About the Dozenal Solstice calendar
(static and interactive versions)

This calendar exists in two places: on this website in a static, printable version, and on a different site, in an interactive, user-configurable version for appointments and other events. The features particular to the interactive calendar are described here.

The idea

The basic idea of the calendar is a rational response to four goals:

1. Make the calendar as regular as possible.
2. Start the year at a neutral astronomical point.
3. Start the count of the years at a notable but neutral historical-astronomical point.
4. Use the dozenal number base.

The following discussion addresses those goals in reverse order. *Where necessary, a subscript* z *indicates the dozenal number base (counting by dozens), and a subscript* d *the decimal number base (counting by tens).*

4. Dozenal numbers. It's long been recognized that counting by dozens has advantages, mostly because a dozen has factors of 2, 3, 4, and 6, as opposed to ten's 2 and 5. Dividing things into even, whole thirds and quarters is very useful. It's not possible to divide ${}_{d}10$ into quarters without a fractional remainder, nor ${}_{d}10$, ${}_{d}100$, ${}_{d}1000$, etc. into thirds without an unending fractional remainder. ${}_{z}10$ (a dozen) and its powers don't have those problems. Decimal $0.1\underline{6}$ (6 repeating), 0.25, $0.\underline{3}$ (3 repeating), and 0.5 are respectively dozenal 0.2, 0.3, 0.4, and 0.6.

In the dozenal number base, single digits are needed for ten and eleven, because ${}_{z}10$ is a dozen (${}_{d}12$). In the Dozenal Solstice calendar, ${}_{d}10$ is ${}_{z}$↊ and ${}_{d}11$ is ${}_{z}$↋, using numerals designed for this purpose in the mid-19th century by Isaac Pitman. (There are various systems of names for dozenal numbers, and other numerals have been used for ${}_{d}10$ and ${}_{d}11$. The Pitman numerals may also be redesigned slightly to disguise their origins.)

The dozenal number base (sometimes called *duodecimal,* after the Latin *duodecim,* for *twelve*) is ideal for a year having a dozen months and for creating a six-day week. We could then divide the week in halves or thirds.

In the Dozenal Solstice calendar, the months may be numbered ordinally from 1 to ${}_{z}10$, and the years counted dozenally also, which brings us to the question of when the count of the years should start, i.e. when years 0 and 1 were.

3. The beginning of the epoch. Nothing happened $_{d}$2017 years ago (as of the date of this discussion) to suggest starting to count the years then. Even the Christian saviour wasn't born then (more likely between 4 and 6 years earlier).

Sanketh Kolhar has suggested starting the count of years near the beginning of the Holocene Epoch, i.e. after the latest ice age. Although that cannot be said to be a particular year, there *is* an astronomical event near the epoch's beginning: in 9564 BCE. That is the latest time that the perihelion, the shortest distance between the sun and the Earth, occurred on the summer solstice. (In 2017, it occurred on January 4 Co-ordinated Universal Time, or Greenwich Mean Time.)

If we use the perihelion of 9564 BCE as the beginning of the calendar, every year starts on the first day of the northern hemisphere's summer. More traditional would be every year starting on the first day of the northern hemisphere's winter. In that case, the first year, year 0, has the perihelion event in its middle, having begun in December 9565 BCE. The second year, year 1, then starts in December 9564.

Using the specified winter start date, Year 0 of the Dozenal Solstice calendar is almost all of 9564 BCE. Accordingly, $_{d}$2017 CE is $_{d}$11580 (not 11581, because in the Christian calendar there's no year 0). That's $_{z}$6850: 6 dozen dozen dozen plus 8 dozen dozen plus 5 dozen plus 0.

2. When the year starts. Although there's understandable lore behind the year's starting on January 1, just as there is behind the calendar's starting 2017 years ago, it makes more sense to start the year on a solstice, as explained in point 3 above. The problems are that 1) the solstices move (since $_{d}$1900, the North's winter falling on December 23, 22, and 21; summer on June 22, 21, and 20); 2) the specific time of a solstice in a year may fall on two different dates depending on time zones; 3) the seasons are opposite in the two lateral hemispheres.

Problem 1. Because of the moving solstice dates, leap years in the Dozenal Solstice calendar are not when they are in the Gregorian calendar. Consequently, it's difficult to predict which are leap years. The four-year cycle of the Gregorian calendar (one leap year, three non-leap) becomes slightly irregular in the Dozenal Solstice calendar, whether its years begin in winter or summer. Once every few decades in the Dozenal Solstice, there are five years from a leap year to the next.

Even if it's not possible to know whether a year is a leap year by dividing it by 4, the Dozenal Solstice calendar has the advantage that the years never go out of alignment with the sun. There's no longer a correction needed to the leap year cycle. (In the Gregorian calendar, years divisible by $_{d}$100 aren't leap years, except that those divisible by 400 are, with another negative correction needed in 3200…)

The interactive Dozenal Solstice calendar automatically converts dates from the decimal Gregorian calendar to the (Holocene) Dozenal Solstice calendar and vice-versa for the years $_{d}$1767 to 2101, a period of 334 years ($_{z}$6682 to 6900, a period of 23↊ years). A conversion table may also be found here. A similar one may be constructed for years starting in June.

Problem 2. This may be solved by taking the desired solstice at Co-ordinated Universal Time. A table for the solstices and equinoxes may be found here.

Problem 3. The southern hemisphere countries may create their own calendar starting on their winter solstice in June. At 0 degrees longitude (as for Greenwich, England), the only difference would be that the year would start six months later, taking June 9564 BCE instead of December 9565 to start year 0. If having a year number that doesn't agree for six months with the one in the northern hemisphere is too awkward, the south may continue to follow what has been established in the North.

1. Calendrical regularity. Making the calendar completely regular is impossible, because it contains either $_{d}$365 or 366 days per year. The nearest and most useful number of days, divisible by $_{d}$12, is 360. That means either $_{d}$12 months of 5 weeks ($_{d}$30 days) each, or $_{d}$10 months of 6 weeks ($_{d}$36 days) each. Anyone who has contemplated living with a decimal metric day divided into $_{d}$10 or $_{d}$20 parts will know why the first alternative for the calendar is better.

For $_{d}$12 $_{d}$30-day ($_{z}$10 $_{z}$26-day) months, totalling $_{d}$360 ($_{z}$260) days, some people have suggested gathering the extra 5 or 6 days at the end of the year. Because that throws off the seasons' alignment, it's necessary to disperse the extra days within the year.

In the Dozenal Solstice calendar, the extra days are designated S-days (from the Latin *super,* meaning *beyond* or *above*) and are not part of any month, even though they occur between months. To have the northern hemisphere's summer solstice always on the first day of the seventh month, the S-days are placed in each half of the year as follows, when the year begins in the northern hemisphere's winter:

	first half of the year	second half of the year
leap year	two S-days	four S-days
non-leap year, first pattern	one S-day	four S-days
non-leap year, second pattern	two S-days	three S-days

The calendar uses S5 S6 / S7 S8 S9 S↊, after the suggestion from Sanketh Kolhar. (The number following *S* refers to the month that the S-day follows.) That is astronomically the most accurate placement of the S-days in a leap year. There's minimal change from it for the non-leap years, as may be seen in the following:

	1	2	3	4	5	6	7	8	9	↊	↋	10
leap year pattern					S	S	S	S	S	S		
non-leap year, first pattern						S	S	S	S	S		
non-leap year, second pattern					S	S	S	S	S			

Months 6, 7, 8, and 9 are always followed by an S-day. Month 5 or month ↊ may be, or both. Which years use which pattern is indicated here. That table is built into the interactive calendar for years starting in winter of both hemispheres.

The placement of S-days when the year starts on the southern hemisphere's winter solstice is the same as the above, after subtracting 6 from each month number:

	1	2	3	4	5	6	7	8	9	↊	↋	10
leap year pattern	S	S	S	S							S	S
non-leap year, first pattern	S	S	S	S								S
non-leap year, second pattern	S	S	S								S	S

Although it would be good to have the equinoxes always fall on the beginning of the fourth and tenth month, that isn't possible if all the months have the same number of days, partly because spring and summer are longer than autumn and winter in the northern hemisphere. Other aspects of the day and year, e.g. the varying length of both over millennia, together with different ways of measuring them, make differences too small to affect the calendar.

Names of months and days

To keep month and day names as they are in the Gregorian calendar would be confusing. In the Dozenal Solstice calendar, the months have names from the twelve original signs of the Zodiac. They are used in classical Greek or their Latin-alphabet transcription to avoid connection with astrology, even though each month begins approximately where older astrology says it should. The days are named after the six primary and secondary colours, in Latin.

While using a number base better than ten, the Dozenal Solstice calendar minimizes irregularities and anomalies, and brings time reckoning at the level of the day, month, and year much closer to solar reality.

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6850-08-07
1201 July 24
2017 July 28