



## Mathematical astronomy morsels IV

by Jean Meeus

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Jean Meeus studied mathematics at the Belgian University of Louvain and is probably the most well-known mathematical astronomer. He is a prolific author and has written many books on transits and eclipses. He has also had articles published in magazines including the *BAA Journal*. He is an honorary member of the BAA having been elected in 1955 November. Jean has received international commendation and asteroid 2213 is named in his honour.

The fourth book in this amazing series contains 370 pages of absolutely fascinating facts. All these books are written assuming an ‘appropriate astronomical background’ and as such there is no glossary. It can be read in isolation, although there are references to previous *Morsels* in the text. Jean’s motivation for writing this fourth volume is the same as for the previous three, and many chapters have been inspired by questions from correspondents, such as ‘can Jupiter be visible with none of its Galilean satellites visible?’ or ‘what is the longest total solar eclipse visible from Europe?’

Personally I find books of this type absolutely riveting, and frequently dip into the various volumes. I have also given talks based on some of the surprising facts discovered by Jean. For example, did you know that on 2007 Jan 1, a shadowless transit of Ganymede across Jupiter occurred? This was because the Sun, Earth, Ganymede and Jupiter were so perfectly aligned that Ganymede’s shadow was obscured by Ganymede itself. Turning this around, an observer within the shadow on Jupiter would have seen a simultaneous total solar eclipse, a transit of Ganymede across the Earth and a transit of Earth across the Sun!

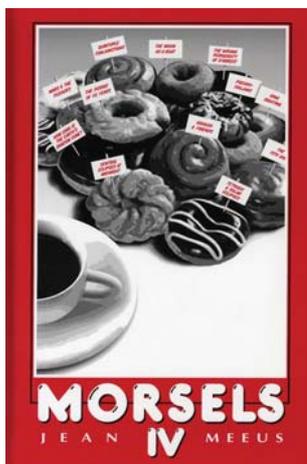
One of Jean’s passions is eclipses, and it amazes me to find that he can still devote a further 115 pages to new eclipse facts. For example the 2015 total solar eclipse which he predicts (even though it shouldn’t be) will be visible from exactly the North Pole (it’s all to do with refraction of course).

Jean is a stickler for accuracy and although English is not his mother tongue, the book is remarkably free from grammatical and spell-

ing errors. Mathematically, Jean’s results are a perfect example of how data should be presented – never using more precision than is justified, well tabulated and well explained.

I have always been intrigued to find out why, if the Earth’s rotation is slowing by 1 ten millionth of a second per day,  $\Delta T$  can amount to around 67 seconds in 100 years, and 2 hours in 1,000 years. Jean explains this admirably. But just sometimes, even Jean cannot explain his results, such as why (in our era) do total solar eclipses fall more often on a Wednesday than any other day? Also, why between 2001–2400 does the 13th of the month fall on a Friday more often than any other day?

How about this for you to try (p.357) – if you are at roughly latitude 48°N and the declination of the Sun is roughly +20° and you are living in a tall building, you could witness the rise of the Sun’s upper limb and then have time to take the lift downstairs and see the Sun rise a second time! Jean always explains his workings, and if I give away any more secrets you won’t buy the book. Also in case you think Jean has a super-powerful computer, he has an ordinary PC and all his programs are written in BASIC.



### Sheridan Williams

*Sheridan is a BAA council member and worked as a rocket scientist with the Ministry of Defence, before taking up a post as lecturer in mathematics. He has always been a keen visual observer and built his own telescope when he was 17. He has written several books and guides on eclipses and travelled to see nine total solar eclipses.*

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