

ASTRONOMY

Reforms in Our Calendar

Various changes are made from time to time to correlate the months with the seasons. The year is longer than 365 days, less than 366, so Leap Year was instituted.

By MARTHA G. MORROW

► THAT extra day the calendar-makers give us once every four years, the bonus of a Feb. 29, this year will come on Sunday. Four years from now brazen young ladies are supposed to "have their day" on Friday, Feb. 29. And in 2100, although divisible by four, there just won't be any Leap Year Day at all.

These various changes in our more or less orderly calendar are made to keep our months eternally at the right season of the year. The system of adding an extra day every fourth year was adopted about 2000 years ago, that of omitting the extra day three out of every four times that a century ends was inaugurated less than 400 years ago.

The calendar of all western nations has been borrowed from the Romans. Their month, based upon the periodic repetitions of the phases of the moon, was about the same length as the lunar month—29 or 30 days. To keep the months in order, they were forced frequently to insert an extra month. A more orderly calendar was definitely needed.

Julius Caesar

Upon the advice of the Alexandrian astronomer Sosigenes, Julius Caesar adopted $365\frac{1}{4}$ days as the true length of the year and ordained that every fourth year should contain 366 days. The tropical year, however, is 11 minutes, 14 seconds shorter than this, so in the course of 1000 years the Julian calendar becomes nearly eight days too long.

In time the vernal equinox had become earlier and earlier. By 1582 it fell on March 11 instead of occurring on March 21, as it did at the Council of Nicaea in 325 A. D. Pope Gregory XIII, therefore, upon the advice of the astronomer Clavius, ordered the calendar corrected by dropping ten days.

In Catholic countries, where the Gregorian calendar was adopted earlier than in the other Christian countries, the day following Oct. 4, 1582, was called the fifteenth instead of the fifth.

To avoid further displacement of the beginning of spring, Gregory decreed

that the rule of adding an extra day every fourth year should be followed except in the case of those century years whose number is not divisible by 400. Thus 2000 A. D. will be a leap year, but 2100 will not, nor was 1900.

Eleven days had to be dropped by England and her colonies—including America—to bring the calendar in line when the new type calendar was adopted in 1752, almost 200 years after it came into use in some European countries. Since 1800 and 1900 were not leap years in the Gregorian calendar, at present that and the Julian calendar differ by 13 days.

Tropical Year

The tropical year actually consists of 365 days, five hours, 48 minutes and 46 seconds. The Gregorian year is thus about 26 seconds too long. But calendar experts won't have to worry for a few thousand years about an error amounting to one day.

The Egyptians, who had calculated as 365 days the time it takes the earth to circulate around the sun (the solar year), divided the year into 12 equal months each of 30 days, the remaining five days being devoted to festival holidays. Their weeks, however, were ten days long.

Nor did the calendar instituted by Caesar include any seven-day week. This was an eastern invention, used by the Babylonians and later by the Jews. Not until the fourth century was the week established in Christendom and Sunday proclaimed as the day of worship.

Both the Julian and the Gregorian calendars have months of irregular length. This also can be traced back to the time of the Caesars.

In reforming the calendar, Julius Caesar established the simple system by which the months, beginning with March, should have 31 days, alternating with months of 30 days, except the last month, February. This was to have 30 days in leap years only and 29 days in normal years.

But this reasonable rule was not long followed. The sixth month, Sextilis, was named after his successor, Augustus.

The story goes that to make this month of August as long as that of July, named after the first Caesar, Augustus stole another day from February. Then to avoid having three consecutive months of 31 days each, he rescrumbled the calendar a little more.

Proposed Changes

A number of reform calendars have been devised throughout the last century to correct such difficulties in our present calendar as:

1. Unequal quarters. One three-month period consists of 90 days, another of 92 days.

2. Unequal months. In normal years February has 28 days, whereas seven of the months are given 31 days each.

3. Indivisibility of months into weeks. At present each month consists of four weeks plus an odd number of days.

Several calendars have been sponsored during the present century, the idea being one should be adopted simultaneously by nearly all of the nations. Outstanding among these are a 13-month calendar and an equal-quarter calendar. Sponsors of these international calendars agree that the year should begin on Sunday, and each introduce an



FOUNDER OF OUR CALENDAR
—Pope Gregory XIII gave his name to the Gregorian calendar which we use when in 1582 he ordered 10 days dropped from the Julian calendar to correct a discrepancy.



LEAP YEAR—The extra day which comes on Feb. 29 was established to match more nearly the time it takes the earth to revolve around the sun. Pope Gregory initiated the rule of adding a day every four years except in the case of those century years whose number is not divisible by 400.

extra day each year—two in leap years—that is a true holiday and belongs to no day of the week. They both follow the Gregorian rule governing leap years.

Under both of these plans the same day of the year would always fall on the same day of the week. Thus New Year's Day, Fourth of July and other holidays would always come on the same day as well as the same date. This would avoid the uncertainty that is eternally arising concerning holidays. For instance, do workers get Friday off when Christmas falls on Saturday or Thursday?

Thirteen identical months of four weeks each are proposed in the International Fixed Calendar. In this method of reckoning days, each month begins on Sunday. The twenty-fourth of each month would always be a Tuesday and there is a Friday the thirteenth in every month.

13 Business Months

A number of businesses in the United States and Canada have actually tried operating on the 13 business months of four weeks each. International acceptance would be necessary, however, before such individual adoption could be given a fair trial.

The year of 12 months is divided into four equal parts by the World Calendar, which introduces certain reforms into the Gregorian calendar we use today. Each quarter consists of three

months with a total of 91 days each. The calendar proposed by this organization, the most active today, has gained wide acceptance.

January, April, July and October, the first month in each quarter, always begin on Sunday and have 31 days. The other months of each quarter consist of 30 days. The second month of each quarter always begins on Wednesday; March, June, September and December start on Friday.

Year-End World Holiday

An additional day is inserted at the end of December and called Year-End World Holiday. The extra day introduced each leap year would appropriately be tagged onto the end of June, the month of brides.

Sponsors of the World Calendar have selected a date less than two years off as ideal for its international adoption. Jan. 1, 1950, was picked because both the present and the new calendars come together at that date, both years beginning on Sunday. Transition from the old to the new could be made much more smoothly than when the Gregorian calendar was adopted and people were cheated out of 10 to 13 days.

The difficulty of fixing the date of Easter is also avoided. This being an ecclesiastical matter, they leave that to the Church to determine.

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