The meaning of "human life"

SIR—In the context of the recent, abortive Unborn Children (Protection) Bill in the UK House of Commons, opinions were voiced about the propriety or otherwise of conducting experiments on human embryos which were "alive"; but I am aware of no serious attempts by biologists to clarify the issue by providing an authoritative definition of what constitutes human life observationally.

Since this issue is likely to recur, I should like to summarize the meaning of (human) life as known from observation.

(1) The property of life, whether human or otherwise, is observably of two different qualities: namely, (a) dependently viable, protoplasmic life (at the level of scale of the molecule), and (b) independently viable, organismal life (at the level of scale of the individual), which in humans is also called "spirit".

(2) Dependently viable, protoplasmic life (1a above) — which, to the best of our knowledge, originated some 3,000 million years ago, and has continued (by means of repeated cell division) without interruption to the present day — characterizes the germ-lines of human beings: that is, the succession of gametes, both ova and sperm; which mediate human inheritance.

(3) Independently viable, organismal life or spirit (1b above) — which observably originates at viable birth, and continues without interruption until organismal death — characterizes the lives of human beings as individuals.

(4) It is thus not sufficient to refer simply to human "life". It is necessary to specify that particular quality of life to which reference is to be made: that is, whether to (a) continuous, protoplasmic life: which generally lingers in body tissues, even after organismal death, and which (as when a body is artificially ventilated) may continue so to linger indefinitely: or to (b) discontinuous, organismal life or spirit, which organismal death invariably displaces.

(5) How, then, shall we specify the quality of life in an embryo (or a fetus) *in utero*?

(6) That it possesses the quality of dependent, protoplasmic life (1a) follows from its observable intra-uterine growth (by cell division) and development (by cell differentiation).

(7) That it does not possess the quality of independent organismal life (1b) before viable birth, follows by definition.

(8) That it does not necessarily possess the quality of potential organismal life, follows from the finite probability of either unavoidable miscarriage or unavoidable still-birth (and, perhaps, as a never-viable monster).

(9) It follows that the life quality which is necessarily attributable to an embryo or fetus *in utero* is that of protoplasmic life: treated as an extension of the protoplasmic life of its mother to which (for its supply of energy) it is dependently attached, and until such time as, by virtue of its viable birth, a protoplasmically alive fetus acquires the organismal quality of an independently alive human being.

(10) That is to say, human life passes through the following general cycle: (a) *In utero,* the embryo/fetus is alive protoplasmically, being dependent (for its energy) on its mother. (b) After viable birth, the human individual is alive both protoplasmically and organismally, being dependent (for its energy) only on itself — that is, it is independent. (c) After organismal ("brain") death, the body of the human individual remains alive protoplasmically, but no longer independently. Therefore, *unless* it be quickly provided with a surrogate mother in the form of an artificial ventilator, inevitably the organismally dead human being progresses also to protoplasmic death.

R.L. HOULT

153 Park Road,
Buxton, Derbyshire SK17 6SW, UK

Down with metric

SIR—Your anonymous commentator (*Nature* 27 June, p.702) is both factually and conceptually incorrect. The first space shuttle laser-stabilization test did not fail because of confusion between nautical and statute miles. The ground-based laser was on a 10,023-foot high Hawaiian volcano. The on-board computer was given this height in feet rather than the nautical miles it was expecting. The volcano became in the computer's mind a 10,023-mile-high mountain. Since the peak would be above the shuttle, the on-board computer faithfully rolled the shuttle so that the mirrored side faced upward to receive the anticipated light-beam. When the on-board computer was later informed that the height was really in feet, the system worked perfectly.

Your commentator then runs on with unfounded remarks about alleged confusions in the English unit system. But there is no confusion. Practically everyone carries at all times two reasonably accurate standard feet, and miles are what it takes a thousand paces to cover. Arguments that the English system is "unscientific" collapse when it is realized that much of that system is based on binary arithmetic (64 pints per bushel, 1/32 in., etc.) or the duodecimal system, both of which possess distinct mathematical advantages. It is disheartening to see metrification pleas emanating from the same nation that gave us Lord Kelvin's absolute foot-grain-second (fgs) electromagnetic units, a system I find quite handy.

Spurious appeals to the French Revolution will not do. Their ten-day week and similar inanities never caught on. The metric measurement was at first voluntary in France since it was assumed that "logic" would prevail. In fact, logic did prevail—people simply ignored the fool units until the powers-that-be made them compulsory in 1840. Things have not changed. Only where the crushing weights of state power bears down on a helpless citizenry does the metric system prevail. Perhaps it is time for a counter-revolution.

DAVID C. JOLLY

Box 931, Brookline,
Massachusetts 02146, USA

NERC and unions

SIR—Your report of Professor E.R. Oxburgh's Royal Society paper on UK geophysics (*Nature* 27 June, p. 709) may have given readers a false impression of trade union attitudes within the Natural Environment Research Council (NERC).

Oxburgh's fears that NERC's commercial competitiveness is constrained by "labour legislation and trade union agreements" are unfounded. All employers are, or course, bound by legislation and the parlous state of NERC's finances can hardly be sought in this direction. The NERC trade unions may be forgiven for feeling slightly flattered that Professor Oxburgh thinks us able to compel our management on the topic of short-term contracts of employment. The truth is, however, that present agreements on so-called "period appointments" were reached after much disquiet had been expressed both by staff and management.

Management was concerned that people working on short-term projects spent one year reading around the topic, one year working upon it and their final year looking for another post. The NERC trade unions agreed that this was an inefficient way of deploying our resources and were naturally concerned at the lack of job security and pension rights. It was against this background that a code of practice was agreed.

Whilst chairman, Sir Hermann Bondi consistently defended present practices. Far from compelling the British Geological Survey to take short-term staff onto the permanent complement, trade unions have often protested to management when such action has been taken summarily and without following due procedures allowing for full competition for filling vacant posts.

Trade unionists within NERC are fully committed to working for an efficient and vital organization. It is a discredit to the scientists and support staff who make up those unions to cast them as obstacles to the realization of NERC's potential.

A. N. CUTLER

Institution of Professional
Civil Servants, NERC Branch,
c/o Institute of Oceanographic
Sciences,
Brook Road, Wormley,
Godalming, Surrey GU8 5UB, UK