

## Problems with Galileo

SIR — “Does the Earth go round the Sun in any but a relative sense?” asked a leading article in *Nature*<sup>1</sup>, and gave this answer: “Prescient Galileo was probably too good a scientist to have committed himself to an absolute view on such a question.” But in the preface of his book *Dialogue Concerning the Two Chief World Systems — Ptolemaic and Copernican*, Galileo explicitly stated: “The celestial phenomena will be examined, strengthening the Copernican hypothesis until it might seem that this must triumph absolutely”<sup>2</sup>. The Vatican Inquisition declared this to be the one and only reason for Galileo’s condemnation. Had Galileo not championed the “absolute triumph” of the Copernican hypothesis, he would not have been persecuted.

Thus the Galileo story remains more of a present problem than your leading article supposes. Evidently, the writer has been influenced by the ideas of Einstein, who claimed that all coordinate systems (both inertial and non-inertial) are equivalent. According to Einstein, “the two sentences, ‘the sun is at rest and the earth moves’ or ‘the sun moves and the earth is at rest’... can be used with equal justification”<sup>3</sup>.

It has taken the Catholic Church several centuries, plus twelve years of scrutiny by a special commission of inquiry (appointed by the Pope in 1979), but they have finally caught up with Copernicus and Galileo. One may wonder how long it would take them to catch up with Einstein!

The Vatican commission correctly remarked that Galileo was mistaken in his belief that he had established a proof of the Copernican theory. The evidence that Galileo produced was indeed inconclusive. The commission also remarked, again correctly, that a universally accepted verification of the Copernican theory was obtained only nearly a century after Galileo’s trial in the form of the annual stellar aberration, discovered by Bradley in the 1720s<sup>4</sup>.

Further indisputable proof came in the 1830s with the discovery of the annual stellar parallax<sup>5</sup>, an effect that was actually predicted by the heliocentric theory, and by this theory alone. All other theories make predictions at variance with the observed stellar parallax and aberration. It was generally agreed in the nineteenth century that what the observed parallax and aberration show is that the Earth *really* moves with respect to the Sun, and to the Sun alone (or, more accurately, the centre of gravity of the Solar System). In the nineteenth century, stellar parallax and aberration were universally regarded as conclusive proofs of the physical super-

riority of the heliocentric system over the systems of, say, the Earth, or Mars, or Saturn, or Ganymede.

If one wants to advocate the equivalence of all systems, one would have to re-interpret stellar parallax and aberration in terms of this hypothesis. How is this done? To the best of our knowledge, it has never been done — a rather curious and serious omission.

In our experience, attempts to publicize these issues in both scientific and public forums have been thwarted by the non-religious Inquisitions of the twentieth century. Thus the Galileo affair has more present significance than the *Nature* leading article has recognized.

**M. Pslmopoulos**

**T. Theocharis**

*Institut für Plasmaphysik,  
Forschungszentrum,  
Postfach 1913,  
D-5170 Jülich,  
Germany*

1. *Nature* **360**, 2 (1992).
2. Galilei, G. *Dialogue Concerning the Two Chief World Systems — Ptolemaic and Copernican*, trans. by S. Drake (University of California Press, Berkeley, 1952).
3. Einstein, A. & Infeld, L. *The Evolution of Physics*, 224 (Cambridge University Press, 1938).
4. Bradley, J. *Phil. Trans. R. Soc.* **35**, 637–661 (1728).
5. Bessel, F.W. *Astron. Nach.* **16**, 65–96 (1838).

## Keeping warm

SIR — August Reader (*sic*) suggests that DREADCO biochemists should turn their attention away from metabolic stimulants and consider ancient transcendental techniques for generating ‘magical heat’ as a means to prevent hypothermia (*Nature* **361**, 200; 1993). Unfortunately, many of these trance-like conditions result in hypometabolism (reduced heat production) and an increase in skin blood flow that will increase heat loss from the body.

In hot climates, the reduction in metabolic rate and the increase in heat loss would help thermoregulation and save on air-conditioning, but in cold environments would lead to hypothermia, or increased heating costs — quite the opposite of DREADCO’s research objective. Moreover, Reader’s suggestion that DREADCO biochemists should look for adrenergic blocking agents would be counter-productive as these agents would inhibit sympathetically mediated thermogenesis, thereby depriving the individual of a valuable source of body heat.

In most mammals, particularly neonates, sympathetic activation of brown adipose tissue (BAT) is the main source of cold-induced and diet-induced thermogenesis. Thus, DREADCO biochem-

ists were on the right track when looking for agents to ‘burn off’ food calories, but if they had consulted the DREADCO pharmacologists they would have found out that BAT-selective agonists (known as  $\beta_3$ -agonists) have already been developed for use as thermogenic antiobesity agents. Several pharmaceutical companies have such agonists in development, although it seems unlikely that they will be marketed as an aid to reducing heating costs, particularly as food energy is more expensive than gas or electricity.

Incidentally, you and other editors may have recently received promotional material for a revolutionary new type of clothing (CLOtherapy) that claims to work by letting “key areas of your brown fat sense and respond to cool outside temperatures”, and which “by working out your brown fat can help you control your body fat”. Given that most human BAT is found around the heart, kidneys and major arteries, one wonders about the invasive nature of this apparel. On reading this material I was convinced that DREADCO scientists had ventured into the ‘rag trade’, but on reflection, they clearly would not have produced anything so daft.

**Michael J. Stock**

*Department of Physiology,  
St George’s Hospital  
Medical School,  
London SW17 0RE, UK*

## Not exclusive

SIR — Your article referring to Frank Grosveld’s work on regulation of gene expression (*Nature* **361**, 572; 1993) says that “Therexsys will have an exclusive licence to the intellectual property, both existing and in future, arising from this work”.

The Medical Research Council (MRC) has not granted such all-encompassing rights. The council’s policy is to exploit its intellectual property as widely as possible in the interest of healthcare improvement. As in other cases, MRC has therefore granted to Therexsys exclusive rights to specific past and current work within a defined field. The range of rights licensed to Therexsys is, we believe, that needed to allow successful exploitation of the specific research findings and development of Therexsys. Work in Grosveld’s laboratory has other applications, outside this field, and MRC has licensed and will continue to license these to organizations capable of constructive industrial exploitation.

**David Owen**

*Technology Transfer Group,  
Medical Research Council,  
20 Park Crescent,  
London W1N 4AL, UK*