# Letters

## 'An introduction to astrobiology'

*From Mr Peter Howard*

In his review of the above book in the December *Journal (J. Brit. Astron. Assoc.,* **114**(6), 364), Dr John Rogers gave as a criterion for recognising a living organism that it is 'capable of organising materials from its environment in a complex way to support its replication'. That is not the whole story, and it reminded me of the clash which occurred between Erwin Schrödinger and the philosopher of science Karl Popper on this subject.[1] As an answer to the question 'What is the characteristic feature of life?' Schrödinger had replied that a living organism takes negative entropy from its environment to delay its decay into thermodynamic equilibrium. Popper denied this definition, saying that every oil-fired boiler and every self-winding watch 'sucks orderliness' from its environment. However, Popper seems to have missed the point about delaying its decay into thermodynamic equilibrium.

Schrödinger's definition was not comprehensive. A more complete definition would be that a living organism: (i) Takes negative entropy from its environment; (ii) Uses some of it to maintain the integrity of its structure and functions against the general tendency for entropy to increase; (iii) Uses some of it to reproduce; (iv) Uses some of it to grow.

All of these must be present simultaneously; remove one and life is impossible.

The problem for astrobiologists is the complexity of each of these processes. Each needs a complex biochemical system for it to function. The simplest known living organisms belong to a group called the *Archaea*, which contains the 'extremophiles' used by astrobiologists as models of possible extraterrestrial life. Many astronomers give the impression that they believe that, given precursors such as amino acids, life is inevitable and would appear spontaneously, a process called self-assembly. Howland[2] considered that expecting a living organism to be formed in this manner is similar to a tornado descending on a junkyard and producing, by 'self-assembly', a jet airliner.

**Peter Howard**

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1 Popper K., *Unended Quest, An Intellectual Autobiography*, Fontana/Collins (1976)
2 Howland J. L., *The Surprising Archaea*, Oxford University Press (2000)

## About the 'Summer Triangle'

*From M. Jean Meeus*

In the October 2004 Journal (*J. Brit. Astron. Assoc.,* **114**(5), 288), it is stated that the name of the 'Summer Triangle', formed by the stars Vega, Deneb and Altair, was coined by Sir Patrick Moore. This seems to be an inaccuracy that is repeated from one author to the other. Although it is indeed possible that Patrick Moore coined the name 'Summer Triangle', he certainly was not the first to do so.

The German name 'Sommerdreieck' already appeared in the first (1933) edition of the book *Astronomie* by the Austrian astronomer Oswald Thomas. I have a Dutch translation of that book, published in 1944, which contains the same name ('Zomerdriehoek' in Dutch).

However, even earlier, in Oswald Thomas' book *Himmel und Erde* (Munich, 1928) the name of the Summer Triangle was already mentioned (page 20).

**Jean Meeus**

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## The annular solar eclipse of 2005 October 3
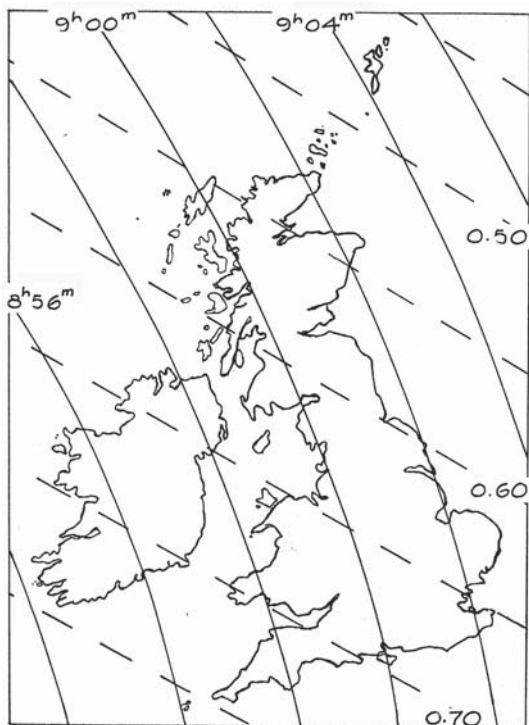


### Local circumstances for the annular eclipse of 2005 October 3
*Partial phases in the British Isles*

| | Begins | | | Middle | | Ends | | |
|---|---|---|---|---|---|---|---|---|
| | UT h m | P (°) | V (°) | UT h m | Mag | UT h m | P (°) | V (°) |
| Edinburgh | 07 53 | 282 | 312 | 09 01 | 0.59 | 10 13 | 151 | 167 |
| Greenwich | 07 49 | 288 | 322 | 09 01 | 0.66 | 10 19 | 148 | 164 |
| Liverpool | 07 49 | 286 | 319 | 09 00 | 0.64 | 10 15 | 148 | 166 |
| Plymouth | 07 45 | 291 | 327 | 08 58 | 0.73 | 10 16 | 143 | 163 |

*From Mr Peter Macdonald*

The annular track on 2005 October 3 crosses the northern tip of Portugal, central Spain and north and east Africa, the greatest duration of 4m32s occurring over Sudan. At Madrid the annular phase lasts 4m11s.

In the British Isles a partial eclipse is visible during the mid-morning, the magnitude ranging from 0.46 in Shetland to 0.76 in Scilly. The Table gives some local circumstances. The angle P is measured from the north point of the Sun's disk through east while the angle V is reckoned anti-clockwise from the vertex.

The penumbra over the British Isles is illustrated in the Figure, from which may be obtained the time and magnitude of greatest eclipse for any location.

**Peter Macdonald**

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