

Revolutionary birthdays

SIR — A number of reports have linked season of birth with psychological aspects as diverse as mental illness¹ and occupational choice². Recent correspondence^{3–5} concerning birth data effects has prompted this report of a relationship between season of birth and stance taken in the scientific revolutions associated with the theories of relativity and evolution.

To ascertain whether there were significant differences in birth dates between proponents and antagonists of relativity theory, the biographies of physicists who took and maintained a committed position from an early stage were scrutinized. The groups were well matched for eminence: 5 of the 10 relativists and 4 of the 9 non-relativists were awarded the Nobel prize.

Investigation of birth dates revealed that 8 of the 10 relativists were born during December, January and March, whereas 6 of the 9 anti-relativists arrived during June and July. Contrasting the months of October to April and May to September, all 10 relativists were born in the winter months as against only 2 of the 9 anti-relativists ($P < 0.001$, Fisher test).

A similar investigation was undertaken with those eminent biologists who advanced or opposed evolutionary theory before publication of *The Origin of Species* in 1859. Again the differences were marked, with October to April accounting for the births of 11 of the 12 evolutionists but only 5 of the 16 anti-evolutionists ($P < 0.002$, Fisher test). Aggregating both scientific debates, December to April houses 82 per cent of the combined proponents' birth dates but only 24 per cent of those of the antagonists; in contrast, May to July accounts for none of the proponents' but 60 per cent of the antagonists' births ($\chi^2 = 18.0$, $P < 0.001$).

One hypothesis suggests itself. Different dates of birth will result in the seasons being experienced at different stages of early development; and the concept of critical or sensitive periods of development suggests that the timing of such experience may have far-reaching effects. Before birth, the developing embryo or fetus is influenced indirectly through maternal behaviour and biology; and maternal activity, diet and health may all change with the seasons. Light-induced hormone fluctuations may be a particularly potent influence on early development.

The social environment of the infant may also be heavily influenced by the seasons. To return to the scientific revolutionaries and non-revolutionaries, all were born in Europe or North America, on average a little north of 50° latitude. Without electric light and central heating, the seasons would have affected mother-infant interaction. Initially the winter-born revolutionary would have been res-

trictively swaddled but with the coming of summer he would have experienced more freedom to explore on his own initiative. The summer-born non-revolutionary, on the other hand, would have enjoyed more freedom at first, when less able to use it, but would have been constrained the following winter when ready to extend his explorations. Could such early experiences have shaped attitudes toward established paradigms?

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1. Hare, E. *et al.* *Br. J. Psychiat.* **124**, 81–86 (1974).
2. Cooper, J. & Smithers, A. *New Society* **24**, 6–8 (1973).
3. Dudink, A. *Nature* **368**, 592 (1994).
4. Edwards, S. *Nature* **370**, 186 (1994).
5. Baxter-Jones, A. & Helms, P. *Nature* **370**, 186 (1994).

ESF membership expanded

SIR — Your report (*Nature* **372**, 395; 1994) stated that the statute of the European Science Foundation was amended “to remove the possibility that countries such as those of central and eastern Europe might acquire associate status”. In fact, the assembly in November decided to encourage qualified science funding organizations in central and eastern Europe to apply to proceed directly to full membership of the foundation.

Following this decision, the foundation has begun to develop contacts with central and eastern Europe with the expectation of extending our membership from that area.

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Coelacanth dated

SIR — I am as excited as anybody by the discovery of the Wollemi pine (*Nature* **372**, 712 & 719; 1994) — I love “primitive” gymnosperms, and I think it is indeed comparable to the discovery of the first living coelacanths. But *Latimeria chalumnae* was discovered in 1938 surely, not 1948 — some of us still remember its announcement as among the few pieces of wholly pleasant scientific news which came out as the war-clouds were gathering over Europe.

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Japanese research

SIR — A recent News article (*Nature* **371**, 734; 1994) wrongly stated that in Japan, “university researchers are prohibited by law from participating in research projects in industrial laboratories”. Researchers from national and international universities conduct research in our laboratory, and this type of collaboration is not only legal, but encouraged. Professors in Japan, as public-sector employees, are not allowed to work as managers in companies and must seek permission from their universities before earning outside income. Although the tone of the News article was critical of the Japanese system, a leading article in the same issue (**371**, 725–726; 1994) suggested that to help US and British university researchers working in industry avoid conflicts of interest, “a cap on consultancy and other earnings would be only seemly”. If Japanese academics truly are not “pushing for regulations that prevent them from working in company laboratories to be erased”, then this seems laudable, not cause for censure.

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Moral premises

SIR — Tom Gehrels' forthright review of the apologia for Werner von Braun (*Nature* **372**, 511; 1994) raises the important question of the moral status of curiosity-driven science and technology. Awe at the heroism of those who attempted to sabotage Braun's rocketry is inevitably reinforced by distaste for the man himself and those who did not scruple to provide him with means to carry on with his work during and after the Second World War. A psychopath remains a psychopath however clever; his talents just make him more dangerous and reprehensible. Rocketry has, no doubt, facilitated astronomical research into the nature of the Universe, but its main fall-out has been to make possible the dissemination of fourth-rate and often corrupting entertainment.

What the whole story makes clear is the urgent need for scientists to examine the moral premises underlying their choice of research — not so much the possibility that their work may be put to evil as well as good use, but their own motivation and its place in the activities of a humanist university or an industry supposedly catering for legitimate human needs. It is only too easy to make a Faustian bargain with the devil.

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