



Up to date

Stephen Wells presents **your answers** to the Easter date conundrum.

The Rev. Ron Reid emailed: 'You have probably been inundated

with solutions to your Easter dates request...' (PCW, April). And, the Rev. Geoffrey Charrett's email was in a similar vein.

They are right. Throughout all the years I have been compiling this column I have never received so many messages on one subject and, as I write, the emails are still coming in! I am grateful to you all.

Unfortunately, there is only space here to mention a few.

➔ **The Rev. Reid** suggested documents at two sites: www.smart.net/~mmontes/carter.html and www.rog.nmm.ac.uk/leaflets/easter/easter.html. I had previously referred to the algorithms from these sites but not the URLs. At the first site, Marcos Montes is with a division of the US Naval Research Laboratory; the other site, the Royal Greenwich Observatory, offers detailed information not only on this subject but everything you want to know about the millennium.

➔ **David Greenhalgh** and **Stan Higgins**

both sent small programs in QBasic. David saw the algorithm in a book called *Time in History* by GJ Whitrow. Stan enclosed a printout of Easter dates from 1977 to 2006 and a similar extract from the Easter.txt file which I included on the April issue cover CD to show that they agreed.

➔ **Roger Gwynne-Jones**, who read the column in his son's copy of PCW, suggested an Easter date-creating function from Chip Pearson's Excel page at <http://home.gvi.net/~cpearson/>. Chip Pearson



➔ **Fig 1** DON LLOYD'S FANCY CALENDAR APPLICATION WHICH INCLUDES A FORMULA FOR CREATING THE DATE OF EASTER EACH YEAR

is a consultant in Kansas City who has gathered a lot of useful Excel information from newsgroups, including how to calculate the dates of moving holidays. This is a valuable site for the Excel user, with macros for lots of things.

➔ **Michael Cohen** recommends a method he found

detailed in the leaflet <http://astro.nmsu.edu/~lhuber/leaphist.html>, based on the algorithm of Oudin (1940). The site is run by the Astronomy Department of the University of New Mexico (one of my favourite states for touring holidays).

➔ **Iain R.T. Burdon** found a solution in the August '81 issue of PCW! It was a Basic program, written by John Waddell, to run in 8K of memory. The formulas were from *Puzzles & Paradoxes* By T H O'Beirne. The solution is for dates from 1582 to 4000. Gareth Suggett actually has that book, published by the Oxford University Press in 1965 and quotes ten steps to calculate Easter.

➔ **Don Lloyd** sent a copy of a calendar he'd created in Excel for January 1900 to December 2099 which includes the dates of Easter. Apart from the spelling ('calendar') it is impressive [Fig 1]. He took the formula for the Easter date calculation from an article in another computer magazine. The latter article was also mentioned by Alasdair I Buchanan.

➔ **David Underwood** produced a Quattro Pro spreadsheet using a formula from a *Sunday Times* article (3rd April, 1994). He writes: 'The formula it gives seems to provide the correct date for Easter, except for 1981 and 2076.'

➔ **Bill Alexander** wrestled with the problem when he was trying to create attendance record sheets for a human resources department at work. He needed a year planner for each employee, with bank holidays marked.

NO LONGER SECRET

Did you know that all workbook files saved in Excel 97 and Excel beta 2000 format contain a secret identification number? You can display it if you open the file with Notepad, press F3 and search amongst the gobbledegook for the string: _PID_GUID. It will be a mixture of numeric and alpha characters like this: AN{BE6F4D50-DBEC-11D2-9CB8-8436A1B8F240}. For larger workbooks, use WordPad and Ctrl+F. You can stop Excel creating it by saving your file in another format, such as Excel 95.

PC network interface cards (NICs) have a unique 12-character identifier and that may form part of the document ID. Installing Windows 98 creates a file called reginfo.txt. If you register Win98 online, your PC transmits this registration information, including the NIC address to Microsoft, then deletes the file from your computer.

I don't use Windows 98, nor do I have a network card, but my Excel 97 files have these numbers. I'm not bothered by them, but if you are, Microsoft now offers an Office 97 Unique Identifier Patch to prevent the creation of the document identifier number and an Office 97 Unique Identifier Removal Tool with which to remove the number from existing Office 97 documents. Look for them at <http://officeupdate.microsoft.com>.

Questions & answers

Q Is there a way of having a cell display a Scenario name on a worksheet? I have about 20 scenarios I want to print out and need to have a separate identity for each — preferably

this would be the Scenario name. I am using Excel 97.
MARTIN NGARE

a Choose Tools, Scenarios, Summary, OK. Enter an equals sign in the cell in which you want the name. Click on the tab for the new Summary sheet which Excel has created, then click on the Scenario name

in the Summary sheet. Press OK and the name will be added to the chosen cell within your worksheet (see Fig 3).

Q I've just bought a new machine and am using Windows NT 4 (SP3), with Excel 97 SR2. When I use an existing macro written for Windows 3.11, VBA takes entries from my input box,

converts them into US Date format and US currency and posts them on to the

spreadsheet in these formats. The macro is designed to post entries into Cash and Petty Cash books. I have changed the Regional Settings. Is there a way to change settings for VBA as it now seems to run independently from Excel?

ALEC THORNE

a It sounds as though you are using a template. Right-click on the cells which hold the dates and reformat them. Then resave the template. Alternatively, press ALT+F11 and see whether formatting is specified in the macro listing.

Scenario Summary				
	Current Values:	Luckiest	Best guess	Cautious
Changing Cells:				
\$A\$2	£100,000	£300,000	£200,000	£100,000
Result Cells:				
\$A\$4				

Notes: Current Values column represents values of changing cells at time Scenario Summary Report was created. Changing cells for each scenario are highlighted in gray.

FIG 3 EXCEL WILL CREATE A LIST OF YOUR SCENARIOS AND YOU CAN LINK THEIR NAMES TO WORKSHEET CELLS

He took the dates for Easter from the *Book of Common Prayer* but was unable to work out a calculation from their rules.

➔ **Alan Dyson** refers to an algorithm from volume 2 of *Winning Ways* by Berlekamp, Conway and Guy, which he describes as 'an excellent book on popular maths game theory.'

➔ **Robin Parmenter** remembered a program in C, that he came across years ago, for his Atari ST. He writes: 'When compiled and linked in Prospero-C on the ST, it produces the same results as in your text file Easter.txt — so it works!'

➔ **James Behrens** generously offered to send me a copy of *The Book of Common*

Prayer, noting that it contains two tables to find Easter day — both valid up to the year 2199.

➔ **John McCabe** provided a program in Turbo Pascal and **Paul Otto** sent an algorithm which, he says, has been used by schools for years, adding: 'This formula works up to 2099 so I guess it may cause Easter chaos in 2100!'

➔ **John Dean** sent an algorithm taken from *The Calendar* by David Ewing Duncan (ISBN 1-85702-721-3) and published by Fourth Estate.

➔ **Dave Scowen** sent a brief email with a beautifully neat Excel worksheet, listing Easter dates from 1900 to 2058. These were calculated with a user function that is so elegantly written and annotated that I have shown it in Fig 2. The worksheet has 1900 in A2 and Easter(A2) in cell B2 and so on, down to row 160. See the file easter.xls on our cover-disc.

Time warp

I first wrote about the dates of Easter in our April issue, on sale 25th February, and some solutions were published in the May issue. The readers' emails presented above were not received until the May issue's deadline had passed.

PCW CONTACTS

Stephen Wells welcomes your comments on the Spreadsheets column. You can contact him via the PCW editorial office (address, p10) or email spreadsheets@pcw.co.uk. Please do not send attached files unless they have been requested.

FIG 2

Neat worksheet

Here is Dave Scowen's listing for an Excel 7 (Excel95 or higher) user function to calculate the date of Easter:

```
'CALCULATION OF EASTER (SUNDAY)
Function Easter(year)
' *** get golden number ***
g = (year Mod 19) + 1
' *** get century ***
c = Int(year / 100) + 1
' *** leap year and lunar orbit corrections ***
x = Int(3 * c / 4) - 12
z = Int((8 * c + 5) / 25) - 5
' *** find Sunday ***
d = Int(5 * year / 4) - x - 10
' *** calculate epact ***
e = (11 * g + 20 + z - x) Mod 30
If (e = 25) And (g > 11) Or e = 24 Then e = e + 1
' *** calculate full moon ***
n = 44 - e
If n < 21 Then n = n + 30
' *** advance n to a Sunday ***
n = n + 7 - (d + n) Mod 7
' *** March or April ? ***
If n > 31 Then mon = 4: n = n - 31 Else mon = 3
' *** n=date, mon=Month ***
Easter = DateSerial(year, mon, n)
End Function
```