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## Time and Again, the Calendar Comes Up Short *Sticklers for Symmetry Lament Imperfections in the 400-Year-Old Gregorian System; Earth's Inconvenient Orbit*

By CHARLES FORELLE

Friday marks the start of another new year, and for a small band of reformers, another missed opportunity.

For the 428th straight year, much of the world will again use the familiar Gregorian calendar. We will suffer the fiscal quarters of varying lengths and the 52 weeks that don't quite fill the year. We will recite rhymes to recall how many days are in June, and shrug if we are asked whether Halloween is on a weekday.



Everett Collection  
Pope Gregory XIII

Almost since Pope Gregory XIII promulgated the new calendar -- itself a reform of Julius Caesar's calendar -- in 1582, proposals have bubbled up for something better.

Apostles of efficiency lament that each year needs a fresh wall calendar. The astronomically precise complain that Gregory's leap-year formula (every four years, except centuries not divisible by 400) is erratic, and a hair off the real

year's length anyway. The financially fixated sigh that next year there will be more shopping days between Thanksgiving and Christmas than this year.

"We have a world-wide consensus about this second-rate calendar that the pope imposed 400 years ago," Simon Cassidy, a California software engineer and amateur calendar scholar, says by telephone from New Zealand, where he is spending the northern-hemisphere winter.

Creating a calendar is like fitting a lot of round pegs into not quite as many square holes. Western tradition demands a seven-day week. Ancient custom, rooted in moon cycles, calls for a 12-month year. The Earth's tilted axis produces four seasons. But the Earth, uncooperatively, takes 365 days, plus a tad more, to go once around the sun, and 365 is divisible by none of seven, 12 or four. And thanks to the extra bit of time -- about one-fourth of a day -- required for a complete orbit, leap years are needed to keep things on track.

Irv Bromberg, who teaches at the University of Toronto medical school, got hooked on calendars four decades ago in a college astronomy course. Rankled by the ragged Gregorian calendar, he created "Symmetry454." Every week and month begin on Monday, Christmas is always a Thursday, and in a nonleap year every quarter has the same number of days.

The price for this symmetry: In Symmetry454, 35 days hath February, May, August and November. All the rest have 28. Except in a leap year, when December, too, has 35. (Leap years occur every five or six years.) On average, the Symmetry454 year is slightly more than 365.2423 days.

For much of history, calendars have existed to organize life around seasons, to give regularity to plantings or religious observances. Medieval Christians knew that Caesar's calendar, which had a leap year every four, needed fixing because spring kept coming earlier.

The spring equinox, the traditional start of the season in the northern hemisphere, occurs when the sun crosses directly above a point on the equator. That had historically been expected on March 21. But Caesar's calendar, by including too many leap years, overstated the average length of a year by about 11 minutes.

That error built up over 16 centuries, and by Gregory's time, the spring equinox was arriving a week and a half early on the calendar. Since Easter Sunday is based on the equinox, this caused great liturgical fuss. The Gregorian reform excised 10 days out of October 1582 and reworked leap years so that there would be three fewer every 400 years -- for an average year length of 365.2425 days.

That is pretty close to the average length of a solar year, measured from one spring equinox to the next: just under 365.2424 days, according to modern astronomers.

Others have tried to do the pope one better. John Dee, a science adviser to Queen Elizabeth I, labored on alternatives. Mr. Cassidy says Dee came up with an "ideal" calendar with eight leap years every 33 years. That works out to an average year length of 365.2424 days. Elizabeth didn't adopt Dee's calendar, though England, no fan of the pope, stuck with Caesar's until 1752.

Twentieth-century advocates of calendar change concentrated on efficiency -- making the calendar "perpetual" so it didn't need to be replaced. In the 1930s, the League of Nations considered a calendar backed by George Eastman of Eastman Kodak -- 13 months of a beautifully regular 28 days (total, 364), plus an extra day at the end. But the U.S. was displeased that July 4 fireworks would be launched on the 17th day of the new month "Sol." The proposal died.

In the 1950s, the United Nations tried anew, this time with the World Calendar. It is perpetual, every year begins on Sunday and every quarter has 91 days. All months have either 30 or 31 days. The 365th day, called "Worldsday" is appended at the end, after the year's last Saturday.

Trouble is, eight days elapse between Sundays (or Saturdays) at the turn of the year. That messes with the Judeo-Christian admonition to keep the Sabbath holy. If God commands you to rest on the seventh day, what are you supposed to do about Worldsday? The religious objections were too much, and the U.N. took a pass.

Wayne Edward Richardson won't let the dream die. Mr. Richardson, the director of the World Calendar Association, is preparing for 2012, which happily starts on a Sunday and is thus an ideal time to switch to the World Calendar. (If current efforts fail, the next shot is 2017.)

As for the seventh-day concerns, Mr. Richardson says Worldsday can be a "double" Sabbath. "There are seven-day creation stories, but isn't it a stretch to use them to justify calendar dysfunction for eternity?" he says in an email.

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“ Until we travel beyond and live off planet, there is no compelling need to change the calendar. Change the calendar? We can't even agree if 05/06/2010 is May 6th or June 5th. ”

— David Kessinger

Others are less optimistic. The "Y2K" reprogramming was "child's play" compared with what is needed for a world-wide calendar switch, admits Dr. Bromberg. At the same time, computers can now easily juggle the knotty math of a Gregorian calendar, meaning there is less imperative for change than 50 years ago, points out Karl Palmen, a programmer in the U.K. who has worked out a calendar based on lunar cycles called "yermes."

"We don't have anyone with the kind of sway that a medieval or renaissance pope had," says Edward M. Reingold, a computer-science professor at the Illinois Institute of Technology in Chicago. Mr. Reingold is co-author of "Calendrical Calculations," the Bible for calendar scholars. He has plumbed countless calendars from ancient Hindu to modern Hebrew, working out their patterns. In an academic paper, he drew a link between an algorithm in computer graphics and the formula for distributing leap years in a calendar.

"The Gregorian system is quite ingenious," says Mr. Reingold. Still, he concedes there is a certain satisfaction to tinkering with the chart of the heavens, even if you aren't a pope.

He tells a joke: A journalist interviews a resident of a mental hospital. They converse for a while, and the patient appears perfectly sane. The journalist inquires why the patient is institutionalized. The patient responds that he has a small problem: "I like pancakes." The journalist says he does, too. "You do?" the patient exclaims. "Come up to my room, I've got a whole suitcase full of pancakes!"

Says Mr. Reingold: "I've got a suitcase full of calendars."

## New Year | How two alternative calendars compare:

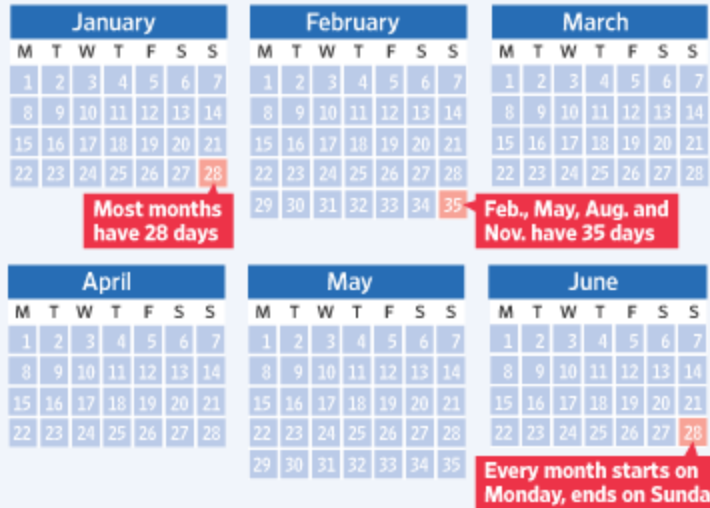
### Symmetry454

**Leap years:** December expands from 28 to 35 days. Leap years occur every five or six years.

**Pros:** Every month, quarter and year begin on Monday and end on Sunday. In non-leap years, every quarter has 91 days, of which 65 are weekdays and 26 are weekends. Perpetual.

**Cons:** Leap-year algorithm hard to work out in your head. We would have to get used to May 33rd.

**Average year length:** 365.2423 days



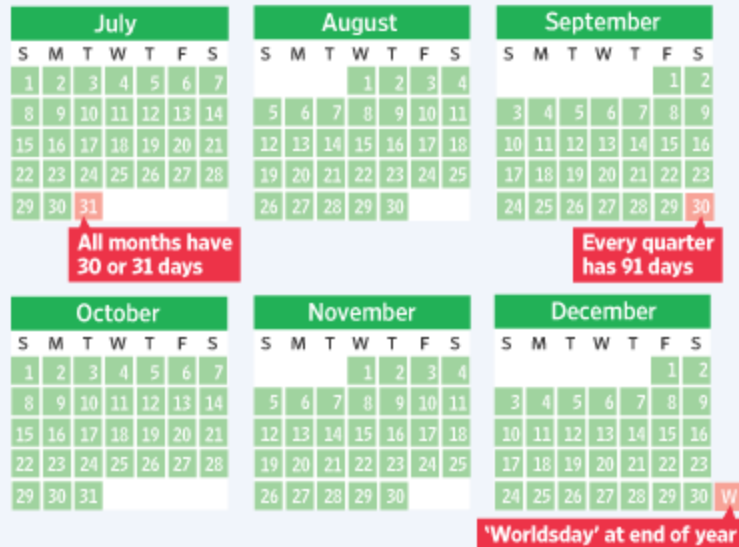
### The World Calendar

**Leap years:** Just like the Gregorian calendar. In leap years, there is a 'Leapyear Day' tacked on to June.

**Pros:** Perpetual, simple to remember. Symmetrical quarters.

**Cons:** Judeo-Christian belief requires resting on the the seventh day. Adding Worldsdays would disrupt the weekly Sabbath cycle.

**Average year length:** 365.2425 days



Sources: Irv Bromberg, University of Toronto; TheWorldCalendar.org