The Gauquelin Effect is born at conception, part 1: Mars

By Graham Douglas

Abstract

To date no testable theory has been put forward to account for the Gauquelin Effect, which remains a mystery or a fraud according to preference. The unstated assumption by researchers that the Gauquelin Effect comes into existence only on the day of birth is here identified as the biggest obstacle to progress.

The present paper attempts to describe part of a possible chain of causation: the stage between planetary influences mediated by solar activity to possible influences of geomagnetic disturbances on the timing of conception and natural childbirth. Two causal stages are proposed: certain phases of synodic cycles involving the earth and the relevant Gauquelin planets acting at conception; followed by a proposed - and so far unsubstantiated - influence of geomagnetic micro-pulsations during labour and delivery.

By combining heliocentric planetary cycle phases involving Earth and a Gauquelin planet around the time of conception with known diurnal intensity variations in the Pc5 band of micro-pulsations on the day of birth it is shown that patterns similar to the typical Gauquelin distributions can be generated from random controls, and further that the Gauquelin Professional data show significantly larger effects than these, as measured by Chi-Squared tests.

For the Mars Effect, evidence is also reported for solar activity correlations, with the planetary sector positions at birth, but more strikingly with the hour of birth and the phases of the ER-MA synodic cycle at conception.

By comparing several files of birth data it is shown that the Mars Effect begins to decline around 1915-20 in parallel with changes in the ER-MA distribution at conception. This decline is to be expected once the role of conception date is understood, because of demographic changes brought about by the increasing use of family planning after World War 1. Further evidence is derived from the increase in both effects during wartime. However astrophysical effects related to longer planetary cycles may also play a part.

Finally, the eminence rankings devised by Ertel have been shown to be correlated with key phases of the Earth-Mars synodic cycle at conception, the ERMA Effect.

Since this effect was unknown to the Gauquelins and to Ertel, the last vestiges of allegations of fraud by the Gauquelins can be dismissed: there is a Mars Effect and it begins at conception.

Introduction

Geomagnetic effects were identified early on by Michel Gauquelin (1976) as candidates for a role in the possible causal chain leading to correlations between the birth times of eminent professional people and higher than expected birth frequencies observed in certain periods of the planetary days. There are 4 such regions but the largest deviations occur in those near the rising and culmination of a particular planet which the Gauquelins came to describe as *key sectors*, as illustrated in Fig.1.

With geomagnetic influences in mind they followed their investigation of eminent professionals by collecting over 50,000 birthdata for ordinary Parisians in parent-child groups, and examined them in relation to the so-called Ci index of geomagnetic activity. The Ci index is not much used nowadays, but it has the merit of being recorded from 1884 onwards. In their first investigation of this type they were able to describe statistically significant correlations between geomagnetic activity and tendency for a given planet to appear in a key sector at the births of children whose parents had this placing. This was called the Heredity Effect, and was important because it had been found with ordinary people and showed a correlation with a geophysical variable.

A second experiment also in Paris showed a weaker effect and the third none at all. They could not explain this since they believed that their samples were very similar in all respects. However the data were from different decades and it is now recognised that solar activity patterns show important long-term variations.

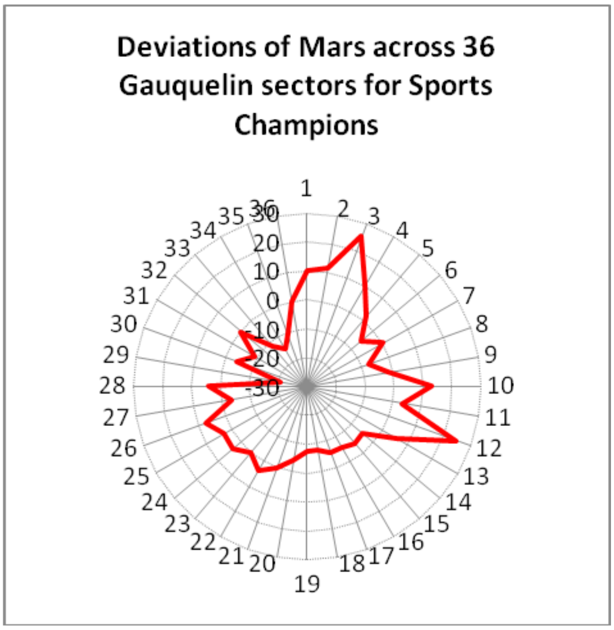


Fig. 1. Showing the deviations of MA sector frequencies from the expected distribution calculated using astronomical and demographic effects, by Mark Pottenger. The Ascendant (AS) is between sectors 1 and 36 and the Midheaven (MC) between sectors 9 and 10. The normal orientation with the AS on the left is not possible here due to the XL software that has been used.

There are switches in the correlation between geomagnetic activity and solar activity at intervals of 20-25 years, (Kischka et al 1999: 803). These may be relevant to understanding the Gauquelin's findings (1988) which showed opposite correlations of the strength of the heredity effect with Ci index respectively for parents and their children. The mean difference in birth dates between parents and children is about 20 years, and one of the switches in correlation occurred in 1921, where the first of the Gauquelins' samples of child births begins, this suggests that such phenomena need to be studied.

It has not proved possible to detect direct correlations of geomagnetic storms with disturbances in the births in the Gauquelin collection of eminent professionals, and this has led Ertel to declare that no such influence exists (Ertel 1989: 12-16). Like so much other research on the Gauquelin data this argument depends on the unstated assumption that the effect, if it exists at all, only occurs on the date of birth.

However, if conception also plays a role in the Gauquelin Effect there is another demographic factor which has never been considered. After rising very rapidly to 2.7 children per woman in France in 1920, following WW1, the fertility rate fell steadily to 2.1 by 1935, indicating greater family planning, despite the official disapproval of birth control (Toulemon *et al*, 2008: Fig. 1., Cahen, 2007). In Sweden a slow fall during the last quarter of the 19th century accelerated around 1905, with the birthrate dropping from 25 to a trough of 15 births per 1000 per year in 1935 before rising again during and after WW2 (Montgomery no date), and very similar patterns were found in Germany (Kendzia and Zimmermann, 2012). From this it follows that there were less of the spontaneous conceptions which might have been influenced by solar activity.

Seymour, Wilmott and Turner (1992) developed a detailed theory of how the cycles of planets revolving around the sun could affect solar activity despite having vanishingly small tidal effects. At that time they relied on observations by Blizzard (1965) and Wood (1972), but since then much more evidence of planetary timing of solar activity has been found, (e.g Abreu 2012, Scafetta 2014, Wilson, Carter and Waite 2008). In Seymour's semi-popular books he described his group's tidal theory and referred extensively to the Gauquelin data in general terms, but never attempted to refine his theory to make it applicable to birth data. He pointed out that tidal cycles are typically 2nd harmonics of the period of rotation – as illustrated by two tides per day in the oceans – and that by supposing the birth process to be sensitive only to the amplitude and not to the direction of some hypothetical tidal process, this could lead to a 4th harmonic correlation, of the kind which clearly seems to be present in the Gauquelin Effect, as shown in Fig.1.

The existence of long-term solar activity cycles is in itself a puzzle because the conventional solar dynamo theory does not explain them. This has led other solar physicists to propose mechanisms for non-linear amplification of planetary tides, in order that they may influence solar energy output, (Grandpierre (1996a), Abreu et al (2012), Scafetta (2014).

Wilson, Carter and Waite (2008) have focused on the outer planets, which contain 99% of the angular momentum of the solar system, and shown how coupling between this and the spin momentum of the sun could explain the existence of the 11 year solar cycle as well as its variations, in terms of the synodic cycle of Jupiter and Saturn. Another relevant observation was made by Hung (2007) who demonstrated a tendency for solar eruptions to occur within 10 solar longitude degrees of the point below an orbiting planet. A suggestive study by Bumba (2009) details patterns of magnetic disturbances on the sun at different phases of planetary cycles. He examined conjunctions and oppositions of Jupiter and Saturn during 5 solar cycles (numbers 19-23), and showed that at the peaks of solar activity Venus and Earth are also aligned with the oppositions of Jupiter and Saturn during odd solar cycles (19,21,23) and with Jupiter- Saturn conjunctions during the even cycles (20,22).

Considering the evidence for geomagnetic or solar activity influences on human life, Ertel has shown that revolutions occur more often close to peaks in the 11.2 yr. Schwabe cycle of solar activity, whose period is very close to one quarter of the 45 yr. synodic cycle of the planets Saturn and Uranus. Figure 2 illustrates how this variation runs very close to the variation in incidence of Solar Proton Events. The data for proton events up to 1986 were taken from Shea and Smart (1990) supplemented by NASA data for X-class flares during the period until 2013. There are many findings of associations of geomagnetic activity disturbances with social and physiological events (Grigoryev *et al*., 2009), so it would be odd if the Gauquelin Effect was exempt.

I am not a solar physicist, but some means of involving the planets is obviously necessary to any physical theory of the Gauquelin Effect so I will follow Seymour and accept this idea of a correlation of planetary synodic cycles with solar events as one part of a plausible model.

The question to consider now is at what stage(s) of the process of conception-gestation-delivery geomagnetic effects might operate.

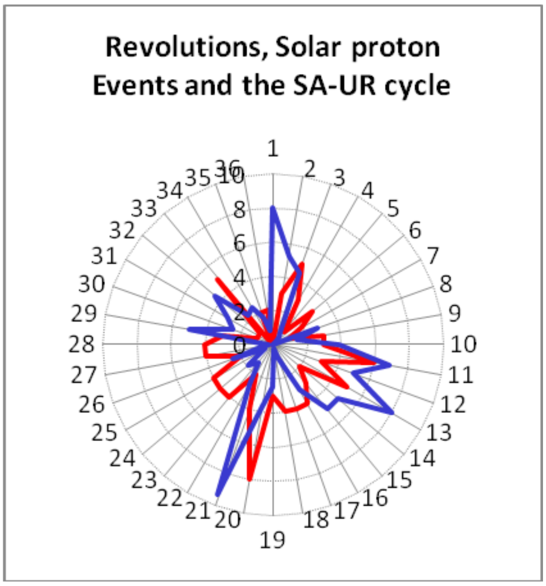


Fig.2. Showing the variation in numbers of revolutions (red line, N = 109) and the frequency of large Solar Proton Events (blue line, N = 395 scaled to N = 109).

Requirements and Conditions for a Theory

Geoffrey Dean *et al* (1996, 18-21) pointed out the need for a theory of astrology to guide empirical research, but excluded the Gauquelin results from their discussion. So, it is useful first to look at the phenomena that we hope to explain in terms of accepted principles and data from astrophysics, and consider how solar events might plausibly correlate with the timing of birth. It is surprising how helpful this initial analysis can be in eliminating inappropriate hypotheses and focusing on lines of investigation that have a chance of being productive. This can be done by listing some principles.

0. The *zeroth* principle is that there is such a thing as the Gauquelin Effect which needs to be explained. I believe it is clear from the extensive and often virulent debates which occurred during the 1980s and 90s, that the idea that the whole thing was an elaborate fraud by the Gauquelins can be excluded. In fact attempts at data manipulation were a feature of the skeptics' attacks (Ertel and Irving 1997). Michel Gauquelin's suicide in 1989 proves nothing about the validity of the observations that he and Francoise dedicated so much of their lives to. The story of these debates is recounted in detail by Ertel and Irving in their book *The Tenacious Mars Effect* (1997), and a detailed commentary on the CFEPP's work is provided by Nienhuys in Benski'd book *The Mars Effect* (1996). And the evidence to be presented now reinforces that conclusion.

More recently Geoffrey Dean, without implying fraud by the Gauquelins, has suggested that parental data tampering or mis-reporting of birth dates on occasions when these were popularly considered inauspicious might account for the Gauquelin observations. Ertel, has exhaustively shown how these supposed influences cannot explain away the Gauquelin Effect, (Ertel, 2003, the last of 5 articles on the subject), and I will not enter this discussion further.

1. The next most important principle is that any possible planetary influence on physiological processes on earth, including childbirth must be mediated *via* the sun. The fact that the Gauquelin Professional data show correlations between birth times and the position of a planet in certain sectors of the terrestrial sky seems at first sight to indicate a direct influence of the planet. However, it is simply incredible that direct gravitational or radiation influences by the planets on the earth could be responsible, and since there is extensive evidence that planetary cycles do influence solar activity, the principle of Occam's Razor requires us to start from there. Indeed, if a direct influence were responsible it would not be expected to produce the typical Gauquelin pattern of 4 peaks and troughs, but rather a simple diurnal rhythm peaking when the planet was above the local terrestrial horizon.

   Michel Gauquelin stated explicitly his belief that the planets only play a modulating role on solar activity, which is "the motor of the system", (Gauquelin, 1968: 566). And it is worth noting that the astrologer Dane Rhudyar expressed the same view (Rhudyar, 1936), which can be traced back to Thomas Aquinas and even earlier astrologers (Barbault, 2014: 98-102).

2. It is important to recognise that more than one scale of timing is involved in procreation. On the day of birth there is the timing of the onset of labour followed by a variable duration of labour prior to birth, with a general tendency for labour to last longer for first-born children.

   But birth is only the final stage of a 9-month gestation process following fertilisation, during which period we may suppose the foetus to be subject to various environmental influences depending on its stage of development. The gestation period must be considered integral to the process, yet it has been ignored by researchers on the Gauquelin Effect.

   Patterns of planets at particular angles to each other during their motions around the sun develop during days or weeks, not hours, therefore we should not expect them to play a part in the initiation of labour and its progress to delivery on the day of birth. Of course the positions of the planets in relation to the horizon do change during a day, but they do so in concert with the sun, in relation to which their motion is negligible on the timescale of hours.

   It follows that any theory involving planets and the sun should focus on the 9-month gestation period and on the timing of conception. The latter is here understood to include both the inclination for intercourse, as well as whatever physiological processes lead to successful fertilisation. It is well known that conception often does not occur until intercourse has been happening for several months.

If indeed the conception date partially determines the Gauquelin Effect then the new demographic factor described above involving the use of birth control, would be expected to play a part in both the Professional Data and the Heredity Experiments. This factor has never been considered before, and its implication would be that the Gauquelin Effect would begin weakening after 1920 in Europe, and not as the Gauquelins believed, only after 1950 when induced births became more common. A consideration of the history of birth control is necessary as it may indicate differences between Europe and the US.

3. It is also important to consider time limitations on the mechanisms that can be proposed for an event on the sun to be able to influence conception or birth.

   If a punctual solar event occurs which is able to influence human physiology, then it could be transmitted to Earth in two possible ways. One is via the solar wind impacting the earth's magnetosphere, and the other is by electromagnetic radiation, and there is a crucial difference in timing between them.

   The speed of the solar wind varies substantially, between about 300 and 1000 Km/sec, depending on solar activity, so the effects of a solar eruption will take widely varying times to reach the earth, between 2 – 6 days. This makes this type of transmission unsuitable for explaining - by itself - the timing of the hour of birth. In addition, the solar wind first strikes the magnetosphere of the earth, from where its effects may take several hours to be transmitted to the ionosphere, and then to the geomagnetic field.

   It is useful here to note that if solar eruptions tend to happen within 10 degrees of solar longitude from an orbiting planet, as Wang has found, then any burst of radiation will be directed towards that planet. It is for this reason that the earth has to be one of the planets involved in a planetary pattern at conception. And 10 degrees of solar longitude is about 1/36 of a solar rotation of 27 days. We can therefore say that the eruption will be effective within 27/36 days or only +/- 18 hours of the exact planetary conjunction or opposition – assuming that it is directed towards the earth or lasts long enough until it is pointing towards the earth. Typically however, solar X-ray flares have a duration of minutes to hours (NASA, no date) meaning that alignment of the earth and the planet needs to be very close in order to be effective.

   Electromagnetic radiation reaches earth in about 8 minutes, so solar eruptions which produce X-ray or extreme ultra-violet radiation will produce extra ionisation in the ionosphere almost immediately.

   Indications that some effects of planetary alignments prior to birth also correlate with Gauquelin sectors has been found in work previously published (Douglas,2008), which could therefore only be the case if transmission was electromagnetic. It is remarkable that the timing of those correlations was found to be extremely precise.

However there is another important possibility for timing on the day of birth, and this is the one which will be used as a conceptual framework here, in view of published findings on geomagnetic micro-pulsations which will be described below. The electromagnetic transmission mechanism just outlined is still required.

Suppose that a pre-existing correlation existed between a diurnal or infradian rhythm in some aspect of human physiology and a geomagnetic rhythm of similar time period, during the processes of gestation and onset of labour. In that case one could imagine that the physiological process could have been synchronised or entrained to a certain phase of such a geomagnetic rhythm by the shock of a geomagnetic disturbance at the time of conception.

Since solar time is measured by the passage of the sun through sectors of the sky during a day, then some of those solar sectors might be associated with peaks and others with troughs in the supposed geomagnetic rhythm, depending on its frequency. Next suppose that this rhythm had become entrained at conception by a solar eruption provoked by conjunction or opposition of the earth and a particular planet, in this case the planetary position would be 'transferred' into a specific relation to the sun in the sectors of the solar day at birth. The relation between the solar and planetary position reached at birth, would depend on the phase of the relevant synodic Earth-Planet cycle, 9 months after conception.

The cycle lengths of the synodic cycles of the 4 Gauquelin planets are:

VE – ER: 1.6 yrs

ER – MA: 2.13 yrs

ER – JU: 1.092 yrs

ER – SA: 1.03 yrs

Now, the average gestation period to spontaneous delivery has been estimated as 267 days (Jukic, A.M. et al 2013), using accurate biochemical tests, so we can calculate the fraction of each cycle covered during this interval.

We are now in a position to consider a specific chain of causation for transmission of solar disturbances induced by a planetary conjunction or opposition at conception, via a geomagnetic micro-pulsation cycle in the timing of birth, leading - accidentally one might say - to the appearance of planetary patterns in sectors of the terrestrial sky. The position of a planet in Gauquelin sectors (or astrological houses) is thus only a sign of an earlier event, and has no causality during birth, it is the solar hour which is important, despite the Sun not showing a classical Gauquelin Effect. In fact Cyril Smith already alluded to this possibility, as discussed below.

It should be noted that the average length of pregnancy derived in the study by Jukic *et al* had a standard deviation of +/- 10 days and a range of +/- 35 days, and that this was for US data, where the average length of gestation was found to be about a week shorter than a decade earlier. It is possible that a slightly longer period such as 273 days might be better for the Gauquelin data. A difference of 6 days amounts to about 3^0 in the 2.14 year ER-MA cycle.

The core mechanism

The first stage proposes that the occurrence of a heliocentric conjunction or opposition of the Earth and a planet provokes a solar eruption which reaches the Earth either in the form of electromagnetic X-ray or u.v. radiation. This is simply a more precise specification of the approach used by Seymour, and by itself it cannot explain the timing of the hour of birth, for the reasons outlined in the previous section.

The second step is a novel one, and depends on observations by Korschunov (1982) of diurnal intensity variations in geomagnetic micro-pulsations. His observations were made in Germany (one of the countries where the Gauquelins also collected data), over a period of 12 years, 1960-1971 and therefore cover a whole solar activity cycle. These pulsations have been classified into 5 frequency bands of the continuous type which are conventionally recognised with periods ranging from 0.2 – 5 sec(Pc1) to 150-600sec (Pc5). The Pc5 band is interesting because it overlaps the period of uterine muscle contractions during labour, and because Korschunov's data showed two variations in its intensity. One of approximately 2 hours during daylight hours, and another of 6 hours, which only appeared in the East-West component of the field, and which Korschunov did not comment on. A similar variation has however been found in Canadian data (Pahud *et al*, 2009).

Testing the hypothesis

Conception.

Since the hypothesis consists of 2 stages each must be tested. First, it is necessary to examine the data for any patterns in synodic Earth-Planet cycles at dates 267 days before birth, which from now on will be referred to as the conception date. The patterns of interest have been specified in the theory by Seymour: they are heliocentric conjunctions and oppositions, and possibly heliocentric square phases too as these were found in Blizzard's data and incorporated into Seymour's theory (Seymour 1992). As described above there is growing support for planetary influences on the timing of solar activity variations, and one of the most useful correlations for the present argument pinpoints the Earth-Jupiter conjunction cycle (Scafetta, 2013).

Michel Gauquelin (1988: 55-58) did examine the distribution of Sun-Mars phases *at birth*, but only for some of his heredity experiment data, without finding a means to progress his understanding, while noting that more work was necessary for the planets JU and SA. But it is important to note that he used geocentric coordinates, and simply calculated angular separations (0 – 180^0), thus not distinguishing whether Mars was ahead of or behind the Sun.

Our starting point is to compare the heliocentric ER-Planet phases at birth and at the nominal conception date 267 days earlier. In each case it is necessary to calculate the differences from controls based on the whole Gauquelin data. They have been derived by taking the Professional data (N=15934) and processing it with the *Jigsaw* program, choosing the option which maintains the time and year of birth and the geographic coordinates of each person unchanged, while shuffling the days and months amongst the whole sample. The data was truncated to the range 1807 to 1945 in order to include a whole number of solar cycles for an earlier piece of research, but this makes no significant difference (N = 15619).

The Mars Effect

Since the Mars Effect is the best known part of the Gauquelin Effect, and the one that has attracted the most attention from sceptics, it is examined first, starting with Sports Champions. The first indication that we are seeking is a surplus in conceptions near the 0, 90, 180 and 270^0 phases of the synodic ER-MA cycle, and this is clearly evident in Fig. 3A, showing the difference from expected numbers of conceptions at 267 days before birth, while Fig.3B shows the corresponding graph for the date of birth. It can be seen that the peaks at -267 days align well with the predicted pattern for three of the four angles, and the pattern is somewhat more distinct than the one at birth.

From the synodic ER-MA time period it can be calculated that the phase angle increases by 124^0 during 267 days, and the similarities between the major features of the two graphs are evident if a rotation of 12 sectors is applied. Divergences can presumably be traced to the ellipticity of Mars' orbit (0.011). The loss of a single strong 4th harmonic signal in the pattern at birth can be seen more clearly in Figs 3C and 3D, and supports the idea that it is at conception when the synodic cycle has an effect.

To calculate the probability of this being a random occurrence the Chi-Squared Test has been used with one degree of freedom (Df = 1). This was done by dividing the data into two categories: those with the predicted four ER-MA phases +/- 10^0, and all the rest. The width of each band has been taken as 10^0 for convenience, because this is the width of the bands used in the distribution with 36 sectors.

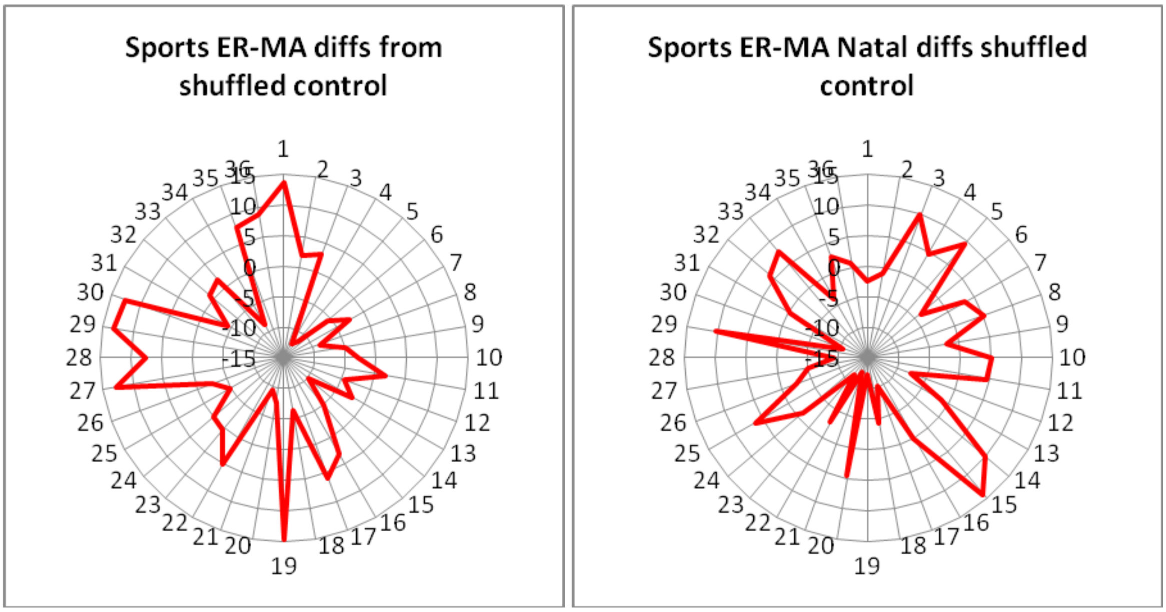
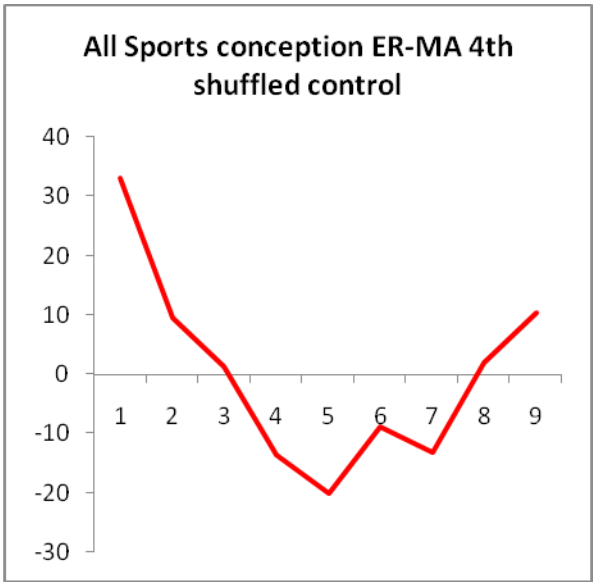
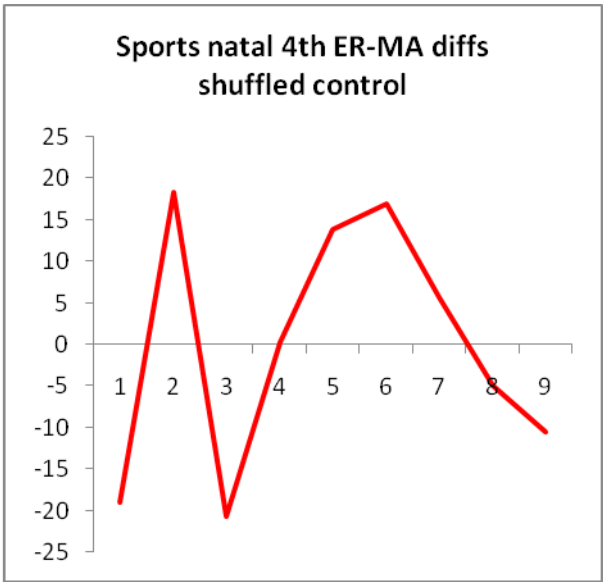


Fig.3A. Distribution of conceptions for Sports Champions across the phases of the heliocentric ER-MA cycle. 3B shows the same calculation for the date of birth.

The value thus obtained corresponds to a probability of 0.025, but since we predicted not just the phase of the deviations from the expected frequencies, but also their direction (positive at the angles specified) the one-tailed probability can be used, which is half this value: 0.013.

Another approach is to look at the 4th harmonic distribution, formed by adding every 9th value to create 9 categories composed of phases 0, 90, 180, 270^0, 10, 100, 190, 280^0, etc. Referring to graph 2C, where the sum of the positive deviations, corresponding to the specified ER-MA angles with a range of +/- 20^0 (adding points 1,2,8,9 in Fig. 3C), amounts to an excess of + 56.1 over the expected value we obtain Chi-Squared (Df = 1) = 6.11 and the one-tailed p value is 0.005. Figure 3D shows a pattern with smaller amplitude, and with another peak besides the simple 4th harmonic of Fig. 3C.





Figs 3C and 3D showing the same data as a 4th harmonic

The deviations calculated in this way are reduced by the small values in the vicinity of the 90^0 phase, and if this data is regarded as a pilot study it is useful to calculate the Effect Size, based only on the positive deviations at the other three angles.

The formula σ = 96/(2087-96) gives the value 0.048, larger than that for the Mars Effect in Gauquelin sectors at birth. Calculating Xi-Squared *a posterior*i using the sum of the observed positive deviations is not statistically legitimate, but it does give an indication of how unlikely this pattern is to have arisen by chance Chi^2 (Df = 1) is 21.3, leading to a probability of $p < 0.00001$.

What is 'expected'?

The pattern in Fig. 3A is highly unlikely to be a chance occurrence, but in order to accept this correlation as a positive test of the current hypothesis it needs to be supplemented by observations that can be deduced from the known features of geomagnetic variations. There are three well-established cycles that can be considered:

1. The approximately 11.2 yr Schwabe Cycle, more commonly known as the Sunspot Cycle.
2. The semi-annual cycle with peaks at the equinoxes and troughs at the solstices.
3. The 27-day synodic solar rotation cycle.

In addition we need to compare the ER-MA data at -267 days separately for those births which happened when MA was in a key sector, and those which did not: does the pattern in Fig.3A arise only from the first group or is it a property of the whole dataset?

4. Finally we need to consider the demographic effect due to birth control. Until now only the effect of obstetric procedures such as induction of labour, or voluntary Caesarean sections on the nycthemeral birth curve has been considered, and this led the Gauquelins not to use any data collected after 1950. But now that we are hypothesising the existence of planetary effects at conception we must recognise that this stage of the reproductive process is also potentially subject to disturbance, which requires a study of the history of the increasing use of birth control methods.

The Sunspot Cycle.

In order to examine the possible effect of the Schwabe Cycle the data was sorted into two parts using published data for the peaks of this cycle. Monthly mean sunspot data was downloaded from the Belgian Royal Observatory site (www.sidc.be/silso/datafiles) and searched to locate the minima and maxima of each cycle from 1804 to 1945. In cases where the data points were ambiguous (mostly near the minima), the smoothed figures provided on this website were used to estimate the best approximation to the date.

The curve of geomagnetic activity (GMA) was closely synchronous to the sunspot number curve (SSN), until about 1910 when the peaks of GMA developed a lag of about 2 years behind SSN, although the minima remained in step (Echer *et al* 2004, Wang et al 2000).

The length of each cycle from minimum to minimum was then calculated and for each solar cycle up to the 1906 peak, a 'High Solar' section equal to half of the respective cycle length was defined, starting from one quarter of a wavelength before the peak until one quarter of a wavelength after the peak. The Jigsaw program was used to filter the relevant professional data files by selecting these date ranges and saving them into a separate file. Any calculations that were performed using the Jigsaw software, such as the frequencies of births or conceptions in each ER-MA heliocentric cycle phase, were copied into an Excel table. It was then a simple matter to calculate the 'Low Solar' frequencies by subtraction from the total data file.

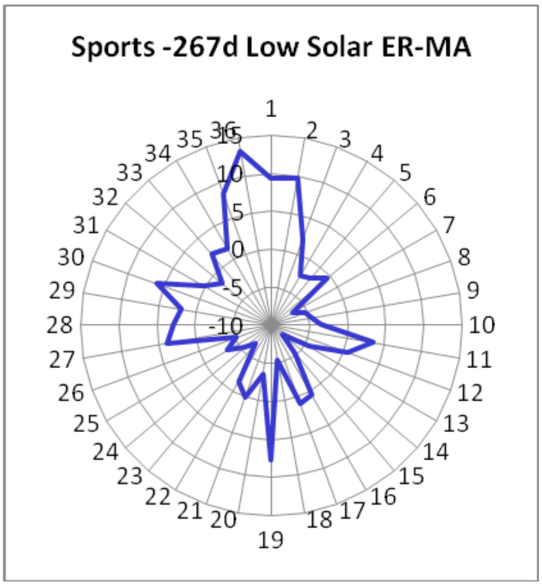
For the data during the period 1906-45, the same method was used except that the half-wavelength sections of each cycle defined across the peaks were shifted to dates 2 years later, to account for the changes observed by Echer et al.

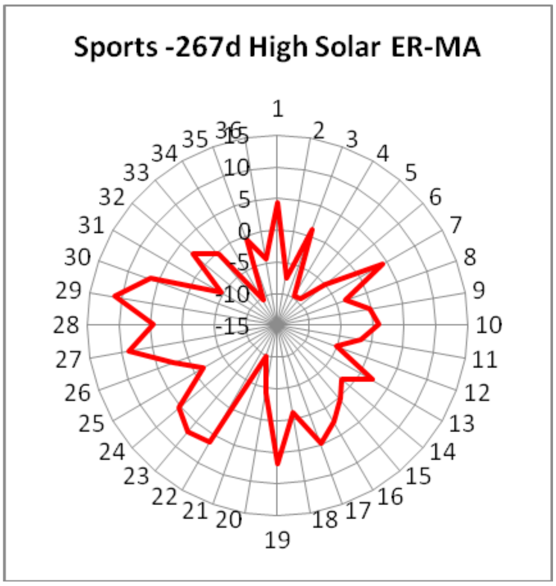
When this is done the strikingly different graphs shown in Figs 4A, 4B are obtained.

The most obvious difference between the two graphs is that when solar activity is low conceptions are more concentrated along the axis of conjunction-opposition in the ER-MA cycle, whereas under high solar activity there is less structure overall, but more concentration towards the axis of square phases.

This can be seen more clearly by creating 2nd harmonic graphs of the data, by combining the conception frequencies for phases 0 + 180^0 , 10 + 190^0 and so on, as shown in Figs. 4C.

In Fig.4D this technique is repeated to create the 4th harmonic displays. In this case, it is clear that the amplitude of the correlation between conception frequencies and the ER-MA phase is a good deal stronger under low solar activity. To assess this the 4th harmonic data was divided into 2 categories: the first 3 and last points, and the intervening 5 points respectively.



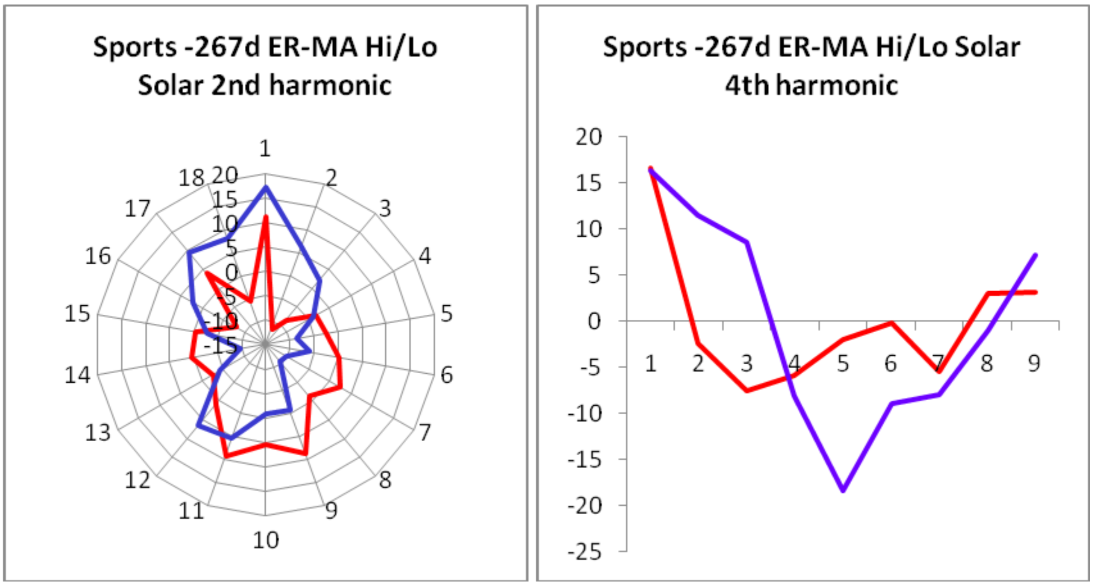


Figs 4A and 4B, showing the effect of changes in solar activity on the distribution of conceptions across the ER-MA cycles for Sports Champions.

This corresponds to the ranges -10 to + 30^0 and 30 to 80^0 in Figs 3A and 3B, slightly wider than in the unfiltered data shown in Figs 4A and 4B. The Xi-Squared results with Df = 1 were 0.67 and 7.16 respectively. While the value for high solar activity is insignificant, that for low solar activity has p = 0.0075.

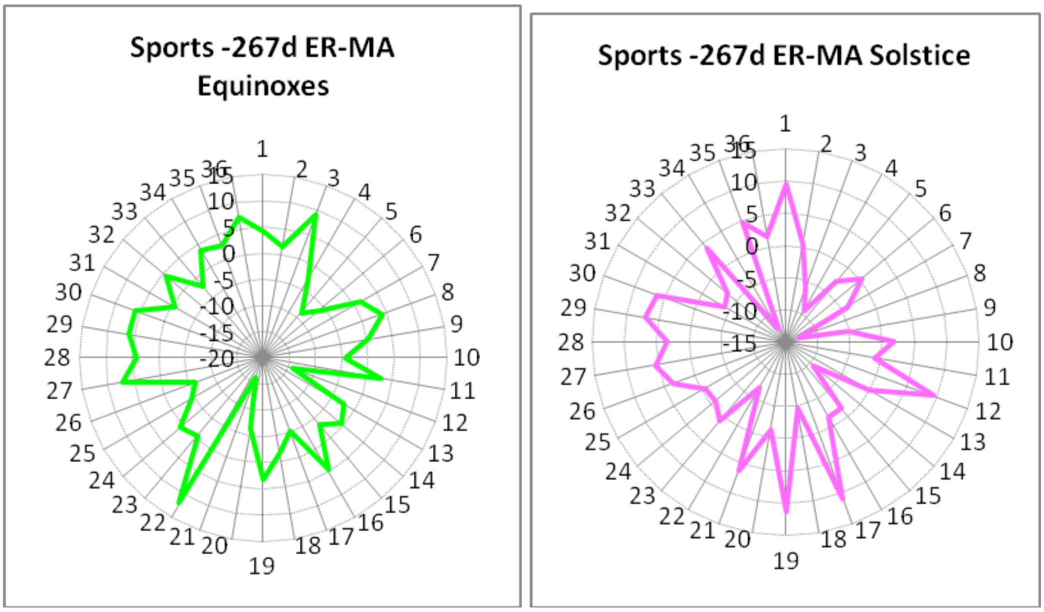
The Semi-annual cycle in geomagnetic activity

This cycle has been known for a long time, and although there are still two competing theories to explain it, they both depend on the inclination of the earth's orbit and its relation either to the solar equator or to the interaction of the solar wind and the earth's magnetosphere (Cliver et al 2004).



Figs 4C and 4D. Showing the same data converted into 2nd and 4th harmonics, blue for low and red for high solar activity.

The essential observation is that geomagnetic activity is greater during the equinoctial seasons of the year and lower during the solsticial months. Although this variation usually has a smaller range than that of the Schwabe cycle it is important to see if it affects the correlation of conception frequencies with the ER-MA cycle. The data was accordingly split into two portions defined by boundaries at +/- 45^0 from the zodiac degrees of 0^0 of Aries, Libra and Cancer, Capricorn.



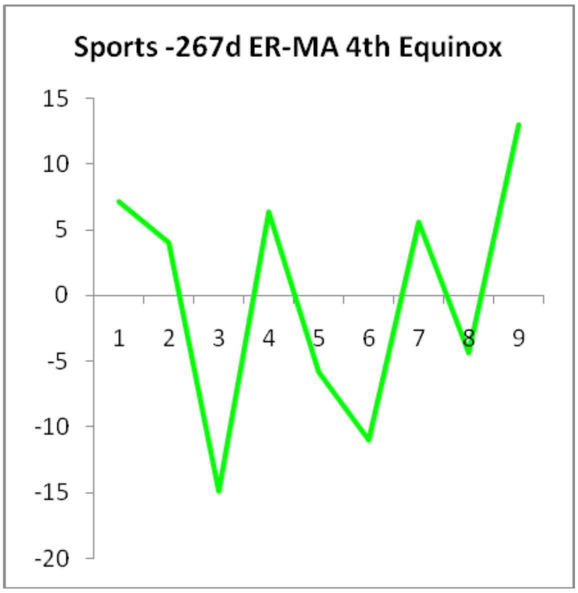
Figs. 5A and 5B. Showing the effects of splitting the samples into 2 equal parts, of 6 months each, centred around the Equinoxes and the Solstices respectively.

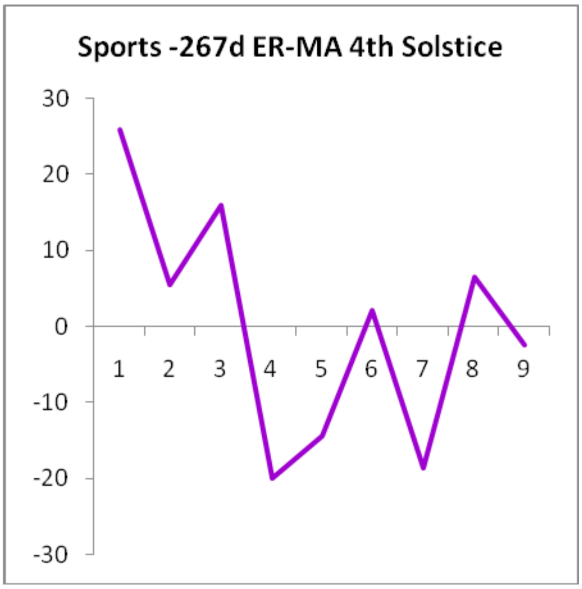
The deviations of corresponding conception frequencies from those expected were calculated by also dividing the shuffled control into Equinoctial and Solsticial parts although the controls did not differ significantly from each other. Results are shown in Figs. 5A and 5B.

The solstice graph seems to retain more of the regular T-shape of Fig. 3A. This is clearer when the 4th harmonic graphs are compared, as shown in Figs 5C and 5D, where the solstice pattern shows a stronger amplitude in the first 3 points, while the equinox pattern is just a series of smaller increases and decreases.

Although a Contingency test does not show significant differences between the 4th harmonic distributions they do differ with respect to their individual controls. Thus combining the first 3 and the last 2 phases to make one category against the remaining 5, as was done with the data in Figs 3C and 3D, the Xi-Squared values (Df = 1) are 4.8 ($p = 0.03$) for the Solsticial data and 1.5 (not significant) for the Equinoxes.

Thus the larger deviation occurs under the less active GMA conditions, as is the the case for solar activity where it is the less disturbed condition which has the greater amplitude.





Figs 5C and 5D. 4th Harmonic versions of 3A and 3B.

This might indicate that there is a lower range of GMA to which the organism is more sensitive. However it has been established that the amplitude of the semiannual variation in GMA is correlated with the Schwabe cycle in a more complex fashion. Thus the greatest amplitude of the semiannual variation is found during the minima of the Schwabe cycle, but only on days when there is a low level of geomagnetic disturbance, as measured by the Ap, Kp or Ci indices, while the least semiannual variation occurs during the ascending phase of the 11 year cycle, and only on days when there is moderate disturbance (Rangarajan and Iyemori, 1997). To examine the data in more detail, it will be necessary to go through the Gauquelin professional data, day by day and record the values of one of the GMA indices available on the internet.

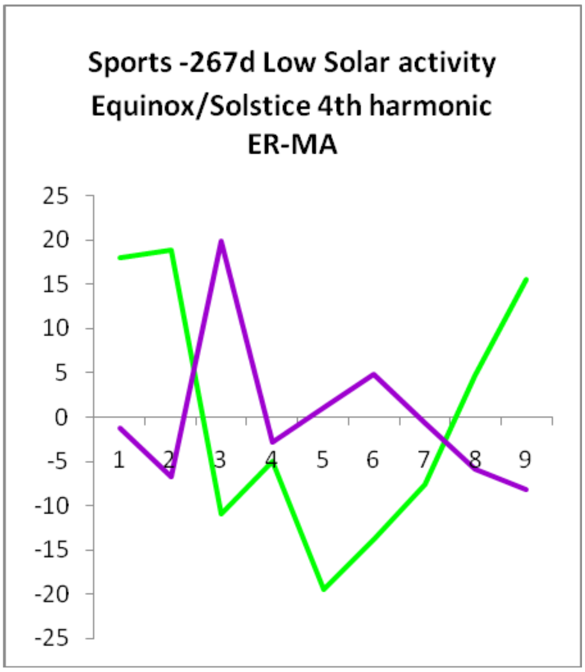
With the present data it remains to look at the combined patterns under both high/ low solar activity and equinoctial/solsticial conditions.

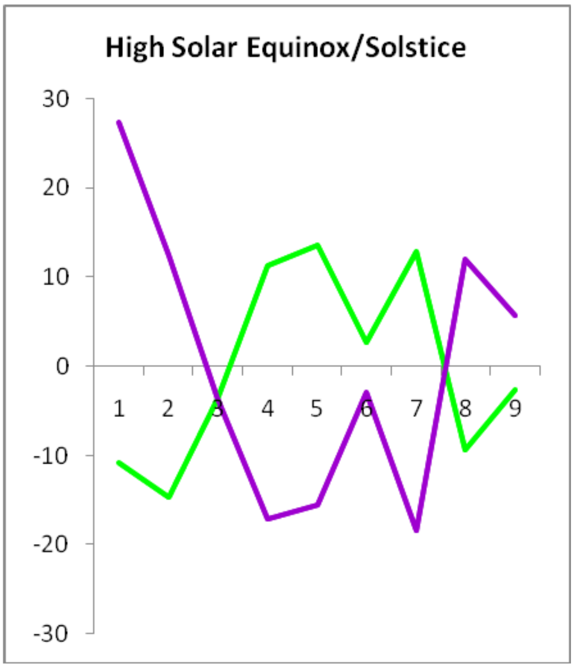
The results are shown as 4^{th} harmonic graphs in Figs 6A and 6B.

Two of these 4 graphs stand out both in amplitude and phase. The equinoctial pattern during low solar activity and the solstitial graph for high solar activity. Both of them show large deviations at both ends of the 4^{th} harmonic graphs, in stark contrast to the other two graphs.

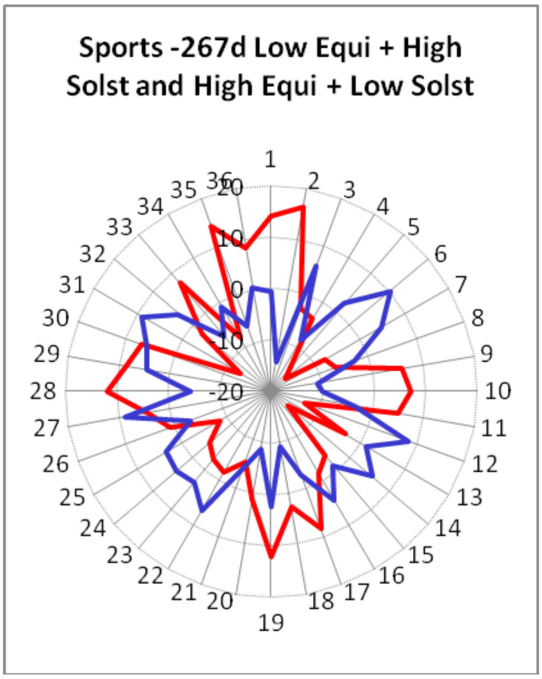
This corresponds to the regions close to 0, 90, 180, and 270^0 in the original data shown in Fig.3A. When they are combined the results are even more dramatic, as shown in Figs. 7A and 7B (4^{th} harmonic). These graphs represent the 3^{rd} possible way of combining the two correlations of season and solar activity.

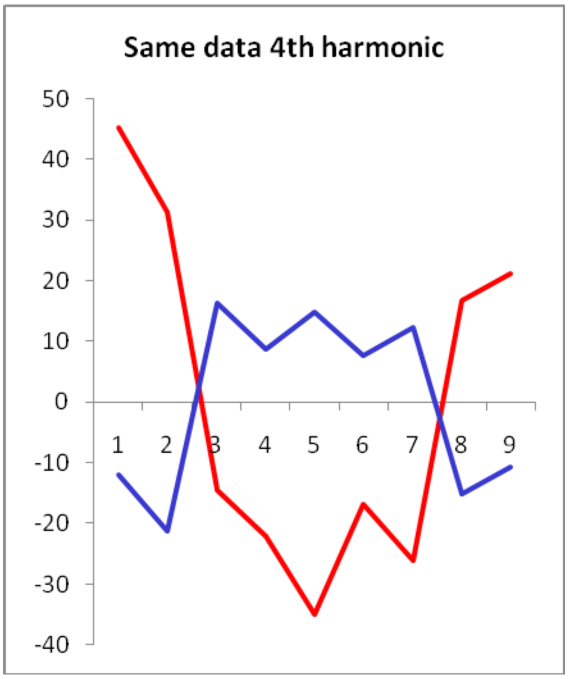
The Xi-Squared value derived from the 4^{th} harmonic for High Solar activity Solstice + Low Solar activity Equinoctial (red line in Fig. 7A) is 48.7 (Df = 1), from a total deviation at points 1,2,3 and 9 of +114.5, Effect Size = 114.5/(1093-114.5) = 0.117. This Xi-Squared value is so high as to make probability calculations unnecessary. It can also be seen that Fig.7B now has the 4^{th} arm of a cross pattern, along the axes 1,19 and 10, 28 which was not apparent in Fig. 3A.





Figs 6A and 6B. Showing the combined effects of solar activity and seasons. Equinoctial data are shown in green, Solsticial in purple.





Figs. 7A and 7B. Showing the 'cross' combinations of High Equinox + Low Solstice (in blue) and Low Equinox + High Solstice (in red), which complement Figs. 4 and 5 above.

So, after looking at the way the conception pattern in ER-MA phases break down according to solar activity and to the semiannual cycle, what have we learned?

First of all there is enough *prima facie* evidence of solar and geomagnetic influences here to justify further investigations, but a solid conclusion requires confirmatory data from other data samples.

The correlation with low solar activity alone seems to be the stronger of the two, with a total deviation in the 3 peaks close to the crucial angles of +62.8 as shown in Fig. 4A, while the association with the semiannual variation is less clear. However, the very strong patterns in Figs. 6 and 7 suggest that it may be important to combine thse two variations.

It is worth noting the relation of the human gestation period to the semi-annual cycle: since 9 months is 1.5 semi-annual cycles, conceptions during the more active phases will be followed automatically by births in the less active phase, and *vice versa*. This may or may not have an influence.

As a useful warning about the care needed in assessing data, especially when more than one planetary cycle is involved, the control graphs for the data in Figs. 6A and 6B, are shown in Figs. 8A and 8B.

It is quite clear that there are strong cyclic variations here, showing the importance of using controls designed for each subset of data. In contrast the controls for ER-MA for solar activity and semiannual cycles separately show smaller variations, while the control for ER-MA alone (used for Fig. 3A) is practically uniform.

The 27 day cycle.

It was not possible to look for evidence of this cycle as it requires special software, but it is worth noting that it was distinguishable from the lunar 27.3 day cycle in a study of births in Brazil (Lisboa and Mikulecky, 2004).

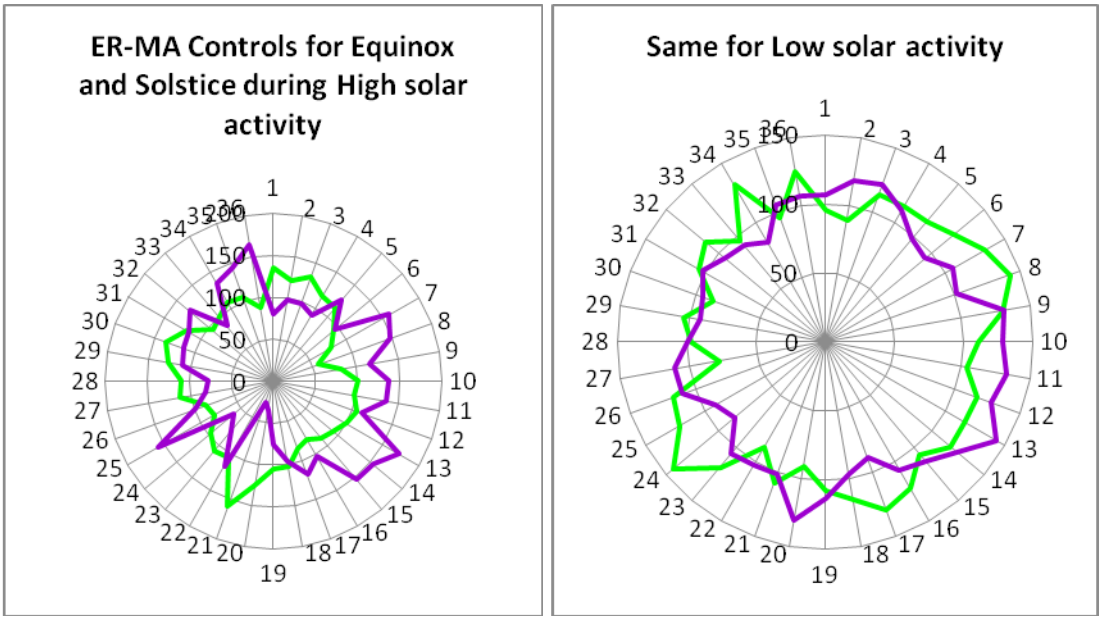
This is the so-called 'synodic solar rotation' cycle, because during the mean solar rotation of about 25 days the earth has moved around the zodiac, so the same solar longitude will not cross the central meridian of the sun as seen from earth for about another 2 days.

It is also worth recalling that the mean gestation period of 267 days is close to 10 solar rotation cycles, and since it is known that solar disturbances often occur in pairs of persistent 'active longitudes' on the sun, the possibility exists for a physiologically active event such as we are considering as a timer at conception, to be repeated with successive solar rotations during gestation.

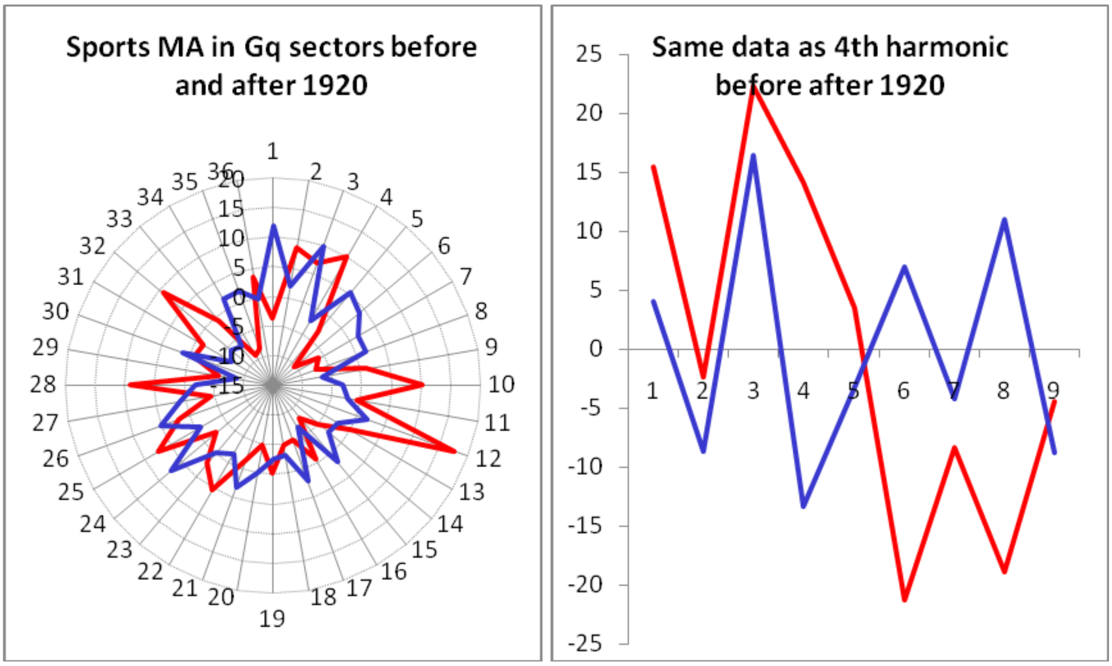
The impact of birth control

In order to examine the possible influence of more frequent use of birth control after 1920 the data needs to be split at this date, and the strength of the Gauquelin Effect examined in each sample separately. However the only professional data set which has a significant proportion of births after 1920 is the Sports Champions.

When these are separated differences are evident both in the conception graphs for ER-MA phases and for the distribution of MA in Gauquelin sectors at birth, which is shown in Figs. 9A to 9D. 1930 has been chosen for ERMA to show the clear loss of structure.



Figs. 8A and 8B. Showing the prescence of regular cyclic variations in the control data when both semiannual and solar activity are controlled for in the ER-MA data.



Figs 9A and 9B. Showing the distribution of MA in Gauquelin sectors at births of Sports Champions before (red lines) and after (blue lines) 1st Jan 1920.

In Figs. 9A, 9B the amplitude of the positive deviations in key sectors before 1920 is +43.8, (N = 1136) and after that date it is 13.7, (N = 951). The Xi-Sq tests show big differences, 9.35 (Df =1, p = 0.0022) before 1920 and 1.08 (Not significant) after that date.

Another distinguishing feature of the data after 1920 is the very small excess of births when MA is near the culmination area, key sector 4. There is also a difference in the distribution near the Ascendant: before 1920 the excess appears in sectors 2 – 4 instead of 36 – 3.

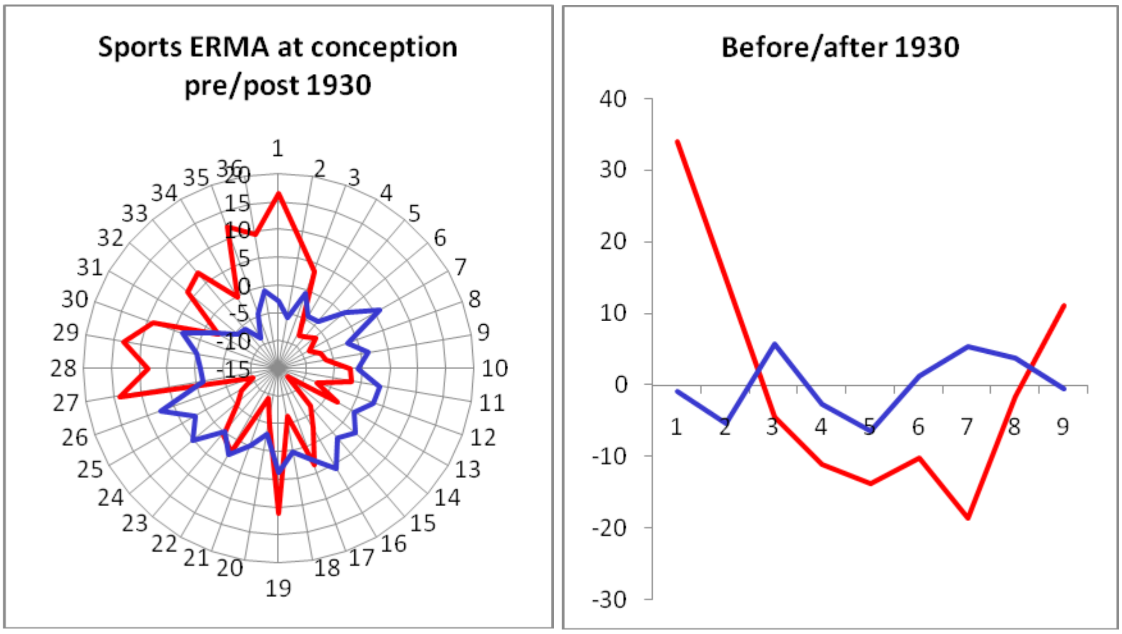
The differences can be seen very clearly in the 4th harmonic graphs (9B), and a Contingency test based on splitting the data into two parts, (sectors 1-5 and 6-9) gives a Xi-Sq value of 4.4 (Df = 1, p = 0.03). The Contingency Xi-SQ value for the data in Fig. 9A is 0.55, not significant, but when the MC is considered separately it is 5.95, p = 0.015. Since the differences are also in the direction predicted, these probability values can be divided by 2.

Turning to the conception data the deviations in the pre 1920 group are also stronger and the larger amplitude is very clear in the 4th harmonic displays in Figs. 9D.

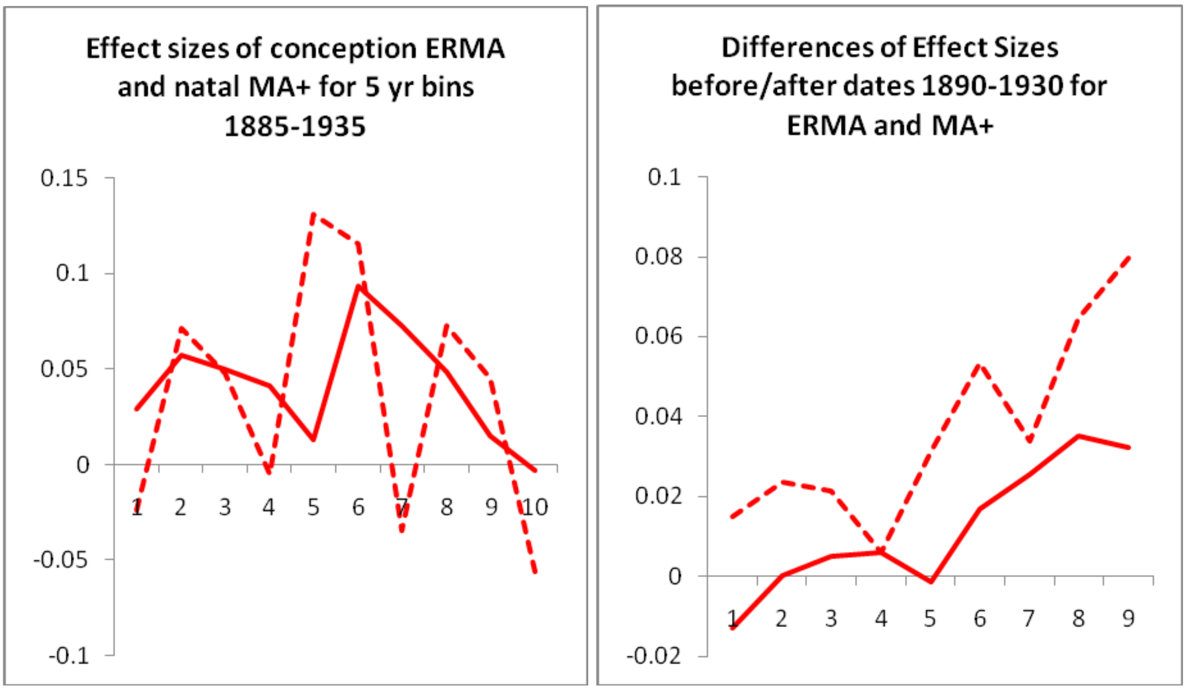
Although the Contingency test is not sgnificant, there is a big difference in the Xi-Sq values for the key sectors compared to the shuffled control.

Before 1st Jan 1920 the value is 10.30 (Df=1, p < 0.001, N = 1136), while after this date the value is only 0.99 (not significant, N = 951), with Effect Sizes of 0.059 and 0.029 respectively. These p values an also be divided by 2 because the differences are in the direction predicted, and taken together with the results at birth for MA in Gq sectors, this is another piece of evidence that the two phenomena are connnected.

In view of these promising results it was decided to investigate more closely by dividing both the conception and birth data into intervals of 5 yrs., starting with 1885-90, and calculating the effect sizes (ES) in two ways. By calculating ES values for both MA at birth and ER-MA at conception for each 5 yr set of data a graph can be plotted from which possible variations can be detected, as shown in Fig 10 A. And the difference in effect sizes before and after a certain year, for the same series of dates 5-yr intervals, and for both the ERMA and MA + data are shown in Fig. 10B.



Figs 9C and 9D. Showing the corresponding differences at conception for ER-MA phases pre (red, N = 1698) and post (blue, N = 389) 1930. Note the disappearance of peaks at the key phases.



Figs 10A and 10B. Showing the variation in EffectSizes in 5 yr steps for the conception ERMA data (dotted lines) and natal MA in key sectors data (solid lines).

With data series like this it is possible to employ the more powerful methods of parametric statistics to measure correlations: the Pearson Product Moment Correlation (PPMC) coefficient in this case, whose critical values are available on the internet at www.statisticshowto.com/tables/ppmc-critical-values/.

The PPMC value is 0.815, corresponding to a probability below 0.01 for dF = N-2 = 7, and each line separately correlates with the year scale with PPMC values of 0.85 (ERMA) and 0.93 (MA+).

At first sight the data in Fig. 10A are not promising, since although there is a decline in the correlation between the Gauquelin Mars Effect and the ERMA pattern at conception after 1915, it also shows large oscillations. The decline is more evident in the increasing differences between the respective Effect Sizes shown in Fig. 10B, which is consistent with the hypothesis of increasing use of family planning.

The peaks of the Schwabe cycle occur in 1893, 1906, 1917, 1928, and these years fall in segments 2, 5, 7, 9. It might be that the oscillations in Fig. 10A relate to the Schwabe cycle, as we have already found that both Mars and ERMA effects are enhanced during low solar activity periods, although this pattern is not followed before point 4 on the graph in Fig. 10A.

In order to obtain a fuller picture of the possible involvement earth-planet synodic cycles at conception, it is important to apply the tests just described to another collection of sports champions, especially because of the controversy between the Gauquelins and various skeptics groups.

The Skeptics' 'debunking' of the Gauquelin Effect.

As described in the book *The Tenacious Mars Effect*, by Ertel and Irving (1997), there have been several attempts to show that the data used by the Gauquelins was biased, the most recent of which was made by the CFEPP (*Comité Francaise pour l'Étude des Phénomènes Paranormaux*) in 1995. Their database consists of 1066 French Sports Champions taken from two French directories, and has been kindly sent to me by Dr. Nicholas Kollerstrom. Another 54 which had been overlooked, were added later making a total of 1120 (Nienhuys, 1996: 136). I was kindly also sent this file by Dr. Nienhuys, and soon noticed that the file of 1066 contained many errors in longitude – such as Paris 2W20 instead of 2E20 – so the data analysed here come from the 1120 file.

Although it contains many people from the Gauquelin collection it is still different enough to warrant a closer examination. The first feature to note is the very different distribution of years of birth, as shown in Fig. 11.

The skeptics data has a very small Gauquelin Effect, with an Effect Size of 0.013, an excess of only about 13 births expectation in key sectors, which is statistically insignificant. But from what we have just learned about the Gauquelin database it is necessary to investigate how the strength of the deviation varies with the period of years during which the births occurred.

The data have been divided into just 4 periods because the sample size is smaller: pre 1920, 1920-29, 1930-39 and 1940-49, and the Effect Size calculated for each interval. Likewise following the observations reported above, the same calculation was made for the ERMA phase at conception, and the results are striking.

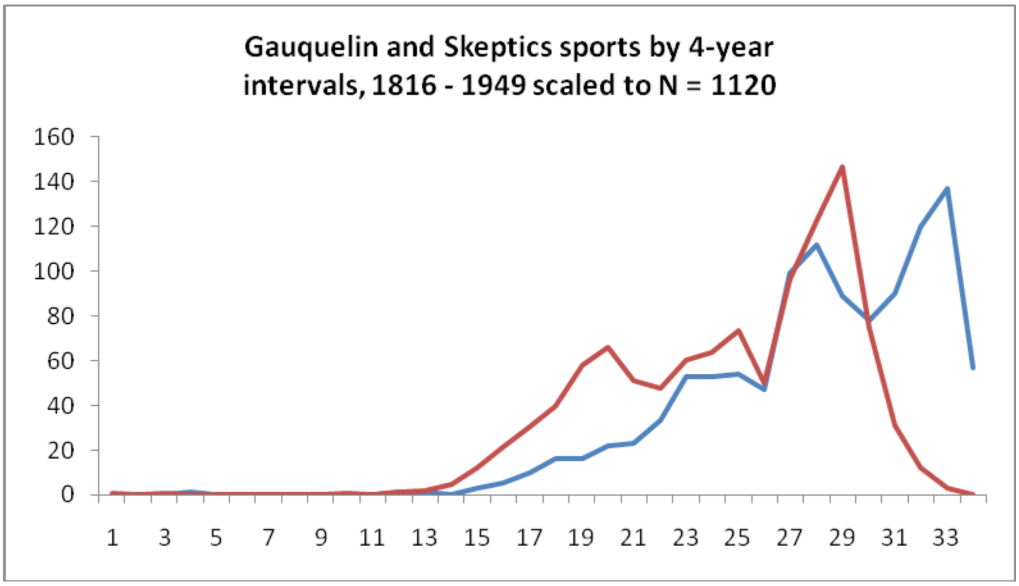


Fig.11. Showing the yearly distribution of Sports Champion births for the Gauquelin data (red) and the CFEPP skeptics data (blue). The horizontal scale numbering is arbitrary, each point represents an interval of 4 years. Both graphs begin to rise about 1860.

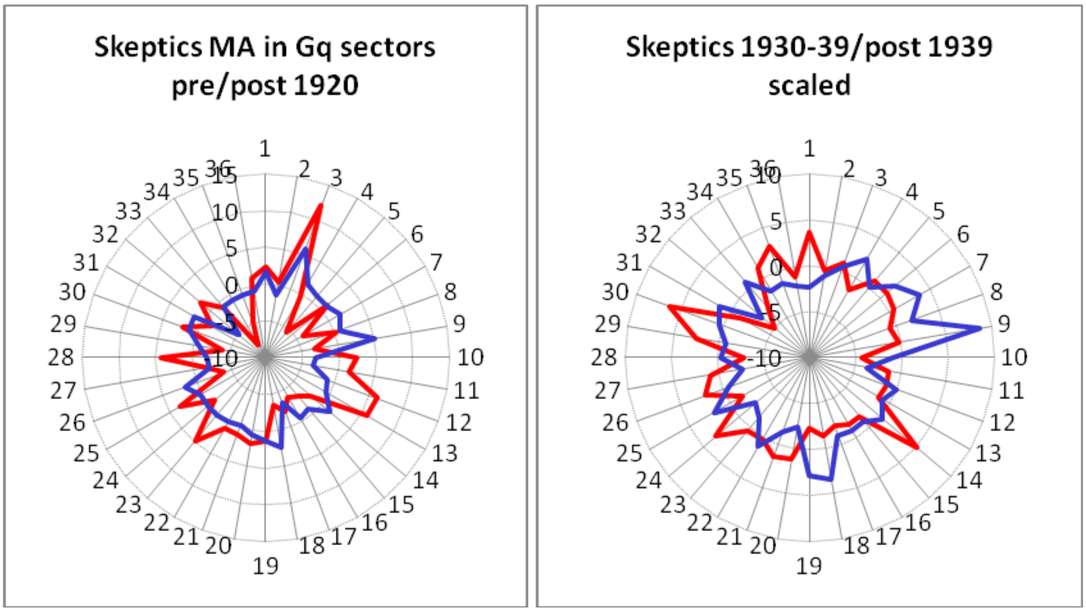
While the Effect Size for both MA in key sectors at birth and ERMA positive phases at conception is over 0.05 before 1920, it is very small or negative in subsequent decades. And since the CFEPP data contains 782/1120 births after 1919 compared to 951/2087 in the Gauquelin data, it is these low Effect Sizes which reduce the overall value, which the CFEPP used to claim that the Gauquelin Effect does not exist.

The true conclusion is quite different: the Mars Effect diminishes rapidly after 1920 – not 1950 as is commonly stated – but before that date, the CFEPP have actually found a *stronger* Mars Effect than the Gauquelins themselves did ! This was pointed out by Ertel (1999b: 53), but he suggested that the Mars Effect had not disappeared because it had fallen significantly below expectancy, or in the present terminology the Effect Size was significantly negative.

The Effect Size in the Gauquelin Sports Champions was 0.065 before 1920 and 0.030 after that date. And again in Fig. 12A we find a greater reduction in the peak near culmination as we saw in Fig. 9A. The Effect sizes for the rising and culminating zones separately are +0.0205 and +0.0089 respectively before 1920 and +0.035 and -0.017 after 1919. Fig. 12B shows the continuing degradation of the Mars Effect in subsequent decades, until it completely disappears after 1940. The contingency test (Df = 1) gave Xi –SQ = 4.52, p = 0.034, comparing the combined key sector frequencies before 1920 and after 1919.

It is important to examine the ERMA patterns in this new sample to compare with the results for Gauquelin Sports Champions, and in Figs 13A – 13D the gradual loss of a 4-peak pattern with time can be clearly seen.

The variation in the Effect Sizes for MA in key sectors at birth and ERMA positive phases at conception is shown in Fig.14 A and 14B. For 14A only the phases of the ERMA cycle defining the biggest peaks in Fig. 3A were used: 330-20 and 240-280^0 in the Gauquelin Sports ERMA data; in 14B they have been defined by the peaks observed in 13A. The latter method gives a much higher correlation coefficient, but the downward trends are similar.



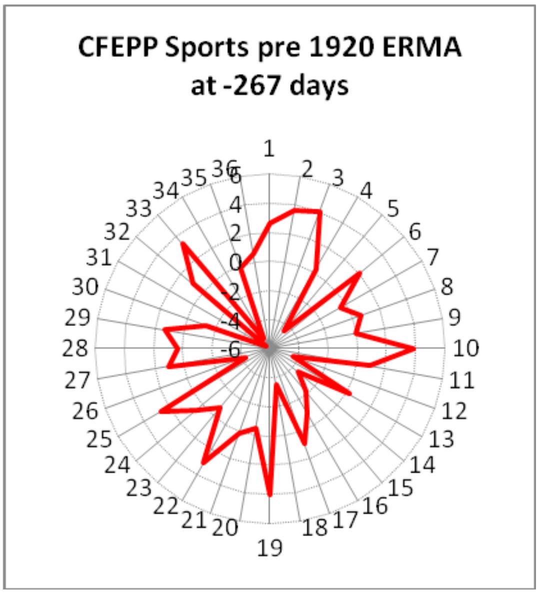
Figs 12A and 12B. Showing the progressive disappearance of **the Mars Effect in the CFEPP data, between earlier (red) and subsequent (blue lines) data sets. In both figures the differences from controls have been scaled to the same sample size to improve the comparisons.**

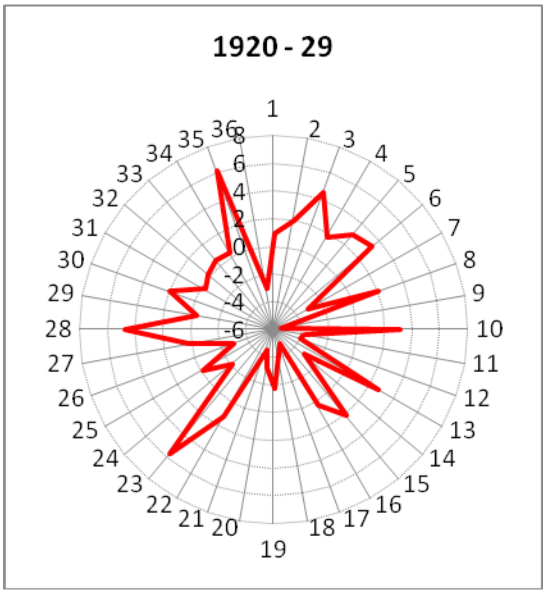
With this choice of ERMA phases the PPM correlation coefficient of 0.570, but in the interests of fair comparisons we need a standardised procedure, and a better candidate is the set of phases found in the Gauquelin 2087 Sports Champions, as shown in Fig. 3A. The set used for testing ERMA filters was expanded slightly to allow for greater width at the 180^0 phase as follows: 340-30, 80-90, 160-200, 260-300^0, a total of 14 out of 36 ERMA sectors.

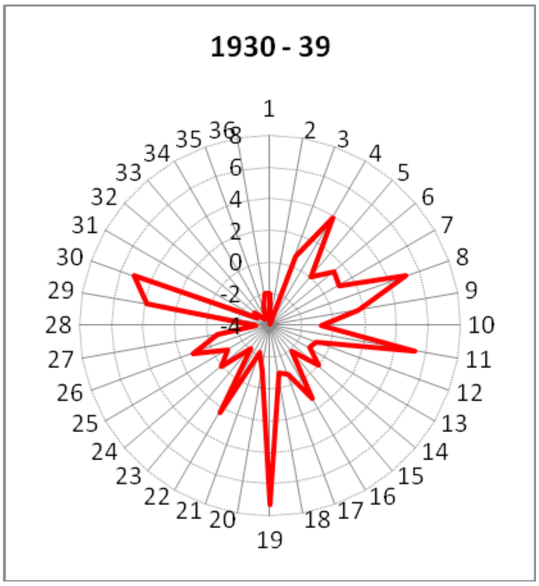
Doing this increases the PPM correlation coefficient to 0.890, a figure which still does not reach the threshold of significance, due to the small number of points available.

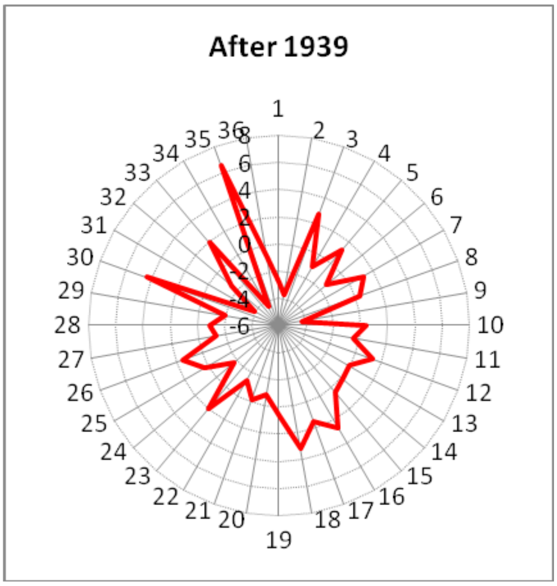
The patterns in Fig. 10A and Fig. 14 are clearly different, but not necessarily inconsistent. In fact if we consider that the Mars Effect is diminishing due to the increased use of contraception after about 1915-20 this is what is expected.

If the same calculations are done with the Gauquelin data, for the same data ranges: pre-1920, 1920-29 and 1930-35 the Effect Sizes for MA in Gauquelin sectors at birth are 0.0467, 0.0297 and -0.0032, respectively, showing a less dramatic rate of decline, but still reaching close to zero by 1930-35 as it does for the skeptics data, and the same effect is visible in the last 4 points of Fig. 10A. The corresponding values for ERMA Effect Sizes are: 0.0586, 0.0760 and -0.0423, respectively, also showing a decrease to a negative value, although increasing at first.Given the way that these patterns are consistent with the hypothesis that the Gauquelin Effect in fact originates at conception, it is important to study other data which contains a Mars Effect.



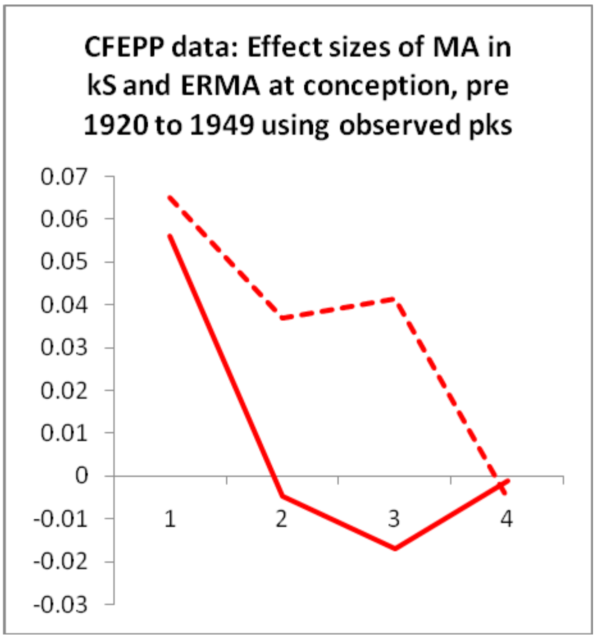






Figs 13A to 13D. Showing the Distribution of conceptions in the CFEPP collection across the ERMA cycle in 4 different time periods, relative to the control.

Some of these other data sets have been the subject of controversy between the Gauquelins and various skeptics groups, with each side accusing the other of biased data selection, but the aim of this paper is not to reignite that debate. The possibility of an influence at conception needs to be repeatedly tested for its possible correlation with the Mars Effect on the day of birth, but at the same time it provides an opportunity to examine a feature which could never have been subjected to manipulation because it was unsuspected.



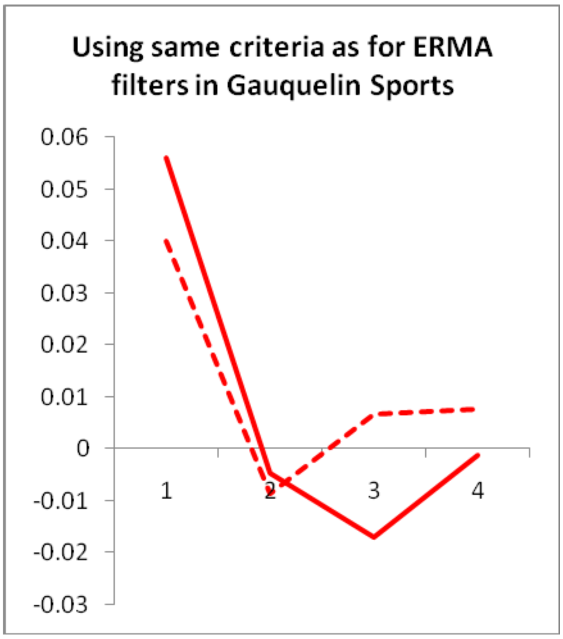


Fig.14A and 14B. Showing the trend in Effect Sizes for the ERMA positive phases (solid) and MA in natal key sectors (dotted line), for the CFEPP data. PPM Correlation Coefficients, 12A = 0.57, 12B = 0.890.Data points are for 4 periods: pre-1920, 1920-29, 1930-39 and post 1939.

If manipulation took place, it was in the selection of data, not in altering the birthdates of known champions because this would have been easy to unmask. So if a data sample which would have shown a positive Mars Effect was manipulated so as to weaken or even negate it, then if the present hypothesis is correct this should automatically also weaken the ERMA effect 267 days earlier than the birth day.

Other European data.

There is are 3 other samples worth considering on the CURA website, the *New Sports Champions, New Army Professionals*, and the *Liberation Fighters*, because they are also professional soldiers, although motivated by a cause and not by a career.

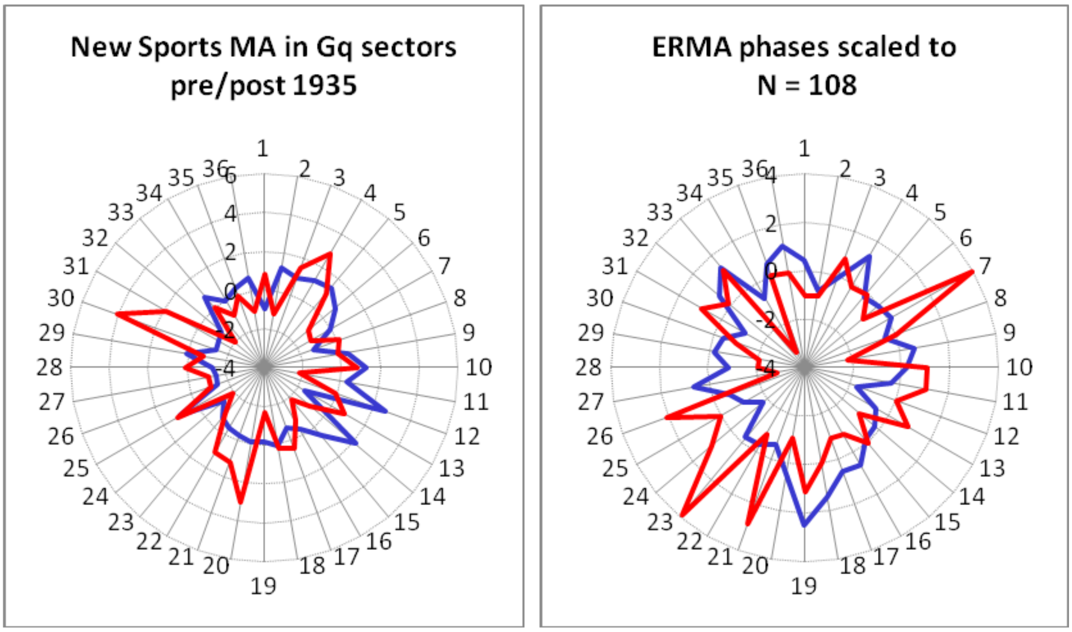
New Sports Champions.

The MA distributions in Gauquelin sectors relative to controls are shown in Fig. 15A and it is the later set which actually show the stronger Mars Effect, with Effect Sizes of -0.001 before 1935 and +0.079 after 1934, with corresponding Xi-Squared values (Df = 1) of 0.0005 (not significant) before 1935, and 10.5 (p = 0.001) after 1934.

In Fig.15B the ERMA data is compared and the Effect Sizes are -0.101 before 1935 compared to +0.058 after 1934, and Xi-SQ values of 5.78 and 4.35 respectively, consistent with the order of the Mars Effects.

Before continuing we need to consider this reversal of expected trend more carefully, even though it is accompanied by a parallel shift in the ERMA Effect Size as predicted.

Unlike most of the other samples of data, these are highly concentrated so that 214/449 were born in the years 1940 – 48, covering World War 2 and its aftermath. The number of troops deployed abroad during WW2 was far larger than in WW1. About 1 million US troops had arrived in France between spring and summer 1918 when the war was nearly over, but over 16 million were abroad in Europe, North Africa and the Pacific following the attacks on Pearl Harbour in December 1941, and many remained as occupation troops in Germany and Japan. 52% of British men aged 19-40 were in uniform during WW2 (Purvis, 1995: 268). Families living at home postponed having more children until after the war, resulting in the baby boom of 1946, but both soldiers abroad and wives and girlfriends left at home for long periods were likely to have casual relationships. The number of illegitimate births during WW1 in England increased by 30%, but during and after WW2 it has been estimated that over 100,000 so-called GI-babies were fathered by US and Russian troops in Germany (Wiltenberg and Widmann, 2007).



Figs 15A, 15B. As above for New Sports Champions pre 1935 (red, N = 108) and post 1934 (blue, N = 341), scaled to N = 108 for comparison. Despite the striking pattern in the earlier data, it is the later set which shows a *stronger* Mars Effect and the ERMA patterns are also reversed compared to the other 2 data sets.

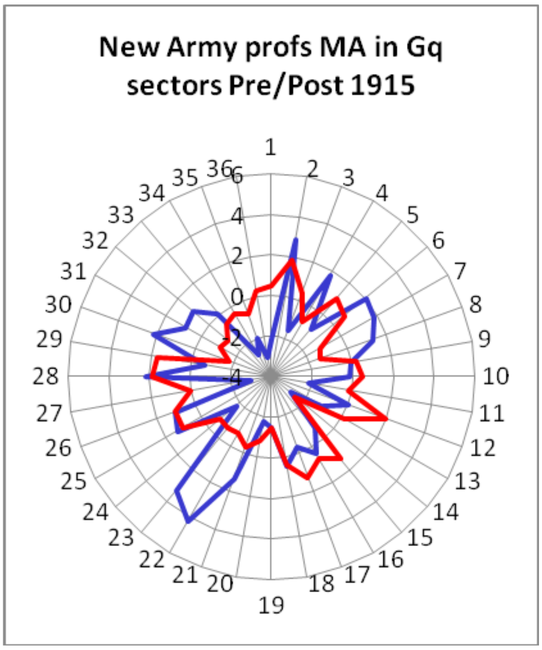
When the New Sports data is filtered to take this into account the pattern is clear. The Effect Size for the Mars Effect for the period June 1940 to June 1947 is 0.087 (N = 186, Xi-SQ = 6.62, $p < 0.01$) compared to 0.014 (N = 263, Xi-SQ = 1.17, not significant) for the rest of the data. The corresponding ERMA Effect Sizes are +0.053 and -0.010 in line with the same trend, and adding more support to the theory that demographics involving conception are crucial to understanding the Gauquelin data.

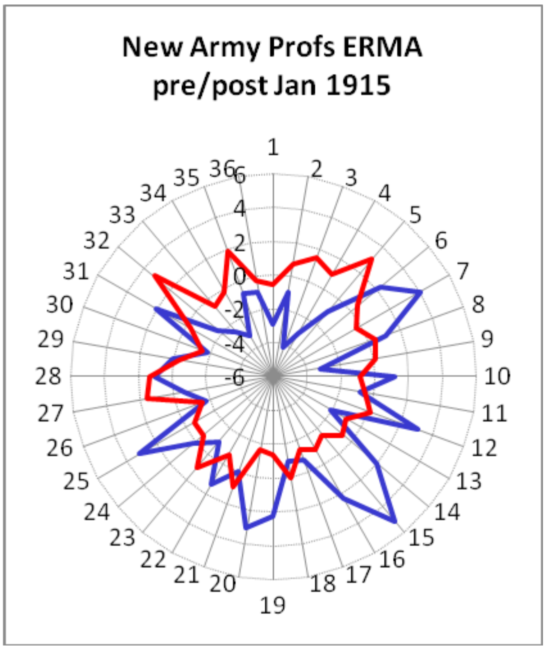
Comité Para data

This collection of 535 French and Belgian Sports Champions was an earlier attempt to test for reproducibility of the Mars Effect, and the conclusion was that there was no significant effect. But once again the historical period turns out to be crucial. The median date was December 1921, and if the collection is cut at this point we get 268 before 1922 and 267 after 1921. The data do not seem to be available with geographical coordinates, but I am indebted to Dr. Nicholas Kollerstrom for providing me with the data analysed by Professor Ertel, which contains the dates, times and Mars sector frequencies in 36 sectors. Using Mark Pottenger's control data, we find 136 births with Mars in key sectors, compared to 124.6 expected by chance, giving a Xi-SQ value (Df = 1) of 1.36, not significant. However when the two halves are analysed separately using the same controls, the corresponding figures are 4.44, p = 0.035 before 1922 and 0.021, absolutely insignificant after 1921. The corresponding Effect Sizes are, 0.022 overall, 0.058 before 1922 and -0.012 after 1921.

When the ERMA data are analysed in the standard way the Effect Sizes are 0.061 and 0.046 respectively, with Xi-SQ values of 3.68, p = 0.06 and 2.15, p = 0.14, values which can be divided by 2 since the deviations are in the predicted direction. However the graphs show sharp but narrow peaks at the 90-100 and 180-190 phases, and when the data are analysed in this way the Effect Sizes are 0.104, 0.066, with Xi-SQ values of 11.15 and 4.79, giving p values of 0.0007 and 0.03 respectively. With both protocols the Contingency Test results were not very significant.

New Army Professionals





Figs. 16 C and 16D. Similar to 14A,B for New Army Professionals before 1915 (red, N= 422) and after 1914 (blue, N = 140), both scaled to N = 140. ERMA data are in the same direction but not statistically significant.

In this collection 474/562 were born between 1888 and 1924, with a negligible fraction during WW2. However when their data are split at Jan 1st 1915 differences appear in both the Mars Effect at birth and ERMA 267 days earlier.

The results are shown in Figs. 16A and 16B. Effects sizes for the Mars Effect before and after Jan 1st 1915 are +0.042 and -0.042, with Xi-Sq values of 3.79 (p= 0.05) and 1.50 (not significant). Despite the strong difference in the Mars Effect, the ERMA patterns are rather vague, although they differ in the predicted direction, Effect sizes +0.0004 pre 1915 and

-0.071 post 1914.

Liberation Fighters

This group would not be expected to reveal a Mars Effect if we stick to conventional definitions based on professional eminence, so finding one here is important. This data is also highly concentrated in time, this time around the time of WW1, 577/616 being born in the period 1896 – 1924, which does not allow analysis in many date bands. However after examining 4 subsets it became clear that there is a frontier between 2 different MA distributions at around 1915. There is little difference in the pattern after this date whether it is cut off after WW1 or includes all the rest of the data. While the expected peak near the ascendant is absent there is a strong peak near the upper culmination until 1915 when it shifts suddenly to the lower culmination. Despite the lack of births with MA rising the shift away form the culmination is strong enough to produce a big change in Effect Size for the Gauquelin key sectors calculated in the normal way, from +0.032 to -0.061. When Xi-SQ is calculated for each of the rising and culminating key sectors separately, the deviations at rising are negative and insignificant, both before and after 1915, whereas the culminating sectors have Xi-SQ before 1915 = 6.85 (Df = 1, p = 0.009), and 1.84 (not significant) after 1914. In each test the two categories used were the key sector under consideration and all the rest of the sample.

When a Contingency test is performed with 3 categories, Upper key sectors (9-12), Lower culmination (28-30) and all the rest, the Xi-Sq value is 16.15 (Df = 2) giving p = 0.0002.

The conception patterns in ERMA are different from those encountered so far, with greater than expected frequencies extending from phases 220-290 after 1915, nevertheless keeping the same criteria as before, the ERMA Effect Size changes from +0.052 pre-March 1915

to -0.045 post-Feb 1915.

The results are shown in Figs. 17A and 17B. It should also be mentioned that there is a strong Saturn Effect, which will be treated in detail in Part 2 of this paper.

The Mars Effect for murderers and terrorists.

Another small (N = 237) but completely independent sample with a positive Mars Effect,

was collected from various sources for a study of murderers and terrorists (Douglas 2010, see also Ruis 2008). It contains 102 births from the US and Canada.

Before 1920 there are only 55 births, and the median date is after 1940, so it was decided to split the data at Jan 1st 1930, in the hope that the Mars Effect would not have diminished too much while retaining a sufficient number of births to make analysis possible, 85 were thus obtained.

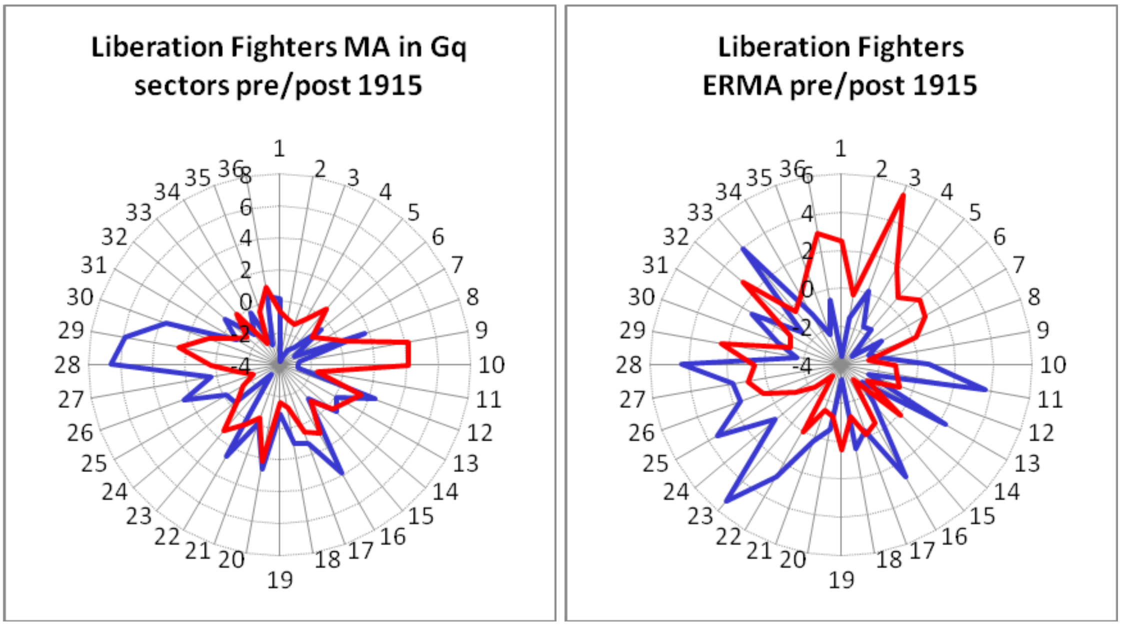


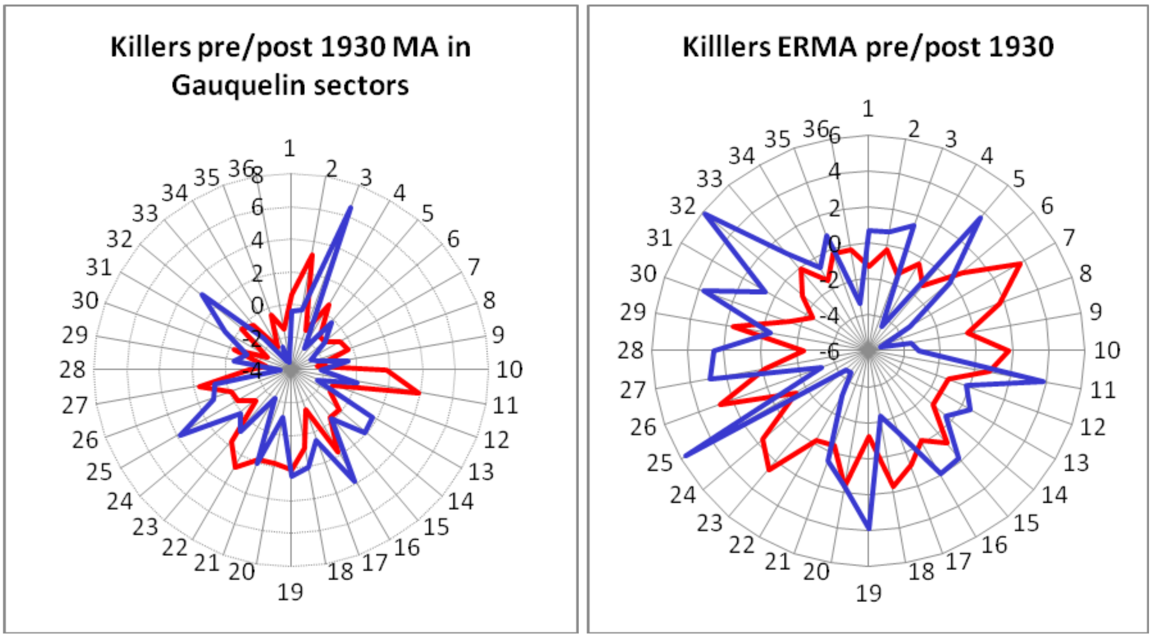
Fig 17 A. Freedom Fighters before March 1915 (red, N = 418) and after Feb 1915 (blue, N = 198). MA in Gauquelin sectors at birth in 14A, and the 2nd harmonic distribution of conceptions across the ER-MA cycle both scaled to N = 198.

Here too the emergence of a positive deviation in key sector 4 before 1930 is evident, a feature not suspected at the time the work was published, but making sense now because the sample is dominated by later births. In Fig. 18 B the loss of 4th harmonic structure after 1929 is evident. The key sector peaks are narrower than usual, occupying only 2 of the normal 4 sectors in each case, and the Effect Sizes for each of these separately were 0.023 and 0.044 for sector 1, and 0.065 and – 0.020 for sector 4, before and after 1930 in each case.

When both key sectors are combined the Effect sizes are 0.091 before 1930 and 0.023 after 1929, while the Xi-SQ values (Df = 1) were 5.43, p = 0.02 before, and 0.74, not significant, after 1930.

Splitting the data at Jan 1st 1940 reduced the Effect Size difference, with 0.065 falling to 0.028 after that date, so if there was a wartime effect it was small, and we must remember that the data are not homogeneous, consisting of a variety of criminal types, nearly half from North America.

There is also a large difference in the minor Gauquelin sectors (19-21) at the descendant, where there is an excess which spreads as far as sector 23 in the earlier data: 27/115 compared to 16/122. And this difference recurs when the data are split by longitude, those west of 5W00 have 5/95 in sectors 19-21, while East of 5W00 the numbers are 22/142.



Figs. 18 A and B. Showing the distribution of MA in Gauquelin sectors for a collection of Murderers and terrorists in 18A, and the 4th harmonic presentation in 18B. Red lines before, blue lines after Jan 1st 1930.

For the ERMA data the corresponding Effect Sizes before and after 1930 are +0.0070,

and +0.019, while when the cut is made at 1940 the values are 0.0007 and 0.0282.

The samples are too small to split them by both date and longitude.

So this is the first sample of data where a decrease in Mars Effect is accompanied by an increase in the ERMA effect.

Since the Gauquelins had already found that a collection of murderers did not show any Mars Effect, we may perhaps compare the existence of one in this collection to the same contrast that exists in the professional data. While ordinary murderers kill for many reasons and often as a result of conflict in relationships, mass killers, serial killers and terrorists are the ‘eminent professionals’ of the world of violent crime, so it might be expected that they would display a Mars Effect, in the same way as eminent soldiers.

The US data

The most controversial test of the Gauquelin Effect was carried out by the CSICOP committee, and published in 1979 along with replies from the Gauquelins (Kurtz, Zelen and Abel; M and F. Gauquelin 1979) in a special issue of the *Skeptical Inquirer* (SI). It seems undeniable from the data as published, that the Gauquelin Effect was not present, as concluded by Rawlins, (Kurtz, Zelen and Abell, 1979: 28), although Ertel has claimed that it was masked by biased selection of data. The CSICOP data does not seem to be available in testable format, due to their bizarre decision to publish only the date of birth, Mars sector position and US State of each birth. However they did publish a summary table of planetary frequencies, and 191 of these sports champions were also included in the *Gauquelin collection of Successful Americans,* which is available on the CURA site, containing 343 Sports Champions. It is worth noting here that among these 191, there are 5 births that differ from the dates published in the *Skeptical Inquirer*. They seem to be typing errors as 2 involve dates and months being juxtaposed while changing from the US to European format.

The frequency of MA in key sectors (12-sector version) 1 and 4 was only about 14.5% compared to the expected figure of 17.2% in every decade from 1920 to 1950, when it dropped to 2,9% as expected from the increased use of induced and caesarian births. Rawlins later commented on this in an unpublished report (cited by Ertel 1999: 17), and in the same special issue of Skeptical Inquirer, pointing out that the key sectors had MA frequencies which were very significantly below expectation. The surpluses in the minor Gauquelin sectors 7 and 10 were by themselves significantly different from chance expectation at the p = 0.05 level.

This is perhaps a sign of how cramped the debate had become, with both sides fixed on the previously defined key sectors and accusing each other of data manipulation, instead of considering the possibility that the US data did perhaps show a variant of the European Gauquelin Effect, in terms of Mars sector frequencies and taking up the observation that the effect changed with time. For some skeptics the only valid data is that which has never been ‘contaminated’ by Michel Gauquelin, for whom, they seem to believe, his search for a ‘Grain of Gold’, led him to develop a Midas Touch whenever he came across new data.

The question of biased selection applies to both the 191 approved by Gauquelin in his collection of US Sports chanpions, and the other 217, according to Ertel (1999), but he has produced evidence that the bias was greater in the whole set of 408, (which were selected by Kurtz in secret), compared to the other Gauquelin collections. Given this situation it is still of interest to examine the ERMA patterns, which of course were not considered by either side in this conflict, and are unaffected by the hour of birth.

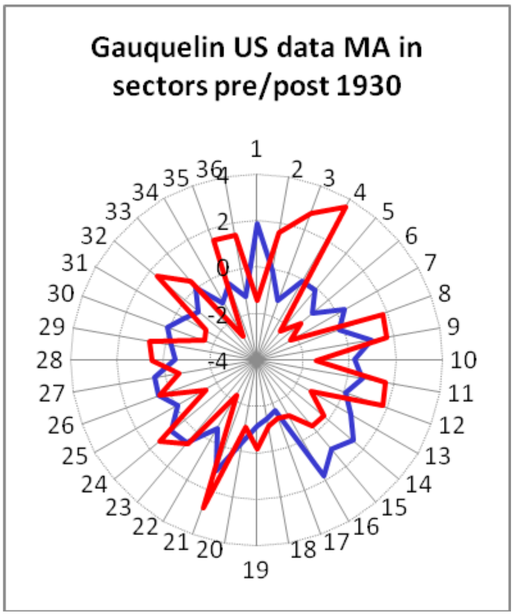
Due to the partial reporting of their data it is not possible to analyse the full set of 408 US champions in detail, since times are not available, however some useful tests can still be made.

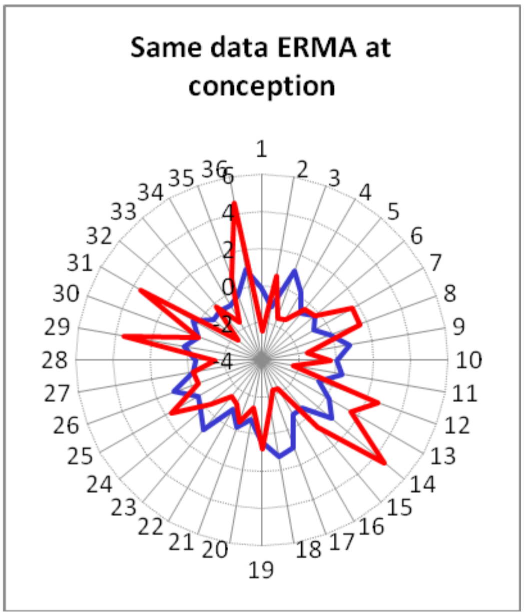
We have the Sports Champions data contained in the Gauquelin collection of Successful Americans on the CURA website, 343 in all after removing one untimed birth, containing the same 191 referred to above, and we can also examine the conception day ERMA patterns.

Looking at the 343 US data selected by Michel Gauquelin in Figs 19 A and B, it is clear that a small classical European-style Mars Effect is still present (total Effect Size 0.031, Xi-Sq (Df = 1) = 2.04 not significant), although stronger in the small sub-sample of pre-1930 data (N = 86) with an Effect Size of 0.100, Xi-SQ = 6.79, $p < 0.01$, leaving an Effect Size of 0.0144 for the data after 1929 (N = 257).

The ERMA graphs show narrow peaks at the conjunction and opposition phases and an avoidance of both the 90 and 270^0 phases. Using the standard method however the Effect sizes are -0.029 and +0.031 before and after the date, thus opposite to the trend in the Mars Effect. By dividing the data at Jan 1st 1939, which is close to the median date, and slightly modifying the ranges of Gauquelin sectors and ERMA phases, the two trends can be made consistent, but at this stage it is better to wait until more US data can be found.

It is more interesting now to compare those fractions of the US 408 accepted by CSICOP with those which were not.





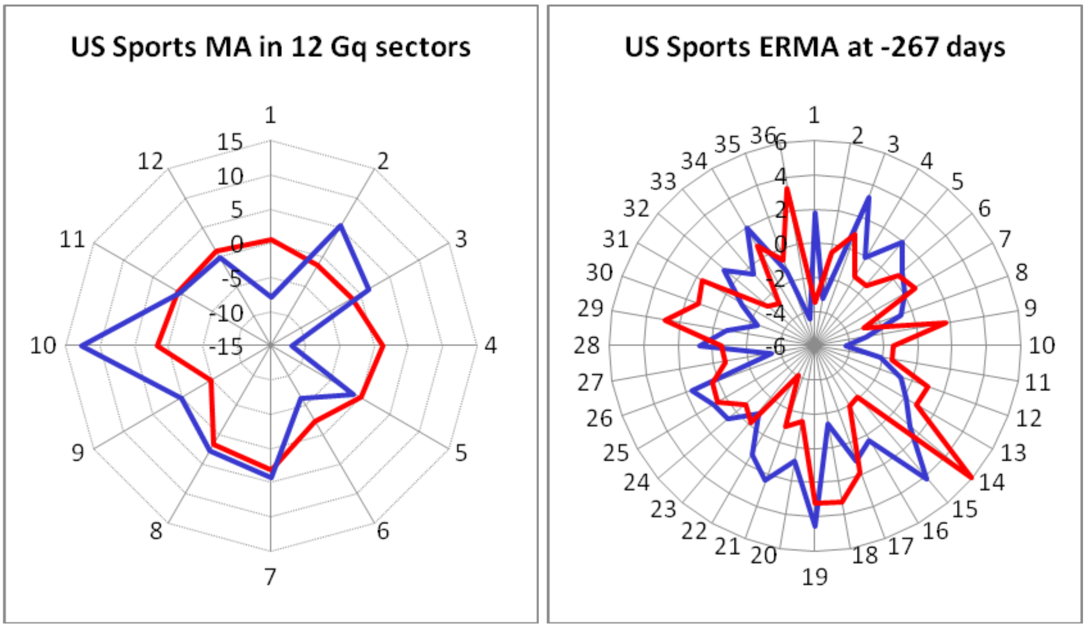
Figs. 19 A, B. Showing the distributions of births with MA across Gauquelin sectors, and in 14B, 267 days earlier across the ERMA cycle, for all (blue, N = 343) and pre-1930 (red lines, N = 86). Both sets have been scaled to N = 86 to show the relative strengths of the effects.

Using the 12-sector frequencies for Mars reported by Rawlins in the SI, together with the data for the 191 Gauquelin champions, we can calculate that the 217 selected by CSICOP had only 19 births with MA in sectors 1 and 4, compared to 36 among the Gauquelin-approved set of 191, leading to Effect Sizes of -0.084 and +0.0009 respectively. When the ERMA data 267 days earlier are calculated the corresponding Effect Sizes are -0.035 and

+0.062, thus indicating a consistent trend with the Mars Effect.

To observe what happens when the data are split by years on such small samples, the best that can be done is to split them near the median year into 2 nearly equal parts, but in any case we do not have times for the 217 selected by CSICOP.

The Mars Effect for the 191 is negative in sectors 36 and 12, so sectors 1-3 and 9-11 were used, which yields 23/97 after 1937 and 17/94 before 1938, with Effect Sizes of 0.061 and 0.0009. The ERMA phases were modified slightly too, because some of the phases used in the standard showed below average frequencies, leaving these: 330 – 360; 80 -90; 160 – 190; and 250 – 260, 280 – 290. The Effect Sizes obtained were 0.113 after 1937 and 0.028 before 1938, again corresponding with the changes in the Mars Effect.



Figs. 20A and 20B. Showing the US CSICOP data split into the 191 which Gauquelin approved (red) and the 216 which he did not.

For consistency the two subsets were also subjected to the protocol used for all other samples, leading to ES values after and before the boundary of 0.0106 and 0.0529 for the Mars Effect, and 0.022 and 0.084 for the ERMA effect. So, the trend is reversed but it happens for both phenomena, and this is also in line with what we have found for wartime conceptions.

US Military

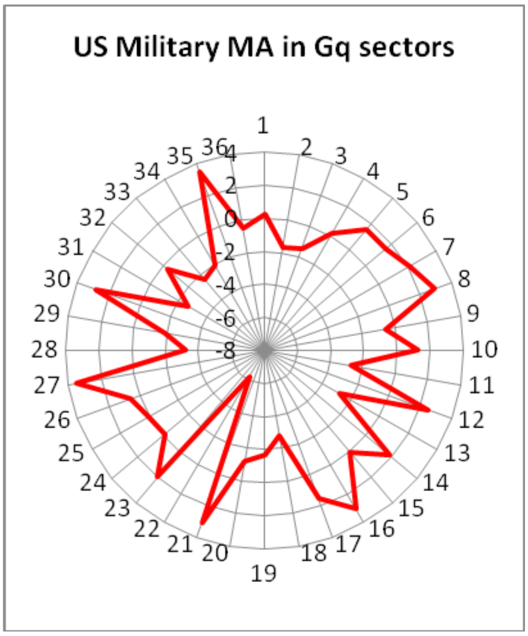
The final US sample is of US military, (N=228) whose birth data are concentrated (213/228) into the period 1912 – 1932, shown in Figs 20A and B. While there is no typical Mars Effect at all (ES = -0.0131), corresponding to a negative ERMA Effect Size of – 0.0092, there is a remarkable pattern in the ERMA cycle at conception. This should be compared with Fig. 3A where it can be seen that the two main peaks are on the opposite side of the graph and do not point to key ER-MA angles, while there is just a small peak near the conjunction. Once again we have the absence of a Mars Effect in correlation with an absent ERMA surplus near the key phases of the synodic cycle. This striking ERMA pattern reinforces the case for investigating planetary dispositions at conception. When this sample is split at January 1st 1921, close to the median date, the Effect sizes for MA in key sectors before and after are

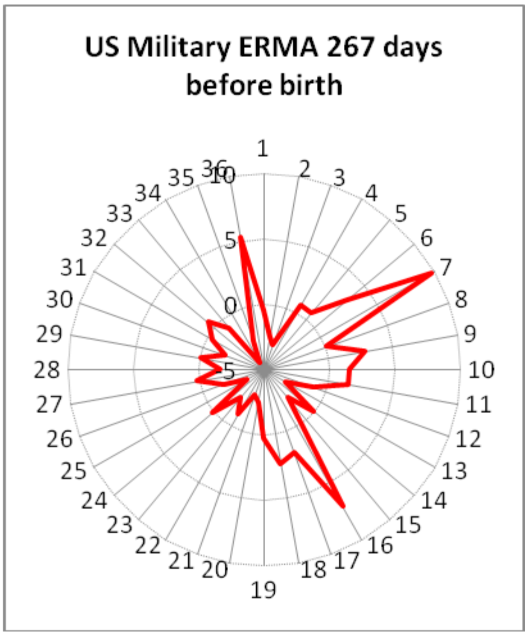
-0.012 and -0.015, while the corresponding ERMA values are -0.015 and - 0.011, all small and negative, but not quite corresponding in trend. And it is interesting that the T-square pattern is much clearer in the pre-1921 set.

The big problem we face is the lack of US data, with samples becoming very small when they are split.

The total fertility rate in most industrialised countries was stable at around 5 per woman between 1800 and 1870 and did not begin to decline until about 1910, dropping rapidly during the first world war, bouncing up at its end, declining until about 1935, and rising again in 1940 to a plateau from which a second decline due to the contraceptive pill began in the 1960s.

The US was different until after WW2, falling steadily from about 7 per woman in 1800 all the way through till the minimum in the 1930s which was typical of other countries (Roser, 2015). While condoms were widely available in the US from about 1870 it is not clear how much this affected the birth rates in the US compared to Europe, but there is no doubt that the fertility rate in the US had been in steady decline long before 1910 when it started to drop in Europe.





Figs 21A and 21B. Showing 228 US military births collected by the Gauquelins.

This topic could usefully be investigated in detail, because there are different factors involved, the fertility rate is a useful index, but the survival rate to adulthood also plays an obvious part, and while there is detailed information on the history of birth-control movements and government restrictions, it is much harder to find historical data on the actual use of birth control, (https://en.wikipedia.org/wiki/Birth_control_movement_in_the_United_States)

The results so far are summarised for convenience in Table 1. In order to measure the overall correlation between a the Mars Effect and the ERMA effect the ERMA data used for the last column were summed. However there are problems due to repetition of data: all 535 sports champions in the Comité Para collection are contained within the 2087 of the Gauquelins published data.

Since Dr. Kollerstrom kindly sent me Professor Ertel's compilation of 4384 sports champions collected by the Gauquelins, and it is clear that this problem is even more widespread. There is a collection of 450 labeled D06 in the compilation, containing 72 entries which also figure in either the C Para or CFEPP data, all born before 1906, which need to be removed. Gauquelin's 450 New European Champions only contains 40 entries before the last one in D06, on November 5th 1919. So to avoid duplication, it seems that we can rely on what remains of the D06 file after extractng these 72 plus another 30 from the USA. In addition a total of 386 CFEPP entries figure among several other Gauquelin sets. After excluding these and another 34 starred entries, there seems to be about 1110 remaining which do not form part of the data so far considered.

So in order to assess the overall correlation between the Mars Effect and the ERMA effect at conception the data in Table 1 were combined but, to avoid repetition, excluding the Gauquelin 343, the US Sport in rows 8,9, and also the Comité Para and CFEPP data. The Xi-Squared Contingency Test value after doing this was 12.92 (Df = 1) giving p = 0.0003. Since this corresponds to a difference in the direction predicted by that in the Mars Effect p can be divided by 2 giving 0.00015.

However since the remaining data in Ertel's collection were of low eminence on his ranking system, it was decided instead to utilise the who 4384 entries solely for examining the very useful ranking scores. Although times are not given for most of the data it is still possible to assess the Effect size of the Mars Effect in each rank, and to do the same for the ERMA effect which does not require times.

This leads to the graph displayed in Fig. 22 showing a correlation between the two sets of effect sizes: as the eminence ranking increases so do *both* the effect sizes.

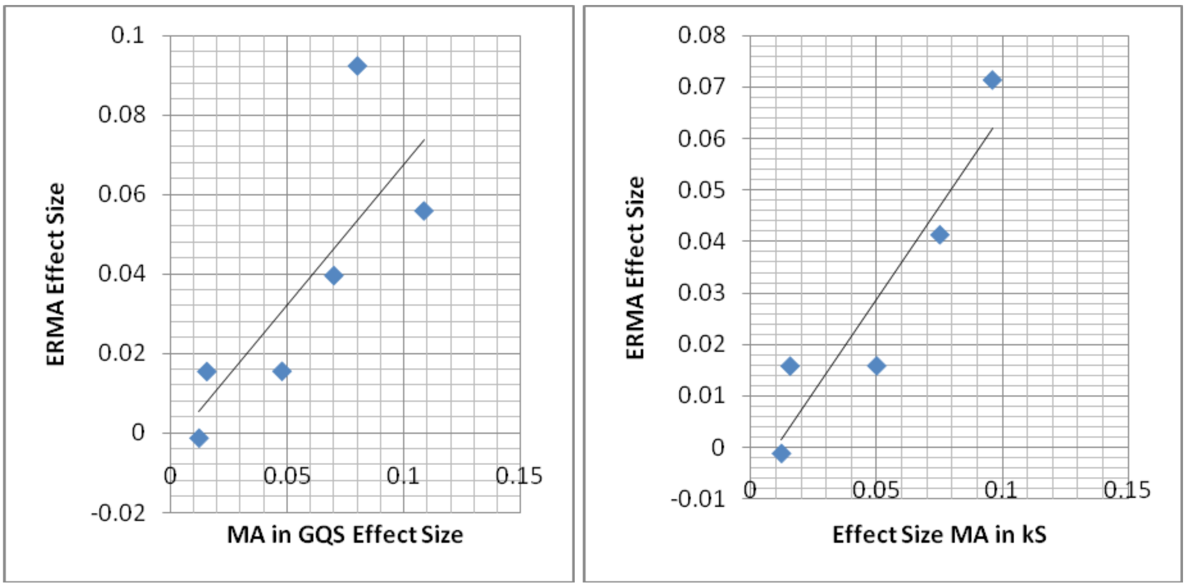


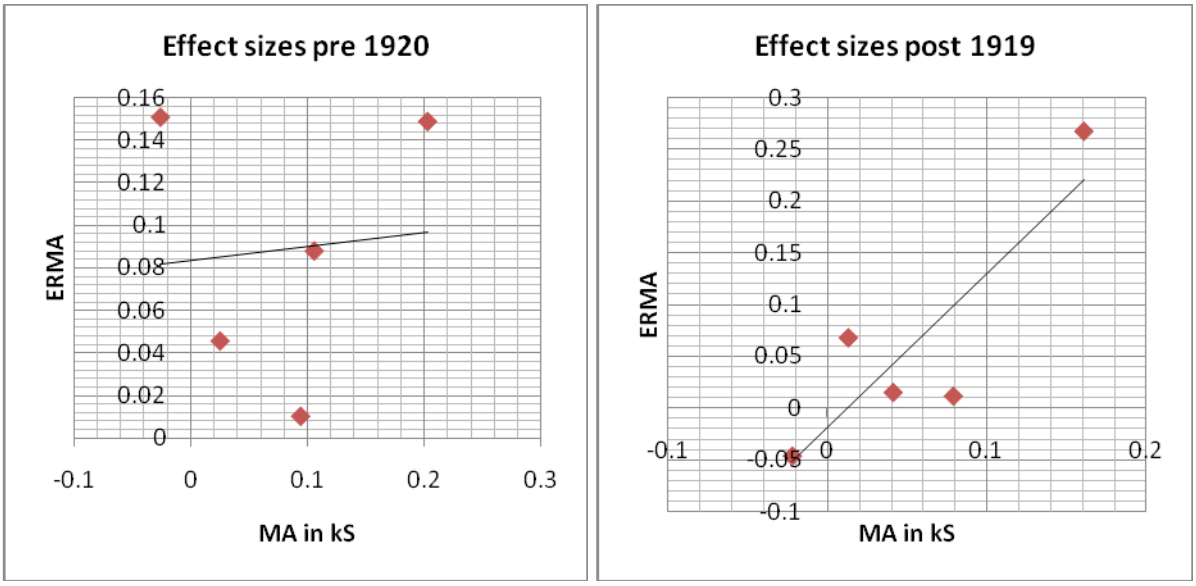
Fig. 21. Showing the corrrelation between the Effect Sizes of the Mars Effect (horizontal axis) and the ERMA Effect (vertical axis), the ranking increase from left to right, 1, 2,3,4,5,6. Pearson PMC coefficient = 0.779; just below the critical value for p = 0.05 of 0.811. For 5 points PPMC coefficient = 0.930.

The trend is clear although the point at Rank 5 is off the line. The last 2 points contain the smallest numbers of data, 101 for Rank 5 and 133 for Rank 6, and when these points are combined the PMC coefficient increases to 0.930, which for 5 points is almost equal to the critical value for p = 0.02, of 0.934. This correlation is a crucial observation because it dispels once and for all the belief that biased data selection engaged in by the Gauquelins invalidates their whole project. Ertel established that there was a small amout of bias, but revealed a systematic correlation between the strength of the Mars Effect and eminence measured by citation counts. If there is also a correlation between the Mars Effect and another effect which was unsuspected by the Gauquelins, then not only do we have a new *theoretical* basis for understanding the Mars Effect, but allegations of fraud become insignificant.

Dataset	ES MA in Gq key sectors pre/post date	ES for ERMA pre/post date	Contingency Xi-SQ Mars Effect	Contingency Xi-SQ (Df=1) ERMA
Gauquelin 2087 1919/20	0.040/0.015	0.057/0.023	AS+MC: 0.56 not signif. MC: 5.95, p = 0.015	2.07, 0.15
Liberation Fighters 1914/15	+0.032 to - 0.061	+0.052/-0.045	16.15 (Df=2), p = 0.0005	12.14, p < 0.0005
New Army 1914/15	+ 0.0420 to - 0.0422	+0.0004 to -0.071	3.93 p = 0.024	2.65 P = 0.057
New Sport WW2/rest	+0.087/+0.014	+0.053/-0.010	2.38 p = 0.068	1.66 P = ???
Comite Para 1921/22	+0.069/-0.016	0.061/0.046	Not sig	Not sig
Killers 1929/30	+ 0.091/ + 0.023	0.007/0.019	Not Sig	Not Sig
Skeptics 1919/20	+0.056/-0.0067	0.040/0.002	4.51 P = 0.034	1.30 0.254
Gauq/Csicop N = 191/216	+0.009/-0.084	+0.058/-0.039	8.76 P = 0.0031	3.82 P = 0.05
Gauquelin (N = 191) 1937/38	0.053/0.011	0.089/0.027	0.39 P = 0.53	0.60 P = 0.44
Gauq US Sport 1930 (N = 343)	0.100/0.0144	-0.029/+0.031	1.98 P = 0.16	1.50 P = 0.22
US Military 1937/38 (N = 228)	-0.012/-0.015	-0.015/-0.011	Negligible	Negligible

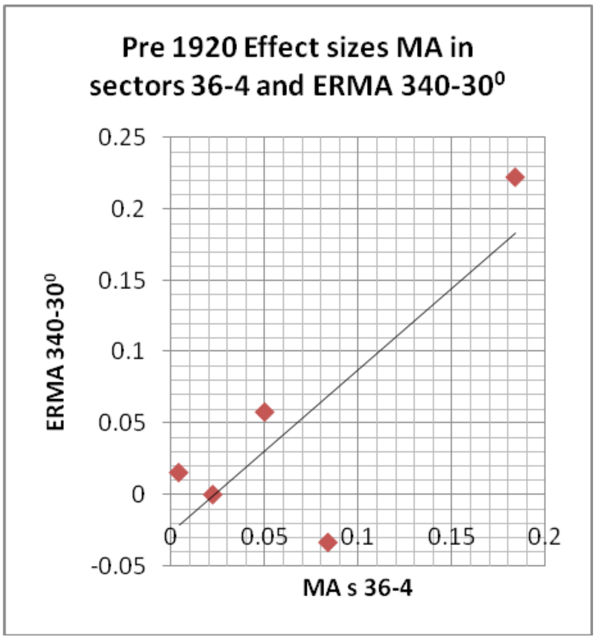
Table 1. Showing response of MA distribution in natal key sectors and ERMA before and after dates indicated in first column. ES = Effect Size. Contingency Xi-Squared test with Df = 1 in each case before and after same dates.

Since the set of 2087 champions formed the core of the Mars Effect claims it is worth looking more closely at them using the eminence rankings.



Figs 22 A and B. Showing the scatter of MA in kS and ERMA Effect Sizes at 5 Ertel Rankings for 2087 Sportsmen split at Jan 1st 1920. PPMC coefficient in 22B = 0.862, not high enough for p = 0.05 (0.878)

Given the stronger Mars Effect before 1920 it might be expected that the correlation would be stronger with ERMA across eminence rankings would be stronger too, but the opposite is true as shown in Figs 22A and B. Since there have been indications that the rising and culminating sectors correlate differently with ERMA it was decided to separate them.



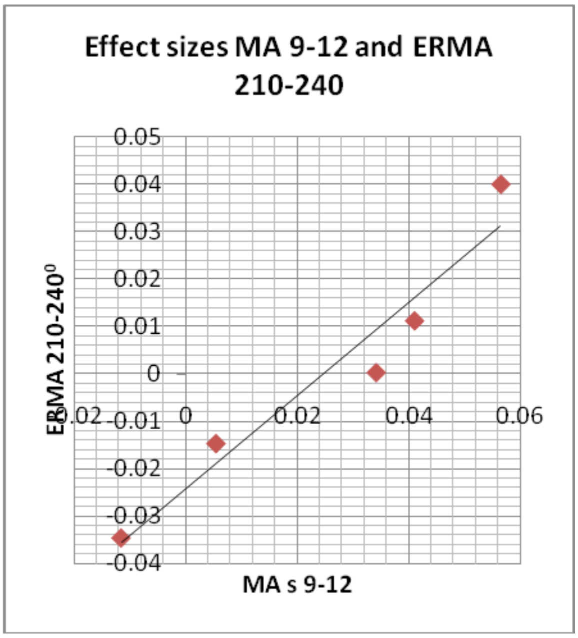
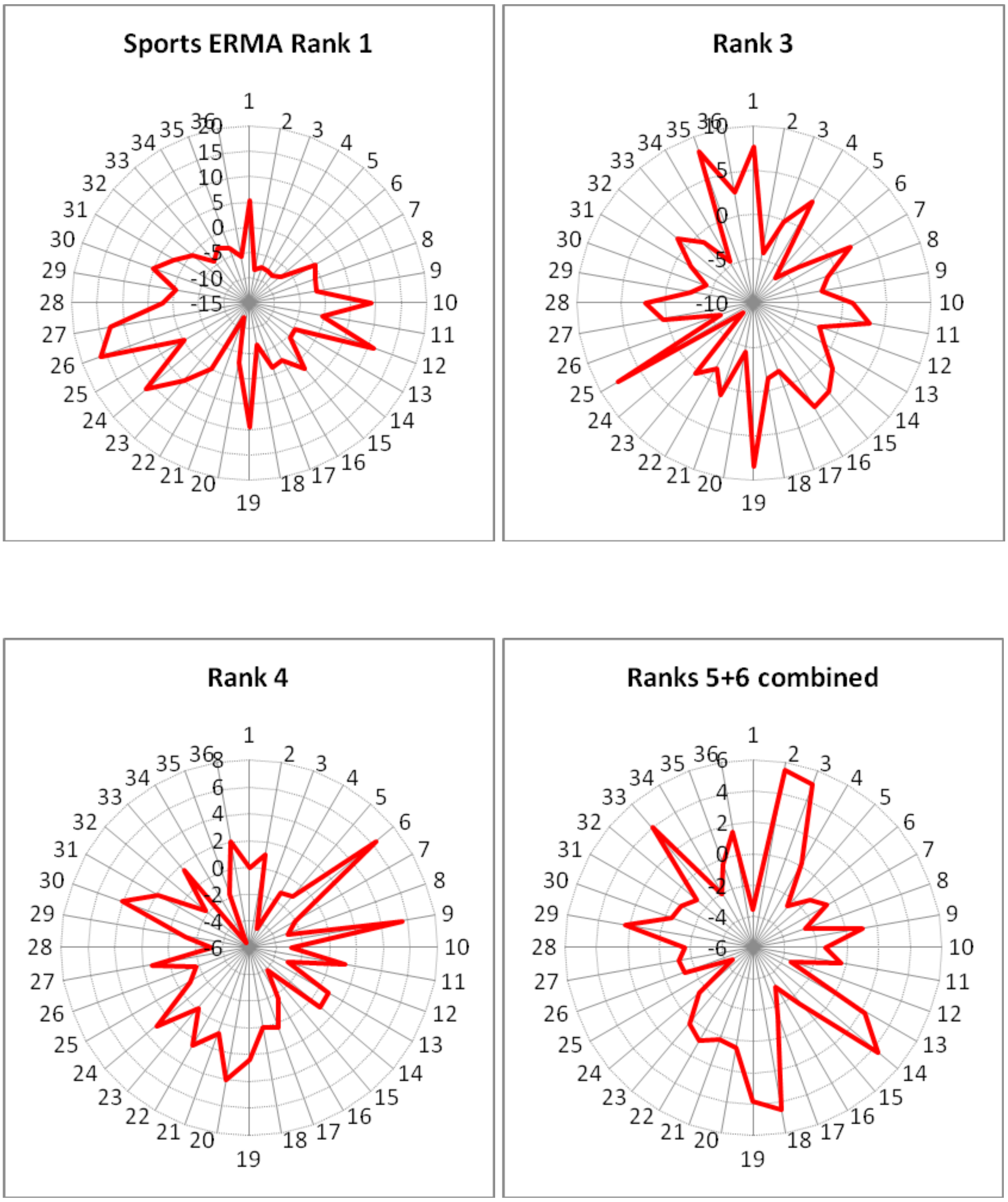


Fig. 23 A,B. Pre 1920 Effect sizes for different of rising and culminating sectors with different ERMA ranges.

A clearer correlation is found (Fig. 23A) when the rising sectors (36-4 in this case as observed) are mapped against the corresponding Effect Sizes of ERMA phases 340-30^0 . In the case of the culminating sector Effect Sizes, the correlation was small and negative with the standard range of ERMA phases used before, suggesting that the intervening phases away from the conjunction, square and oppositions of ER and MA are more important. The best result was found for the phases 210-240^0 as shown in Fig. 23B, with a PPMC coefficient of 0.968, corresponding to $p < 0.01$, although it seems unlikely that such a narrow phase range could have a determining influence. More investigation is required.

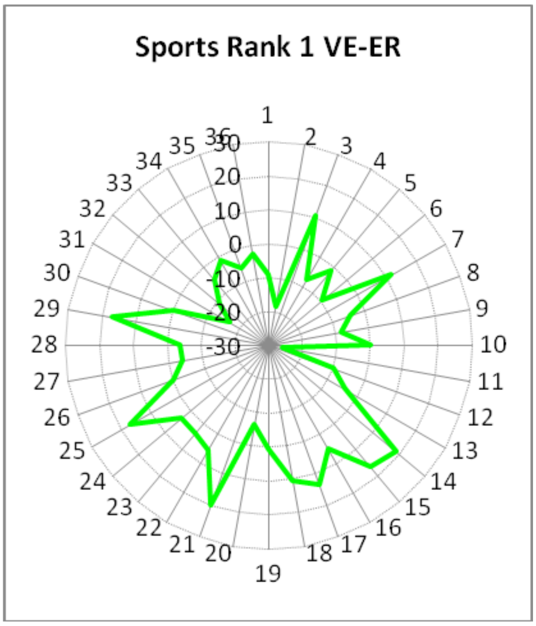


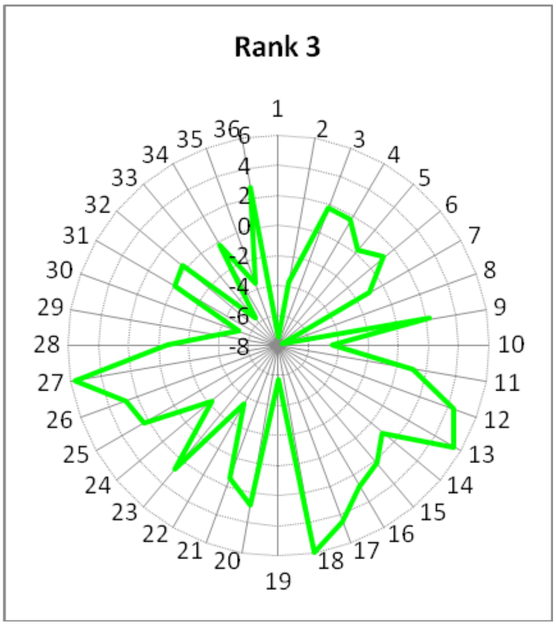
Figs. 24 A to D. Showing the distributions of Sports conceptions across the ERMA cycle at different Ertel Rankings.

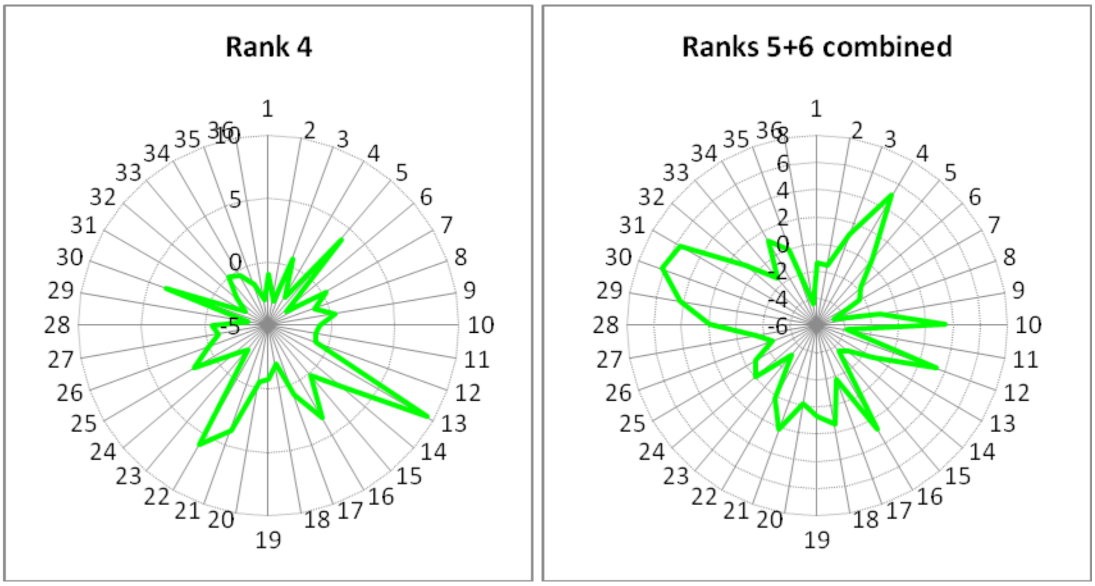
The correlation coefficient is not the only index of a trend, and in Figs. 24 A,B the distributions of births are shown for a selection of Ertel rankings, for the complete champions data.

Although none of them achieve the clarity of Fig. 3A the gradual development of structure in the distributions as the Rank increases is evident, while Rank 5 seems more structured than Rank 6, in line with the Effect Sizes. It is also curious that the lowest rank shows higher frequencies of conceptions at the square angles while the top ranks are aligned with the conjunction and opposition phases – the same trend observed above with decreasing solar activity.

But this is not all, there is a trend in the VE-ER cycle as well, as shown in Figs. 25, and even more extraordinary, are the SA-UR synodic cycle data shown in Fig. 26. The VE-ER data show how the conceptions begin to concentrate around 2 phases, which crucially are *out of phase with those of the ERMA cycle*. They thus support the central concept of the current theory, that solar activity is affected by 0, 90, 180 and 270 degree phases of synodic cycles, that these influences are correlated with human conception, and that VE and MA are antagonists: if sports champions are born when MA has a strong influence they also require VE to have a weak influence. This brings together the much-maligned work of Michel and Francoise Gauquelin, and the tentative theory of Percy Seymour.







Figs. 25 A to D. Showing the development of structure in the VE-ER synodic cycle as Sports Champion ranking increases.

And when we see the emergence of highly structured distributions in the SA-UR cycle it supports the evidence produced above that low solar activity favours the Mars Effect.

To gain a better picture of the trend in the VE-ER cycle an Anti-Effect Size has been devised by calculating the frequencies of births in the peak phases observed for Ranks 4 to 6, shown in Figs. 23, C and D, and applying this algorithm to all the ranks. We have no data for the Venus Effect at birth but the trend in the VE-ER cycle is thus shown in Fig. 26.

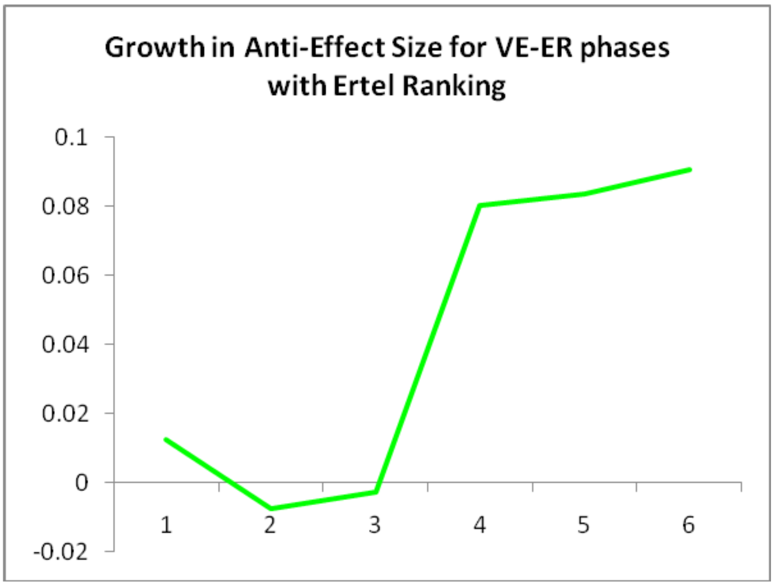
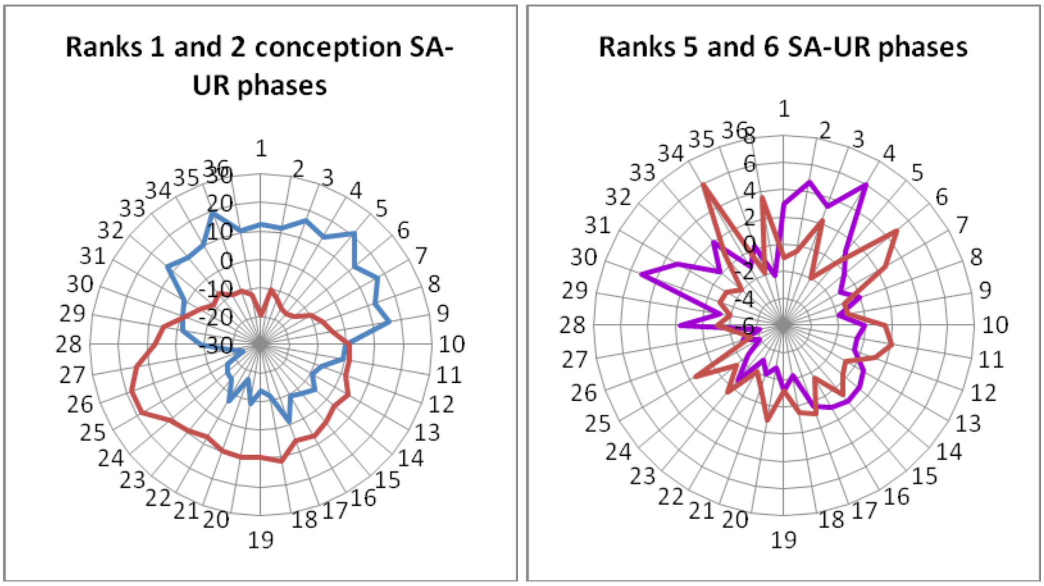


Fig. 26. Showing the increase in VE-ER Effect Size with Ertel Ranking.



Figs. 27A and B. Showing the distribution of conception dates acros the SA-UR cycle for 4 Ertel eminence rankings. Rank1 (red line, N = 2242) has been scaled to Rank 2 (blue line, N = 1108), ranks 5 (red) and 6 (purple) are nearly equal in sizes.

Caution is required interpreting longer-term variations in terms of planetary cycles such as SA-UR, because demographic influences could be in play, or there could have been variations in the standards of eminence, and the frequency of gathering and publishing data on eminent champions. Nevertheless the shifts in phase distributions are remarkable. Between phases 1 and 2 there is a dramatic and extremely significant shift in dominance of half a SA-UR cycle, which is hard to attribute to the shift of 16 years in the peak of the yearly distribution. And it is worth noting for another reason: the 22.3 years of half a SA-UR cycle is very close to another important solar activity cycle. There also seems to be a progression in Ranks 5 and 6 where a shorter cycle emerges close to one quarter of the length of SA-UR, in other words the Schwabe Cycle. The phase of the peaks in Fig. 27B should be compared with those in Fig.2, and it is clear that the former are a little later in phase, i.e. past the peaks in solar activity, although earlier than the minima.

Conception patterns and Gauquelin planets in natal key sectors.

Before moving on to examine the timing of birth there are two important features still to consider:

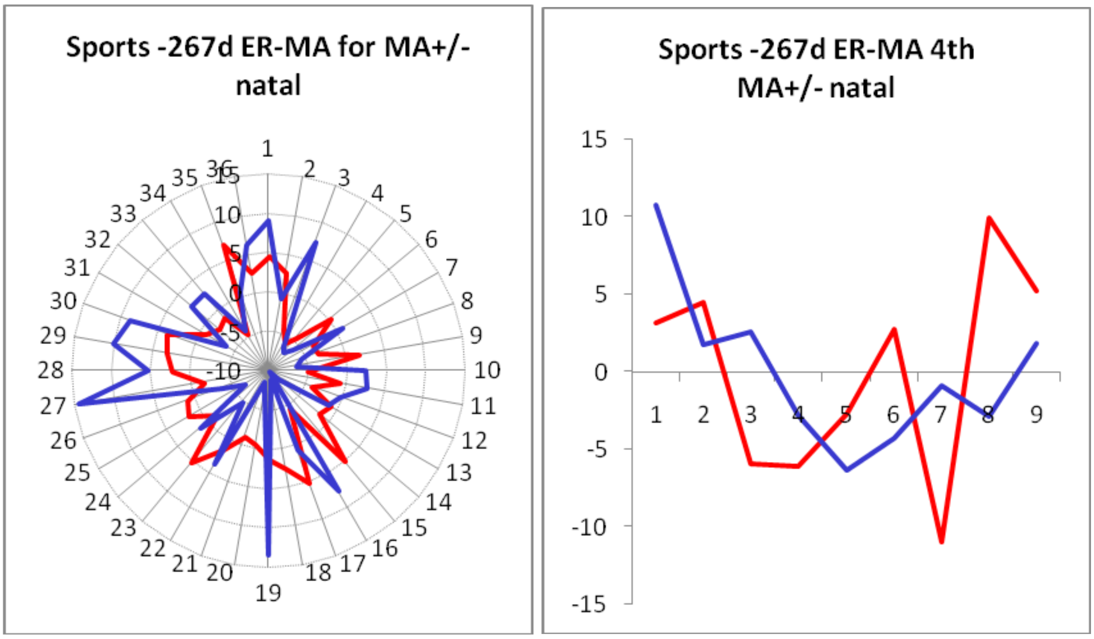
1. The present purpose is to search for a plausible theory of the Gauquelin Effect, so it is crucial to separately compare the conception patterns of ER-MA for sports champions who were subsequently born with MA in key sectors (the MA+ group) or in non-key sectors (MA (-)).
2. the possible patterns in Venus the opposite planet of Mars astrologically speaking (Douglas 1995, Irving 1996).

Fig. 28A shows the distribution together with its 4^{th} harmonic in 28B, in which the MA(-) set has been scaled down to the same to the same size (N = 552) as the MA+ set. The most important difference is that there is very little difference, as confirmed by a Xi-Squared Contingency Test on the 4^{th} harmonic data, although the 4^{th} harmonic pattern reveals a small phase shift between the two sets.

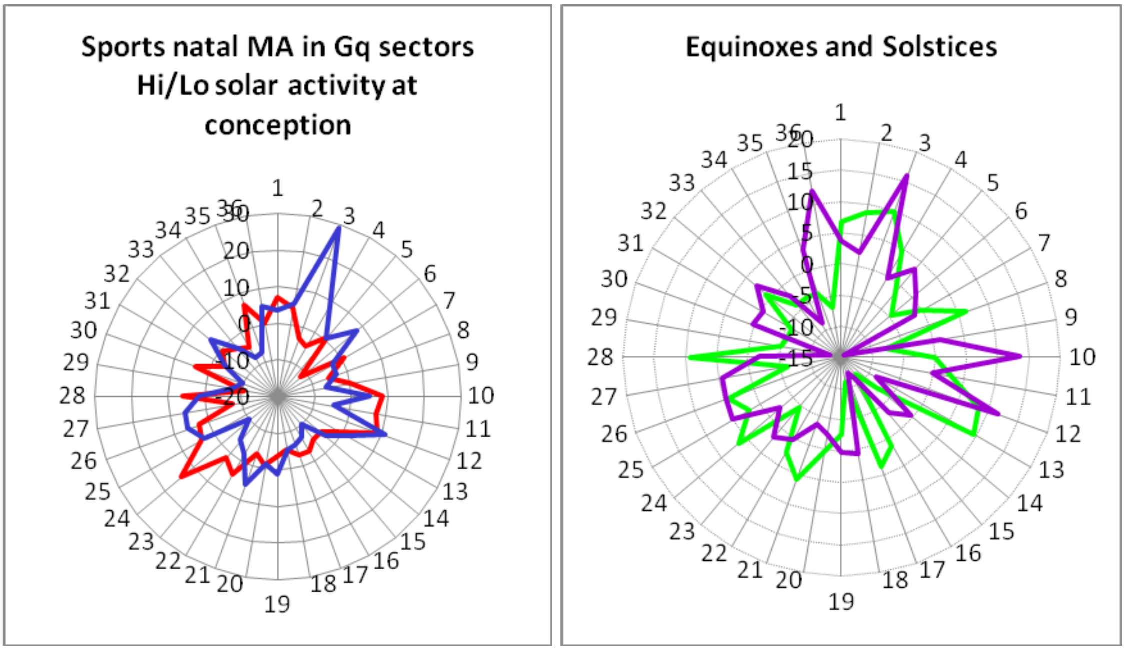
Another approach is to plot the natal MA distributions in Gauquelin sectors for births which were sorted at conception according to the solar activity and seasonal criteria described above.

In Figs. 29A and 29B the MA distributions across Gauquelin sectors are shown and it is clear that the biggest difference occurs in the solar activity graphs. While low solar activity favours an excess of births with MA in sectors 36-3, near its rise, high solar activity correlates with births when MA is in sectors 9-12 near the upper culmination, and also in sector 24 below the horizon. In comparison the seasons do not favour either key sector, but there is a small rotation clockwise in the equinoctial case.

Since these shifts in relative strengths of the key sectors were also apparent in the decline and rise of the Mars Effect in the period 1920 – 1947, the influence of solar activity must also be considered with demographic effects.



Figs. 28A and 28B. ER-MA patterns for conceptions which led to natal MA+ (red) and MA(-) (blue) sectors, scaled to equal numbers of births, N=552.



Figs. 29A and 29B. Showing the distributions of MA in Gauquelin sectors at birth for conceptions separated by solar activity and seasons. Red = High solar activity, Green = Equinoxes.

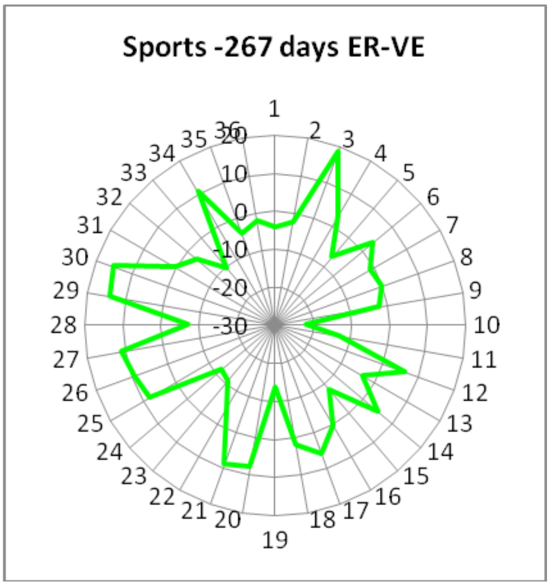
From these comparisons, despite the striking deviations from chance in the distributions of conceptions across the ER-MA cycle (Figs 5A, 5B), they are not mirrored in the MA distributions in Gauquelin sectors at birth, while still showing an effect of solar activity.

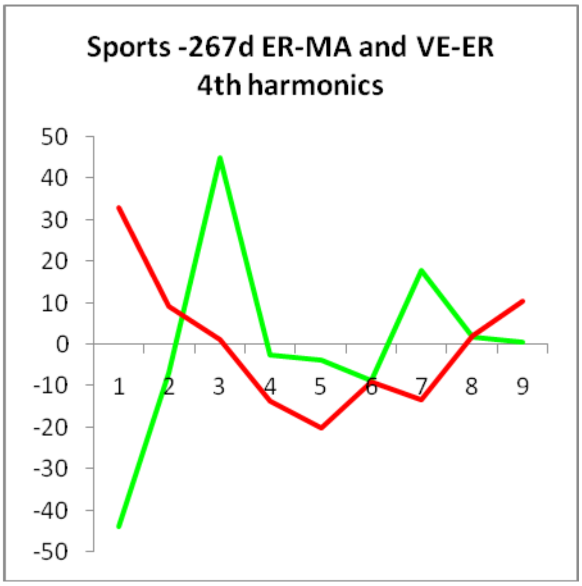
So we are left with two conclusions: either the conception patterns are a new factor in the professional data independent of the natal MA sector patterns, or there is a third factor which ties together the patterns set at conception with the time of birth. This latter constitutes the second stage of the present theory.

Now let us consider the conception patterns for Sports Champions across the Venus – Earth synodic cycle. Venus is symbolically opposed to Mars in astrological tradition, and this contrast also exists in the Gauquelin data – along with an opposition of Jupiter and Saturn, (Douglas 1995, Irving 1996). This is an important principle showing that astrological symbolism has a structural integrity, and since it is repeated in the Gauquelins' empirical data it is natural to inquire whether it exists in the conception data on synodic cycle phases too.

The difference between Figs. 30A and 3A is very striking: at each 0, 90, 180, and 270^0 phase there is a dip instead of a peak, a phase difference which can be seen clearly in Fig. 24B which compares the 4th harmonic patterns. Dividing the data into the first point on the 4th harmonic – and all the rest the Chi-squared value (Df = 1) is 9.194 giving p = 0.0024, which can be divided by 2 for the predicted pattern so p = 0.0012.

This contrast with the ER-MA data at conception makes a coherent pattern and further consolidates the relevance of the present theory.

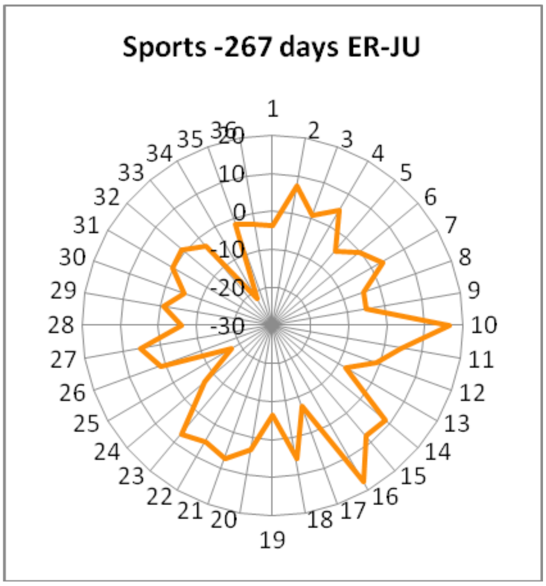


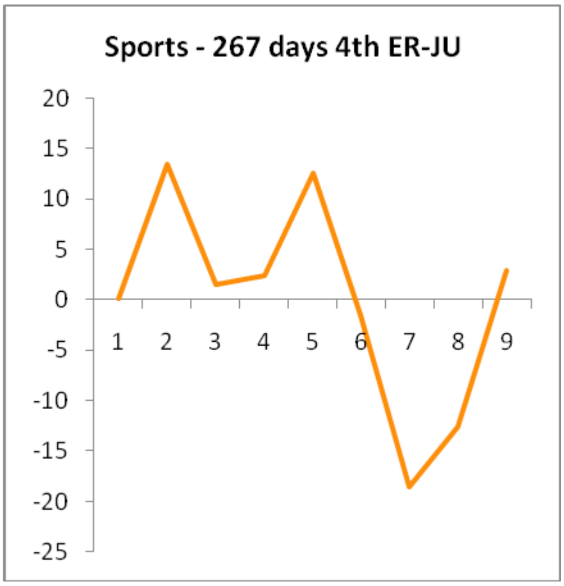


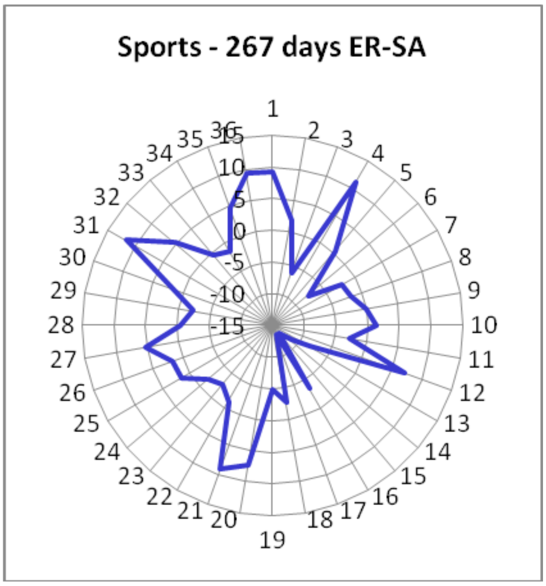
Figs 30A and 30B. Showing the distribution of conceptions across the VE-ER cycle and its 4th harmonic (green) compared to that for ER-MA (red line).

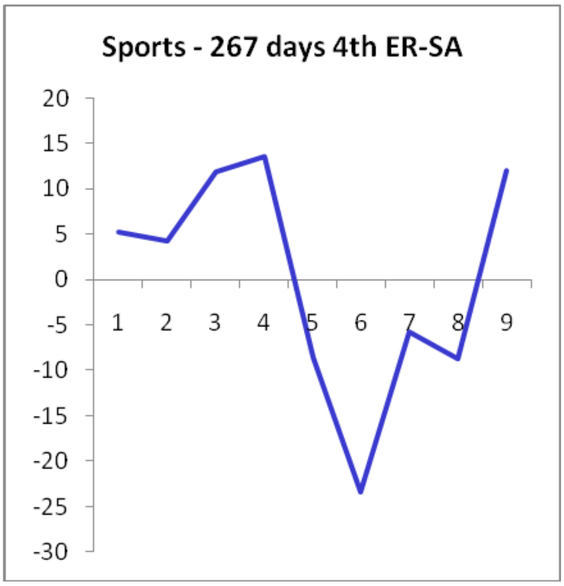
It is useful also to examine the patterns for ER-JU and ER-SA, because the structural relationship of the symbolism suggests that they will show neither of the patterns so far uncovered, but should be rather indifferent in the regions of these 4 key angles.

Indeed these 2 graphs do not show either the strong peaks in sector 1 of the 4th harmonics found with ER-MA, nor the dips of VE-ER. Their overall shapes are more similar to VE-ER, with peaks in sectors 3,4 and troughs in 6,7. The ER-SA distribution in Fig. 31C still has signs of a cross pattern like that of ER-MA, but rotated away from the axes of the latter, and the 4th harmonic is significantly different from chance by Xi-Sq (Df = 1, $p < 0.05$) when it is divided into phases 1,2,3,4,9 and 5,6,7,8.









Figs. 31 A – D. Showing the distributions of ER-JU and ER-SA at conception for Sports Champions.

Having described the patterns found in synodic cycles at the time of conception, there is clear evidence of correlations with solar/geomagnetic activity, but – by itself - this offers no explanation for the timing of spontaneous delivery on the day of birth.

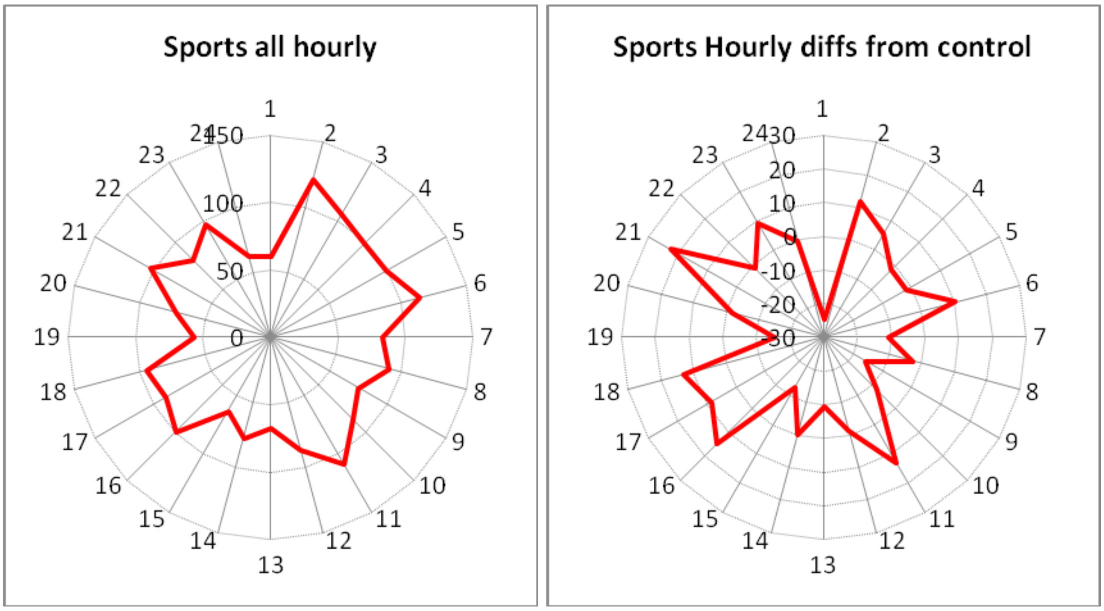
For that it is necessary to consider the diurnal variations in birth times and to introduce a new factor – geomagnetic micro-pulsations in the Pc5 range.

The timing of delivery

While the hourly variation (Fig. 32A) – often referred to as the nycthemeral curve – looks unremarkable, a strong pattern emerges once we consider the way it deviates from the pattern for the whole Gauquelin professional data collection (N = 15619) between 1807 and 1945, as shown in Fig. 32B.

In this case the control was simply scaled down from the total without any shuffling since it is essential to retain the time distribution. There is an argument for smoothing the control data, but it is not straightforward to do this because there is a large drop at midnight even in the control, which seems to be a real phenomenon.

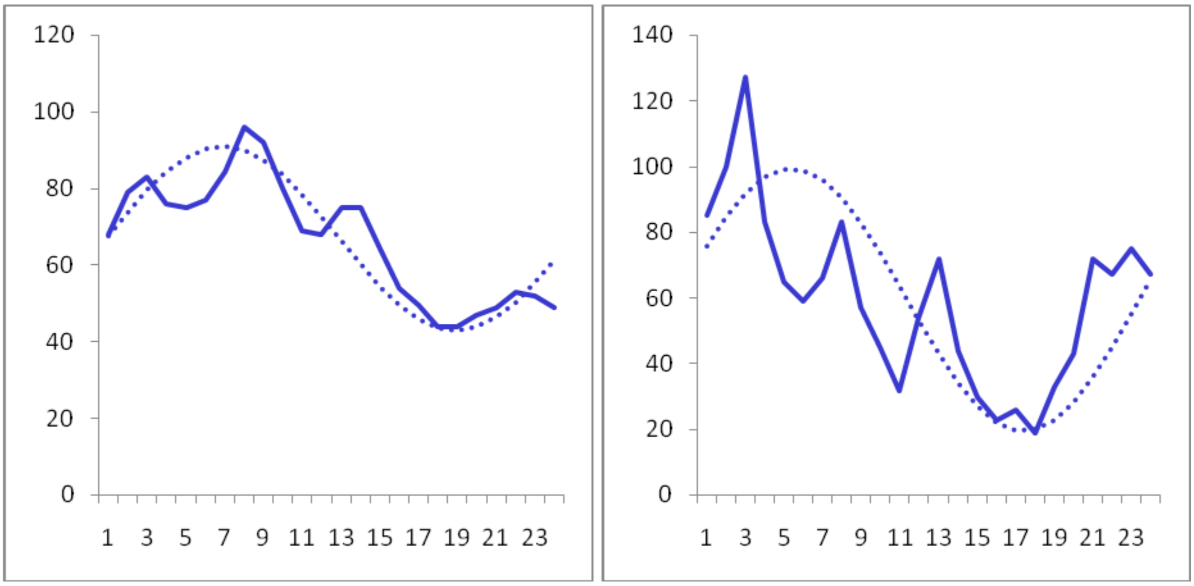
Professor Cyril Smith addressed the issue of hourly variations in a Haldane Lecture in 1997, noting strong 6hr. components in many cases when the Gauquelin data for different key sector planets was subjected to Fourier Analysis. He commented modestly that '*this suggests not only that the planetary effect is real, but that we are beginning to learn something of the laws which guide it*', (Smith, 1999). Indeed we are.



Figs. 32A and 32B. Showing the nycthmeral variation of births for future Sports Champions, and in 11B the same data showing deviations from the mean professional data.

It is time now to examine the data on the diurnal variations in the intensity of the Pc5 band of geomagnetic pulsations mentioned above.

The data are not available in digital form, and attempts to contact the author and the observatory were unsuccessful, so an old-fashioned method was employed to convert the data into numerical values. The printed graphs were enlarged with a photocopier and then traced and transferred to millimetric graph paper. Having done this, points plotted in the originals at regular intervals were measured on the graph paper and entered into an Excel data sheet from which the graphs in Figs. 33 A-B were produced.



Figs. 33A and 33B. The diurnal variation of Pc5 intensity with a 24-hr sine wave dotted trendline added. 33A for mean of all data, 33B for low solar activity days. The scales are arbitrary.

The amplitude of these diurnal variations depends on the degree of geomagnetic disturbance, measured by the Ap index, and on quiet days (Ap < 8, N = 1994 days), Korschunov found that the timing of the peaks remained constant but that the peaks near 03.00 and 21.00 hours LMT increased relative to the opposite ones at 15.00 and 09.00 hrs, as can be seen in the figures. On days of high geomagnetic disturbance (Ap >25, N = 460 days) the amplitudes of the 6 hr peaks are hard to distinguish from the background.

Besides the 6 hr. peaks, it is also interesting to note the form of the 24 hr trend line which peaks in the early morning and has a minimum in the afternoon, which of course is similar to a typical nycthemeral curve for spontaneous births.

These 6hr and 24hr variations are thus common to the Pc5 intensity variation and the hourly variation of birth frequencies, whereas the strongest features of the so-called Quiet Day Variation of the earth's magnetic field, or *Sq,* are 24 hr, 12 hr and 8 hr components (Douglas 2007).

When the Sports Champion hourly data are split into high- and low- solar activity segments the main features of Fig. 17B are retained, although there are differences in the detail. If the variations in Pc5 intensity shown in Fig. 33A, B are related to the timing of birth then at low solar activity the peaks around 21.00 hours and 03.00 would be expected to change.

Fig. 19 B shows some suggestion of this, although there is a more obvious increase in both the 23.00 – 04.00 and 11.00 – 16.00 ranges, with a corresponding decrease between them. A contingency test (Xi-SQ = 5.90, Df = 1) gives p = 0.02. Overall, however a simple correlation, based on a linear relation between micro-pulsation intensity and frequency of births is not evident.

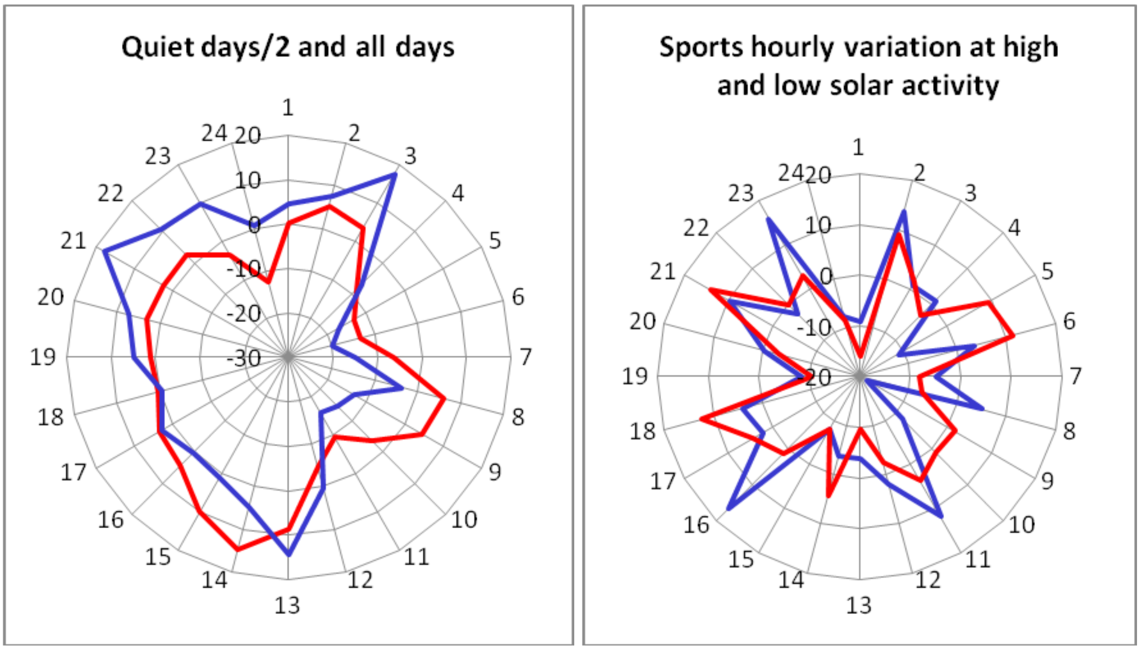


Fig.34A. Deviations from the sine wave trendline in Figs. 33A (red line,mean data) and 33B (blue line, low solar activity). Fig. 34B shows the hourly deviation from expected birth frequency for Sports Champions at low (blue) and high (red) solar activity. In this figure both graphs have been scaled to the same total number of births, (N = 1026).

In order to develop the hypothesis we are considering for the Gauquelin Effect, it is reasonable to suppose that the peaks in the ER-MA distribution at conception would combine with the diurnal 6hr peaks in Fig.32 B to produce the typical pattern of MA in Gauquelin sectors, but we must remember that the data has been divided into 4 subsets, by splitting both at conception in the phases of the ERMA cycle and in the hours of birth.

The hours of birth here regarded as positive are 2-6.00, 8-12 noon, 15-17.00 and 20-22.00: 12 hours altogether; the remaining hours were classed as 'negative' for simplicity, thus in combination with the +/- phases of the ERMA cycle creating 4 categories: ++, +-, -+ and --.

Referring to Figs 35 A,B we see that 2 out of the 4 combinations of births filtered by conception ERMA phases and birth hours account for most of the observed Mars Effect for Sports Champions: births with positive deviations from the ERMA expectation at conception and with birth hours concentrated in the peak times of Fig. 34B; plus conceptions with negative deviations from the ERMA expectation but with birth hours *avoiding* the peak ranges of Fig. 34B. Together these amount to 49.5% of births, but they contain 84% of the MA excess in key sectors at birth, and the Xi-SQ value (Df = 1) is 21.24, p < 0.00001, with an Effect Size for the 1034 births of 0.060. The Effect sizes for the 4 categories are: ++ 0.081, +- 0.013, -+ 0.011 and – 0.045. The overall Gauquelin Effect for 2087 births with the control used here is 0.035 with a total of 70.7 excess births with MA in key sectors and a Xi-SQ value (Df = 1) of 13.23, $p < 0.0005$.

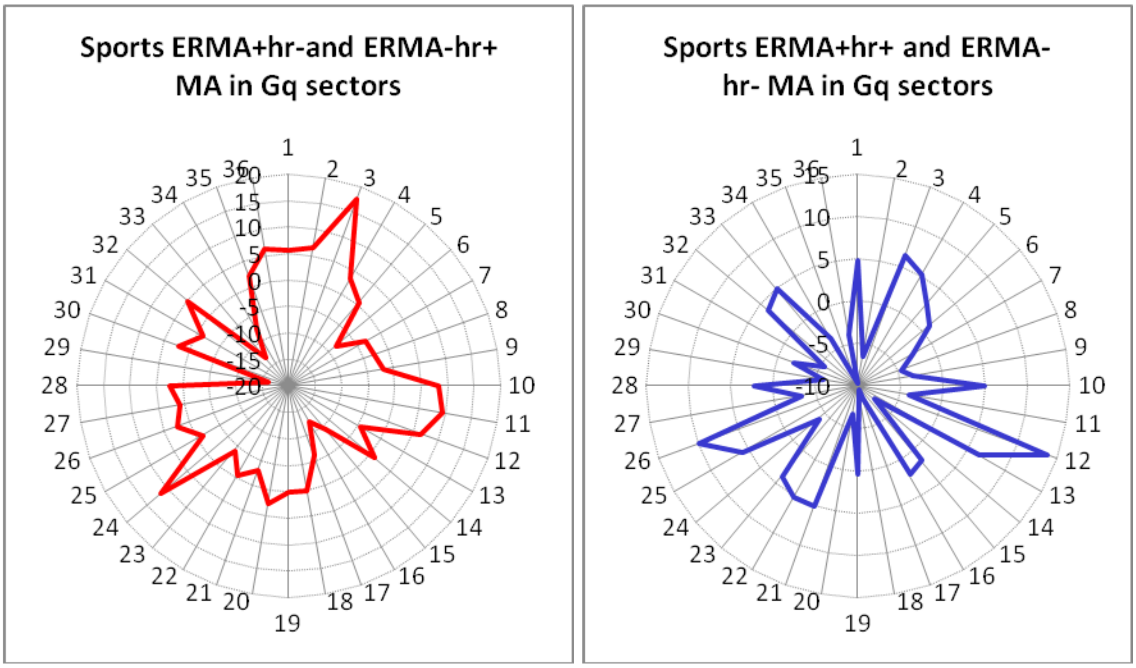
How does the VE-ER cycle play a part?

In Figs. 15A and 15B we have seen how at conception the key phases of the VE-ER cycle are avoided, in direct contrast to the ER-MA cycle, so it is natural to inquire whether the 2 cycles can be combined to indicate the genesis of the Mars Effect. And here again the use of *controls based on the same filtering as the data samples* is crucial.

To illustrate how failure to ensure this can lead to spectacular artefacts the controls obtained after filtering by both ER-MA and VE-ER are shown in Fig. 36.

At this point It is worth stating the overall framework of the method of testing being employed. Simply combining filters such as ERMA at conception with selected hours of birth can generate Gauquelin-type distributions from a random control - proving nothing.

If there is a real effect (according to the present hypothesis), it must mean that the probability of being born at a certain hour is *conditioned by an effect* which occurred at a certain ERMA phase at conception, so it is imperative to subtract from the observed data a control which compensates for the effects of combined but *independent* probabilities of conception at the same ERMA phase with birth at the same hour.



Figs 35A and 35B. Mars in Gauquelin sectors for data filtered first by ERMA pks (+) and troughs (-) at conception, followed by peaks (+) and troughs (-) in natal hourly distributions. In Fig. 18A, 84% of the total Mars in kS excess is concentrated in 49.5% of the sample. Effect size = 0.06.

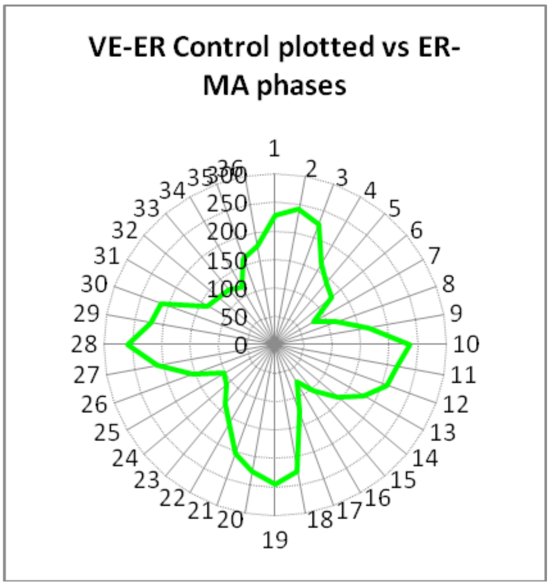


Fig. 36. Showing the degree of interaction between the VE-ER and ER-MA cycles. The shuffled control was filtered using the same ranges of the VE-ER cycle which were emphasized at conception for Sports Champions (N = 6092). This is how it is distributed over the ER-MA cycle.

To investigate the combination of birth hours with the preferred phases of the VE-ER cycle at conception (20-60, 80-90, 120-140, 170-180, 190-200, 240-270, and 330-340 degrees), six different hour filters were initially applied, after adding back the 267 days subtracted from the birth day. Each filter had 4 sets of 3 hour intervals in a cross pattern, for example: 0-3.00, 6-9.00, 12-15.00 and 18-21.00, and the resulting MA sector distribution was then plotted. The next set then began with 1-4.00, 7-10.00 etc.

Surprisingly the time filters did not make a lot of difference to the Effect Size for MA in key sectors, which only varied from 0.064 to 0.081. And the best visual appearance did not correspond with the highest Effect Size, which was traced to some filters producing narrower peaks with some Gauquelin sectors having negative deviations.

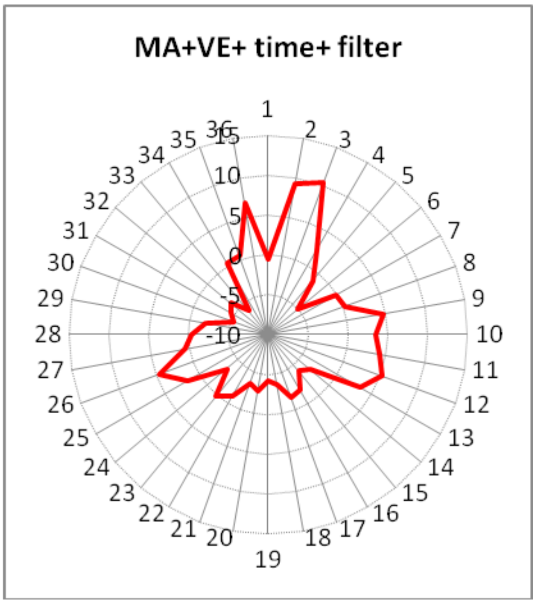
Time filter +/-	Number	Effect Size	Xi – SQ (Df = 1)	% total deviation
Time +				
All VE-ER filter	455	0.124	23.9	77.6
MA-VE+	260	0.029	0.78	11.5
All ER-MA filter	195	0.286	51.34	119.9
MA+VE+	363	0.272	90.70	67.1
MA+VE-	168	0.254	38.84	52.7
MA-VE-	477	- 0.041	3.19	- 31.5
Total	1100	0.062	15.67	100.0
Time -				
All VE-ER filter	414	0.020	0.69	256.6
MA-VE+	223	0.111	11.01	702.0

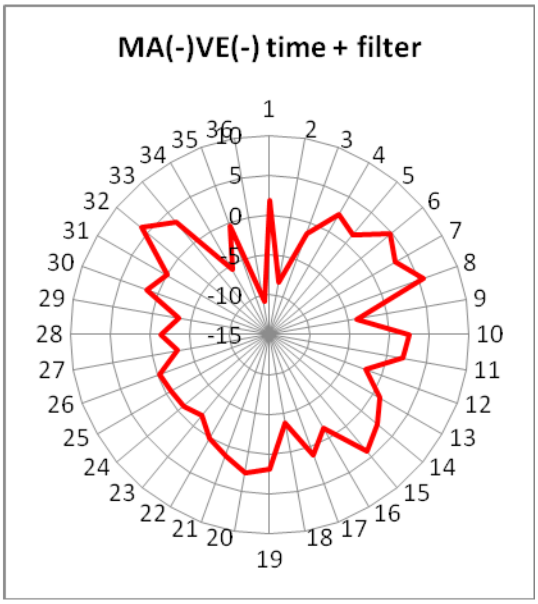
All ER-MA filter	191	- 0.075	4.59	-485.8
MA+VE+	351	- 0.079	9.86	- 953.0
MA+VE-	160	- 0.086	5.51	- 475.5
MA-VE-	413	0.024	1.11	359.5
Total	987	0.003	0.05	100.0

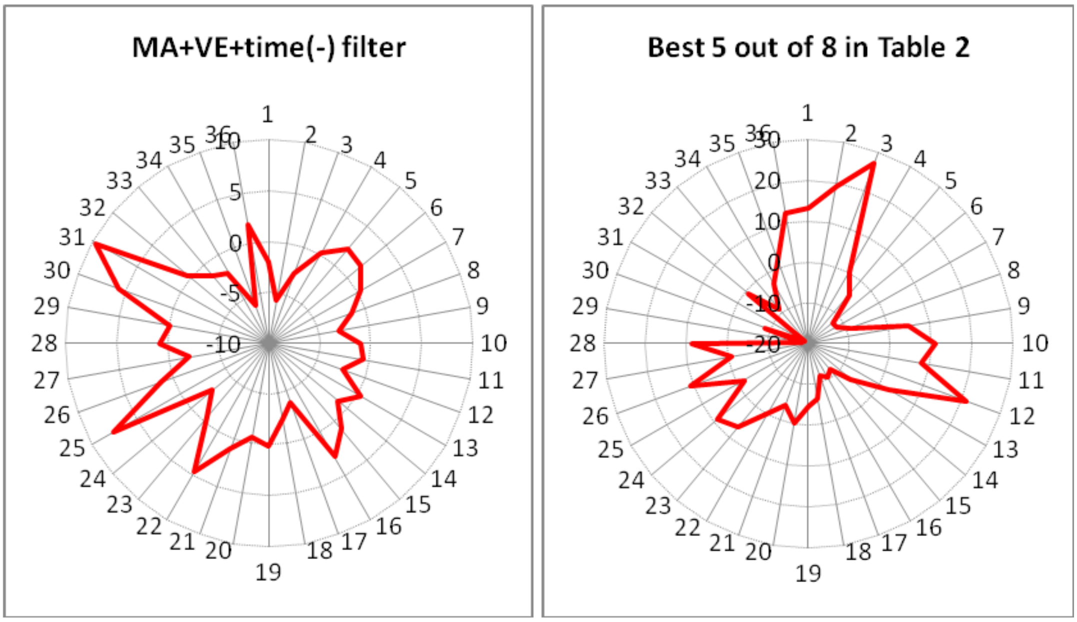
Table 2. Showing the results of the filters described. All + signs indicate a filter where the factor was over-represented compared to expectation, a synodic cycle phase at conception or a set of hours at birth. Yellow highlights show the sets with the largest contributions. Strongest effects highlighted.

In order to get a full picture it is necessary to combine both the VE-ER and ER-MA phases at conception with the different hour of birth filters, which reduces the sample sizes as well as producing a large number of graphs, so in view of the small effect of birth time in combination with the VE-ER cycle it was decided to construct a limited set of 8 combined filters. Thus at conception there are the following 4 combinations using a similar +/- notation to the one already described to indicate the VE-ER and ERMA phases which are over/under-populated at conception: ++, + -, - + and - -.

Each of these was then filtered again (after adding back the 267 days subtracted from the birth date), by the 2 subsets of birth hours already defined from Fig. 32B.







Figs. 37A to D. Showing the effects of different filters applied to the Sports Champions collection, the same filters were applied to generate individual controls for each case. The best 5 is the sum of the 3 positive results from the + time filter and the 2 from the (-) time filter, out of the total of 8 categories. For these 5 subsets, N = 1259, Effect Size = 0.102.

This range also produced one of the better MA distributions in key sectors after filtering by VE-ER alone, as just described. The 8 sets are displayed in table 2, and a selection of the graphs in Fig. 37A to D. Examining Table 2, we see that when the + time filter is applied it combines most effectively with the MA+VE+ combination, and that MA+ alone is more effective than VE+ alone. When both negative synodic cycle filters are applied the overall effect is also negative.

In addition the negative time filter produces mostly negative results with the exception of the MA – VE+ filter.

All of this confirms the hypothesis being tested, although it must be acknowledged that all of the filters could still be optimised. But Effect Sizes do not describe the shape of the graphs, so it is useful to look at a selection to get a fuller picture, as shown in Figs 34 A to D.

Conclusions from Sports Champions.

We have seen that there are strong deviations in conception frequencies across the ERMA cycle, which combine with hourly variations on the day of birth in such a way that 2 out of the 4 combinations account for 84% of the excess MA in key sectors. There are also significant correlations between the conception ERMA phases and the peaks and troughs of the 11.2 yr Schwabe Cycle, and to a lesser degree with the semi-annual variation in geomagnetic activity.

In addition to this we have seen that the conclusion drawn by the CFEPP that there is no significant evidence for a Mars Effect is erroneous: the Mars Effect is strongly present in their own data prior to 1920, after which date it diminishes. This observation is consistent with a role played at conception by the ERMA cycle being interrupted by the growing use of family planning after World War 1. Thus the belief that only induction of births influences the Gauquelin Effect is also likely to be mistaken: it began to decline much earlier than that, possibly due to the use of birth control methods, and rose again during WW2 when society was massively disturbed.

However we cannot rule out the possibility that longer-term solar activity variations also play a part in the decline of the Mars Effect. There are oscillations in the Effect Sizes in Fig. 10, which suggest this, and as Ertel has pointed out, if the Mars Effect shows significant *negative* correlations during certain periods, this is not the same thing as a simple disappearance of the effect. And there is the recurring observation that the rising and culminating sectors are affected differently by selection of the period of data, which argues for astrophysical effects.

Importantly there is a correlation between a decline in the Gauquelin Mars Effect at birth and a decline in the strength of a positive ERMA effect at conception in 4 out of the 6 non-overlapping datasets collected in Table 1.

These have been interpreted as consistent with the hypothesis that there are optimal ranges of geomagnetic activity which influence the timing of birth, and that the Pc5 band of geomagnetic micro-pulsations may be the vehicle for timing of birth.

By using Ertel's eminence ranking for all the Sports Champions data a new correlation has been established with the ERMA Effect to supplement the correlation to Mars G% found by Ertel. This strengthens the case for a prenatal origin for the Mars Effect even further.

As a consequence we can see that the planet MA plays no physical role at all from its Gauquelin Sector position, but it can be described as a sign, or more specifically an index, (using C.S.Peirce's semiotic terminology) of its earlier effect at conception that has been carried forward to the day of birth by the existence of a 6 hr. cycle in the Pc5 intensity.

There are more data on the Mars Effect in Gauquelin Professional groups for Soldiers and Physicians, but since these groups also involve other planets they will be considered in Part 2 of this study.

Some more general reflections.

Eminence has been the criterion for deciding whether a group of professional subjects qualifies for inclusion in a study of the Gauquelin Effect, which has led to interminable disputes about the correct way to measure eminence and its threshold. But the emergence of the ERMA effect at a nominal conception date around 267 days before birth provides a different basis, which is rooted in a *theory* of the Gauquelin Effect. This offers a new standard of assessment based on the expected frequencies of a Gauquelin planet in key sectors compared to the expected frequencies of the key phases of the synodic cycle at conception. If the key sector frequencies are significantly higher than expected *and* so are the key phase frequencies then there is a Gauquelin Effect, independently of considerations of eminence.

This is only a general principle at the moment: calibration is required to assess how large the deviations from expected frequencies need to be to qualify, and how strongly they are correlated. And we have not considered the other planets, VE, JU, SA and their respective professional groups.

The eminence rankings have proved a rich source of data for analysing the ERMA Effect in conjunction with the Mars Effect, so it is to be hoped that much more can be done if the eminence rankings for the other Gauquelin planets are available.

Acknowledgements

Some parts of the work reported here would not have been possible without some important contributions from other researchers.

In particular I thank Dr. Nicholas Kollerstrom for sending me the large collection of Sports Champions which contained the rankings devised by Professor Ertel, and Dr. Jan Nienhuys for original copies of the CFEPP data.

Loading the data from these files into the Jigsaw program was greatly facilitated by a short program specially written by Ray Murphy, a dedicated Australian researcher.

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