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letters

NASA Administrator Fletcher and former Shuttle Program Manager Abrahamson.

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RICHARD L. GARWIN

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APS and SDI

Let us define SDI-1 as a population defense of such incredible efficiency and reliability that it would truly make nuclear weapons obsolete and SDI-2 as a ballistic-missile-defense system similar in purpose to the ABM systems of Presidents Johnson and Nixon (and in violation of the treaty Nixon finally agreed to).

SDI-1 is what President Reagan continues to describe to the public and to the Soviet leaders as SDI. But any competent physicist knows SDI-1 is impossible as long as the Soviet Union stays in the arms race. To call a spade a spade, it is a scientific hoax. I believe The American Physical Society has the urgent duty to warn the public and the President of what is perhaps the greatest scientific hoax in the history of our country. Remaining silent gives the impression that it is not a hoax. Even worse, forming an APS study committee without first warning the public is a signal to the public that APS thinks that SDI may well make nuclear weapons obsolete.

Because it is possible that the President has not received clear and competent scientific advice, it is important for him to see that the organization that represents American physicists is so strongly opposed to SDI-1. The American public, which depends on the advice and leadership of their President, certainly has not received competent advice. In fact, the latest public-opinion polls show the public is in favor of proceeding with SDI. The hoax is of such enormous magnitude that the public is now in the process of being cheated out of over 10^{12} dollars. Even more important than this loss of money and resources is the loss to our national

security and the loss of new possibilities of arms reduction. I feel it is mandatory that the public receive scientific advice it can trust—via an APS public warning of the hoax that is now in progress.

I am using this letter to request the APS Council and officers to issue a public statement along the above lines before the results of its narrow and limited SDI studies are known. The following is a suggested wording of a proposed public statement that I have submitted to The American Physical Society Council for action at its next meeting:

The Council of the APS feels it has the responsibility to warn the public and officials of our government that no amount of effort and cost could provide a nuclear weapon defense of population so efficient and reliable that it would make nuclear weapons obsolete; at least not as long as the Soviet Union stays in the arms race. Furthermore, anyone who claims the possibility of such an invincible shield against all forms of delivery, whether he knows it or not, is engaging in a scientific hoax which could ultimately lose the US taxpayer over a trillion dollars.

JAY OREAR

Cornell University
Ithaca, New York

11/85

WILLIAM W. HAVENS JR REPLIES: At the APS Council meeting, 26 January 1986, council member Michael Fisher introduced a motion prepared by Jay Orear. Following lengthy discussion, Thomas H. Moss, chairman of POPA, proposed the substitute motion "that the APS President appoint a special committee to examine the desirability of an APS Council statement on SDI and if a statement is desirable draft a proposed statement." The committee is to report its recommendations to the council for consideration at the next council meeting, on 27 April 1986. The substitute motion was approved by the council and all of us will have to wait until 27 April to find out what the APS Council will decide on this important matter.

The American Physical Society
New York, New York

2/86

Star Wars petition

In his article on the nationwide campus anti-SDI petition drive (November, page 95) William Sweet quoted Lisbeth Gronlund and John Kogut as saying that few physicists would be eager to publicly defend SDI, or "Star Wars." While this may well be true at Cornell and Illinois, those of us who organized

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the same petition drive here at Purdue (where 31 out of 62 physics-faculty members have signed the petition pledge) have encountered a firestorm of publicly voiced opposition from highly vocal SDI supporters in the physics and electrical-engineering departments. Because many (but not all) of these are not themselves very knowledgeable in this area, they usually end up either by questioning the expertise of their opponents or by asserting that SDI is only a "research program," that only such "research" will reveal whether ballistic-missile defense is feasible and that no one can form a judgment before this "research" is completed.

It is easy to dismiss such arguments on the grounds that no one is a true expert on all aspects of the program, that SDI is going far beyond any mere lab research program, that there are some very general detail-independent difficulties with it and that feasibility judgments are always made before any large research or development project is undertaken. Public-opinion polls show that SDI does seem to have gained acceptance by a non-negligible part of the general public, however. The arguments against SDI have evidently failed to reach or convince a large number of people whose opinions could be critical in Congressional funding decisions on the future direction of the program.

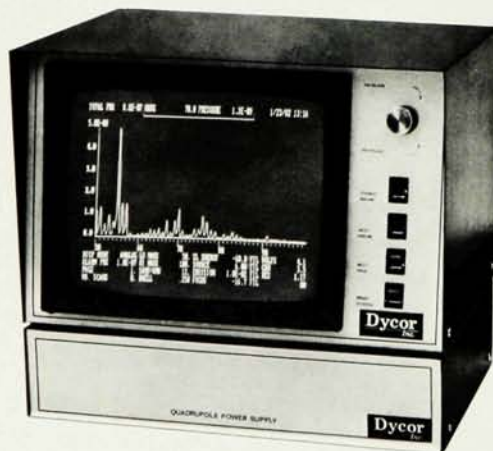
In our own local discussions and debates (one of which drew a standing-room-only audience of almost 200) it has been forcefully brought home to us that simple, general arguments are usually far more effective than ones based on the subtleties of deterrence theory or technology. The latter would include, for example, the overwhelming timing disadvantages that "pop-up" BMD has against similar pop-up anti-BMD weapons (which could, for example, shoot down the former during their vulnerable boost phase) or the use by ICBMs of fast-burn fuels or depressed trajectories to evade x-ray laser beams by completing their boost phase within the atmosphere.

Audiences are generally more receptive to arguments based on the non-leakproof nature of BMD and on the fact that complicated systems (such as computer software, especially for mid-course defense against warheads and decoys) are unlikely to work reliably the first (and only?) time under real battle conditions, particularly against an enemy who is deliberately trying to inject as much unpredictability as possible into his attack.

Most of the defense systems favored by the SDI organization involve low-orbit space-based components. Such systems are, of course, worthless unless

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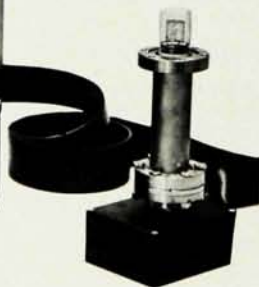
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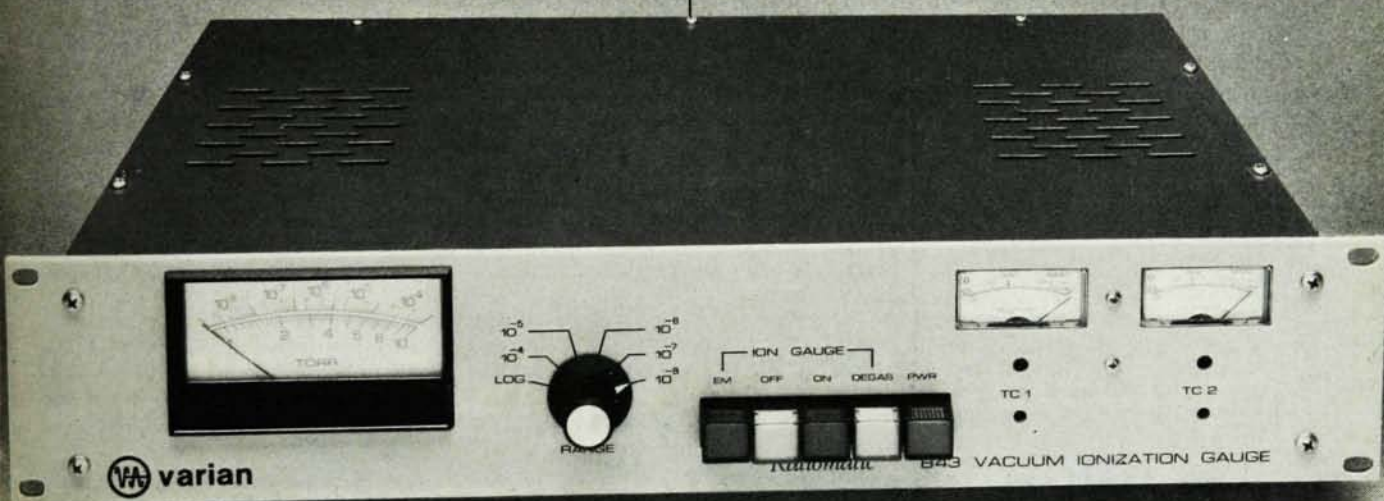
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techniques can be developed to make these components survivable under a direct cost-affordable enemy ASAT attack (where a highly concentrated ground- or space-based offensive ASAT system need attack only a small part of a BMD system that is necessarily thinned out by the constraints of satellite motion). But then the very same techniques would also make it possible to have survivable space-based offensive nuclear warheads, which could be rapidly decelerated and launched at ground targets by mass transfers from satellites moving in the opposite direction, for example; they would give considerably less warning time and be much harder to defend against than ICBMs. Such warheads are at present banned by the 1967 Outer Space Treaty, but an abrogation of the 1972 ABM Treaty will surely undermine the 1967 treaty as well.

The fear of direct offensive space weapons was repeatedly expressed by Mikhail Gorbachev during the recent summit meeting in Geneva, where he also warned that all arms-control constraints will be "blown to the winds" unless Star Wars is stopped. The Soviet Union may well respond to SDI deployment by deploying a space-based nuclear-warhead system, masquerading, perhaps, as a defensive x-ray-laser BMD system (along with decoy satellites). If it feels threatened enough, it may respond even with a nonsurvivable system, which could still be used in a "preemptive" first strike. If so, "our last state will indeed be worse than our first" (Matthew 12:45).

LOUIS A. P. BALÁZS

Purdue University

West Lafayette, Indiana

12/85

Absolute dating

Regrettably, though perhaps predictably,¹ the exchange between Robert V. Gentry and me on absolute dating and polonium halos (December 1984, page 91) has not clarified the argument as I intended. His rejoinder, flawed and evasive, is too misleading to stand unanswered. Therefore, since I do not wish to give the impression by default that he has won the day, I will attempt to clear up some of the confusion he has engendered.

Gentry does not, in fact, disprove the annual nature of layered sequences, such as certain tree rings and Greenland ice cores, which indicate ages greater than 6000 years. His failure even to mention the ice-core data, a common creationist practice,² betrays his professed objectivity. This evasion is especially disingenuous because the

Greenland ice cores are new to this forum and almost certainly the best long-term absolute dating scale.

Contrary to Gentry, I did not claim that bristlecone pines produced no multiple, or false annual, rings. What I meant, following H. C. Fritts,³ was that in their natural habitat they are not as susceptible to false rings as other species are known to be.

Gentry's reference to W. E. Lammerts,⁴ then, is not only misguided, but irrelevant. Lammerts produced false rings in bristlecone seedlings by manipulating growing conditions, but he ignores the fact that false rings can be detected by microanalytical and x-ray techniques⁵ in addition to visual inspection, which he considers unreliable. Regardless that false rings can be identified reliably, creationists need up to one-third of the rings to be false so that all the rings fit into the period since the Flood.⁶ Gentry's attempt to disprove the age of the bristlecone pines fails because false rings in mature trees are extremely rare, and especially so at the sites studied.⁷

What must surely qualify as the "coercive evidence" Gentry would accept as validation for the extreme age and annual nature of bristlecone-pine and ice-core records is at hand. Just as trees ingest carbon-14, the ice caps capture beryllium-10 from the atmosphere. Because the production of both isotopes is a function of solar activity, the variation of C^{14} and Be^{10} over time in trees and ice, respectively, should parallel each other closely if they preserve true annual strata. Such a comparison is possible now that mass spectrometry is sensitive enough to measure⁸ the small amounts of Be^{10} in the melted ice. Because C^{14} would be used only as a marker and not for dating, I hope Gentry will agree that this test would certify the validity of the bristlecone-pine chronology.

Two other significant items bear on Gentry's case. First, while granites are Precambrian, they are *not* primordial, as Gentry seems to think. The oldest rocks on Earth are not granites.⁹ However polonium halos were formed, they did not witness any beginning. Second, the Green River Formation of shale and limestone, covering tens of thousands of square miles, contains 20 million varves of paired light and dark layers. Creationists ascribe their formation to turbidity currents during the Flood. This would mean three layers laid down every two seconds, which is highly unlikely. More credibly, this formation is witness to 20 million years of sedimentation,¹⁰ which severely undermines the validity of the creationists' 6000-year time scale.

Finally, in my December letter I did not intend for Gentry to be insulted, but merely wished to indicate his falli-