions. He then stated, in his foreward to our methods volume, "I have looked for errors in the present work—and I have found none" (Porte, 1957).

—Twenty years later, a skeptical astronomer, Dennis Rawlins, wrote a memorandum in which he discussed the chief methodological objection to the Mars effect, that is, the demographic problem. Rawlins called it "the dawn factor" problem. Rawlins then rejects that objection on the grounds of astronomical and mathematical arguments: ". . . therefore, one concludes that Gauquelin has made fair allowance for the effect under investigation" (Rawlins, 1978).

Of course, all our tests and assumptions about the expected frequencies did have an empirical basis to begin with. Skeptics were generally unaware of my own numerous checks and controls, or else—understandably—they were not persuaded by those. They wanted to carry out control studies of their own and with their own procedures. It is here that the Para Committee's experiment and the Zelen test came into being.

Para Committee Replication

The Belgian Committee for the Scientific Investigation of Alleged Paranormal Phenomena (Para Committee) is composed of scientists including astronomers, demographers, and statisticians. This committee is extremely skeptical of, and strongly opposed to, the recognition of any paranormal phenomena. Unconvinced by my statistical documentations, the Committee decided to gather a new group of 535 sports champions; and in fact they obtained results quite similar to mine.

There have been many misunderstandings regarding the Para Committee's successful replication. Therefore, I would like to reproduce here the table published in the Committee's own report (Para Committee, 1976) (Table 3).

The Mars distribution observed for the new sample of the Committee's 535 champions is associated with a value for χ^2 of 26.66 which, with 11 degrees of freedom, is significant at the .01 level.* The Committee's report furthermore contains this unequivocal statement:

The distribution of the actual frequencies of Mars is far from uniform: They display the same general pattern found by M. M. Gauquelin with samples of other sports champions, the main characteristics being a clear predominance in sector "1" (rising) above all the others. The Comité therefore gives its agreement on this point with the results of M. M. Gauquelin. (Para Committee, 1976, p. 331)

The Para Committee was, of course, greatly surprised at their own result. Jean Dath, a professor of engineering at the École Royale Militaire of Brussels, and Jean Dommanget, astronomer at the Brussels Royal Observatory, both of whom had worked actively on the project, subsequently began to question my methods even though they had agreed with those six years earlier. A discussion ensued regarding the calculation of expected frequencies; according to the Para Committee, a more adequate procedure would eventually reveal a fault or artifact—likely of demographic origin—such that the Mars effect could be accounted for by some "normal" cause. To its credit the Para Committee then undertook several counter experiments. The most significant of those is described in what follows.

*** It is worth stressing that this is a result that has actually been weakened by the Committee's format of a complete 12-sector breakdown. In view of the predictions made ahead of time it would have been technically preferable to test the significance of the observed frequencies in key sectors 1 and 4 (pooled) against the *sum total* of the other 10 (and df = 1).**

TABLE 3
Para Committee replication. Mars' distribution at the birth of 535 sports champions

Classe (i)	Fréquence observée $f^{o}_{(i)}$	*Fréquence calculée* $f^{th}_{(i)}$	$\Delta f = f^{o}_{(i)} - f^{th}_{(i)}$	$\frac{(\Delta f)^2}{f^{th}_{(i)}}$
1	68	47,7	+20,3	8,64
2	47	46,9	+0,1	0,00
3	36	45,3	−9,3	1,91
4	51	44,0	+7,0	1,11
5	36	43,2	−7,2	1,20
6	30	42,7	−12,7	3,78
7	36	41,6	−5,6	0,75
8	50	42,2	+7,8	1,44
9	53	43,7	+9,3	1,98
10	54	45,2	+8,8	1,71
11	40	46,2	−6,2	0,83
12	34	46,4	−12,4	3,31
Total:	535	535,1		$26,66 = x^2$

Reproduction of Table 1 from the Para Committee report. Legend/translation, from left to right: 1st column: Classe = Sector, 2nd column: Fréquence observée = Observed frequency; 3rd column: Fréquence calculée = Expected frequency; 4th column: difference between observed and expected frequency; 5th column: square of the difference divided by expected frequency. For comments, see text (from Para Committee, 1976, p. 330).

Para Committee Counter-Experiment

A crucial test for evaluating hypothetical demographic or astronomical biases is to create a distribution of births which corresponds statistically to that of the champions' (i.e., the same year, month, day, place, and time of birth); but "shuffling" (systematically rearranged) the ***hours*** of birth: Each champion would keep, as it were, his actual birth date and place, but would be assigned the birth hour of, for example, the athlete preceding him in the alphabet. Exactly the same demographic and astronomical conditions, therefore, pertain to the group thus constituted as to the champions' population with its factual birth hours.

The Para Committee repeated this procedure nine times, each time systematically shifting the birth hours by a predetermined number of (alphabetical) steps. For example, in the first test, champion No. 4 keeps his real birth ***date*** and ***place*** but "receives" the birth ***hour*** of champion No. 3; and so forth for the others. In the second, champion No. 4 is assigned the birth hour of champion No. 2, No. 3 the one actually identified with No. 1; and so forth. In the third test, No. 4 receives the birth hour of No. 1, No. 3 now has that of No. 535; and continuing in this manner.

When the procedure is completed, the results are those shown in Table 4, which is taken from Dommanget (1970); *cf.* also Gauquelin (1972, 1982).

The distributions of Mars for the nine counter-experiments differ significantly from the distribution obtained with the real times of birth of the

champions. Our conclusion is accordingly, that the Mars effect, again replicated by the Para Committee, cannot be considered a (procedural) error or demographic artifact. Moreover, the values in Table 4, column $f_{1,9}$ are very close to the theoretical (expected) values I calculated by my methodology and which were previously used by the Para Committee itself (see Table 3, third column).

That was not, surprisingly enough, the final conclusion in the Para Committee's report. Actually, the Para Committee discarded the results of their own counter-experiments. According to their rationale, it is "impossible" to calculate any expected frequencies for Mars because the problem is too complex. Without being more specific the report claims that I surely must have made some methodological mistake somewhere. Now it was the merit of the Zelen test to clarify the situation.

The Zelen Test

Professor Marvin Zelen of the Department of Biostatistics, Harvard University, suggested another experiment, later known generally as the "Zelen test" (Zelen, 1976). In Zelen's view that experiment should either prove or disprove the existence of the Mars effect. His rationale was as follows:

TABLE 4
Para Committee's counter-experiment for sports champions

	Classement **Alphabétique**										
cl	f_0	f_1	f_2	f_3	f_4	f_5	f_6	f_7	f_8	f_9	$f_{1,9}$
1	68	45	55	44	44	56	38	47	50	40	46,6
2	47	50	43	38	46	37	52	49	45	56	46,2
3	36	46	47	52	46	43	45	51	45	42	46,3
4	51	58	44	50	45	54	49	32	53	42	47,4
5	36	35	42	40	42	31	54	44	44	50	42,4
6	30	38	35	50	41	41	31	43	43	46	40,9
7	36	31	48	34	37	44	33	50	37	36	38,9
8	51	36	34	40	52	46	40	44	50	39	42,3
9	53	48	51	52	48	51	46	38	42	40	46,2
10	53	48	45	48	38	40	53	53	40	39	44,9
11	40	54	48	34	49	46	49	42	37	41	44,4
12	34	46	43	53	47	46	45	42	49	64	48,3
	χ^2	33,0	24,9	36,1	32,2	21,6	40,8	43,1	25,8	60,4	25,4
	p	—	0,8%	—	—	3%	—	—	0,6%	—	0,7%

Explanations and comments: **"Classement alphabétique"** is alphabetical order. From left to right: *cl* = Mars sectors; f_0 = actual distribution of Mars at the birth of the champions; f_1 through f_9 = distributions for the nine counter-experiments; $f_{1,9}$ = means of the nine counter-experiments, by Mars sector. The bottom rows marked χ^2 and p designate the chi-square statistic and its probability under the null hypothesis, respectively. Values are obtained by comparing the actual distribution, f_0, with the respective distribution of each counter-experiment, $f_1, f_2, \ldots, f_9$. All nine differences are significant: Those between f_0 and f_1, f_3, f_4, f_6, f_7, and f_9 are significant at $p < .001$. The remainder range from $p < .05$ to $p < .01$. The overall comparison between f_0 and $f_{1,9}$ (last column) yields $p < .01$ (after Dommanget, 1970).

Supposing the Mars configuration at the birth of champions is nothing but the consequence of an artifact, then all nonchampions born on the same day and in the same place as the former ought to exhibit the same phenomenon —that is, they, too, should have been born more frequently at the rise and culmination of the planet (the "key sectors"). One merely needed to contact the registry offices of the birth places of the champions and request the hour of birth of everyone born on the same date and thus under identical astronomical and demographic conditions as those. Calculations of the positions of Mars at the hour of these additional births would yield the answer desired.

I agree to carry out the test under the close supervision of Zelen, Kurtz and Abell, managing to gather 16,756 birth hours of nonchampions born in the same week (i.e., ±3 days of the target date) and in the same places as 303 sports champions. The latter were drawn from the total of 2,088, using an objective procedure of which Zelen had been apprised beforehand.*

I then sent photocopies of all birth records received from the registries to Paul Kurtz, chairman of the Committee for the Scientific Investigation of Claims of the Paranormal (CSICOP). Results of the test were published (Gauquelin, 1977). They provide an unequivocal answer within the framework of Zelen's reasoning: It is that Mars occupies "key sectors" significantly more frequently at the champions' births than is noted for the large number of other individuals, whose births occurred on the very same days and in the same places as the former. Table 5, reproduced from the Zelen test report, gives the main empirical evidence in a numerical format; Figure 4 is a graphic analog of this Table (when rotated 90° clockwise).

Eventually, the three CSICOP members involved in the Mars control studies, Professors Abell, Kurtz, and Zelen, would acknowledge that ". . . Gauquelin adequately allowed for demographic and astronomical factors in predicting the expected distribution of Mars sectors for birth times in the general population" (Abell, Kurtz, & Zelen, 1983).

Discussion

What is the present status of the Mars effect? In its favor are the considerable statistical significance, the satisfactory checks of the procedures, the independent replication by the Para Committee, and the results of the Zelen test. So then, is there really a Mars effect?

It is only fair at this point to mention that Kurtz, Zelen, and Abell conducted still another study on a fresh sample of 409 (U.S.) athletes, this time with negative outcome (Kurtz, Zelen, & Abell, 1979/1980). Personally, I do not consider this finding a real setback since the investigators failed to take the factor of eminence into adequate account: This factor, however, is

* "Michel Gauquelin had long before sent him (Zelen) three detailed descriptions of the sampling procedure which were entirely straightforward and barred Gauquelin himself from influencing the data" (Professor Richard Kammann, 1982).

TABLE 5
Results of the Zelen test

Each of the Seven Days Taken Separately						
	Nonchampions		Champions			
Day	N Number of Births	k Mars in Key Sectors	n Number of Births	y Mars in Key Sectors	P' 303 (k/N)	CR
−3 days	2,302	347	—	—	46	3.2
−2 days	2,354	382	—	—	49	2.7
−1 day	2,485	436	—	—	53	2.0
0 day	2,341	373	303	66	48	2.8
+1 day	2,460	422	—	—	52	2.1
+2 days	2,449	395	—	—	49	2.7
+3 days	2,365	390	—	—	50	2.5

Comments: For each of the seven days centering on the champion's birth the observed frequency of Mars for champions (=66; column y) is significantly higher than the expected (empirical) figures for the nonchampions. The latter are listed in column p' and range from 46 to 53. The probability under the null hypothesis, of the difference between 66 and each of the expected frequencies (46, 49, etc.) can be determined by way of the respective critical ratios (CR). The seven values of CR (last column) correspond to *p*-levels ranging from .002 to .05, two-tailed. The outcome for "0 *day,*" the champions' exact birthdate, is most interesting in the context: The appearance of Mars in key sectors exceeds the expected one to a particularly remarkable extent. The "expected value is of course based on the nonchampions born in the same locale and on the same day. The likelihood of that difference under a hypothesis of "no effect" is less than .006. The overall results would seem to be the best confirmation that methodological errors cannot explain the Mars effect (from Gauquelin, 1977).

of paramount importance in the phenomenon at issue. Kurtz, Zelen, and Abell have maintained, on the other hand, that their sample does represent successful athletes sufficiently well. Professor Ertel on his part recently demonstrated that in the U.S. sample too many lower ranking athletes were aggregated with two few exemplary ones. He also showed that the more renowned those American Subjects, the more prominent also the Mars effect (Ertel, 1987).

Consequently, I believe that the U.S. study, too—although of limited significance in itself—tends to substantiate the Mars effect for outstanding champions (Gauquelin, 1979/1980). This assessment is shared by reviewers of the American tests (Curry, 1982; Eysenck, 1983).

May I conclude by saying how well I understand the skepticism of scientific investigators confronted with a claim like the Mars effect? I myself cannot but agree with the late astronomer, George Abell, as he wrote in his foreword to my ***Dreams and Illusions of Astrology*** (Gauquelin, 1979):

To be honest, I am highly skeptical of Gauquelin's findings and his hypothesis. The main reason is I cannot imagine a mechanism whereby the effect can be produced.

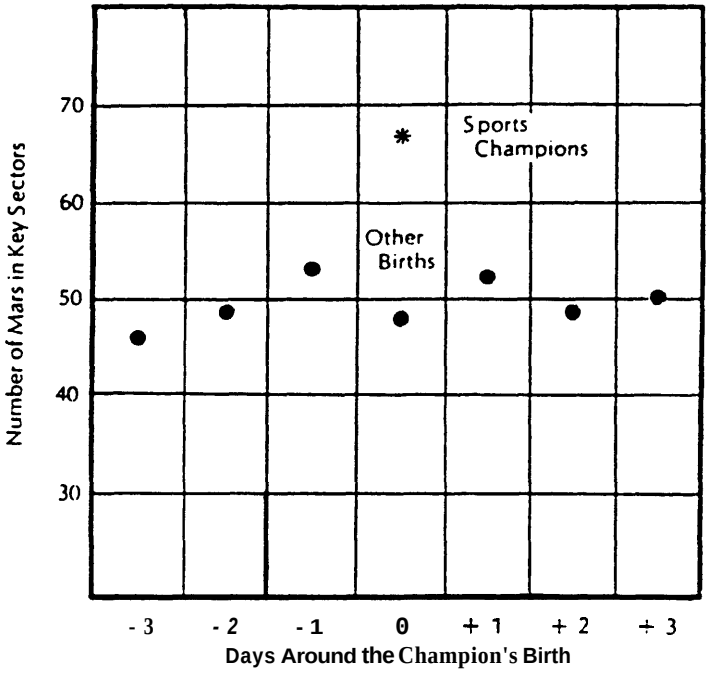

Fig. 4. Zelen test. Mars in key sectors for sports champions versus other births. The observed frequency (= "number*" in graph) of sports champions' births with Mars in key sector (*) is significantly higher than the expected number calculated from nonsports champions born in the same places, relative to each of the ±3 days considered (from Gauquelin, 1977).

However, I do not know that the effect is not there; my skepticism cannot be considered closed-mindedness, any more than a gullible acceptance of astrology should be regarded as open-mindedness. If the planetary effects suggested by Gauquelin are real, then his discovery is of profound importance. Consequently, I think the Gauquelin evidence, based on a great mass of data collected over many years, deserves to be checked out. (Abell, 1979)

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