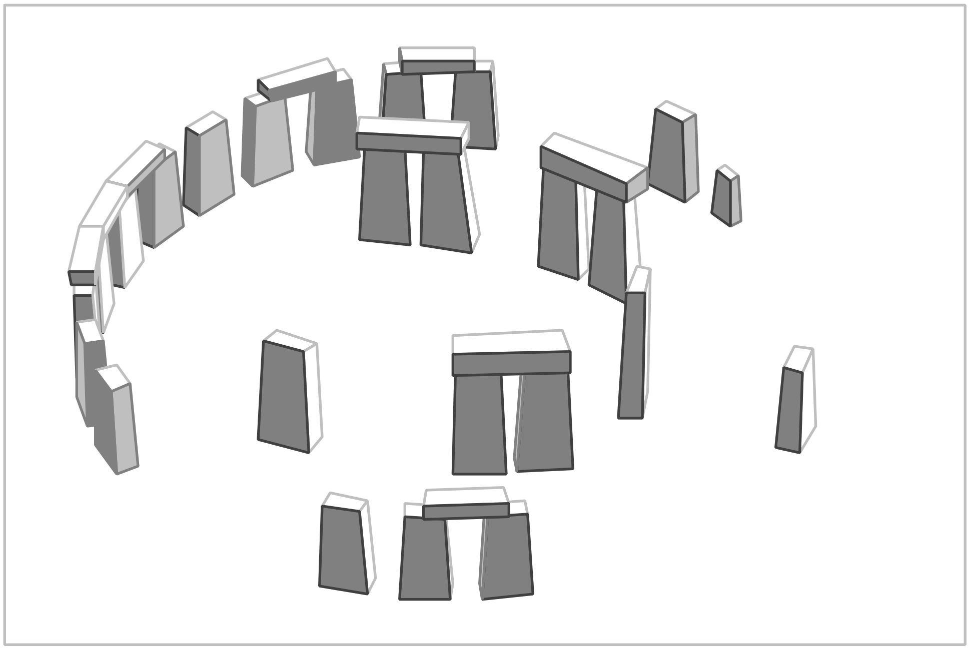
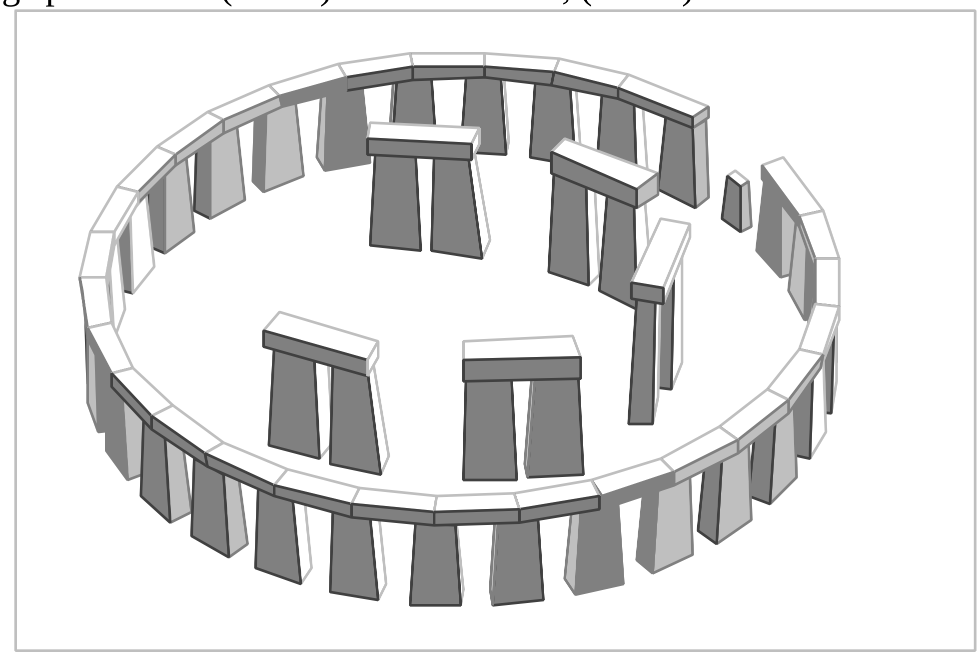


Stonehenge phase IIIA: (above) elements intact, (below) reconstructed as built.



This reconstruction contains 73 stones total and 5 trilithons (central archways) possibly indicating the length of a normal year as 73 x 5 days (73 x 5 = 365). Note that there are 33 lintels (stones hung upon rooted stones) in two groups, a group of 28 lintels capping the circle and a group of 5 capping the trilithons. The solar calendrical significance of the lintels can indicate a 33-year leap-day cycle where a 366th. day is added seven times (every four years) in 28 years and then the eighth leap-day of the cycle is added after 5 more years.

S. Cassidy, 1053 47th Street, Emeryville, Ca. 94608; 6/96

June 21st. 1996 A.D.
Emeryville, Ca., U.S.A.

P.S. Dear Mr. Eco : Sorry I mispelled the name! Which reminds me, ...was there any reason why you substituted for the burning of Cecco of Ascoli in "The Name of the Rose "?

Dear Mr. Ec~~c~~o

I just got up at 5 a.m., awaking with an urge to write to you. Your latest novel ("The Island of the Day Before") strikes many chords with me. Most cogently, your seventeenth-century jesuit astronomer is obsessed with determining (on Christian grounds) the "zero-point" for "fixing" terrestrial longitudes. I have recently stumbled upon a solution to this very problem (most reluctantly, for I am atheistic by nature and nurture) but believe I am not the first to find it.

Modern historians of science concern themselves only with the progress of mathematicians in determining relative longitudes, ignoring the other aspect of the problem (fixing termini) which concerned many of the same mathematicians whose source material they study. I first came across this "zero-longitude"[1] problem while studying the history of the calendar.

Recent jesuit studies (e.g. A.Ziggelaar in "Gregorian Reform of the Calendar" ed. Coyne, Hoskin, Pedersen, 1983) reveal that pope Gregory XIII's calendar reform commissioners were aware of a strong rival to Clavius' solution to the problem of restoring the spring equinox to the 21st. of March. The solution of Clavius, the jesuit commissioner, which was finally adopted and is still in effect, restricted the equinox to March 19, 20 or 21 (for any European longitude), with an initial 10-day correction, and with a change in the four-year leap-day rule. This current leap-year rule (taken over by the jesuit astronomer Clavius from earlier proposals of Pitatus and Lilius) continues the Julian Calendar tradition of having leap-days every fourth year but excludes leap-days in years whose A.D. number

[1] *I notice you use the Spanish naval term "punto fijo". This term ("fixed point") appears to emphasise this secondary, little-studied aspect of the historical problem of longitude, but I believe its origin may possibly come from the way in which early mathematical navigators saw the problem: They knew how to determine their latitude by observations of the sun's or pole-star's altitudes (latitudes have a natural zero at the earth's equator or poles). This latitude determination enabled them to draw a "line" on a map along this latitude to represent all their possible positions. Then their problem (the longitude problem) was to know which "point" along this line "fixed" their actual position. Be that as it may, I will refer to the "fixing" problem as the "zero-longitude" problem.*

is divisible by 100, but not divisible by 400. For example: 1700, 1800 and 1900 A.D. had no leap-days but 1600 and 2000 A.D. do have leap-days in the Gregorian calendar system.

The rival (and long suppressed) solution (set forth by Gregory's only Oriental commissioner, the Syrian patriarch Na'amat allah) used a 33-year cycle of leap-days. It is easy to understand and elegantly grounds the calendar in the traditional 33-year life of Jesus. It could also have kept the spring equinox truly confined to the 21st. of March (the official calendar date of the spring or vernal equinox by the traditions of the Church, ever since the Nicene council).

With the 10 day correction, implemented in 1582 A.D. by Pope Gregory, Clavius and the other commissioners, the 33-year leap-day cycle could have kept the equinox on March 20th., but, with an 11 day correction (as proposed concurrently in Britain by John Dee) Na'amat allah's proposal could have restored and restricted the equinox to March 21st.

The simplest implementation of the 33-year cycle, would continuously repeat, every 33 years, the first 8 leap-years, in the years 1 to 33 A.D, (nominally the years 4, 8, 12, 16, 20, 24, 28 and 32 A.D.). Long division would have been unnecessary to determine whether it is leap-year, since there is a short-cut using addition. Just add the century number to the number of years passed in the century. For example: for the year 2012 A.D., we add 20 to 12, and get 32 A.D. which is nominally a leap year in the traditional life of Jesus.[2]

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[2] *This centurial-addition principle will on its first application generate a year-number in the first two centuries A.D. This derived year-number has the same remainder when divided by 33 (i.e. has the same position in the 33-year Anni-Domini Jesus-cycle) as the original year-number. If the result is in the second century A.D. rather than the first, then a second application of this additive principle will reduce this new year-number to a year-number in the first century A.D. (e.g. for 1996 A.D., we add 19 to 96 and get 115, a year in the second century A.D.; so then we add 1 to 15 and get 16 A.D.). Having used our principle to reduce the year to a corresponding year-number in the first century A.D., we may find that the resulting first-century year-number is greater than 33. In this case we then simply subtract 33 or 66 to bring it within the traditional life of Jesus (e.g. for the year 2017 A.D., we add 20 to 17 and get 37 A.D.; so then we subtract 33 and get 4 A.D.). One or two, double-digit additions, or, one addition and a subtraction, always suffice until 3498 A.D. After 3498 A.D., two additions and a subtraction or three additions may be necessary (but three additions and a subtraction would not be necessary until 340,099 A.D.).*

The connection with the zero-longitude problem stems from the extreme smoothness and exactitude of this proposed thirty-three-year cycle. The adopted Gregorian leap-year rule allows error to accumulate for one or two hundred years, causing large discontinuities when the correction is finally applied (see figure 3 below). The discontinuities in the 33-year cycle are as small as could ever be possible in a calendar based on whole numbers of days.

The Syrian commissioner, Na'amat allah, cited Omar Khayyam and numerous accurate Arabic and Persian solar observations to support the underlying average year-length of the 33-year cycle (365 plus eight thirty-thirds days, or 365.2424..recurring). Modern astronomical calculations confirm that the average length of the tropical year, when measured from the Spring Equinox, became in the 16th. century, is now, and will most probably be for millennia to come, 365.2424 calendar days (to the nearest ten-thousandth of a day). Gregory's commission actually adopted 365.2425 (the underlying parameter of Clavius', Lilius' and Pitatus' solution).

Note that modern astronomy texts cite a figure of 365.2422 days for the tropical year. This is habitually, mistakenly, stated as "the mean interval between vernal equinoxes" or words to that effect, but is really an average over all tropical points[3].

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3 *John Dee noted, in his 1582 treatise on the reform of the calendar, that the length of the tropical year depends on which tropical zodiacal point you measure it from. This little-known fact is consistently overlooked by all but the most careful astronomers. This error has even crept into the "astronomers bible"(see "The Explanatory Supplement to the Astronomical Almanac", 1992, prepared by the U.S. Naval Observatory, Royal Greenwich Observatory, Jet Propulsion Laboratory and the Bureau des Longitudes, particularily page 576). The error is harmless for usual astronomical practice, but leads to completely erroneous mathematical analyses of calendar accuracy in such publications as Scientific American ("The Gregorian Calendar" by Gordon Moyer, May 1982), The Dictionary of Scientific Biography (page 324 under"Al-Khayyami" the biography of Omar Khayyam) and the Encyclopaedia Iranica (vol IV, pages 670-672 on the Jalali and Modern Persian calendars). I have found one modern analysis of the calendar which grasps this fact ("Astronomical Appreciation of the Gregorian Calendar", 1949, in Vol. 2, #6, of Ricerche Astronomiche Specola Astronomica Vaticana) by a jesuit, J. De Kort, who, is nevertheless unable to correctly state the true length of the vernal- equinox-year (giving it as 365.2423 days), resulting yet again in a flawed, incomplete analysis of calendar accuracy.*

This modern value for the tropical year (365.2422 days) has no more to do with the vernal or spring equinox than it has to do with the summer solstice, winter solstice or autumn equinox. Until this error is corrected, it is necessary to refer to specialised astronomers such as Jean Meeus (e.g. "Astronomical Algorithms", 1991, chapter 26 on Equinoxes and Solstices). The following graph (fig. 1) of the way in which the length of the mean vernal-equinox-year changes over the centuries, shows actual current theory (the solid squares) and the value usually wrongly compared (empty diamonds) to calendrical values:

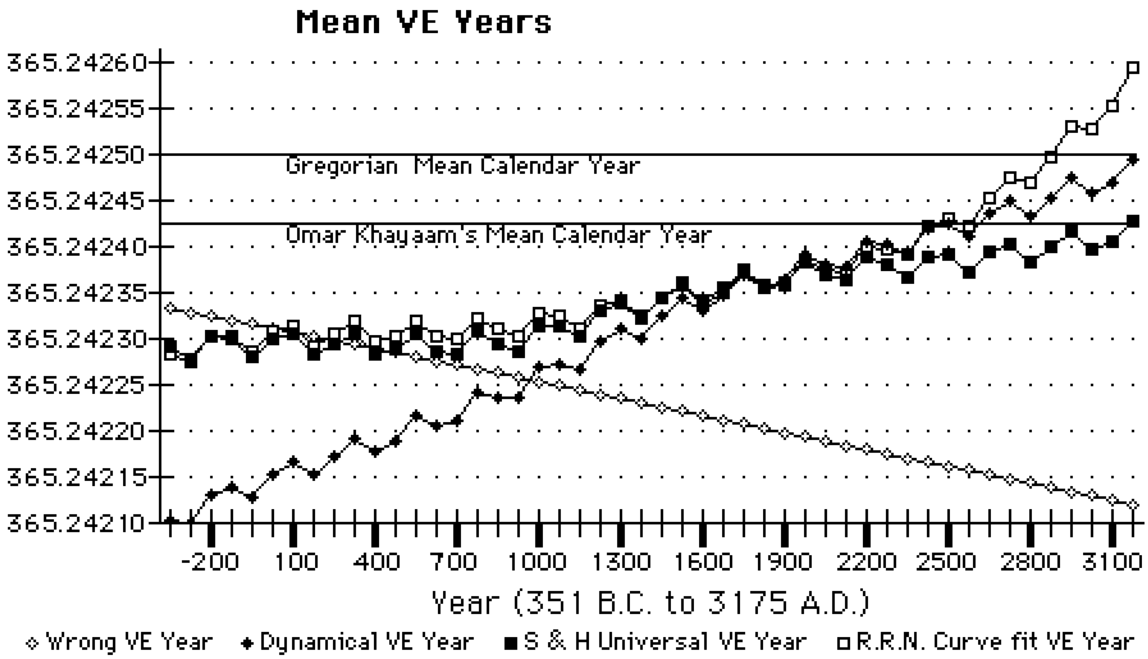


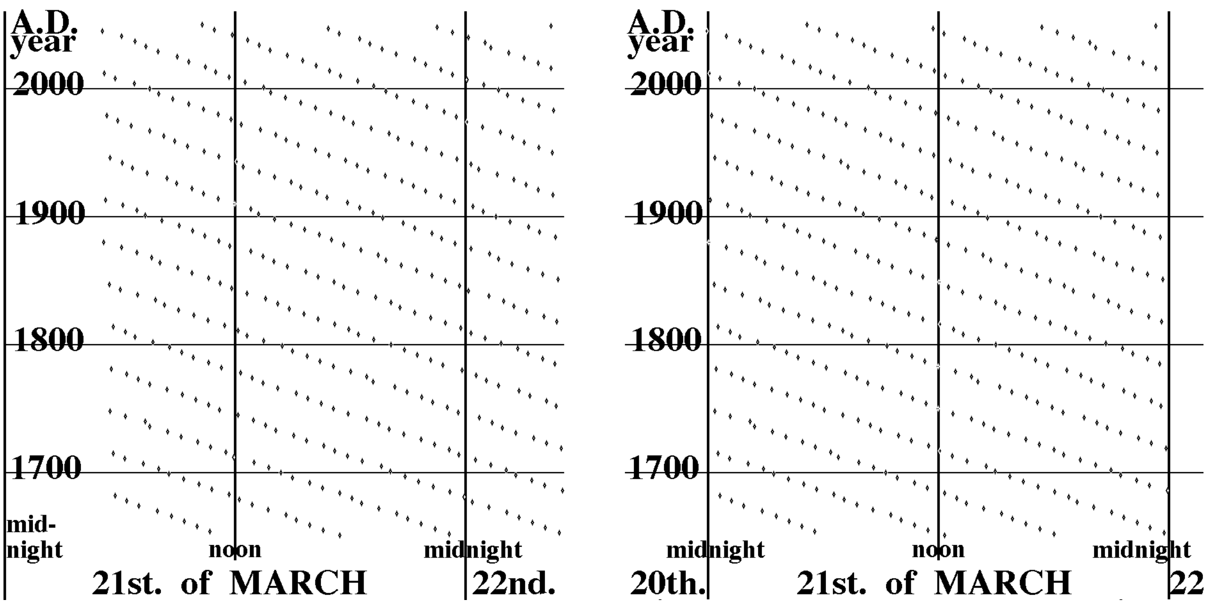
Figure 1: Showing the changing tropical year length, compared to the two rival fixed calendar years. The Dynamical curve is derived from Meeus, using unreal days of fixed length, pegged to the 20th.century day-length. The S&H curve is probably closest to the truth and combines the Meeus Dynamical formula with Stephenson and Houlden's 1986 theory of the changing length of the day (see Meeus 1991, chapter 9). The R.R.N. curve is an unorthodox alternative, combining Meeus with (and illegally extrapolating) R. R. Newton's model of the Earth's rotational history (see R.R. Newton, "The Moon's Acceleration...." vol.2, 1984).

Because Na'amat allah's 33-year cycle is so smooth and accurate, it could have kept the spring equinox confined within the same 24 calendar-hour period, every year. This and the proper initial correction (Dee's 11 days) were what Gregory's calendar commissioners required in order to best adhere to the Nicene tradition of a March 21st. equinox.

However, even with such a properly regulated calendar reform, the 24-hour calendar interval (within which the equinox would always have occurred) would in general begin and end at some time other than local midnight for most longitudes, and would thus straddle two consecutive calendar dates (i.e. either, March 20th. to March 21st., or March 21st. to March 22nd.).

This 24-hour interval would only fall between midnight and midnight within a <u>narrow band of specific longitude</u>. Along this strip of longitude the equinox would always have occurred on March 21st.

Date and Time of Vernal Equinox in the Anni Domini 33-year Calendar,
a) at the longitude of Greenwich b) at longitude of Washington D.C.



Figures 2 a) and 2 b): Showing how the 33-year Anni Domini leap-day cycle would have restricted the occurrence of vernal equinox to an interval of 24 calendar-hours. At the longitude of Greenwich, England, figure 2a charts this interval from March 21st. 5 a.m. to March 22nd. 5 a.m. (5:08 a.m. mean or standard time). Fig. 2b, for the longitude of Washington D.C., 77 degrees west, shows the 24-hour interval running from midnight to midnight on the 21st. of March, assuming Dee's 11-day initial correction. Vernal equinox times are taken from Meeus ("Astronomical tables...", 1983).

Thus the adoption of the mathematically simplest, and most Christian, implementation of the 33-year cycle would logically specify the existence of a meridian or narrow band of longitudes within which, and only within which, the Nicene edict could stay correct. This would probably have come to be seen as God's chosen meridian by all Churches that recognised the Nicene council.

I hypothesize that this geographical consequence of the 33-year cycle may have, paradoxically, figured in a decision to suppress it and to adopt the less accurate alternative. The issue of achieving Nicene perfection cannot arise in the adopted solution of Clavius because it allows the equinox to occur at any time within about 53 calendar hours, even without regard to longitude differences, and thus the geographical issue can be ignored, since the Nicene equinox tradition cannot be fulfilled anywhere.

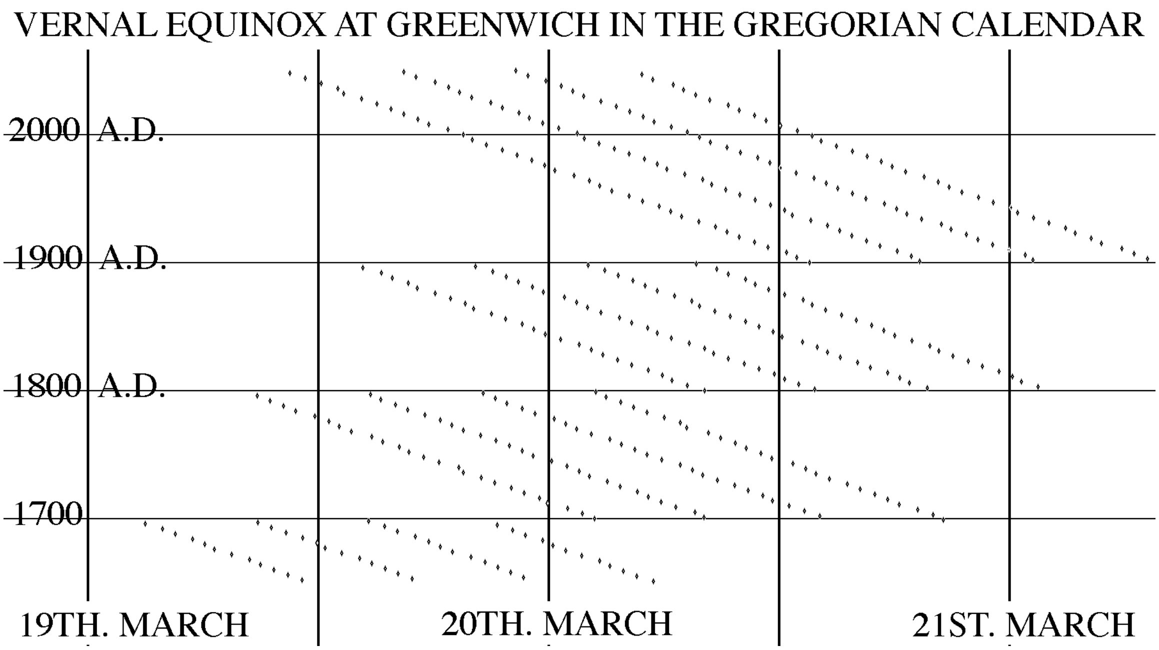


Figure 3: Showing how the occurrences of the Vernal Equinox in the Gregorian calendar are spread over more than 52 calendar hours for any given longitude (the longitude of Greenwich, England is used in this example which charts 400 equinoxes from 1651 A.D. until 2050 A.D.).

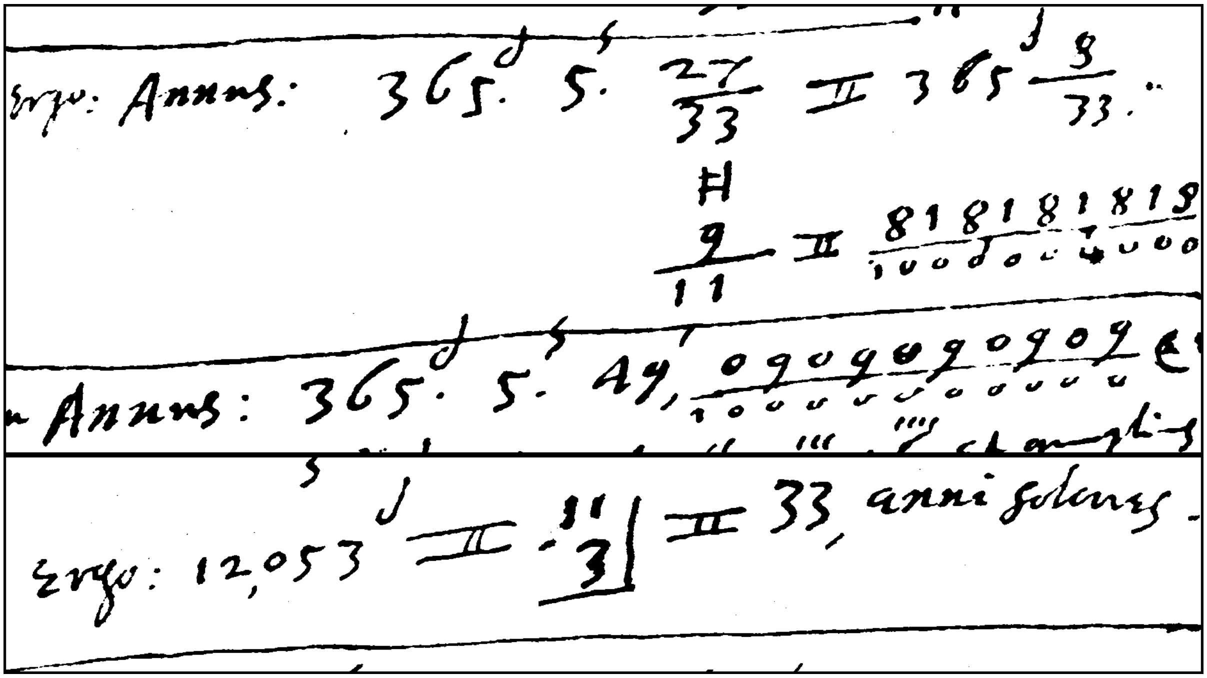
My grounds for supposing there was active suppression are many, but I will here mention only my search in the works of J.J. Scaliger, where I find consistent mention of Scaliger's receipt of correspondence, from the Syrian patriarch Na'amat allah, concerning Arabic solar parameters, Persian solar calendars and even Omar Khayyam's involvement in a short-lived calendar reform, but no mention of the 33-year cycle. Whether Scaliger himself suppressed information or the Syrian patriarch consciously withheld it from a Protestant scholar in deference to his Roman Catholic hosts, or was censored by his Vatican-appointed translator, is not clear to me as yet, since I currently lack the resources to continue the necessary inquiries at the Vatican and other Italian libraries.

Perhaps a conservative desire to retain as many Julian-calendar features as possible, a perceived mathematical complexity in a 33-year system, or simple bureaucratic inertia (Clavius may have heard from the Syrian after Gregory’s preliminary calendar commission had already canvassed Catholic princes with the Lilius\Pitatus system) can explain Clavius’ decision to ignore the mathematical, astronomical and religious superiority of the Syrian’s proposal, (without regard to any hypothetical geographical consequences). Moreover any reasons Clavius had for suppressing knowledge of an alternate method of Calendar reform, may just revolve around a desire for conformity to Pope Gregory’s decree, among as many Christian nations as possible, and specifically a desire to prevent any serious rival Protestant calendar reform.

But, if we examine Vatican relations with the one European government that got closest to immediately implementing an alternative reform (the English government of Queen Elizabeth I) and in particular, jesuit relations with the intellectual party within that government (John Dee, Sir Walter Raleigh and the so-called “school of night”) responsible for proposing that rival calendar reform and for initiating the first British attempts at colonisation of America, we find much that makes a great deal of sense when interpreted in the light of the geographical consequences of the perfect Christian 33-year calendar.

My initial hypothesis, which has so far withstood all falsification tests that I have been able to bring to bear upon it, was, and still is, that “John Dee was involved in a plot to secretly break the Spanish monopoly on the Christian calendrical longitude”. I say secretly, because those anti-Hapsburg or Protestant powers arrayed against King Phillip, would not have approved of anyone discussing the value of what Spain (perhaps unwittingly) possessed; at least not until Spain was no longer the sole possessor of this potential treasure.

I bring up “secrets” of the “school of night” at the risk of dabbling in the sort of wild conspiracy theories, parodied in your novel “Foucault’s pendulum”, because it is in the unpublished manuscripts of Thomas Harriot (Raleigh’s other mathematical magus, a friend and probable pupil of Dee’s, and usually identified as the “conjuror” of Raleigh’s “school of atheism” attacked in jesuit broadsides) that I found my first objective confirmation of the “zero-longitude school-of-night hypothesis”. I enclose a copy of my proposal to the Bodleian library and, below, examples of Harriot’s notes subsequently discovered there.



Figures 4 and 5: Showing two of many statements in Harriots handwriting, from his manuscripts, which show his reliance on the 33-year calendar cycle.

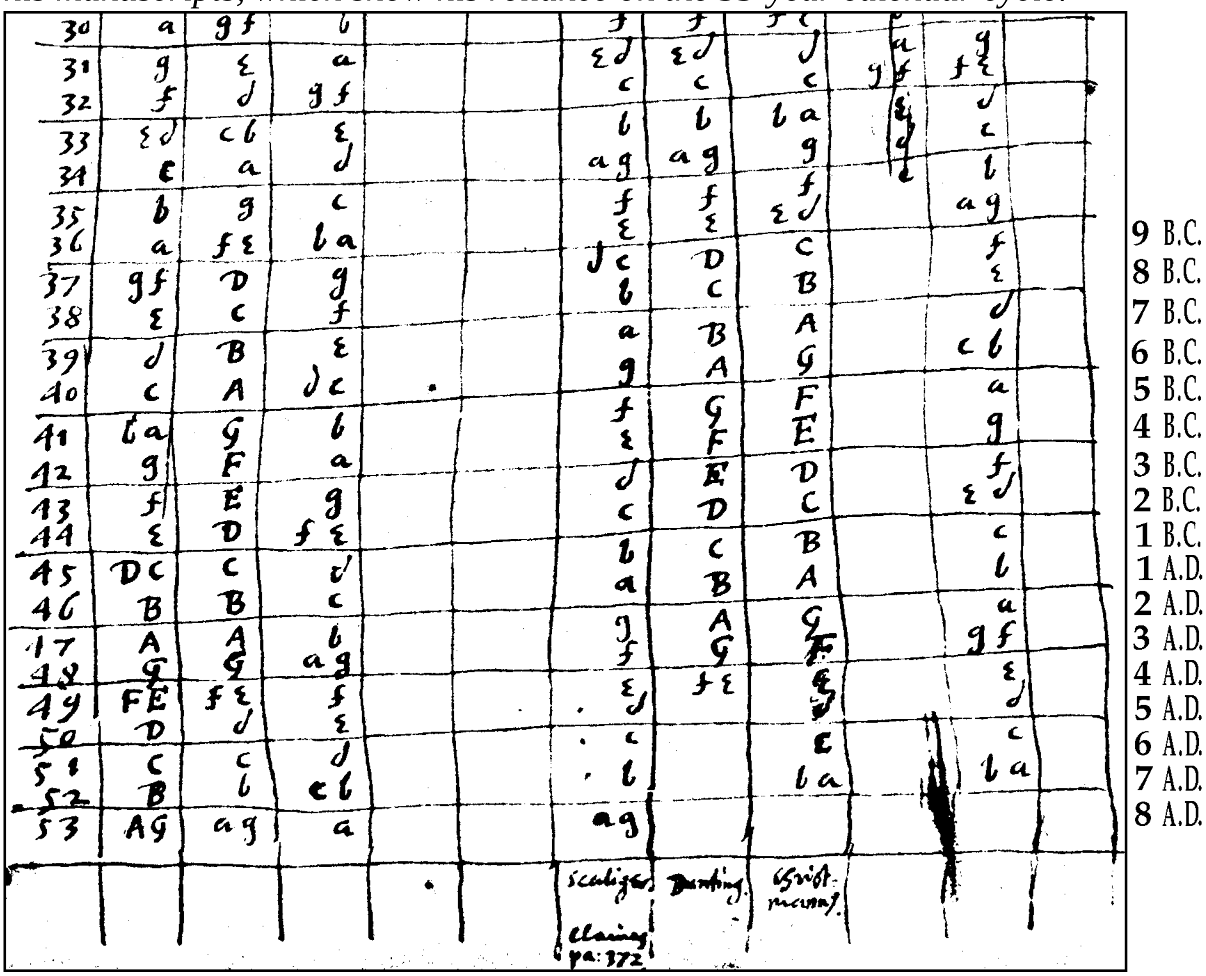


Figure 6 above: Showing Harriot's table of the early years of Julius Caesar's calendar and theories of the official leap-years. Was 4 A.D. a leap year?

Apparently Clavius and Scaliger thought not (column 7) while ?Bunting? (column 8) thought it was, (double Dominical Letters indicate a leap-year).

My hypothesis suggests that Clavius would have promoted findings that 4 A.D. was not really a leap year, because he would then be better able to deny the "historical reality" of any 33-year Jesus-cycle in a rival calendar. In this regard, I wish to see Clavius' correspondence (published in 1992 by the University of Pisa, eds. Baldini and Napolitani) especially his correspondence with John Deckers. I am looking for an Italian collaborator who is interested in my research concerning the following topics at the Protestant end of things:

Dee's strange behaviour; his relations with Sidney, Davis, Walsingham, the Gilberts, Raleigh and Elizabeth; and the evidence in his 1583 library catalog. Dee as "the Dog that Didn't bark". Diplomacy and espionage; Dee in Germany, Kelley and the Jesuits.

The nascent "Protestant league", the landgrave of Hesse, Fredrick of Denmark and the financing of Brahe; his mural quadrant, the accuracy of solar altitudes attainable in the 1580's and the significance of Danish Iceland (Kepler's Somnium). Harriot vs. Brahe, parallax, refraction and "fixing" the calendrical longitude.

The lunar eclipse of 1584, spring clocks in Wingandacoa and the mystery of the two English counterparts of Manteo and Winchese.
Harriot and White's map showing their accurate survey of Wingandacoa, the Bahamas and the line of longitude connecting them. This line and the intent to plant "50 miles into the main". Their failure and the continuing secrecy. White and Walsingham.

Marlowe and the "school of night", Raleigh as Tamberlaine dropping his "perpendicular", Dee as Faust (the "conjurer and calendar-maker"), the rescue of Bruno and, Mephistopheles offer of secrets and the Pope's year-length. Jesuit jabs, atheist scandal, Marlowe's murder, the ensuing hiatus and the Jacobean sequel.

Yours sincerely,

Simon Cassidy