

## Neutron bombs

SIR — Neutron weapons, I was astounded to read in your journal, "are a blessing and not a curse". With blessings like that, who needs curses?

That surely is the point about the theory of nuclear deterrence. Its insane logic presents every new cursed twist of the nuclear arms race as a blessing. The 50 and 100 megaton weapons were supposed to be a blessing because politicians would hesitate more before unleashing Armageddon. You now argue that neutron bombs are a blessing because they obviate the need to use the big bombs first. Next you will argue, if a low-radiation high-blast bomb is developed, that this is also a blessing since it will destroy property but not people. And a Doomsday bomb that would blow the world asunder would also be a blessing because of the fear of starting a war that it would put in the enemy.

In the last analysis, those who support the nuclear deterrent theory will admit that these weapons are all a curse. That's why one wants nuclear disarmament. But that sane admission cannot co-exist with the dogma that new weapons of death are a blessing. If you allow it to, you become guilty of a form of double-think which is scientifically dishonest and politically and militarily disastrous.

As for the "cynical" (as you call it) argument that neutron weapons will help disarmament negotiations, it is not so much unrealistic, as you argue, as just plain stupid. It is surely obvious that balanced mutual force reductions are more difficult to obtain agreement over the more numerous become the weapons systems deployed on both sides. To argue the opposite is perverse.

I am a "lay" reader of *Nature*. Your support of neutron weapons seems to me to be a betrayal of the efforts of your contributors to understand — and improve — the world we live in. Your arguments do disservice to the entire scientific community and the human values that give it purpose.

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THE phrase complained of appears in the following sentence: "In the bizarre logic of the nuclear battlefield, in which strategic nuclear weapons are intended to stay forever in wonderland, neutron weapons are a blessing and not a curse." — Editor, *Nature*.

## Shielding tanks

SIR — The United States Government and the British Ministry of Defence claim that the neutron bomb is a weapon developed for use against tanks. You have stated (*Nature* 13 August, p.571) that these weapons are more easily (than "ordinary" nuclear weapons) directed against military personnel.

By making reasonable assumptions about neutron weapons concerning the neutron energy spectrum and the ratio of the neutron and gamma energy fluxes it can be shown that a radiation shield could be incorporated into the armour of a tank which would reduce the radiation dose to the crew by a factor of over 100. Such a shield would negate the enhanced radiation properties of a neutron weapon. The neutron bomb would become no more effective than normal nuclear weapons of similar explosive power.

The precise constituents of such a shield would depend on whether it would be attached on the outside of the tank or added as a lining

to the crew compartment. Let us assume that for the tank armour possibly 5 cm of steel can be used as the outer component of the shield. A lining of 10 cm of polythene or other hydrogenous material would thermalize the neutrons and a millimetre of boron or other neutron absorber would remove the neutrons. The inside layer would be a gamma shield and 1 cm of lead would be adequate. Such a shield would add about 5 tons to the weight of a 30 ton tank.

This type of shield, which could be widely incorporated into tanks and military vehicles, would make neutron bombs no more effective against tanks than the small fission nuclear weapons which are reputed to be widely distributed to United States forces throughout the world.

The United States insistence that neutron bombs are for use against tanks in the face of widely available information which enables tanks to be protected against the special effects of neutron bombs, forces the impartial observer to attribute the real reason for the production of neutron bombs to their potent ability to kill people whilst causing only the minimum of collateral damage.

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## Local reaction

SIR — Apparently, Lord Rutherford's maxim that there is mathematics and physics and that all other activities are stamp collecting, is still valid in Ms Rich's writings on Yugoslav scientific institutes. The result is a biased assessment of the scope of their competence, specifically in problems related to nuclear power (*Nature* 11 June, p.446–447). A quick check with the *Science Citation Index* would show the scientific activities of the two cited "physics" institutes to cover a broad range in Rutherford's "philatelic" category.

Contrary to the statements in *Nature's* article, there is no "local misunderstanding of the distinction between the charging of a reactor and its start-up". There is no misunderstanding or lack of knowledge with respect to reactor or nuclear fuel technology, much less on the importance of additional power sources in a power-hungry country with few significant energy resources still available for exploitation. Nor has there ever been any misunderstanding based on ideological doctrinarism, contrary to what could have been perceived from another article by the same author (*Nature* 288, 5; 1980).

The dispute is over the technological and organizational discipline necessary in building, starting and operating high technology units like nuclear reactors. The one mishap, in 1958, was the result of just such a typical breach of work discipline.

The dispute is rather between the narrow, mission-oriented technocrats and the concerned scientists on the consequences of siting large facilities in an already ecologically strained region. Scientists insist on careful planning and broadly based environmental impact assessment. Their concern reaches beyond the narrow, albeit possibly correct, advice of "no technological obstacles", offered by a reputable international expert to our supposedly less developed country. The dispute is well within the framework of questions raised in reviewing the Final Safety Analysis Report, and concerns another problem — that of the reference plant for the

Krško unit.

The scientific community is not beyond reproach either. Its lack of credibility, or "weight", with the decision-making social strata stems from some recent and not so recent failings. But it should not be blamed for either disciplinary monoculture or primitive ecological extremism.

I could not refrain from voicing my displeasure with these articles, although this letter might prove just another exercise in futility. Ms Rich's articles remind me of a statement made by one of your great historians. Writing about an infamous propaganda minister of recent European vintage, he claimed that the points in the minister's propaganda items were made so well, that even the opposite of it was still not the truth.

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VERA RICH WRITES — I cannot accept Dr Pravidic's statement that there is no "local misunderstanding". During my visit to Zagreb in March and April of this year, I spoke with a number of members of the public who interpreted the announcement of the imminent "charging" of the reactor to mean that it would "start working" immediately. I fully agree that the main dispute lies between the "concerned scientists" and the technocrats. Perhaps the undoubted local apprehension arises from a fear that in such a conflict, the technocrats may win.

## Mystery genre

SIR — In reading Edmund Leach's review of the book *Genes, Mind and Culture* by C.J. Lumsden and E.O. Wilson (*Nature* May 21, p.276) it strikes me that comments such as "crass idiocy", "parody of science", "gibberish" and "phoney" might be a trifle intemperate coming from a reviewer who admits that he cannot comment on the bulk of the work, which is in neuroscience and psychology.

What is far more intriguing is the question of what Leach could have had in mind when he referred to the "genre" to which *Genes, Mind and Culture* belongs. At first it went right by me, but I did a double take later when I recalled that Leach had once written a review on the genre of "popular ethology" books, such as those of Lorenz and Ardrey. It was hilariously entitled "Don't say 'Boo' to a Goose" and appeared in the *New York Review of Books*.

That was 15 years ago. Is it possible that Leach is still referring to the same genre? I ask, because — significantly — he does not mention the major theoretical work *Sociobiology* in his list of E.O. Wilson's credentials. Worse, he calls Wilson a "popularizer". Surely there is not a regular reader of *Nature* anywhere — on either side of the well-known floor — who conjures up the image of "popularizer" when Wilson comes to mind.

I urge that Leach be invited to identify the mysterious genre in which he has classified the Lumsden–Wilson book and if it is ethology — there is virtually no ethology in *Genes, Mind and Culture* — then clearly his review must be rescinded from the pages of *Nature* as having been written by a uniquely unqualified party.

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