

## McNamara's plan

SIR — We suggest a strategy for global disarmament of nuclear weapons: that all land-based missiles carrying nuclear warheads be destroyed. We refer to a statement by Robert S. McNamara in *Newsweek* of 5 December 1983 and repeated at the meeting of the Bellerive Group in Geneva last December that nuclear weapons have no military use whatsoever other than to deter one's opponent from their use. With the words of Professor Robert Neild, Cambridge, at that same meeting: "we could draw back the nuclear weapons to where they belong, deep in the oceans, where they could serve the sole purpose of deterring nuclear attack or threat". We note that there seems to be general agreement that a limited nuclear exchange cannot be confined, but will lead to a general exchange of strategic weapons. If so, land-based missiles do not add to deterrence over and above what submarine-based missiles can achieve.

The nuclear arms deployed on land thus only reduce the security of the nations possessing them. The risk of nuclear war triggered by accident or misinterpretation (such as a computer error or an astrophysical phenomenon such as the 1908 Tunguska event misinterpreted as a nuclear attack) is greatly increased by the mere presence of stationary nuclear weapons on the continents which, being vulnerable, call for a fast response. Submarine-based nuclear missiles cannot be easily found or destroyed by enemy forces and thus do not invite overreaction in response to or in anticipation of a presumed first strike.

The specific disarmament measure we suggest can be undertaken unilaterally without any loss of security. Any nuclear power implementing this strategy will gain a colossal political victory.

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## Improper psychiatry

SIR — I was interested to read (*Nature* 304, 293; 1983) that "... remaining members (of the World Psychiatric Association) should put their houses in order. . .". You meant, I suppose, that neither unconditional nor automatic legitimacy should be granted to WPA when, as now, the bad boys are out. I cannot but agree with such a view. However, in the same article, you use the term "mental illness" when referring to several types of anomalous human behaviour. The nature and/or the very

existence of such "illness" remains a matter of debate, as you make clear, so I find it misleading when such "illness" is referred to later in the article. This shows how hard it is to avoid the use of an ambiguous term, even in a scientific journal.

This confusion could lead the reader to believe that scientifically unequivocal correlations have been found between truly existent mental illnesses (of a total physical origin), social danger (as an effect of such an illness) and treatments (scientifically based). Of course, if such correlations exist, they are far from being unequivocal and, beside mental "illness", social danger seems to be of a very doubtful consistency too. Even more doubtful is the therapeutic value of treatments based on physical modifications of the human brain (electroconvulsive therapy, lobotomy, heavy drugs) which, it is claimed, work simply as repressive tools. This is as close to torture as to therapy.

Put simply, the problem of ill use of psychiatry is psychiatry itself. The alleged use of psychiatry in repressing political dissent — an extreme degeneration of an already strongly criticized activity — provides an opportunity for pushing WPA and the United Nations to face their responsibilities. As for the Soviet Union's resignation from WPA, it should not be welcomed unconditionally, as it can be justified as a way of maintaining social prestige, credibility and income for the remaining members of WPA. Moreover, unpleasant though it is, we must face the possibility that such a resignation can be represented as a protest or a Soviet psychiatrist's refusal to play the role of scapegoat.

Finally, can we be sure that the type of abuse of psychiatry as documented by various international human rights organizations happens only in the Soviet Union? Should we draw the sad conclusion that what in the Soviet Union is done for political reasons is done elsewhere for ill conscience and/or for material benefit?

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## Frost tolerance

SIR — Current ideas on the protection of plants from frost by alteration of the characteristics of the bacteria normally resident on the leaves raises an environmental question because of the differences between resistant and non-resistant plants, and the role of supercooling in each of these when they are exposed to frost.

The cultivated potato, some beans and the dahlia are examples of non-resistant plants which are damaged by ice forming within their tissues but not by sub-zero temperatures if no ice forms. This is possible if the water they contain supercools as the temperature passes below freezing point. In the great outdoors, the surfaces of leaves are normally quite dirty with all manner of material, some of which may be

expected to be of the sort which encourages water to freeze when the temperature falls below zero. The connections between events on the surface of leaves and the freezing of water within are unclear, but it is certainly true that the freezing of dew on the surface can lead quickly to ice formation within. It has been shown that some bacteria normally resident on leaves are able to encourage ice formation by virtue of some property of their coat. Genetic engineering has succeeded, it is claimed, in creating forms of these bacteria which lack the ability to trigger ice formation in water below its freezing point. It is also being suggested that if the natural population of bacteria on leaf surfaces of frost-susceptible crops could be replaced by these altered forms, then the plants would be less likely to freeze during frosts and so avoid damage.

Some cases of frost resistance by avoidance, apparently involving a thick water repellent cuticle, are known in natural vegetation. However, the majority of frost-resistant plants are quite different, they are tolerant of freezing dew and the formation of ice within the leaves and stems. Although like non-resistant plants their cells are killed if ice forms inside them, there are mechanisms which ensure that ice forms only between the cells and in less important tissues; the cells become desiccated due to water loss to the intercellular spaces, but few freeze. These mechanisms take time to work, and it is essential that in these plants the process of ice formation begins as soon as possible after the temperature falls below zero. Frost-tolerant vegetation is usually inoculated by freezing dew which sets off internal ice formation, and if this triggering fails, as it does when there is no dew because the air is too dry, then the subsequent "black" frost is more than usually damaging. The reason is that the plants have supercooled to a temperature well below zero, and when ice formation eventually begins it is a very rapid process. This is damaging because the movement of water out of the cells to the growing ice crystals cannot keep up with the rate of ice formation, and the ice grows into the cells and kills them.

Because of the different role of supercooling in the survival of these two main categories of plants, the expected results of any treatment which encourages supercooling will be different too. The question is, what may happen if such a treatment, carried out on a crop, also affects the surrounding natural vegetation? If the treatment works at all, the crop may be less damaged but the natural vegetation may be more damaged than would have been expected from the severity of that particular frost, unless the frost were so slight that both types of plant survive by supercooling.

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