

## CORRESPONDENCE

## Aircraft evolution

SIR — Hoyle (*Nature*, 12 November 1981, p. 105) was echoed by Wickramasinghe, as reported in newspapers on 17 December 1981 during the Arkansas trial, and is quoted by Sluysers (*Nature* 21 January, p. 184), as saying that "for higher life forms to have evolved by chance is comparable with the chance that a tornado sweeping through a junkyard might assemble a Boeing 747 from the materials therein". The simile is glib, meretricious and deceptive. No evolutionist has suggested that higher life forms are assembled by chance from debris.

However, the inept comparison provokes memories of the actual evolution of the Boeing 747, starting a mere 80 years ago with primitive flying machines that indeed looked like products of junkyards. As in biology, but almost infinitely more rapidly, aeronautics proceeded from the simple to the complex. The inventions of the Wright brothers and Santos Dumont led to Blériot's 1909 monoplane and a host of larger aircraft within the next decade. Boeing planes started to cross the oceans in 1934 and the 74-passenger Boeing Clipper was in trans-Pacific service in 1937. Preceded by the British Comet, Boeing 707s brought in the jet age of travel in 1959. They were the evolutionary predecessors of the 747. The brief history of aircraft technology is filled with branching processes, phylogeny and extinctions that are a striking counterpart of three billion years of biological evolution.

Instead of misleading newspaper reporters with attacks on evolution and fables about 'flu bugs in comet tails, Hoyle and Wickramasinghe should note that protein molecules evolve by elongation of small polypeptides and that living organisms acquire ever-increasing complexity from gene duplication as now revealed in DNA sequences. Also, that wide-bodied jets evolved from small contraptions made in bicycle shops. Or in junkyards.

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## Brought to Book

SIR — Jon Marks's letter about Creationism (*Nature* 28 January, p. 276) is obviously either a parody or a hoax. No other explanation is possible of such a farrago of perversity and farce.

The inerrancy of the Bible may well be a risible Aunt Sally, but even so it is not to be knocked down by the ineptly aimed brickbats lobbed at it by Mr Marks. His paraphrase of St Luke's account of Jesus and the repentant thief is inaccurate, and his comment upon it ludicrously, if not wilfully, naive; his gibe at *Leviticus*'s classification of bats with birds would strike home only if "bird" had always had the same narrow meaning as it has today, which, of course, is not the case. And as for Origen's mockery of the proposition that "the first three days existed without Sun, Moon and stars", I suspect that most modern cosmologists would prefer to side with *Genesis*! If one wishes to confute Fundamentalism, is it not best merely to point to the Bible's self-contradictions? These, after all, are many: for example, the discrepancy

between the genealogies of Jesus offered in *Matthew* 1 and in *Luke* 3.

Fallible the Bible certainly is, but I cannot agree with Mr Marks that its myth has even more rivals, let alone any superiors. The wealth of the Bible's wisdom, the beauty of its story, the power of its images are vast, unexampled, seemingly inexhaustible: if proof were needed, the Bible is the source of some of the greatest works of some of our greatest artists — the *Divina Commedia*, the *St Matthew Passion*, the Sistine frescoes, *Paradise Lost*, the *Last Supper*, *Messiah*. Where are the fruits of the *Kalevala*, or the *Elder Edda*, or the *Odyssey*?

That the Bible is not "original", everyone admits: but that is far from being a failing: in literature, as in ethics, "originality" is the prerogative of cranks, and the "original" usually monstrous — and, like most monsters, sterile. No great story — be it the *Morte d'Arthur* or the tale of Noah's Flood — is *sui generis*. Indeed, to trace the resemblances between the biblical myth and those of other books is to play straight into the Christians' hands, for it is part of the Christian thesis that among the pagan legends there may be "good dreams" sent from Heaven: blurred, poetic visions of what, in the New Testament, became concrete, prosaic fact.

It is said that Mr Marks thinks that a Creator of 750,000 species of insect would have to be a "cosmic bore", but the blame for boredom usually lies with the bored: Mr Marks's remark tells us more about Mr Marks than it does about God. Yawns are not admissible as philosophical arguments.

But Mr Marks is quite correct, I believe, when he says that the existence of God is "irrelevant" to evolution; perhaps one might broaden his observation, and say that the existence of God is irrelevant to science generally. The supernatural, if it exists, is by definition intrinsically unknowable to "natural" science (except in the very limited sense that Shakespeare is knowable to literary criticism). Worse still, even if the supernatural not only existed but also operated upon nature, science would certainly find those operations all but impossible to assimilate: for the price that science pays for relying ultimately upon repeatable experiments is that science finds it enormously difficult to incorporate irreproducible phenomena, especially when such phenomena do not seem to accord with current scientific theory. There is a perennial temptation to reject odd phenomena as "impossible". "Improbable" they may be, but "impossible" they most definitely are not. To label any observation, however bizarre, as "impossible", is profoundly to misunderstand the provisional nature of scientific law. Those who jeer at the Bible's reports of miracles commit precisely the same philosophical error as those old astronomers who, we recall, were frightfully amused by the quaint bucolic fantasy that stones sometimes fell from the sky.

In conclusion, then, Christian apologists should regard science neither with fear nor with hope: science is not, and never can be, an arbiter of theology: no experiment in any laboratory will ever verify or falsify the resurrection of Jesus Christ. Similarly scientists must have the honesty and the humility to concede that science's methods of

inquiry are radically limited in scope. We cannot vivisect God.

Though, in our way, we tried.

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## Losers all

SIR — Your report that the Medical Research Council will not accept grant applications from British university departments inadequately equipped for the proposed research (*Nature* 19 November 1981, p. 201) invites comparison with the analogous situation in the United States. In both countries, a system of "dual support" prevails for government-sponsored academic research. Government agencies, accepting that discipline-oriented university research yields fundamental findings of profound cultural value and of potential benefit for society, and the major — but by no means only — investors in these activities. As a condition of making limited grants to departments or individuals, the government expects the universities to supply the remaining research necessities. (In Britain, the university's resulting relative share is much higher than in the United States.)

Here, the two systems diverge in nature. The British university's general funds come from the same exchequer as do research grants. The same austerity mood that leads a research council to emphasize that it will withhold funding unless the laboratory involved is "well found" also leads to the tightening of general university support from which the university is expected to equip laboratories. Without other resources for this type of research, the institution makes painful choices to sustain part of the research "duet".

In the United States, the federal government pays less than total direct and total indirect costs of sponsored faculty projects (regardless of method of reimbursement). The universities receive no general federal support but must meet the balance of federal project costs by drawing on their own general funds for instruction and other activities. These come principally from state governments (for state universities) and student tuition and, to a lesser extent, from alumni, foundations, industry and endowment. Admittedly, American universities have a more diversified financial base than do most British institutions. Yet, non-federal sources of funds have their own views on research and are not eager to make up the difference on federal projects.

Here, some similarities can perhaps be suggested. In Britain, departments receiving inadequate university funding may be denied research council support. In the United States, the university may be forced to make up the balance, on federal projects, with funds it would otherwise use for promising research by graduate students or young faculty members. In this zero-sum situation, these faculty and graduates are not only the immediate losers but also involuntary co-sponsors of the public interest research that *does* receive their university's funds. Ultimately, as you observe, "the rest of us" are the losers.

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