ation are taken into account, one easily derives the negative binomial distribution as the stationary solution to the one-step master equation. Again, the particles are indistinguishable. In the appropriate limit these two distributions merge into a Poisson distribution but this distribution does not give Maxwell–Boltzmann statistics until a factor $N\ln m$ is added to the entropy which tells us that the particles are distinguishable. There is nothing classical or non-classical about these distributions; merely the physical settings are different.

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More on avoiding jet lag

SIR—I believe airlines could confidently re-structure their operation to minimize jet lag. For many years passengers have suffered more than they need.

The problem lies in the convention of maintaining port of departure times during a flight. Only after landing are passengers reminded of the time difference and it is from this moment that their acclimatization begins. I promulgate a different approach which I have used for years, as it largely eliminates the problem.

Crucial to the method is the anticipation of the time-zone (and the behaviour patterns with regard to meals and period of rest) of the destination rather than the country of embarkation. If the time at the destination is eight hours ahead, then the traveller's watch is to be set at the point of boarding. Thus, if dinner served after take-off roughly coincides with breakfast at the point of arrival, the passenger should think of it as breakfast. If an eastwards flight entails arrival at dawn, then you should rest through the night, even if it was not 'night' when you boarded.

The result is that you arrive with one-third of the diurnal cycle of readjustment already accomplished. In this way, I have avoided almost all the effects of jet-lag after long periods in planes. The practical findings of Mrosovsky and Salmon, so graphically described in *Nature* **330**, 372; 1987, provide experimental evidence for a similar phenomenon in animals.

Most significantly, the authors sensibly speculate whether the internal clock "may be susceptible to feedback from overt activity". Practical experience suggests this is true. Now that there is experimental evidence for the effect, perhaps I could encourage airlines to synchronize with the destination and to serve meals compatible with where their passengers are going rather than where they have been.

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Maternal terminology

SIR—In his News and Views article on chiral morphology (*Nature* **330**, 204–205; 1987), John Galloway makes an error in terminology that is frequently committed: the confusion of 'maternal inheritance' with 'maternal effect'. He describes as an example of maternal inheritance the case in which "the hand of coiling is determined not by the individual snail's own genes but by those of its mother". This should have been described as a maternal effect. Maternal inheritance (King, R.C. & Stansfield, W.D. *A Dictionary of Genetics*; Oxford University Press, 1985), in contrast, is when a particular genetic element is trasmitted only through the mother — as with mitochondria, for example. An example of paternal inheritance is the transmission of the Y chromosome in mammals. I can think of no simple example of 'paternal effect', unless one would allow sporophytic self-incompatibility, in which the genotype of the anther determines the compatibility phenotype of the pollen, regardless of the pollen's haplotype. Because the physiological, genetic and evolutionary aspects of these features of heredity are quite distinct, the distinctions between them should be clearly understood.

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Two neutrino periodicities from supernova 1987A

SIR—The detection of neutrinos from the explosion of the supernova 1987A has opened up a new area of scientific study. One line of investigation has been that of Harwit *et al.*[1], who seek to find a periodicity in the arrival times of the 12 neutrinos detected by the Kamiokande experiment and the 8 detected by the IMB experiment. They claim to have found a periodicity of 8.915 ms.

In my view, there are a number of difficulties in their evaluation of the period's significance. (1) Their use of a mean square criterion only selects periods for which the arrival times cluster in phase around the arrival time of the first neutrino. A better criterion that avoids this arbitrary restriction is to use the root mean square deviation. (2) The enumeration of periods defined by their equation 6 is oversampled by a factor of 10 when compared either to their equation 5 or to period enumeration as in a Fourier transform (that is $P=T/n_x$, $T=t_N-t_1$, $1<n_xT/2D$; D=timing resolution). This oversampling explains why the 'good fits' for the Kamiokande data occur in 'a single time bin'. (3) The expected number of good fits will be the number of trial periods ($T/2D$) multiplied by the probability for their threshold of acceptance (0.00485). For the Kamiokande experiment (T=12, 438.8 ms, D=0.1 ms) the expected number is 301, while for the IMB experiment (T = 5,582 ms, D=1 ms) the value is 13.5. The two data sets have overlapping ranges of trial periods when $3<n_x<6{,}219$ in the Kamiokande data, for which $6{,}217\times0.00485=30$ 'good fits' are expected. Each of these 'good fits' will have a probability of 0.00485 for matching an IMB 'good fit', so the overall probability of a chance coincidence is $1-(1.0.00485)^{30}=14$ per cent.

These results indicate that additional 'periodicities' could be present in the observed neutrino arrival times. In fact, my period finding routines do find many periods which satisfy each data set and several which satisfy both simultaneously. My best period is one of 9.828 ms, which has r.m.s. deviations of 15 per cent and 11 per cent of a period for the Kamiokande and IMB results respectively. This is to be compared with the r.m.s. deviation of the 8.915 ms period of 18 per cent and 11 per cent respectively.

In conclusion, the 'periodicity' found by Harwit *et al.* is likely to have arisen by chance alone from random arrival times. Indeed, other periods of higher significance are to be found in the same data. So if one period is accepted, then the second period must also be accepted.

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SIR—Harwit *et al.*[1] report detection of an 8.91-ms periodicity in the neutrino burst from supernova 1987A. We argue (1) that their method is biased against the phase position of the peak and therefore should not be used for periodicity searches where the signal shape is unknown, and (2) that the 5 'good fit' period values lie well within one independent Fourier step, implying that the probability of chance occurrence of the effect is 5%, a much smaller significance than the authors state.

For a pulse superimposed on a random background, the phase distance between the centre of the pulse and a reference time t_0 (in our case the first detected arrival time) lies between 0 and 1, in a distribution that tends to be uniform for large pulse duty cycles or small pulsed fraction. Only for very small duty cycles and small pulsed fractions will the distribution peak around 0. The y-test used by Harwit *et al.* is defined by the statistical variable

$$y(f) = (1/N) \sum_{i=1}^{N} [ft_i - \mathrm{int}(ft_i)]^2$$

where f is the trial pulsation frequency, N is the total number of detected neutrinos,