

CHRONOLOGY

Despite Leap Years, Calendar About Three Hours In Error

Modern Calendar of Pope Gregory XIII Corrects Earlier Errors But Still is 24 Seconds Off Annually

WHEN Pope Gregory XIII reformed the calendar in 1582, with the advice of the astronomer Christopher Clavius, he corrected an error that had existed in the earlier Julian calendar of nearly ten minutes a year, but even his calendar is not perfect.

The average length of the year according to the Gregorian calendar is about 24 seconds longer than it should be—the time that the earth takes for a complete trip in its orbit around the sun. But this remaining error is so small that it will not be until about the year 4600 that our calendar will be as much as a day in error. At present the difference that has accumulated since Pope Gregory's time is only about three hours, not enough to bother anyone.

The whole difficulty in making a satisfactory calendar comes from the fact that the earth does not turn an even number of times while it is making a trip around the sun. Instead, it turns almost $365\frac{1}{4}$ times. More accurately the number can be expressed as 365.24219, but even that is not exact. The two periods of time are incommensurable—one cannot be expressed precisely in terms of the other, no matter how many figures are used after the decimal point. Consequently, the best calendar is the one that most closely approximates this relation.

Named for Caesar

The Julian calendar, named after Julius Caesar, by whose decree it was introduced in 45 B.C., was due to the Roman astronomer Sosigenes, who had placed the length of the year at $365\frac{1}{4}$ days. As the extra fraction of a day amounted to one day every four years, the leap year was invented. By having a 366-day year every fourth year, the difference was mostly accounted for. But because the actual year is about ten minutes shorter than Sosigenes assumed, by 1582 the calendar was 13 days out of step, and the beginning of spring came on March 12, instead of March 25, where Caesar had placed it. If this had been allowed to continue, it would even-

tually have come in the middle of winter, and as this would have put Easter and other religious festivals in the wrong time of year, Pope Gregory ordered the reform that bears his name.

Instead of restoring the beginning of spring to the 25th, however, he made it the same as in the year 325 A.D., the date of the Council of Nicaea, which had set the rules for determining the date of Easter. Ten days were dropped bodily from the calendar, which made the necessary correction. Then, in order to prevent a recurrence of the error, he ordered that in the future years marking the beginning of a century should not be leap years unless they were di-

visible by four hundred. Other years would have the extra day if their number was divisible by four. Thus, in the Gregorian calendar there are 97 leap years every four centuries, instead of a hundred, as Caesar had it. For this reason the year 1900 was not a leap year, but 2000 will be one.

But this difference of three days every four hundred years is a little too much of a correction by about 24 seconds a year. This amounts to a day in 3,000 years, so by the year 4600 spring will start on March 22, unless some other change is made in the meantime. By that time the Eastern Orthodox Church will have a more accurate calendar than ours. They adhered to the Julian calendar until 1923. Then they adopted the Gregorian but with a slightly different leap year rule. This is that century years shall be leap years only when their numbers divided by nine give a remainder of 2 or 6. This will not be out of step with ours until the year 2800 which, in the Gregorian calendar, will be a leap year, but in the Eastern reckoning it will be an ordinary one.

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MEDICINE

Medical Training Could Reduce Maternal Deathrate

LACK of training of medical students should be remedied to prevent needless deaths of mothers in childbirth and to cut maternal deathrate, it was advocated in discussions at the annual congress on medical education held under the auspices of the American Medical Association.

Proper training in medical school, it was suggested, could do as much for childbirth deaths as public health measures have already done to lower death rates from typhoid and diphtheria.

Better training of medical students in the management of childbirth and education of expectant mothers to demand the best scientific care during the period before their children are born as well as the time of the birth are the means advocated for reducing maternal mortality.

The general practitioner devotes almost a third of his time to obstetrics, but the subject dealing with the man-

agement of childbirth is allotted only 4 per cent. of the time allowed for the entire medical course, Dr. Robert H. Riley, state health officer of Maryland, pointed out.

Need for better training of medical students in obstetrics was also stressed by Dr. Charles B. Reed of Chicago.

"Sentimentalists everywhere are maintaining that maternity cases are not getting adequate medical care and that in consequence the American mortality and morbidity rate is much higher than in other countries," Dr. Reed said.

Although the charge cannot be substantiated because of dissimilarity in collecting and analyzing statistics in different countries, "social theorists and salaried altruists make a great ado over this assumption and use it freely as an argument for the passage of paternalistic and unconstitutional laws together with a prodigal expenditure of public money," he observed.

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