Letters

Large Females, Small Males

Roger Lewin (Research News, 13 May, p. 884) asks, "Why is the world full of large females?" Perhaps, though, the question is, "Why is the world full of small males?" Dwarf males occur commonly among plants and animals, sometimes being reduced to parasites on the females. The role of these males is "merely" to produce sperm; by being reduced, their competition for species-specific resources is concomitantly reduced. One could imagine, however, that if the role of the male animal were enhanced to include such additional functions as defending the female and young, protecting larger social groups, and labor sharing, selection could be such as to maintain a size for males comparable to that of the female or even larger.

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Brain Implants and Behavioral Changes

With regard to the operations to implant adrenal gland tissue or embryonic brain tissue into the brains of patients with Parkinson's disease (Research News, 22 Apr., p. 390; 13 May, p. 879), there may be relatively simple explanations for some of the results and side effects that have been described.

Before the introduction of L-dopa for the treatment of Parkinson's disease, and even before the introduction of stereotactic surgery to treat this condition, several direct operative procedures on the brain were used to treat parkinsonism. One of these was the anterior capsulotomy, developed by E. Jefferson Browder (*1*). This operation, which resulted in some improvement in parkinsonian symptoms, was performed by making a transcortical incision in the frontal lobe to enter the frontal horn of the lateral ventricle, removing the head of the caudate nucleus, and sectioning the anterior limb of the internal capsule. The procedure was probably quite similar to the *approach* used for the adrenal brain implant. Thus the improvement seen after the implant may be related to the damage of the anterior limb of the internal capsule, rather than to a neurotransmitter effect.

Second, the behavioral changes described in some of the patients ("disinhibition," increased pain threshold) resemble the changes described after a frontal lobotomy. The transcortical approach to the head of the caudate nucleus involves transection of some of the pathways in the frontal lobe, as in frontal lobotomy.

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REFERENCES

1. E. J. Browder, *N.Y. State J. Med.* **47**, 2589 (1947).

Chemical Lab Wastes

The mounting problem of chemical wastes in research laboratories is one that will simply not go away by itself. I suggest that budgets submitted as part of applications for research grants should be required to include an item for disposal of any hazardous wastes that may be generated in the course of the study. The value of such an inclusion goes beyond the matter of fairness in meeting costs. When there is no such allocation, it is easy for no one to pay, and the wastes are left behind after the project is over or even after the investigators leave or retire. The hazard may be unrecognized or poorly understood by people who were not involved in the work or, worse yet, may lead to illness or accidents. If disposal of hazardous waste is included in grant budgets, it would focus responsibility and go along way toward eliminating the problem.

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The National Aerospace Plane

I would like to comment on David C. Morrison's News & Comment article "Testing the limits at Mach 25" (20 May, p. 973). Morrison states, "At very high velocities, shock waves impede the flow of air into engine inlets" (as a reason why Mach 25 might not be achieved). Actually, shock waves do not impede flow; they effect necessary compression of the air flow. The problem at high velocities is that energy added by combustion is small compared with the kinetic energy of the entering air. Consequently, the compression and expansion processes must be very efficient for the air to be exhausted at a velocity higher than its entering velocity. Unless the engine accelerates the air, net thrust is not produced.

Later, Morrison states, "75% of the space shuttle's lift-off weight is fuel, four-fifths of which is liquid oxygen .... Simply by largely eliminating the need for on-board oxygen, an air-breathing space plane could garner enormous savings." First, oxygen is not a fuel by usual definitions. Second, most of the shuttle's lift-off weight is solid propellant in the solid rocket boosters. About one-third is liquid oxygen. Third, and most important, air-breathing launch propulsion systems propose to remove liquid oxygen from the vehicle—it costs about 2 cents per pound—and replace part of it with exotic machinery costing thousands of dollars per pound, to permit efficient combustion using the oxygen in air. To argue that this will save money is what was called, a few years ago under different circumstances, "voodoo economics."

Morrison correctly describes the enormous amounts of costly labor that go into space launches. Some have argued that differences in institutional factors between the tradition of rocket launches and the tradition of aircraft flight will pay off in greatly reduced labor costs for the National Aerospace Plane (NASP). However, the NASP promises to be a far more exotic machine than the space shuttle, and as a result I doubt that this view has merit.

None of this is to argue that we should not invest in hypersonic flight technology; we should. But the suggestion that this is a "magic" path to low-cost space launches is so questionable that it endangers support for the program.

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Mitochondria in Sperm

In Jean L. Marx's article "Multiplying genes by leaps and bounds" (Research News, 10 June, p. 1408), the indefatigable long-distance swimmers, the spermatozoa, are described as bereft of mitochondrial DNA. Please reassure my gametes that this is incorrect.

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Response: Carney's gametes can be reassured that they do have mitochondria. I regret it if my error caused them any concern.—JEAN L. MARX