Harvesting human embryos

SIR—A social movement for the harvesting of embryos for medical, utilitarian and possibly even commercial reasons seems to be a real possibility. Recent discoveries[1,2] suggest that a number of neurological disablements may be alleviated, if not cured, by fetal brain grafts. Consider, then, the following scenario. An agent of a commercial corporation or a national agency approaches a young woman, preferably from a country of the European Economic Community, and offers her £15,000 if she will (1) become a surrogate mother, (2) have an abortion in England before the 23rd week of pregnancy and (3) donate the aborted embryo to a suitable foundation. The brain tissue can then be used to save or enhance the life of some eminent businesswoman or statesman or general, or even some with-it reproductive technologist.

Four objections to this frightening scenario must be noted and rebutted. First, that such actions would be illegal. In fact, the legal position on payment of money for surrogacy is at the moment uncertain. The mother has ownership of the aborted embryo but it is illegal for her to sell it. Gifting is not, I believe, covered. The crux of the legal objection seems to be the mechanism of payment and whether or not it can be brought to court.

Second, it may be said that such a woman would not be able to obtain an abortion. The fact is that in 1985, according to the Government Statistical Surveys Office of Population, Census and Survey, 171,873 abortions were carried out in England and Wales (this includes residents and non-residents). This does not suggest that there would be a great difficulty in obtaining such an abortion.

Third, it may be argued that there would be moral objections. However, a number of people, if they are consistent, should not be averse to the above scenario: for (a) the lives of valued members of the community are being saved or enhanced at the expense of those of unwanted embryos; (b) it extends and supports a woman's right to choose; (c) it conforms to current moral attitudes that value actual living persons' utilities more than potential persons' rights; (d) an embryo is being eliminated that is not capable of independent life.

Fourth and finally, it may be thought that with the number of aborted embryos available, there is no need to persuade or induce women to enact the above scenario. One does not know what the supply/demand match would be. However, suppose supply is greater than demand. Are the surplus embryos to be incinerated? Or are they to be sold or donated to other countries? Does the private sector have a role to play? Who owns the embryo? Should its donation be a matter of altruism, like blood? Or should it be a commercial enterprise? Or should the disposal of such embryos be banned?

It is because I think the above scenario not unlikely that I must reluctantly agree with the general tenor of Erwin Chargaff's article[3] and his profoundly pessimistic conclusions.

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2. *The Times*, 22 May (1987).
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Seeing eye to eye

SIR—In your tribute to Sir Peter Medawar (*Nature* **329**, 472: 1987), you quote his dismissal of the views of a nameless ophthalmologist on El Greco.

The ophthalmologist (Mr Patrick Trevor-Roper) demonstrated that when the paintings are viewed through a cylindrical lens of the right power and orientation, the oddity of the figures (and most of their aesthetic appeal) completely disappears. The speculation that the painter might have suffered from a corresponding astigmatism requires that the defect be unilateral. He could then view the subject with the abnormal eye, and the canvas with the normal one.

The hypothesis may be implausible, but it is not nonsensical.

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Antimatter

SIR—In his review of antiproton annihilation (*Nature* **328**, 773; 1987), T. von Egidy is a little dismissive of possible practical applications of antimatter. Although the production of antimatter is always likely to be inefficient, there may be applications where utility justifies macroscopic production. Moreover, the problems of storing macroscopic quantities of antimatter, although difficult, may not be impossible. Egidy himself notes that this would require neutralization of the antiprotons with positrons and the use of strong magnetic fields and low temperatures, but these problems may have technological solutions.

Significant military exploitation of this technology is unlikely: the military have the ways and means to destroy us all anyway. Here, as elsewhere, the question of the military abuse of technology can have only a political solution.

On the other hand, there are applications to which antimatter may be uniquely suited. In particular it has a potential use as a rocket fuel for interstellar travel[1,2]. Interstellar travel with flight-times measured in decades is impossible with chemical rockets because chemical fuels are not energetic enough for the attainment of semirelativistic velocities. Matter–antimatter annihilation releases 6×10^9 times as much energy per unit mass as the reaction of hydrogen and oxygen, making interstellar flight possible with relatively small amounts of antimatter.

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No new biology

SIR—Because Schrödinger was an eminent theoretical physicist, his little book[1] was probably read by many physicists. They would have learnt just as much biology if they had read one of the then current popular biology books. But they would have felt no urge to do that. As H.J. Muller pointed out in a dismissive review[2] called "A physicist stands amazed at genetics", Schrödinger's book fostered the much-needed liaison between the physical and biological sciences. However, contrary to the impression Schneider[3] tries to convey, there was little or nothing in the book that was useful to biologists — especially biochemists. We already knew of the specificity associated with the linear array of amino acids in proteins, and those familiar with nucleic acids assumed a similar specificity in the arrangement of nucleotides. Calling such structures 'aperiodic crystals' did not clarify the issue.

The book raised a curious pseudo-problem about entropy. Schrödinger's cat, and his refrigerator before nuclear energy began to be used, depend ultimately on sunlight to pump out entropy. These comparable processes raise no philosophical difficulties: since the time of Lavoisier there has been general agreement among biologists that organisms are heat engines living in an abundant energy flux. Even the cleidoic egg is incompletely cleidoic, and life in the abyss depends on photosynthetically produced oxygen.

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