Date lines

Stephen Wells tracks down Easter days and deals out date dodges.

Because we have to prepare this column so far in advance I have not yet received mail on the problem mentioned in last month's column, of calculating the date of Easter Sunday. So meanwhile I've dug out some more information myself.

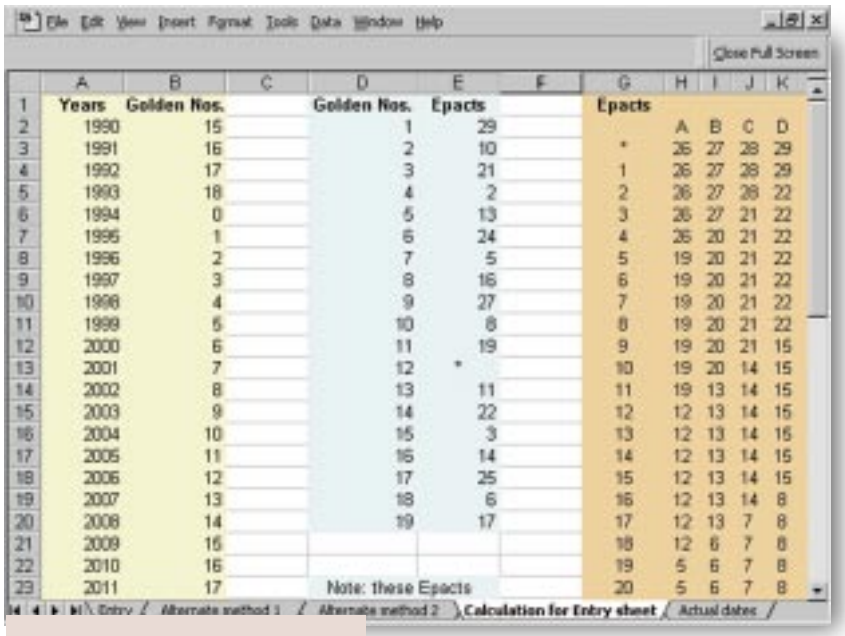
The file Easter.xls on our cover-mounted CD this month can be opened in Excel 5 and above. It contains data from three sources: *Christian, Hebrew and Mahometan Calendars* by W.S.R. Woolhouse, printed in 1864 and kindly provided by my local Diocesan Chancery Office; several algorithms available in leaflets from the Royal Greenwich Observatory; and a list of dates from 1875 to 2124 calculated, but not guaranteed, by M.J. Montes.

If you just want to know the date of Easter Sunday for any year between 1990 and 2019, go to the 'Entry' worksheet, enter the year and the date will be displayed. The sheets, 'Alternate Method 1' and 'Alternate Method 2' illustrate two different algorithms, spelled out step by step. The sheet, 'Actual dates' is the list of 250 years' Easter days. For many years, all these methods agree but unfortunately, not for all.

If you look at the fifth worksheet in Easter.xls, entitled 'Calculation for entry sheet,' you can see the problem (this is the sheet which calculates the answers for the 'Entry' sheet). The various calendars are all a bit of a best-guess, really. They are man's attempts to clock how the world turns. The year 2000, for instance, is supposed to mark 2000 years since Christ's birth. But this date was not guessed at until the 6th Century. Also, the early calendar makers went from BC to AD with no year zero — this was the earliest built-in Y2K bug — because at the time the concept of zero had not been visualised.

The various calendars are man's attempts to clock how the world turns

On the Calculation sheet [Fig 1] you will see panels for 'Epacts', 'Dominical Letters', 'Golden Numbers', and 'Numbers of Direction'. A Dominical letter is used in the Ecclesiastical Calendar to denote the day of the week in a year. The letters A to G (representing the days of the week) are placed opposite Jan 1 through Jan 7, Jan 8 through 12 and so on, throughout the year. The pattern falls back one letter each year and two letters in a leap year. Other adjustments have to be made after a century and a millennium.



	A	B	C	D	E	F	G	H	I	J	K
1	Years	Golden Nos.		Golden Nos.	Epacts		Epacts				
2	1990	15		1	29			A	B	C	D
3	1991	16		2	10		*	26	27	28	29
4	1992	17		3	21		1	26	27	28	29
5	1993	18		4	2		2	26	27	28	22
6	1994	0		5	13		3	26	27	21	22
7	1995	1		6	24		4	26	20	21	22
8	1996	2		7	5		5	19	20	21	22
9	1997	3		8	16		6	19	20	21	22
10	1998	4		9	27		7	19	20	21	22
11	1999	5		10	8		8	19	20	21	22
12	2000	6		11	19		9	19	20	21	15
13	2001	7		12	*		10	19	20	14	15
14	2002	8		13	11		11	19	13	14	15
15	2003	9		14	22		12	12	13	14	15
16	2004	10		15	3		13	12	13	14	15
17	2005	11		16	14		14	12	13	14	15
18	2006	12		17	25		15	12	13	14	15
19	2007	13		18	6		16	12	13	14	8
20	2008	14		19	17		17	12	13	7	8
21	2009	15					18	12	6	7	8
22	2010	16					19	5	6	7	8
23	2011	17		Note: these Epacts			20	5	6	7	8

Entry / Alternate method 1 / Alternate method 2 / Calculation for Entry sheet / Actual dates

▲FIG 1 CALCULATING EASTER DAY WITH ANY CERTAINTY IS NOT EASY AS IT DEPENDS ON WHAT THE MOON IS DOING, BUT THIS WORKBOOK ATTEMPTS TO FIND OUT

- A Golden Number refers to the cycle of the moon over 19 years. The number which any given year occupies in the current cycle is called the Golden Number.
- The Epact is a number which represents the age of the moon on Jan 1 of any given year.
- The Number of Direction is the number of days that Easter Sunday falls later than March 21.

Easter is the first Sunday after the first full moon which happens on, or next after, March 21. If the full moon is on a Sunday, the Easter Day is the Sunday after. So, if we can calculate what the moon is going to be doing (or was doing) on the first day of any year, we can say when Easter will be.

Blind dates

Reader David Kelsey wrote to me with a quick solution to another reader's problem. David notes that if you want to stop Excel from displaying entries as dates you can insert a single quotation mark before the entry.

What this actually does is change the formatting. If you enter 10-15 (referring to an age group of 10- to 15-year-olds) in cell A1 with default formatting, it will display Oct-15. Confusingly, this does not mean Oct 15th but Oct 1st 2015 because Excel's default date format is MMM-YY.

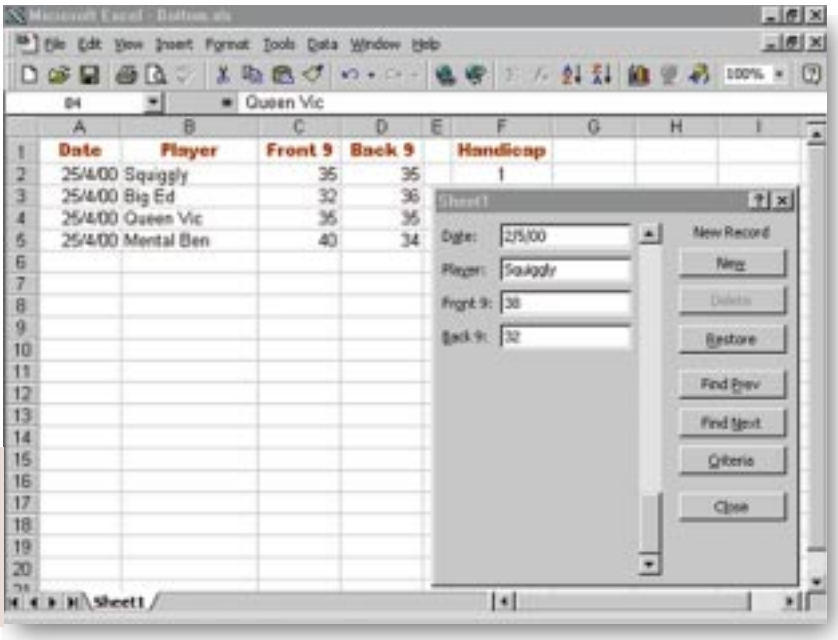
If you enter '10-15 Excel displays it as text but records the number 42278, which is the date number for 1/10/2015. Therefore, if you enter A1+1 into another cell the default General format will display this new value as 42279. But not to worry because you can always tell Excel what you really, really want by custom formatting.

A date with the Romans

A reader who works in the film industry emailed me, asking: 'In a list of credits, I need to show this year (1999) in Roman numerals. Some companies are using the form MIM but the Excel ROMAN function shows it as MCMXCIX. Which is the correct one?'

Actually, the Excel ROMAN function has five forms: ROMAN(1999,0) or ROMAN(1999) is the default and will display your current result. But you can change the 0 to 1, 2, 3 or 4 and get, respectively, the following equally correct results: MLMVLIV, MXMIX, MVMIV, MIM.

However, for next year, all five form numbers will display the year 2000 as MM.



▸FIG 3 A SIMPLE WAY TO JUMP TO THE BOTTOM OF AN EXCEL LIST AND ADD A RECORD IS TO USE THE DATA FORM

ADDED VALUE

Reader, Shane Devenshire has cleaned up an earlier recorded macro of mine. I had used the Tools, Macro, Record facility in Excel and had written about it in last December's column. The macro's purpose is to find the latest value at the foot of a column on one worksheet, and copy it into a specific cell on a second worksheet.

Shane has shortened my code and eliminated the movement of the cursor. His effort doesn't need the screen to redraw and the only thing displayed is the change of value in the required cell. Shane's new improved version is shown below:

```
Sub Balance()
    Sheets("July").Range("X1").End(xlDown).Copy
    Sheets("Victoria").Range("Y69").PasteSpecial Paste:=xlValues
End Sub
```

You're unlikely to want to go to the bottom of column X on the July sheet and enter the value in cell Y69 on the Victoria sheet but you can replace those four example entries to suit your needs.

Double date

Two of the most useful keys in Excel are the Control and Shift keys. I frequently use them myself to extend obvious options. For example, I often need to quickly enter today's date into two different Excel ranges.

Let's say I need to enter it into A1 to A30 and D31 to D60. I highlight A1:A30 then hold Ctrl while I highlight D31:D60; then press Ctrl+; (semicolon) to produce today's date. Finally, I press Ctrl+Enter to enter the date in all the selected cells. If you try this and A1 to A30 are blank when you start, and there is an entry in A31, you can quickly select A1 to A30 by pointing to the bottom of cell A1 then, holding Shift+Ctrl, double-click. Conversely, if there are already entries in A1:A30 which you wish to replace with the date, and cell A31 is blank, you can use this shortcut for highlighting the range.

Data Form dodge

When reader Philip Whiting says that he wants to jump to the first blank row immediately beneath an Excel list, I believe him. Particularly so when he is kind enough to send a macro which does the job [Fig 2].

However, if the objective is to add a record to the list, one of the fastest ways to do so is via Excel's Data Form [Fig 3]. Take a simple golf scorecard giving the date of the game, the names of the players and their scores, going out and coming back. An empty column can provide a break between the list and a handicap column which can be completed in blocks using cut and paste.

There is no need to define the database nor create range names. You can just click anywhere in the list and choose Data, Form. The displayed dialogue box, shown in Fig 3, will show the first record in the list. Just click New and enter a new result. Then press Enter. Excel will find the next blank row, enter the new record in it, and offer you a blank entry form to add another result. When you have finished making entries, press Close — it's simple.

[FIG 2]

Making the jump

```
Sub Freerow()
Selection.End(xlDown).Select
ActiveCell.Offset(1, 0).Range("A1").Select
End Sub
```

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