2. We have not deleted females from the U.S. test because they are not being compared with nonchampions. In the U.S. study there are 9 female sports champions, with one born in a key sector. If the women were deleted, it would not affect the results significantly.

3. One champion, Louis Groza, was inadvertently omitted from the first sample because of confusion with his brother Alex Groza; but he was added later, making a total of 341 from the *Lincoln Library*.

Report on the U.S. Test of the Gauquelins' "Mars Effect"

Dennis Rawlins

In his analysis of 2,088 European sports champions, Michel Gauquelin found that Mars appeared in a specified pair of his 12 celestial "sectors" (1 and 4) at the birth of about 22 percent (more exactly, 21.65 percent) of the sample, instead of the theoretical expectation of 17 percent (about 2 in 12; more exactly, 17.17 percent).[1]

The odds against this occurring by chance are some millions to one. Unlike Zelen, Kurtz, and Abell in their paper in the November/December 1977 *Humanist*,[2] I do not doubt the rates, analysis, or odds. Indeed, in a March 1977 memorandum, I established that Gauquelin had taken proper account of astronomical-demographic influences (they are minor, anyway—see Appendix), about which some question had been raised by CSICOP and the Comité Para.

However, because there could have been unknown problems with the European sampling (on which all previous CSICOP studies have been based), it was deemed desirable to see whether Gauquelin's prediction of 22 percent success could be verified with a fresh sample.

In 1977-78, Kurtz and aides gathered a sample of star U.S. sportsmen, of a size proportionally comparable (in depth) to the European one. The birth data were available for only 407.[2a] However, this number proved quite sufficient to test the hypothesis.

Because I had already expressed myself strongly on the subject of Gauquelin, I asked to have nothing whatever to do with the choice of a new sample.[3] However, after a while, I was retained by CSICOP to calculate

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celestial positions (a strictly computational labor, happily not subject to statistical bias or predisposition).

Incidental note: Gauquelin's method (faithfully adhered to in this experiment) of dividing the sky into 12 sectors happens to be identical to the division into 12 mundane "houses" of a horoscope (except that Gauquelin numbers in reverse order—e.g., his favorite sectors, 1 and 4, correspond to mundane houses 12 and 9, respectively). I might also note that traditionally (at least since Ptolemy's *Tetrabiblos*, 18 centuries ago), the two most significant points of astrologers' house division are the Ascendant ("oroscopos") and the Midheaven. The east bound of Gauquelin's sector 1 is the Ascendant, and the east bound of his sector 4 is the Midheaven.[4]

I mention such peripheral points only because it has been stated that Gauquelin's results have nothing to do with traditional astrology!

A person sympathetic to astrology (and who was not told the nature of the test—or even that Gauquelin was involved) was hired to determine, for each birth, the correct time-zone and whether Standard or Daylight time obtained.

To assist in placing the results in context, I arranged my computer program to yield, for each birth, the sectors of all planets, and the sun and the moon. The results are displayed in Table 1.

Table 1
Scores for Each Sector, for All 10 "Planets" for the U.S. Test, 407 Sports Champions

Sector:	1	2	3	4	5	6	7	8	9	10	11	12
"Planet":												
Sun	36	36	40	33	29	23	27	28	35	34	43	43
Mercury	43	34	38	31	30	25	24	30	34	36	38	44
Venus	41	40	37	41	24	21	27	30	36	35	35	40
Moon	30	33	36	36	39	37	30	35	31	28	32	40
Mars	*30*	39	35	*25*	33	22	39	37	29	47	36	35
Jupiter	32	40	41	31	32	28	38	32	36	36	29	32
Saturn	34	35	41	32	35	37	36	32	43	29	25	28
Uranus	33	33	33	44	46	41	28	34	33	24	26	32
Neptune	47	42	39	34	33	28	32	23	36	29	30	34
Pluto	53	34	54	37	50	34	20	26	27	16	31	25

Using for each sector the theoretical probability 1/12 (very close to what might be obtained by more refined methods; see Appendix) for the likelihood that Mars was in any given sector at the moment of an athlete's birth, we expect to find about 34 ± 6 in each sector ($407/12 \doteq 34$ and $(407 \cdot 11)^{1/2}/12 \doteq 6$).

That is, according to the bell-shaped (Gaussian) curve, about 68 percent of the sector-counts in Table I should be in the range 28 to 40, and about 95 percent should fall in a range twice as broad (99.7 percent in thrice the first range).

Excluding the slow-moving outer three planets (Uranus, Neptune, and Pluto—where sectors 1 through 6 averaged overlarge counts, due to astronomical factors that exercised a particularly strong effect on the Pluto data, as is readily seen in Table 1), we find a near-perfect Gaussian fit—indicating that all the scores are virtually chance (see Appendix). Thus the experiment fails to verify Gauquelin's neo-astrological hypothesis.

If we examine the Mars results in particular, we find that the highest sector-score is that of sector 10 (47 hits). Gauquelin's specified sectors received only 30 hits (sector 1) and 25 (sector 4), for a two-sector total of 55. This is distinctly (but not significantly) below chance expectation (67.8 ± 7.5 for a pair of sectors).

By a coincidence that (from Gauquelin's viewpoint) is rather perverse, the sector 1 and sector 4 scores both represent sharp relative *minima* in relation to the adjacent sector-counts—the very opposite of the European findings (see Gauquelin's graphs, e.g., *Humanist*, Jan./Feb. 1976, p. 31).

Beyond testing the specified hypothesis: the Mars scores' chi-square indicates a probability of about 0.2, not significant. This is of some additional interest in connection with the strange assertion (*Objections to Astrology*, pp. 58-60) that one ought to use an "empirical" standard-deviation instead of a theoretical (a priori) one in such analyses. The chi-square test shows that an empirically derived standard-deviation does not convincingly supplant the theoretical value. (And, if it did, this could be confirmatory, not negative, regarding astrology.)

While our experiment clearly does not support Gauquelin, the question remains: How strongly does the test on such a modest sample *dis*qualify his hypothesis? The answer is surprisingly firm.

Gauquelin predicts 21.65 percent success—i.e., 88.1 ± 8.3 out of 407. The actual (sector 1 plus sector 4) score, $30 + 25 = 55$, is only 13½ percent of 407. (This ought finally to dispose of the expectation of the 1976-77 Zelen, Kurtz, and Abell study that 22 percent, not 17 percent, was the true theoretical expectation level, and thus that Gauquelin's European results represented nothing out of the ordinary.) Since 55 is 33.1 below the score predicted (88.1) by Gauquelin for sectors 1 and 4, the normalized deviation (33.1/8.3) is nearly 4, which corresponds to odds of over 10,000 to 1 against our test results occurring[4a]—*if* Gauquelin's "Mars effect" were real.

Since independent data show Gauquelin's neo-astrology to be this unlikely, one is left wondering: How has Gauquelin been able to publish study after year, confirming his theories, at highly

significant levels, often corresponding to odds of millions to one? I leave the solution of this mystery to future researchers and/or the reader's imagination.

Gauquelin himself once suggested that changing birth-techniques explain away the failure of entirely independent testing to replicate his work (a fate it shares with all other astrological claims). I will close by quoting from my 1977 prediction (*SI*, Fall/Winter 1977, p. 82): "If subsequent retestings fail to confirm Gauquelin's theories, can he not... say, 'My observations [only] concern births occurring in Western Europe before 1945.' "[5] As I commented then: "Curious parochialism from the author of *The Cosmic Clocks*."

Postscript: I would urge our Committee henceforth to take the precaution before embarking on another extensive attempt at replication of an alleged paranormal experiment to request formally: (a) that the claimant's loopholes be provided us in advance; (b) that a leading apt occult organization back the claim's validity; (c) that post-test judging be performed by competent, neutral third-party referees.

Note added October 8, 1979: These computations and analyses were done in 1978 (long before the other papers appearing here). I have only just been informed that a 408th subject (L. Groza) was later added to the final sample. Considering its trivial effect on the results, I have not bothered refiguring all the earlier work at the last prepublication minute.

Finally, I wish to add these comments:

All the other papers here make excellent points while criticizing each other for post hoc sample-splitting ploys—when they like the data. But then they all turn right around and themselves use those very same condemned sample-chopping tactics—when faced with test results that were not in accord with their expectations.

Ironically, Gauquelin's crème-de-la-crème alibi plays right into my original suggestion (*SI*, Fall/Winter 1977, p. 82; *SI*, Winter 1978, pp. 72-73) that the best test of Gauquelin's Mars effect would be to see if he could use this mundane-horoscopic discovery's assistance to beat bookmakers' odds on sports events. Such a simple, predictive experiment would evade all of the ambiguities and suspicions that have clouded and wasted so much previous labor and research in this area.

Further commentary on the issues raised in this paper and in these notes is available from the author.

Acknowledgments: For assistance in this work, I thank Mary D. Kidd, Mart Peep, John Schopp, Mary Frances Sodaro, Fred Talbert, and Lorraine Clayton. However, I am entirely responsible for the accuracy of

the experiment (beyond the point of the state birth-registries' return of the requested raw data to CSICOP).

Appendix

In the discussion above, the expectation score for sector 1 plus sector 4 is found simply by multiplying 2/12 times the sample-size: $(2/12 \cdot 407 = 67.8 \doteq 68$ hits expected.

However, if we include astronomical-demographic influences, the expectation number of hits for sector 1 plus sector 4 is about 69 instead of 68. (In sector 1, it is 36 instead of 34; in sector 4, 33 instead of 34.) This modest effect is what some CSICOP and Comité Para critics of Gauquelin have been obsessed with for so long—without ever bothering actually to calculate its magnitude.

The effect (inclusion of which only makes Gauquelin's case a little worse)[6] is computed by combining[7] (a) astronomy and (b) demography. The first, (a), is the planet's tendency to be near the sun more often than not. The second, (b), is the daily birth curve. This is the variation of the birthrate with hour, or—roughly speaking—the birthrate variation as the sun revolves daily through the sectors of the sky. One may see from the sun data of Table 1 that this variation has an amplitude of about 20 percent.

In this connection, there is a serious problem with Gauquelin's reflex protest that the U.S. replication-failure is explained by different birth methods' upsetting the diurnal rhythm, thus "masking" the alleged Mars effect here. A comparison of his European daily birth curve (Gauquelin, *Birth and Planetary Data*, Ser. C, v. I, p. 50) shows a pattern noticeably similar to the U.S. curve (approximately given by the sector-counts for the sun in Table 1, above): an amplitude of about 15-20 percent, the high around sunrise, the low about sunset.[8] And so, for the U.S. test, the expectation curve is also similar to Gauquelin's European one (ibid., p. 80, or *SI*, Winter 1978, p. 71): phase same as birth-curve's (high near sunrise, low near sunset), amplitude about one-third as high, namely, about 5 to 7 percent. For example, 6 percent of $34 \doteq 2$; so sector 1 expectation $\doteq 34 + 2 = 36$.

If birth procedures are supposed to be so different here that they suppress the Mars effect in the United States, then why are these curves so similar here and in Europe?

Notes

1. The slight difference (17.17% - 2/12 = 0.5% is due to Gauquelin's careful accounting for the small astronomical-demographic influences inherent in the problem (see Appendix).

2. Two years after its publication, this paper's authors have still not answered my repeated questions about it. For example, why collect (and have Gauquelin laboriously compute) control data on more than 16,000 nonchampions associated with 303 of the old (1960s) 2,088 champions data—and then reject Gauquelin because (as was known in advance) the smallness of the old-data subsample (303) did not in itself permit very firm conclusions regarding the already well-established 22% rate (as did all 2,088)? The plain fact is that Zelen, Kurtz, and Abell proposed their challenge (*Humanist*, Jan./Feb. 1976; and Sept./Oct. 1976) in confident expectation that 16,000-plus control data would deflate Gauquelin's champion claims by also exhibiting a 22% rate (Mars in sectors 1 and 4). The actual 17% outcome was thus a clear success for Gauquelin and should have been openly reported as such.

2a. A 408th name was added later (see my "Note added October 8, 1979" in this paper.

3. I vainly urged that the rest of CSICOP also stay out of sampling, as a matter of policy. However, since some have expressed suspicions regarding the fairness in this instance, I am bound to state that I (more than anyone) can vouch for the fact that Kurtz's selection was unbiased. To fudge the sample, one must correctly pre-compute celestial sector positions, but Kurtz, Zelen, and Abell never did accomplish this before the samples were finally turned over to me and the solutions given to them.

4. The probability is only 1 in 33 of one's happening by pure chance to choose such a pair of sectors consistently (i.e., both angular or both cadent) and contiguous to these two astrological bigpoints. This strongly indicates that Gauquelin has not simply tried a lot of different houses and then picked out (a posteriori) those with the best scores. His other planet-profession studies have also found sectors 1 and 4 to have the most nonrandom scores.

4a. The CRC tables (e.g., *CRC Handbook of Mathematical Tables*, 1975 ed., p. 933) have for decades listed 1 in 15,773 probability (odds 15,772 to 1) for 4 or more standard deviations, two tailed. Since 15,773 is merely the inverse of a three-significant-digit figure (6.34×10^{-5}, also given in CRC), it is expressed too exactly. (Same for nearby data in same column.)

5. Likewise, the failure to replicate Gauquelin's European results for post-1945 is excused: "As the 'natural' diurnal rhythm of delivery is disappearing, so too is the planetary effect. Modern medical practices are replacing the cosmic environment and masking its role" (Gauquelin, 1973 self-quoted by him in *SI*, Winter 1978).

6. The total deviation (sector 1 plus sector 4) is now 55 - 69 = -14. This is pretty close to astro-missing (see *SI*, Fall/Winter 1977, pp. 80-81). We also find that the chi-square test probability is now nearer 0.3, no significance whatever.

7. Mathematical details available from author.

8. Besides the sun and Mars, one may discern variations with the same phase (high near sunrise, low near sunset), though with different amplitude, in the Table 1 data for Mercury and Venus, and for the same reasons as Mars—solar proximity (see (a) and (b) in my Appendix). Note that at sunrise the sun moves from sector 12 to sector 1; at sunset, from sector 6 to sector 7.

Star U.S. Sportsmen Display the Mars Effect

A comment on the Kurtz-Zelen-Abell experiment

Michel and Françoise Gauquelin

It has been found that famous European sports champions tend to be born more often than nonsports figures when Mars is in its rising or culminating

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sector (i.e., sectors number 1 and 4 of Mars's diurnal movement divided into 12 parts). These sectors were called "key sectors" by Marvin Zelen (*Humanist*, Jan./Feb. 1976). The Mars effect was first observed by us and was then clearly replicated by the Comité Para of Belgium.

In order to test the Mars effect on U.S. athletes, Kurtz, Zelen, and Abell selected a sample of 408 sportsmen. The necessary celestial calculations were computed by Dennis Rawlins. In their report of the results of this test, Kurtz, Zelen, and Abell write: "Our analysis of American sports champions shows no evidence of the Mars effect"; and Rawlins concludes, "Our experiment clearly does not support Gauquelin." But our study of the Kurtz-Zelen-Abell experiment leads us to the opposite conclusion: The data on the "star U.S. sportsmen" (Rawlins *dixit*) strongly display the Mars effect.

Characteristics of the U.S. Sample

A scientific fact demands precise conditions of observation; when these conditions are not respected, the effect does not appear. In our scientific publications, we pointed out that the planetary effect on professionals only appears when the following conditions are observed: (1) the births are natural; and (2) the professionals are well-known people. We devoted an entire book to the demonstration that the intensity of the Mars effect is strongly related to the degree of fame and achievement of the champions (*Les Hommes et les Astres*, 1960). During a meeting in July of 1977, in Buffalo, with Professors Kurtz, Zelen, and Abell, M.G. therefore insisted, for reasons explained below, on the necessity that they not retain births after 1950 in their sample and that they select only names of great U.S. sports figures. Unfortunately, they encountered difficulties and could not fully respect these conditions.

1. *The births of the selected sports figures should be natural ones.* In the Kurtz-Zelen-Abell sample, most of the births were relatively recent (70 percent after 1930 and 10 percent after 1950). There is a presumption of medical intervention in recent births. However, the nychthemeral curve of the sample shows a majority of morning births over afternoon births. This indicates that a reasonable proportion of the births were natural ones; only the most recent ones, after 1950, remain dubious. Therefore, the lack of Mars effect underlined by Kurtz, Zelen, and Abell in their sample does not seem to result from an excess of medically induced births.

2. *The selected sports people should be the greatest names in the history of American sports.* This second condition is not respected; there are few "all-time great" names in the sample. For instance, *The World*

Almanac and Book of Facts 1978 lists 93 champions who were elected members of the Pro-Football Hall of Fame, but only 5 of them appear in the Kurtz-Zelen-Abell sample; 163 champions were elected to the National Baseball Hall of Fame, but only 3 of them appear in the sample; etc. The percentage of "star U.S. sportsmen" in the sample is thus low. However, a fundamental question can be investigated: Do the real sports stars of this sample display the Mars effect? The answer is, yes, they do, as we shall now demonstrate.

The First Selection Process

Let us give a brief account of how the Kurtz-Zelen-Abell experiment was actually conducted. There were two different stages. At first, they tried to follow my recommendations. During my visit to Buffalo on March 21, 1978, Paul Kurtz gave me a photocopied document indicating the references on which the first inquiry was based. I quote:

> First selection process of American sports champions:
>
> *Lincoln Library of Sports Champions*, 1974—Selected all American sports champions listed.
>
> *Who's Who in Football*, 1974, and *Who's Who in Basketball*, 1973—Selected only champions that were chosen for All-Star team.

The *Lincoln Library of Sports Champions* contains only well-known names, and the All-Star team seems also a good criterion. So we would have few objections to the first selection process, except that:

—the choice of athletes remains rather broad, since, according to Paul Kurtz, 605 athletes correspond to one of these criteria;

—I recommended that basketball players not be included, for they have given the most disappointing results in the European sample (actually, in the U.S. sample, the basketball players display the lowest Mars effect of all subgroups); and

—more disconcerting, when we carefully checked the above-named volumes of *Who's Who*, we found that the criterion of "All-Star team" had not been seriously followed. Paul Kurtz and his collaborators chose the most renowned champions from *Who's Who*, without following any definite criteria.[1]

Despite these points, the first selection process is very favorable to our hypothesis. The U.S. sports champions *born before 1950* display the Mars effect (20.3 percent are born with Mars in key sectors) like the European champions (21.6 percent). The effect is strongest for the few champions

TABLE I

The Mars Effect: Kurtz-Zelen-Abell's First Selection Versus Whole Sample

U.S. athletes of the first selection, born:	Observed number of key sector births	Expected number of key sector births*	Difference	Standard deviation	Probability†
Before and after 1950	25	17.25	= 7.75	3.86	0.05
Before 1950	24	15.91	= 8.09	3.71	0.04

* Calculated from the proportion of Mars positions in key sectors in the whole sample of 408 births.
†Significance level (two-sided test).

born before 1930 (27.3 percent), and weakest for the champions born after 1950, as we predicted. (In Appendix I, we give a list of the 128 names of this first selection process, with their Mars position in the 12 sectors.)

Following the statistical analysis used by Kurtz, Zelen, and Abell for judging the results of the Zelen test in their article "Is There a Mars Effect?" (*Humanist*, Nov./Dec. 1977), we can demonstrate that the athletes of the first selection display the Mars effect significantly more than the total sample of 408 cases and that the Mars effect increases, as predicted, if we remove the champions born after 1950 (see Table 1).

Figure 1 (upper curve) shows, for the athletes of the first selection, a distribution in the 12 Mars sectors that is very different from the distribution we would expect from chance. The Mars frequencies are above average not only after the rising and the culmination of the planet (sectors 1 and 4), but also after its setting and its lower culmination (sectors 7 and 10). Since our first researches, these four zones very often showed peaks, although the setting and the lower culmination were less regularly significant than the rising and culminating sectors (Gauquelin, *Les Hommes et les Astres*, 1960).

This replication, which is mentioned only briefly in Kurtz, Zelen, and Abell's paper, seems to support the Mars effect. But the sample is somewhat small—128 cases—because only 18 states were willing to provide the requested information and many records were not available for the hour of birth. Kurtz, Zelen and Abell rightly judged that the sample had to be enlarged. There were several ways to do this: by trying to persuade other states to deliver the birth information for other champions

of the first selection; if this was impossible, by gathering other top athletes in Europe, as Marvin Zelen had suggested in 1977.

But they retained another solution.

The Second Selection Process

Here is a quotation from the document that was given to us by Paul Kurtz in March 1978:

> Second selection process focused only on states that responded to first listing. Resource material used:
>
> *Who's Who in Football*, 1974; *Who's Who in Basketball, 1973—Selected remainder of champions not chosen in first sample.*

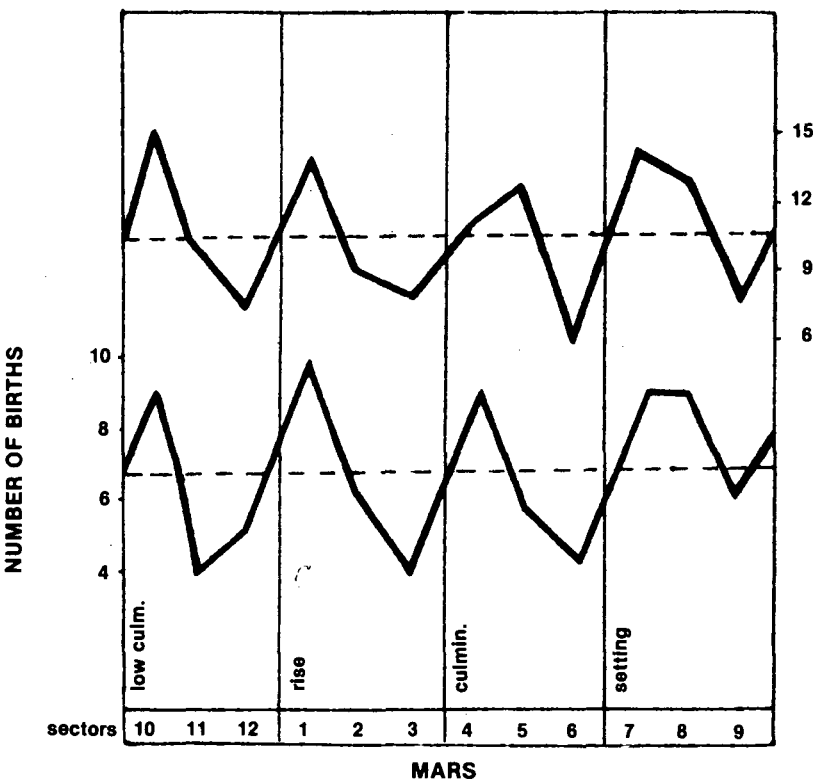

FIGURE 1: Mars and the births of U.S. Sports Champions. Diurnal distribution of Mars in twelve sectors. Upper curve: Kurtz, Zelen, and Abell's first selection sample, lower curve: "Star U.S. sportsmen" born before 1950, according to "The World Almanac 1978" and "The Lincoln Library." (Birth data from Kurtz and Mars calculations from Rawlins.)

Who's Who in Track and Field, 1973; *Who's Who in Boxing*, 1974—Selected all American-born sports champions.

This second selection seems unsatisfactory, except for the last two books chosen, *Who's Who in Track and Field* and *Who's Who in Boxing*, which represent worldwide selections of athletes not previously used. It is not surprising to us that the athletes of these books also display the Mars effect: 20.3 percent of them were born with Mars in key sectors; compared to the 13.5 percent of the whole sample, the difference is significant. But only 64 out of 280 names of the second sample come from these two books.

The largest part of the second selection, coming from *Who's Who in Football* and *Who's Who in Basketball*, has serious defects:

—As we demonstrated, to be listed in a national *Who's Who* does not offer a sufficient standard for observing the Mars effect: In *Les Hommes et les Astres* (1960) we showed that 599 footballers, who were in the first division of the Italian Football League but who had not achieved international status, did not show the Mars effect either. The U.S. *Who's Who in Football* lists more than 1,000 contemporary players, surely too many to represent the top athletes. Moreover, as the great names had already been chosen for the first selection, this second selection appears to be in reality more of an "anti-selection."

—The present paper of Kurtz, Zelen, and Abell contradicts the document given to us by Paul Kurtz in March 1978. The authors now claim that the list of the second selection process "includes many All-Star and All-Pro players in basketball and football not included in the first sample," when Kurtz's first document affirmed that the All-Stars had been included in the first selection.

—Other inconsistencies appear: (1) several athletes called "All-Star" in the Kurtz-Zelen-Abell Appendix are not listed as "All-Star" in the reference books; (2) some coaches, who were never champions, were erroneously included in the sample; (3) some athletes listed in *Who's Who* are not included in the sample, in spite of the fact that they were born in the states willing to provide birth data and although they were born during the years in which the hour of birth is actually recorded (a list of such cases has been sent to Kurtz et al.).

Therefore we cannot expect any significant Mars effect with the dubious second selection drawn from these two *Who's Who* volumes. Its interest lies rather in the comparison of the results obtained from athletes of minor importance with those obtained from top athletes. These results confirm our opposition to the selection; meanwhile the 192 top athletes from the first sample and from the *Who's Who in Track and Field* and

Who's Who in Boxing display a Mars effect of 20 percent, the 216 minor athletes of the second selection from the *Who's Who in Football* and *Who's Who in Basketball* only produce 8 percent. The difference is strikingly significant.

Star U.S. Sportsmen

We obtain thus a confirmation that the better the selection, the stronger the Mars effect. In this respect, we can point to more rigorous criteria of achievement than Kurtz-Zelen-Abell's first sample. Among the 408 names they gathered, would the Mars effect increase with athletes who reached the pinnacle of success?

A criterion for selecting champions of the highest eminence that is strictly objective and easy to verify is inclusion in the *World Almanac and Book of Facts*, a widely known publication. Let us take its 1978 edition. On pages 860-862, there is a list headed "Notable Sports Personalities." It gives the names of the most famous figures in the world history of sports. Thirty-one of them, whose names are known by all Americans, are listed in the sample; out of these 31, 8 were born with Mars in key sectors, i.e., 25.8 percent (see Appendix II).

On pages 818-827 of the same Almanac is a list of champions who received Olympic Gold Medals. We find 20 of these U.S. Olympic champions in the sample, of whom 7 were born with Mars in key sectors, i.e., 35 percent. Those who achieve the highest Olympic honors seem also to display the highest Mars effect (see Appendix II).[2]

Let us also consider the *Lincoln Library of Sports Champions*. It is the first document used by Kurtz, Zelen, and Abell and gives a comprehensive survey of U.S. sports specialties. Among the 408 births of the sample, 73 athletes come from this series (see Appendix II).

The samples drawn from the *World Almanac* and the *Lincoln Library* are small. Eliminating the inevitable duplicates between the samples, we can add them. We obtain in this way a group of 88 really prominent U.S. athletes; 19 of them were born with Mars in key sectors, i.e., 21.6 percent; and if we remove from this prominent group the 7 athletes born after 1950, the Mars effect increases to 23.5 percent. For comparison, the percentage of Mars positions in key sectors in the whole sample is 13.5 percent.

The statistical analysis adopted by Kurtz, Zelen, and Abell in the *Humanist* (Nov./Dec. 1977) will serve again to test the Mars effect in this highly selected sample. Table 2 shows that the Mars effect is significantly higher with these "star U.S. sportsmen" than in the total sample of 408 athletes.

Figure 1 (lower curve) gives the Mars distribution in 12 sectors for the

Table 2

The Mars Effect: Star U.S. Sportsmen
Lincoln Library + Notable Sports Personalities + Olympic
Champions (duplicates withdrawn) versus whole sample

Star U.S. sportsmen born:	Observed number of key sector births	Expected number of key sector births*	Difference	Standard deviation	Probability†
Before and after 1950	19	11.86	+ 7.14	3.20	0.03
Before 1950	19	10.92	+ 8.08	3.07	0.01

*Calculated from the proportion of Mars in key sectors in the whole sample of 408 births.
†Significance level (two-sided test).

sports stars born before 1950. Actually, with its four maxima in sectors 1, 4, 7, 10 (i.e., rise, culmination, setting, and lower culmination), the curve looks remarkably like the curve we published in 1973 as representative of the sports champions' typical personality (M. and F. Gauquelin, *The Mars Temperament and Sports Champions*, 1973). The tendency already noted in the first sample (Figure 1, upper curve) is stronger in this new selection. We could not expect anything better, considering the smallness of the group.

Conclusion

The conclusion is clear: the Mars effect is linked to the degree of celebrity and achievement of the athletes. It is significantly higher for the 88 U.S. sports stars than for the remaining 320 individuals of the sample. This needs a comment.

Let us first stress that the 320 minor athletes were born in the same states and in the same years as the 88 world-famous champions. They form thus an ideal control group. The small proportion of Mars in key sectors in this control group demonstrates that the Mars effect cannot be considered as a consequence of an atronomical or demographic artifact.

Let us also remark that the athletes in this kind of control group are not "unsuccessful." Generally, they followed an honorable career in their

specialty—otherwise their names would not be listed in a *Who's Who*. What makes them different from the famous champions is their incapacity to pull themselves up to the top rank in very important competitions. Our investigations of the personality of athletes offer an explanation of this phenomenon: the relationship between Mars and success in sports is weaker than the correlation between Mars and the temperament. Highly successful champions very often possess what we describe as the "Mars temperament." Such temperament is not absent in less renowned athletes, but it is less marked and not more frequent than in nonathletic people. But it remains surprising that the less successful athletes of the Kurtz-Zelen-Abell sample display a Mars effect that is *below* the average of 16.7 percent and that it is regularly decreasing from the first "screening," for which the Mars effect reaches nearly 20 percent, to the third "screening," in which it falls to the significantly small value of 7 percent! I leave the solution of this mystery to future investigations.

New Famous European Athletes Display the Mars Effect

Kurtz, Zelen, and Abell's experiment confirms, from our point of view, the existence of a Mars effect with highly successful U.S. sports champions. The observed effect (21.6 percent) is comparable to the effect observed by the Belgian Comité Para (22.2 percent) and by us (21.4 percent).

The statistical basis of the American sample is unfortunately too limited to be conclusive, in consequence of the difficulties encountered in the United States in obtaining the hours of birth. What can be done? A new sample is obviously needed. It is easy to obtain in Europe, where a new generation of athletes can be gathered, as was suggested by Marvin Zelen in the July 1977 meeting. I offered my help for this task, under the entire control of the Committee, Dennis Rawlins being entrusted with the astronomical calculations (letter of November 10, 1978, to Professors Kurtz, Zelen, and Abell, and to Rawlins). I received no answer. During a visit to the United States in April 1979, I repeated my proposal, offering the necessary bibliographical documents that we had brought with us. But the Committee did not seem desirous to undertake this experiment. We therefore decided to carry out the new experiment by ourselves, remaining, of course, ready to submit all the documents for scientific controls.

The pertinent information on this experiment can be found in the latest volume published by our laboratory: *The Mars Effect and the Sports Champions: A New Replication on 432 Famous Europeans, with Publication of Their Birth and Mars Data* (1979). The subjects were mostly born between 1940 and 1950. The birth data were gathered using objective sources of information from seven countries. The Mars positions were

calculated from the birth times of these famous athletes by Astro Computing Services (San Diego) and by us. Then the actual frequencies were compared to the expected frequencies based on a sample of nonathletes. Mars was observed 106 times in key sectors at the time of birth of the sports champions (instead of the expected 74.2), i.e., in 24 percent of the cases. The result is significant at the 0.001 level. The effect is observed whatever the nationality of the athletes. On the other hand, in a control group of sportsmen belonging to the same generation as the famous champions but not reaching the same degree of achievement, it could not be detected.

The results obtained with U.S. star sportsmen and with new famous European athletes are remarkably coherent. It seems obvious that the Mars effect with renowned athletes is an indisputable fact that should now be explained.

Acknowledgments: We were able to analyze the U.S. sample thanks to the courtesy of Paul Kurtz, who sent us the basic documents.

We must acknowledge also Neil Michelsen, director of the Astro Computing Services, in San Diego, who checked the celestial calculations of Rawlins. The agreement between the computations of Rawlins and Astro Computing Services is excellent, and the few divergences have no influence on the Mars distribution in sectors, nor on the conclusions. In order to avoid discussions on this matter, the calculations of Rawlins were adopted throughout the present study.

Notes

1. In the U.S. sample, the 9 female champions have been retained. Why then does Kurtz et al. insist that the 9 French female champions had to be eliminated in the Zelen test?

2. The Mars effect with U.S. Olympic champions is *stronger* than the Mars effect observed with famous Parisian athletes, contradicting Abell, Kurtz, and Zelen's assertion that the Mars effect is significant only in Paris!

Appendix I
First Selection Sample of Kurtz-Zelen-Abell

For each state are given the names of champions and the corresponding Mars position at birth in 12 sectors (sources: P. Kurtz and D. Rawlins)

Alabama		**Kansas**		**North Carolina**		**Oregon**	
Aaron	7	Kilmer	5	Eller	8	Fosbury	4
McCovey	2	Ryun	6	Gabriel	8	Lolich	7
Counsilman	1	Sayers	11	Jurgensen	2	Mahan	1
Peoples	2	Ward	9	Patterson	8	Wilcox	4
Davenport	11	Hadl	8	Petty	10		
Mays	5	Zook	4	Schollander	1	**South Carolina**	
Starr	4	Armstrong	3	Wilhelm	7	Blanchard	4
Williams, B.	9			Hanburger	8	Frazier	8
Wynn	11	**Kentucky**		Hudson	12	Gibson	1
Baughan	1	Clay	4	Bellamy	9	Lemon	2
Phillips	10	Hornung	12			Allen	12
		Unseld	7	**Ohio**		Yarborough	4
		Cowens	10	Brown, R.S.	7	Gilliam	5
		Combs	6	Owen, N	7	Scott	1
California		Smith, A.	2	Steinkraus	5	Jeter	7
Budge	1			Mack	5	Webster	3
Pollard	4	**Massachusetts**		Csonka	12		
Casper	1	Morin	8	Dawson	5	**Utah**	
Chadwick	7	Sweeney	5	Houston	11	Mann	6
Williams, T.	1			Havlicek	1	Olsen	10
Cronin	10	**Minnesota**		Lucas	9		
Davis, G	10	Gagne	10	Nicklaus	8	**Virginia**	
Rigby	5	Maris	5	Cassady	12	Ashe	6
Lee	10	Bertelsen	3	Griffin	1	Tarkenton	7
Young	10			Vogel	9	Willard	8
Vukovich	1	**Montana**		Page	9	Dandridge	7
Wills	8	Kramer, G.	5	Saimes	4	Brown, R.L.	6
Spitz	11			Rose	10	Dale	11
Walton	7	**Nevada**		Staubach	8	Jordan	10
Warmerdam	9	Kramer, J.	11	Gordon	1	Lanier	12
Cunningham	9			Battles	7		
Curtis	12	**New Jersey**		Warfield	3	**Wisconsin**	
LeBaron	5	Barry	2	Abramowicz	3	Dempsey	10
		Button	3	Fortunato	5	Kojis	8
		DeMarco	3	LeBeau	10	Hirsch	8
		Robinson	11	Tyrer	10	Otto	6
Colorado		Mitchell	11	Volk	10	Ameche	4
Werner	7	Heinsohn	5	Wright	11	Bakken	1
White	2	Taylor	3	Embry	7	Gillingham	2
		Verga	2			Thurston	4

22 were born before 1930 (6 have Mars in key sectors, i.e., 27.3%): Hirsch, Kramer J., Gagne, Button, Wilhelm, Steinkraus, Battles, White, Counsilman, Wynn, Blanchard, Gibson, Ward, Budge, Pollard, Chadwick, Williams T., Cronin, Davis G., Lee, Wills, Warmerdam.

10 were born after 1950 (1 has Mars in key sectors, i.e., 10%): Bertelsen, Taylor, Griffin, Allen, Rigby, Young, Spitz, Walton, Cunningham, Curtis.

11 were drawn from the Who's Who in Basketball (1 has Mars in key sectors, i.e., 9%): Kojis, Heinsohn, Taylor, Verga, Combs, Smith A., Dandridge, Hudson, Bellamy, Embry, Pollard.

Appendix II
88 Star U.S. Sportsmen

Listed in: The World Almanac and Book of Facts 1978 (Olympic champions = OC; Notable Sports Personalities = NSP) and Lincoln Library of Sports Champions (= LL). Birthdata sources from P. Kurtz; Mars calculations from D. Rawlins.

Star U.S. Sportsmen	Mars sector	OC	NSP	LL
AARON	7		x	x
ALLEN	12			x
ASHE	6		x	x
BARNES	4	x		
BARRY	2		x	x
BIFFLE	4	x		
BLANCHARD	4			x
BRAGG	12	x		
BROWN R.S.	7			x
BUDGE	1		x	x
BUTTON	3	x	x	x
CAMPBELL	4	x		
CARPENTER	4	x		
CASPER	1		x	x
CHADWICK	7			x
CLAY	4		x	x
COUNSILMAN	1			x
COURTNEY	8	x		
COWENS	10		x	x
CRONIN	10			x
CSONKA	12			x
DAVENPORT	11	x		x
DAVIS G.	10			x
DAVIS O.	3	x		
DAWSON	5			x
DEMPSEY	10			x
DILLARD	1	x		
ELLER	8			x
FOSBURY	4	x	x	x
FRAZIER	8		x	x
GABRIEL	8			x
GAGNE	10			x
GIBSON	1		x	x
GROZA L.	12			x
HAVLICEK	1		x	x
HIRSCH	8			x
HORNUNG	12		x	x
JOHNSON C.	2	x		
JURGENSEN	2		x	x
KILMER	5			x
KING	3	x		
KRAMER G.	5			x
KRAMER J.	11		x	x
LEE	10	x		x
LEMON	2			x
LOLICH	7			x
LUCAS	9			x
MAHAN	1			x
MANN	6			x
MARIS	5		x	x

Star U.S. Sportsmen	Mars sector	OC	NSP	LL
MAYS	5		x	x
McADOO	8		x	
McCOVEY	2			x
NICKLAUS	8		x	x
OLSEN	10			x
OTTO	6			x
OWEN	7			x
PAGE	9		x	x
PATTERSON	8		x	x
PATTON	12	x		
PETTY	10		x	x
RIGBY	5			x
ROSE	10		x	x
RYUN	6		x	x
SAYERS	11		x	x
SCHOLLANDER	1	x		x
SCHUL	9	x		
SPITZ	11	x	x	x
STARR	4		x	x
STAUBACH	8		x	x
STEINKRAUS	5			x
TARKENTON	7		x	x
UNSELD	7			x
VUKOVICH	1			x
WALTON	7			x
WARD	9			x
WARFIELD	3			x
WARMERDAM	9			x
WERNER	7			x
WHITE	2			x
WILHELM	7			x
WILLIAMS B.	9			x
WILLIAMS R.	11	x		
WILLIAMS T.	1		x	x
WILLS	8		x	x
WOTTLE	2	x		
WYNN	11			x
YARBOROUGH	4			x

Born after 1950: ALLEN, McADOO, RIGBY, SPITZ, WALTON, WILLIAMS R., WOTTLE.