

NewScientist

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LANGUAGES ON DEATH ROW WHO NEEDS CULTURAL DIVERSITY?

Lean, mean
motors

Green
goldmine

Pick your
own new year



new and meaningful solutions, not old—or new—ways of avoiding them.

**Ralph Estling
Ilminster, Somerset**

Davies completely fails to answer the problems posed by Ralph Estling's letter. Instead, he simply paraphrases the letter in a dismissive way ("Ralph Estling raised the old problem of what existed prior to the big bang") and then just discusses the misleading paraphrase.

Estling's letter was a logical analysis of the statement by Davies, made earlier in this correspondence, that "Quantum physics and the so-called inflationary Universe scenario give a plausible account of the initial conditions, that is, of how the expanding Universe originated from nothing" (Letters, 23 September 1995). In his reply, Davies demonstrates what Estling describes as the cosmologist "galloping off in all directions" leaving the reader nowhere. There are several instances of contradictory arguments.

In his earlier letter Davies answered a question about the compatibility of black holes and the big bang which started this correspondence. His explanation was based on the statement that: "The laws of gravity are symmetric in time". In the current letter he writes: "Because the big bang is the origin of time, *prior* is meaningless". However, if time did not exist before the big bang, the equations governing the big bang cannot be symmetric in time and the argument of Davies' first letter is negated by his second.

To give another instance, Davies writes, "Given those laws of physics, then the coming-into-being of space, time and matter in the big bang can perhaps be explained". In the next paragraph he says, "People still fall into the trap of assuming that the laws of physics existed before the big bang. That is not true." As Ralph Estling says, the rest of us shout "Whoa" being unable to follow such abrupt changes of mind.

Paul Davies wants to have it both ways. The laws of physics explain the big bang but didn't exist at the time. Gravitation is symmetrical with respect to

time, but time ceases to exist at the origin. The Universe at the beginning was both nothing and everything. Schrödinger's cat is both alive and dead. What has happened to the normal rules of logical thought—the common sense sought by Ken Wallace at the start of this correspondence?

The correspondence has shown the gulf between those readers who tend to believe that when a set of postulates leads to contradictory conclusions, the postulates must be wrong, and those writers who follow the *New Scientist* editorial line, that the understanding of the Universe resides in these contradictions.

**John Enderby
Walton, Warrington**

We have two ways of ordering events in time: past, present and future; before, after and simultaneous with one another.

Davies asserts that this method of ordering events is invalid "before" the big bang: "Because the big bang represents the origin of time itself, 'prior' is meaningless when applied in the normal, temporal sense".

Having, in this context, thrown "prior" in its recognised sense, out of the front door, he smuggles it in through the back door by allowing that "... one may still use the word prior in a logical or explanatory sense as something more fundamental".

This has no meaning for me: in what way does "prior" used in a logical or explanatory sense differ from "prior" used in the usual sense? Apparently, the term is transformed and made legitimate in the context of the big bang by being, or referring to "something more fundamental". Is it rude to ask: more fundamental than what?

**E. Paull
London**

No clean hands

How odd that in 1908 Ernest Rutherford readily accepted the prize money from Alfred Nobel, the inventor of dynamite and then eleven years later did not shake hands with Fritz Haber, just because Haber's development of ammonia synthesis,

which has saved millions of people from death by starvation, could also be used to make explosives (Letters, 9 December 1995).

I am sure I am not the only one in whose eyes Rutherford has fallen a few notches on the respect scale, and I wonder whether this was what P. G. Sussman intended by relating this anecdote. Haber was as much a scientist as Rutherford, and no more responsible for grenades than Rutherford was for the atomic bomb.

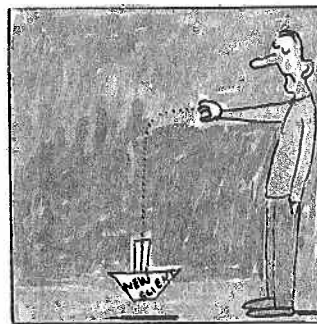
I feel the time has come to stop glorifying such tales of the past which fortify the myth of the ugly "German". Rutherford's action in this tale does not promote the myth of the fair "Englishman" (albeit naturalised) either.

**Kishor Bhagwati
Lausanne, Switzerland**

Pushing down

The article "Breaking the Laws of Flight" (18 November 1995) makes a common error in describing the phenomenon of aerodynamic lift. It ascribes lift to the cross sectional shape of the aerofoil which causes the air flowing over the top to move faster than the air flowing beneath, presumably creating a pressure differential that resulted in lift.

This is incorrect. An aircraft flies by pushing air down. In level, unaccelerated flight the



"push" downward (air mass flow rate \times downward velocity of the air) equals the weight of the aircraft. This experience is common to anyone who has flown a conventional aircraft and realises that at slower forward speeds the angle of attack must be increased over that of normal cruise speeds. This assures that the mass flow rate goes up to compensate for

the decreased downward velocity of air.

The actual nature of the downwash is complex but does include wing-tip vortices. These are occasionally manifested at air shows by aircraft equipped with wing-tip smoke generators which show a downwash, spiralling flow of air.

If this concept is confusing, consider two facts: first, conventional aircraft, assuming proper fuel and lubrication systems, can fly upside down for extended periods of time. Second, some aerobatic aircraft have wings with symmetric aerofoil cross sections. If the article is correct, the latter should not be able to fly.

The real purpose of the aerofoil shape used in conventional aircraft is that it generally produces the optimum ratio of lift to drag.

**Timothy Jenson
Edina, Minnesota**

Keep it wet

Our group has been interested in the care of historic properties for many years. Tam Dalyell should be glad to know that our research has shown that the tolerable relative humidity (RH) fluctuations (for textiles or anything else) can be calculated from considerations of an object's material properties (Forum, 11 November 1995).

Air conditioning systems are one way to limit damage from high RH excursions. Humidifying systems are also necessary to prevent damage from low RH excursions that otherwise occur in cold climates when buildings are heated.

The absorption of water vapour by organic fibres is well known, and these properties must be taken into consideration in any approach to preservation.

Recently, we used the water absorption properties of cellulose fibres to develop a strategy for buffering photographic materials during low temperature storage.

**Marion Mecklenburg, Charles Tumosa, Mark McCormick-Goodhart, David Erhardt
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