

The Julian Calendar and Why We Need to Know It

Stephen P. Morse (steve@stevemorse.org)

Early Roman Calendars

| | Romulus ca 753 BCE | Numa Pompilius ca 713 BCE | by 450 BCE | Julius Caesar 45 BCE | Augustus Caesar 8 BCE |
|---------------|------------------------------------|--|---------------|---|---|
| Ianuarius | | | 29 | 31 | 31 |
| Februarius | | | 28(23/24) | 29 (30) | 28 (29) |
| Intercalarius | | | (27) | | |
| Martius | 31 | 31 | 31 | 31 | 31 |
| Aprilus | 30 | 29 | 29 | 30 | 30 |
| Maius | 31 | 31 | 31 | 31 | 31 |
| Iunius | 30 | 29 | 29 | 30 | 30 |
| Quintilis | 31 | 31 | 31 | 31 | 31 Iulius |
| Sextilis | 30 | 29 | 29 | 30 | 31 Augustus |
| September | 30 | 29 | 29 | 31 | 30 |
| October | 31 | 31 | 31 | 30 | 31 |
| November | 30 | 29 | 29 | 31 | 30 |
| December | 30 | 31 | 31 | 30 | 30 |
| Ianuarius | | 29 | | | |
| Februarius | | 28 (23/24) | | | |
| Intercalarius | | (27) | | | |
| | 304 days + 61 days left over | -----355 days com----- -----377/378 days leap----- leap year cycle unspecified | | 365 days com 366 days leap 3-year cycle | 365 days com 366 days leap 4-year cycle |

Numbers in parenthesis are for leap years. Other numbers are for common years.

The calendar as modified by Augustus Caesar was to become known as the Julian calendar.

Gregorian Fix

Earth goes around the sun once every 365.2422 days.

Average year in the Julian calendar is 365.25 days.

Error causes seasons to advance 1 day every 128 years (about 3 days every 400 years).

By the 1500s, the error was about 10 days.

Pope Gregory XIII decreed the following starting October 4, 1582:

1. Ten days be stricken from the calendar
2. Century years are not leap years unless they are divisible by 400
3. There is a third condition that will be discussed later

Catholic countries switched over on that day or shortly thereafter
Italy, Poland, Portugal, Spain switched on October 4, 1582
France, Holland, and part of Belgium switched later in 1582
Austria, the rest of Belgium, and Catholic Germany switched in 1583
Czechoslovakia and Catholic Switzerland switched in 1584
Hungary switched in 1587
Transylvania switched in 1590

Protestant and Greek Orthodox countries switched later
Protestant Germany switched piecemeal during the 1600s
Denmark, Iceland, and the rest of the Netherlands switched in 1700
Canada, Great Britain, Ireland, and eastern U.S. switched in 1752
Japan switched in 1873
Egypt switched in 1875
Albania, Bulgaria, China, Estonia, Greece, Latvia, Lithuania, Romania,
Russia, and Yugoslavia all switched between 1911 and 1923
Turkey switched in 1927

Even within the land that was to become the U.S., the switchover was not simultaneous
Texas, Florida, California, Nevada, Arizona, and New Mexico
switched with Spain in 1582
Mississippi switched with France in 1582
Eastern seaboard switched with Great Britain in 1752
Alaska switched in 1867 when it became part of the U.S.

The Price for Waiting

In 1500s and 1600s the correction was 10 days
In 1700s the correction was 11 days
In 1800s the correction was 12 days
In 1900s the correction was 13 days

Unique Switch-overs

Alaska switched over when it was acquired by the U.S. from Russia in 1867. At the same time the International Dateline was redrawn with Alaska on the U.S. side rather than on the Russian side. That resulted in Alaska losing 12 days because of the switch and repeating one day because of the dateline change.

Sweden attempted to do a gradual conversion by skipping leap years from 1700 to 1740 rather than throwing out 11 days all at once. But they abandoned the plan after skipping the leap year in 1700. That left them inconsistent with both the Julian calendar and the Gregorian calendar. In 1712 they reverted back to the Julian calendar by having 30 days in February that year. Then in 1753 they switched to the Gregorian calendar cold turkey.

Nova Scotia switched a few times. In 1605 it switched to the Gregorian calendar. In 1710 it switched back to the Julian calendar. And in 1752 switched back to the Gregorian calendar.

Places Still Using the Julian Calendar Today

Eastern Orthodox calendar for calculating Easter and other feasts
Berber people in North Africa and on Mount Athos
Ethiopia (uses Alexandrian calendar which is based on the Julian calendar)

Start of the Year

In the initial Julian calendars the year number changed on January 1. But then local calendars were aligned to the Julian calendar, and each kept its own date for changing the year number.

Alexandrian calendar (Egypt): August 29/30
Several local provincial calendars: September 23 (Augustus' birth)
Byzantine year: September 1
Eastern Orthodox Church liturgical year: September 1
Russia from 998 CE: March 1
Russia from 1492 CE: September 1
Russia from 1700 CE: January 1
Western Europe during Middle Ages: December 25 / March 25
England pagan times: December 25
England from 1089 to 1155: January 1
England from 1155 to 1751: March 25

Above were mentioned two of the conditions for the Gregorian switchover (striking days from the calendar, adding the century rule for leap years). There was a third condition, namely to unify the day on which the year number changes. Every country adopting the Gregorian calendar will change the year number on January 1.

Double Dating

Prior to adopting the Gregorian calendar, dates between January 1 and the day the year number changed had two years associated with them. The first was the year in the Julian calendar, which was the calendar in use. The second is the year that it would have been if the year number had changed on January 1. To avoid confusion, both years were sometimes entered into a record. This is referred to as Double Dating or Dual Dating.

As an example, George Washington's birth record (in the Washington family bible) reads "George Washington, son of Augustine and Mary his wife was born on 11th day of February 1731/2." In the Julian calendar, which was in use in the U.S. at the time, the year number changed on March 25. So his Julian birthday in was February 11, 1731. But

if they had changed the year number on January 1 instead of March 25, his Julian birthday would have been February 11, 1732.

George Washington's Birthday

Washington was born on February 11, 1731/2 in the Julian calendar. In September 1752 the U.S. switched to the Gregorian calendar. And Washington would have turned 21 five months later, on February 11, 1753.

If we count the days of his life up to February 11, 1753 Gregorian, we see that he would have been alive 11 days shy of 21 years. That presented a problem. To solve that problem, the switch-over decree made special provisions to use the Julian calendar for computing time durations that started before the switch occurred. So Washington's 21st birthday was on February 11, 1752/3 Julian, which is February 22, 1753 Gregorian.

Washington died in 1799, but had he lived to 1801, his birthday of February 11 Julian would have become February 23 Gregorian. Note the change in his Gregorian birthday from February 22 to February 23. And in the current century his birthday would be February 24.

This same problem affects any of your ancestors who were born at a time and place that the Julian calendar was in use. It's up to you to decide how you want to enter those birth dates in your family tree.

The Gregorian Error

The average Gregorian year comes out to be 365.2425 days. The Earth goes around the sun once every 365.2422 days. That difference causes the seasons to advance one day every 3,333 years. So all Pope Gregory did was to kick the can down the road, although he did kick it quite far.

One simple correction would be to eliminate leap years in millennium years that are evenly divisible by 4,000. So the year 3000 would be a leap year, but the year 4000 would not be. With that correction, the seasons would advance one day in 20,000 years.

The Julian Converter on the One-Step Website

On my site (<http://stevemorse.org>) I have a tool for converting between Julian dates and Gregorian dates. The tool adjusts by the required number of days and also takes the year-number-change date into consideration. That tool is at <http://stevemorse.org/jcal/julian.html>.