

letters

Gol'dand (elementary particles), A. Kaplan (theoretical physics), M. Khait (theoretical physics), V. Kislik (solid state and nuclear), I. Klein, M. Kushnir, B. Lainer (solid state), V. Lander, B. Levich (chemical physics), M. Liberman, E. Luchemeskaya, N. Meiman (theoretical physics), E. Neimotin, E. Pargamannik, M. Pekker (magnetics), L. Raibshsteinas, V. Raiz (biophysics), V. Simanovsky, L. Ulanovsky (astrophysics), G. Volk (biophysics).

The Soviet official to contact is Academician A. P. Alexandrov, President, Academy of Sciences of the USSR, Leninsky Prospect 14, Moscow V71, USSR.

Imprisoned in Czechoslovakia is Vladimir Lastuvka, a nuclear physicist. The official to write to is Dr Gustav Husak, President, Czechoslovak Socialist Republic, Praha-Hrad, Czechoslovakia. Roger Posadas, a theoretical physicist, is imprisoned in the Philippines. Letters should be sent to President Ferdinand Marcos, Republic of the Philippines, Malacanang Palace, Manila, Philippines. C. Pomponiu is being kept from leaving Rumania. The official to contact is Ioan Ursu, President, Council for Science and Technology, Str. Roma #32-34, Bucharest, Rumania.

BERNARD R. COOPER
West Virginia University
JOHN PARMENTOLA

5/11/78 Massachusetts Inst of Technology

NBS corrections

I read with great interest the article in the May issue (page 101) on my plans to restore scientific strength of the National Bureau of Standards. I wish to correct two statements made in that article.

It was reported that the National Bureau of Standards budget for fiscal year 1979 "... includes a program increase of \$2 million as the *final* (emphasis added) increase of a five-year plan for increasing basic research and rebuilding technical competence." In fact, this \$2 million is the *first* increment of what I hope to be a five-year plan.

In my interview with your reporter, I suggested that the NBS Synchrotron Ultraviolet Radiation Facility, SURF-II, is less desirable for research purposes than similar facilities elsewhere because of its relatively low voltage and current. This statement is in error and, as the staff of SURF-II reminded me with some vigor, a quite opposite situation prevails in the spectral region that it covers. Many other parameters beside electron energy and beam current must be specified to determine the only quantity of real interest to the user, namely the photon flux delivered to the user's specimen. The majority of monochromators currently in place on SURF-II yield flux values com-

parable to or exceeding those of similar instruments at other synchrotron radiation facilities.

By way of example, a typical grazing-incidence monochromator at SURF-II gives a peak output flux at 100 eV of 10^{10} photons/sec-Å. In addition, a new normal-incidence monochromator is to be commissioned shortly whose output flux at 10 eV is expected to be about 10^{11} photons/sec-Å. Clearly these instruments and several additional instrumented ports offer outstanding and diverse research opportunities to both NBS staff and the research community at large. In fact, I would be pleased to see the research community make some use of this excellent facility.

ERNEST AMBLER

National Bureau of Standards
Washington, D.C.

Space colonies vulnerable

I believe Malcolm Thackray (February, page 83) has misplaced his hope, when he avers that space colonization may enable a segment of humanity to escape the ravages of earthly warfare.

On a practical level, we should recognize that space colonies are extremely vulnerable systems, susceptible to destruction by a variety of means limited only by the ingenuity of the munitions engineer. This has already been underscored by the advancing development of orbital weapons by the Soviet Union (as well as our own efforts). Furthermore, a space colony is not likely to be fully self-contained, within the means of foreseeable technology, making it uniquely susceptible to blackmail from its earthside providers—or a victim of starvation in the event of catastrophic global war. Need I also speculate on the prospect of nuclear terrorism perpetrated in a space colony by fanatics?

But these hopes are misplaced on a more basic level. Thackray seems to think that international (or even interpersonal) violence is strictly a terrestrial phenomenon, like thunderstorms or earthquakes. This is not so, for the violence in human society springs from *human beings themselves*. We cannot deceive ourselves into thinking we can "run away" from our legacy as a human society; the legacy will catch up to us as it always has, age after age, continent after continent.

Rather than run away from this fundamental moral problem, we should face it squarely. We, as physicists, share in the responsibility for modern weapons technology, and we should not hesitate to protest and remonstrate with those who propose to bend these discoveries to unconscionable ends. Our colleagues in other countries are subjected to political repression worse than Galileo ever experienced.

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rienced, yet our voices are only weakly raised. If we cannot protect our brethren on Earth, how can we expect to protect them in outer space where the environment is alien and inimical to human existence from the outset?

Space colonization represents a monumental effort in technology to achieve the worthy end of peace—yet it is an expedient cop-out. The hardest task is not to move mountains, but to move human hearts. And that is the task before us.

M. J. DUNN

McGhan Medical Corporation
5/16/78
Santa Barbara, California

THE AUTHOR COMMENTS: Mike Dunn has expressed our dilemma only too clearly. Simply because it is more difficult to change human nature on Earth than to establish a space colony capable of sustaining and defending itself in the far reaches of the solar system, we should try to give ourselves the other option. Although interpersonal violence will certainly travel with the space colonies, it is unlikely that terrorism or the mass annihilation madness will prevail within their confines. These can only be perpetuated by politicians in a world where many different languages and cultures prevail and where an increasing population competes for diminishing resources.

MALCOLM THACKRAY
SRI International
3/28/78
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Membrane phase transitions

The article by John Nagle and Hugh Scott entitled "Biomembrane phase transitions" contains a discussion concerning the effect of cholesterol on lipid bilayers which is, unfortunately, incorrect. The authors have chosen to ignore the initial Raman work of Joseph Lippert and myself (Proc. Nat. Acad. Sci. 68, 1572-1576 (1971)) which showed clearly that the effect of cholesterol on membrane bilayers is not to "kill" the phase transition but in fact to greatly broaden it. The thermodynamic data which they cite are experimental artifacts induced by a finite calorimetric scanning rate in a calorimeter of insufficient sensitivity to observe such a greatly broadened transition. Recent measurements with the new Privalov calorimeter in several laboratories including our own have now shown that the original thermodynamic results must be revised. The improved thermodynamic measurements show that the effect of cholesterol is to broaden the melting transitions, thus substantiating the Raman work.

It is regrettable that these authors did not discuss the many advantages which the Raman effect has in determining