A CALENDAR DATE CALCULATOR

by

Peter W. Voisey

Engineering Research Service

Research Branch, Canada Department of Agriculture, Ottawa

The need to determine the number of days between given calendar dates or vice versa frequently arises in agricultural research and production. The elapsed time before certain actions must be taken in the reproductive and productive cycles of animals and plants must be controlled and scheduled. For example, gestation in animals, movement of hens to laying batteries and the planting or harvesting of crops.

Time is expressed as calendar dates because these relative points in time are universally used and understood. Conversion of time periods to dates can be made by a computer but for many purposes this is not convenient. Counting days manually on a calendar is time consuming and subject to error particularly if numerous conversions must be made. A solution is the circular calculator of which there are many special types manufactured. However to the author’s knowledge a conversion calculator for calendar dates has not been marketed, although nomograms and tables have been published by farm suppliers for this purpose in advertising literature.

A circular date calculator was described by Abel (1). A disc with its perimeter divided into 182 equal parts to form the inner scale was rotated above a second disc whose perimeter was similarly divided but marked in the order of calendar days and months to form the outer scale. This instrument had the disadvantages that it could not be used for periods greater than 364 days and if a period passed through December into January one day must be added or subtracted from the result to make the conversion. Also each division on both scales represented two days and the inner scale was marked off in even days and the outer in odd or even days depending on the number of days in the month. Thus this calculator was somewhat confusing particularly for unskilled labour. The reason the author used this arrangement was probably the practical problem of dividing a circle into 365 equal parts.

To be useful any special calculator should be easily reproduced to spread the cost of preparing the scales and to make copies readily available at a modest cost. The techniques used to produce a specific gravity calculator for potatoes (3, 4) were therefore used to produce a calendar date calculator.

The circumference of a 38 cm diameter circle engraved on an aluminum sheet was precisely divided into 365 parts using a milling machine equipped with a dividing head and differential attachment (2). This master scale was traced on to mylar sheets. The scale on one sheet was marked with days and months to produce the outer scale and the graduations on the other sheet were marked consecutively 1 to 365 and 365 to 730 to produce the inner scale. In addition the operating instructions were printed in the mid-area of the inner scale. The two mylar sub-master scales were then reduced to one-third size and printed photographically on 0.51 mm thick vinyl sheet. The scales were then trimmed to size and assembled by a plastic pivot in the center (3).

The resulting calculator (Fig. 1) is pocket size (12.7 cm diameter) and has a yellow legend printed on a black background. This colour combination provides high legibility for such high density scales.

To determine the number of days between known dates, zero on the inner scale indicated by a pointer, is set opposite the first date on the outer scale. The interval is then noted on the inner scale opposite the second date. To determine the dates for a given number of days the scales are read in the opposite direction.

The calculator can be read directly for intervals up to two years. If longer periods are required the corresponding multiple of 365 must be added to the conversion. Leap years are not accounted for and one day must be added to the conversion whenever the end of February is passed for a calculation in a leap year. This could be readily overcome by constructing a special leap year model with 366 divisions.

Arrangements have been made to produce the calculator commercially. It is estimated that they may cost about $4 (5).

REFERENCES


Figure 1: The date calculator.