# letters

practical social relevance at the time fundamental results are being obtained, and even more impossible to do it before.

▶ Lewis Branscomb (vice-president, IBM):[4]

Microelectronics for computers and the technologies for recombinant DNA were not contained, even implicitly, in the engineering handbooks of their day, nor were they tripped over "by accident" in some laboratory. Indeed, it is hard to think of any technology important to our economic competitiveness or our standard of living that has not been bolstered, directly or indirectly, by exploratory research into fundamental aspects of matter and energy.

Finally, a rereading of Roy's letter convinces me that his is an extremist view. In spite of the mail, this can't be the consensus of PHYSICS TODAY's readers. To use the punch line of my favorite story, "Is there anyone *else* out there?"

### References

1. See, for example: L. M. Lederman, Sci. Am. **251,** 40 (1984); J. A. Tay, C. H. Luellyn-Smith, Fiscal Studies **3,** 15 (1985); M. Bianchi-Streit *et al.*, *Economic Utility Resulting From CERN Contracts*, CERN **84-14** (1984).
2. G. Pake, Mater. Res. Bull., May/June 1985.
3. H. Casimir, *Haphazard Reality*, Harper and Row, New York (1983), p. 312.
4. L. Branscomb, dedication address for the Tevatron, October 1985.

LEON M. LEDERMAN
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*2/86*

## Strategic Defense Initiative

Wolfgang K. H. Panofsky's plea against the Strategic Defense Initiative (June, page 34) overlooks an important fact: the complete inability of technological experts to foresee the state of technology 20 or even 10 years ahead. This was true for the airplane, the machine gun, the tank, radio, radar, the jet engine, television, the atom bomb, the hydrogen bomb, the ICBM, space vehicles, satellites, lasers and electronic computers. In view of this, as a scientist one would say, "Because we are so ignorant, by all means let's go and find out."

The alternative, "We now have secure mutual assured annihilation capacity; for heaven's sake, let's not rock the boat," seems rather unappetizing, in particular because it is permanent. Because we are so much more sensitive about these things than the Russians, does anyone think that they will ever

negotiate themselves out of what for them is a comfortable situation?

PIETER J. VAN HEERDEN

7/85 *Woodinville, Washington*

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Panofsky's statement that "nothing in the US Constitution dilutes the responsibility of a President to comply with existing treaties in force" ought to be evaluated in light of the actual text of the Constitution itself.

Section 8 of Article I of the Constitution specifies, in clause 15, that "Congress shall have the power . . . To provide for calling forth the Militia to . . . repel Invasions." Article IV, Section 4, charges the United States with the responsibility to protect each of the states from invasion. Finally, Amendment II of the Bill of Rights guarantees that our right to "keep and bear arms," within the context of a well-regulated militia, "shall not be infringed."

While it is true that Article II of the main body of the document grants the President the power to make treaties (Section 2, clause 2), and it is also true that these treaties "shall be the supreme Law of the Land" (Article VI, paragraph 2), it is nowhere stated that this treaty-making power shall override the Bill of Rights or the main body of the Constitution. In fact, Article VI, paragraph 2, specifies only that the treaty-making power takes precedence over "anything in the Constitution or Laws of any State to the contrary notwithstanding." Furthermore, the very last clause of Section 10 in Article I allows the states to defend themselves if "actually invaded, or in such imminent Danger as will not admit of delay."

Nothing in the Constitution supports the conclusion that the treaty-making power is arbitrary, unlimited and supersedes all individual rights guaranteed us by the text of the Constitution and the Bill of Rights. One can readily infer, however, that all arms-limitation treaties that infringe on our right to have our military forces keep and bear defensive weapons of our choosing are unconstitutional and therefore illegal. This would apply specifically to the ABM treaty as well as to both versions of SALT.

Because I do not believe that the framers of the Constitution would have subordinated their rights or those of their countrymen and descendants to any arbitrary power, foreign or domestic, and because the legal language supporting this conclusion is clear and precise, I submit that the ABM treaty is unconstitutional and illegal.

J. H. PHILLIPS

8/85 *Austin, Texas*

PANOFSKY REPLIES: Pieter J. van Heerden charges that I share the inability of other technological experts to foresee the state of technology one or two decades ahead, and he cites a number of developments that were unforeseen. Yet as I discussed in my replies to similar comments in the October issue (page 13), there is a large difference between the "technological breakthroughs" required for SDI to succeed and the type of developments cited by van Heerden and other critics. SDI is intended to lead to technical systems that are meant to be used against a live and able opponent, and that will therefore initiate a process of defense, offensive countermeasures, defensive counter-countermeasures and so on. It is not a matter of a single result of pitting man's ingenuity against nature, as were the examples cited by van Heerden. The key issue remains whether the process that SDI proposes to initiate involving a new series of mutual responses between the United States and the Soviet Union serves the interests of the national security of the United States and of world peace. As elaborated in my June article in PHYSICS TODAY, I judge that it does not.

J. H. Phillips raises the interesting point whether *any* arms-control treaty violates the Constitution of the United States. He agrees that Article VI, paragraph 2, of the Constitution states that treaties entered into by the United States preempt the constitution or laws of any state that might have contrary provisions. Indeed, the United States Constitution makes the President the Commander in Chief and gives him responsibility to conduct foreign affairs and thereby provide for the national security. Yet one must recognize that increased armaments and increased national security are by no means synonymous; in fact post-World War II history has amply demonstrated the contrary. The power of the President to negotiate treaties, even if they conflict with private rights involving arms or ownership of property, has been confirmed by numerous Supreme Court decisions.

Negotiated arms control is rightfully considered a component of the conduct of foreign affairs. According to Article VI of the Constitution, treaties are the supreme law of the land, subject only to other provisions of the Constitution. They can be modified by mutual renegotiation or abrogated unilaterally under specific provisions that provide for prior notice and invoke the supreme national interest of one of the signatories.

The specific claim by Phillips is that arms-control treaties are in conflict with the provision of Article II of the Bill of Rights that "a well-regulated Militia, being necessary to the security of a free State, the right of the people to keep and bear Arms, shall not be infringed." No court has ever held the Second Amendment to impose any limitation on the President's power to conduct foreign affairs, but the specific relation of arms-control treaties to Article II has, to the best of my knowledge, never been explicitly litigated. In view of the foregoing it seems to me to be patently absurd to claim that the US President and Executive Branch cannot negotiate and sign a treaty that limits weapons by all signatories if the President believes this to be in the security interest of the United States, and I see nothing in the Constitution that would prevent such a treaty from entering into force once the Senate, by a two-thirds majority, has recommended its ratification to the President and the President has then executed the instruments of ratification. The Constitution has done well in weathering the transition to the nuclear age. If Phillips were correct in his interpretation it would be a sad day indeed.

WOLFGANG K. H. PANOFSKY

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1/86 *Stanford, California*

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While the articles on SDI in the June PHYSICS TODAY (pages 24, 34) are useful in outlining its tremendous technical challenges and severe difficulties, neither discusses the real, fatal problem with SDI.

This is simple and is not technical. It is confidence. Consider, say, the space shuttle. Here is a system run by a carefully trained, experienced organization, a system based on a mature, carefully tested, well-understood technology, one used many times, with which there is much experience and to which extreme care is applied, all for the flight, thoroughly planned for many months and undertaken in the best possible conditions, of one single shuttle. Yet something always goes wrong.

How about SDI? It can never be tested as a whole, nor can many of its components be completely tested. Much of the technology will always be new and uncertain and the operators will have had no experience with it. There will be not *one* object to control, but many, many thousands. The use will not be long planned but sudden, perhaps unexpected. And the conditions will be not ideal but totally chaotic, with everyone extremely rushed and under the most severe pressure possible. And everything must work, not merely adequately, but perfectly.

Even granting the most advanced and sophisticated technology and planning, the achievement of brilliant solutions to all the daunting technological

problems, will we ever have confidence in the system? The answer is obvious.

What are the consequences? We and the Soviets will build such systems. Because of their complexity, and luck, it is quite possible that only one will work, even if they are identical; indeed by chance a poor system may work while a good one does not. And there is no way to predict what will happen. Can we take the risk that theirs will work and not ours? Clearly we will not only be in a race for a better and larger defensive system, but simultaneously we will tremendously increase our offensive systems as well to overwhelm their defensive system in case it works and ours does not. And they will do the same. Thus there will be two arms races, offensive and defensive, mutually interacting, speeding up both.

It is this lack of confidence, which has no solution, technical or otherwise, that will prevent what Gerold Yonas suggests in his article: both superpowers making "significant reductions in offensive missile forces." The final phase, when "offensive missiles are at a negotiated low point," is very unlikely as SDI will so greatly increase the need for offensive forces. (If we can negotiate such reductions, why can we not do it without SDI; why is it necessary to spend hundreds of billions of dollars to encourage the negotiators?) What happens if theirs works but ours doesn't? And why are we subjecting our nation to this tremendous peril by building SDI, thus encouraging the Soviets to do the same?

Even the wildest hawk realizes there are finite resources that can be given to the military. With a spiraling double arms race taking huge amounts of money, cuts will have to come from somewhere. One source is obvious: Withdraw our forces from Europe, and perhaps surrender it to the Soviets. Are the hawks really willing to give up Europe and our commitments elsewhere for SDI?

Does not surrendering our influence in large parts of the world threaten our own way of life and perhaps mean its destruction? Cannot SDI (the suicidal defense initiative) become the means by which we destroy ourselves? Why spend several hundred billion dollars to do nothing but damage our national security and way of life?

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*9/85*

## Reality and quantum theory

We enjoyed reading David Mermin's article (April 1985, page 38). We agree with him that the so-called Einstein–Podolsky–Rosen paradox is brushed aside by many physicists without good reasons, most frequently because of