THE ELIMINATION OF PERPETUAL CALENDARS

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If we wish to find the day of the week for any date, one way to solve the problem is to use a perpetual calendar. Another way to solve the problem is to calculate the day of the week by mathematical methods. In the past these mathematical methods have been so complicated that it has been much more convenient to use a perpetual calendar. This explains why some people have put themselves to the expense of buying perpetual calendars. The purpose of this article is to provide a mathematical method which is so simple that the entire calculation can be done mentally and which is as convenient as a perpetual calendar. In this article this mathematical method is applied to the Gregorian, Julian, and World calendars. Since a great many records have been made using the Julian and Gregorian calendars, the adoption of the World calendar would not completely eliminate the usefulness of applying the mathematical method to the historical calendars. The mathematical method also shows to what extent the World calendar is a simplification; this is important because proposals to reform the present calendar are attracting world-wide attention.

In the theory of numbers occurs the expression,

$$a \equiv b \bmod p, \tag{1}$$

which is read a is congruent to b modulo p, and which means that the difference of a and b is divisible by p. Since p in this article is always equal to 7, it is convenient to represent (1) by

$$a \equiv b. \tag{2}$$

Assume m stands for any number which represents any monthday of any month. Assume w stands for any number which represents any day of the week. It is assumed that 7 stands for Sunday, 1 for Monday, 2 for Tuesday, etc. It is assumed that the constant c for any month is the value of m at the first Sunday in that month. Then (2) becomes

$$w \equiv m - c, \tag{3}$$

which enables us to find w if m is known provided the constant c is known for the month in question. Consequently, all we need to complete our theory is to discover a method of finding c for any possible month.

First, there will be discussed rules for finding c for any month of the Gregorian calendar in 1935. An inspection of the calendar shows that c for December is