

# Speaking Of...

## Scientists and Romanticists

Ray Bradbury tells us in poems and prose that behind every scientist is a romantic. (This is probably widely true, except perhaps at Caltech, where romanticism must be either stamped out or overlain with cynicism.) The 21st century may regard Bradbury as the man who *really* understood why we left the Earth.

—William K. Hartmann,  
in a book review of *Mars and the Mind of Man in Science*, May 10

## Peace

You remember Robert Oppenheimer's analogy, when he spoke of the Soviet Union and the United States as being like two scorpions in a bottle. There we are in a bottle, and if either of us stings, the other one stings—and we'll both be dead! So, it looks like a pretty hopeless situation for the two scorpions.

Now this is a view of the scorpions in a bottle as seen by one looking down from outside. From the scorpions' point of view, the implicit conclusion of the outside observer is quite unacceptable. We happen to be *involved*, and being involved, we have to proceed on the assumption that something useful *can* and *will* be done.

In the first place it is very disagreeable not to make that assumption, and in the second place it is literally true that we cannot resign from the human race.

I think things *can* be done, and I don't see any need to give way to a gospel of despair. It comes down to a question of what are the available lines of action.

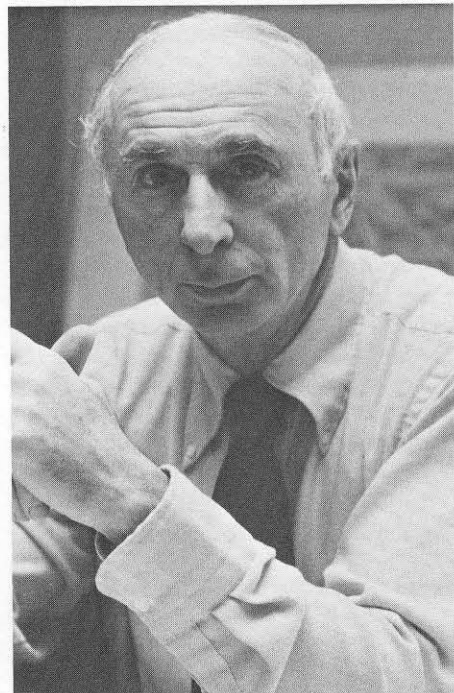
Here I would remind you that some good things have happened in the last

20 years. We have made progress with China. We are making progress of a kind with the Soviet Union—for example, there has been in the past a very real apprehension of direct military attack by the Soviet Union on Europe or on the United States; but this is not something that we now feel to be an imminent threat.

Let's see what we ought to do now; and then let's see whether there's any reason to assume we can't. First, I turn to the home front. It's of the very nature of the foreign relations of the United States that the United States is always at least half of any foreign relationship we have. The home front is of the essence; to use the words of the old fable, it is the goose that lays the golden eggs. The *internal* vitality, cohesiveness, and morale of the United States is the single most important factor that must be constantly taken into account in the conduct of foreign affairs. It is the *central* problem *now*, and nothing is more important than for us to deal with it. I will put this bluntly—we have to restore relations of trust and confidence between the people of the United States and their government.

There are times when I am tempted to put this need in the technical language of the foreign service: We must at least restore diplomatic relations between the American people and their government. At the moment it is hard to say that there are relations of trust and confidence—or even cordial diplomatic relations—between Congress and the presidency, or between the judiciary and the presidency, or between many of the regular departments of government and the White House, or between the Democratic party or indeed the regular Republican party and the White House.

Along with that restoration—here I will not hesitate to use old-fashioned language—there has to go a sense of moral cleansing, and a sense that we



Milton Katz

can count on the elementary decencies in our government.

With China, I think we should continue the way we are going, which is, be sensible, don't be rambunctious, recognize that there is no serious conflict of interest, certainly not the kind which warrants shooting.

When I turn to the Soviet Union, I see two things to keep in the forefront of attention. First, we must continue to work on control of nuclear weaponry not only because it is directly related to the risk of a holocaust and because, for both of us, it is enormously expensive in dollar terms (a precipitating factor to continuing inflation), but also because it is enormously expensive in terms of materials and energy. It is one of the great and rapid consumers of the raw materials and energy about which we are now troubled.

Second, it seems to me manageable for the Russians and us to arrive at a point

where we could agree to stay *out* of local conflicts. I don't know what significant interest the Soviet Union had in southeast Asia, but it has been my view ever since I first had the honor and opportunity to express my opinions to President Eisenhower in 1954 that there have been no vital interests of the United States engaged in Indochina. And to fight wars where no *vital* interest is involved—and not even any *major* interest—is stupid in the extreme. It's also immoral, even for people who are not pacifists but believe that war can on occasion properly be used as an instrument of policy. It's immoral because that kind of killing can never be justified unless it's necessary to maintain vital purposes and interests.

We are managing now, at least in the military sense and for the time being, to keep American and Russian forces out of the Middle East. If we and the Russians could at least agree to stay out of there militarily, and stay out in fact, then we could work with them on arms control.

With regard to Europe and Japan, it's clear that we have to reestablish far more mutually constructive relationships than we have. This does not mean we close our eyes to the facts of conflicting interests. But it means that we identify our elements of common interest and build on them, and identify our conflicts of interest and find ways of reducing the friction to a practical minimum.

I recognize the psychological difficulties. When we developed the relationships with Europe and with Japan through the fifties, we were the only one that was vital and really able to function. Both Europe and Japan needed our military protection, and we gave it; they needed our economic support, and we gave it; they wanted and welcomed our leadership in many respects, and we gave it.

Today Europe is again an immensely

vital area in the basic intellectual and political sense and in the economic sense; and Japan is a thriving and enormously vigorous economy. If Europe and Japan seem to have difficulty in accepting the responsibilities that go with their present strength, we on our part seem to have difficulties in accepting the fact that they no longer will readily do everything that we ask them to do.

I don't think we can reconstruct NATO as it was or reconstruct the kind of relationship that formerly existed. What we *can* do is reconstruct a working relationship that's mutually useful and constructive, that takes account of present realities, and in which all of us adjust ourselves to changed circumstances.

I think the United Nations, given its changed character, can be used effectively for certain things. It could be the institutional mechanism, above all institutional mechanisms, where the advanced industrial societies (meaning, essentially, Europe, North America, and Japan in the non-Communist world, and the Soviet Union and East European countries like Czechoslovakia and Poland on the Communist side) could deal with the so-called L.D.C.'s (the "Less-Developed Countries," which means essentially the nations of Latin America, South Asia, and Africa) as a group. The dealings could relate to trade and exchange; and to the apparent attempts of the L.D.C.'s to organize intergovernmental cartels to raise the prices of raw materials.

Through the U.N., it may also be practicable to find somebody—not the United States, not the Soviet Union, but somebody with our support and the Soviet Union's support—to work on local conflicts between or among L.D.C.'s in an endeavor to bring them to some kind of adjustment.

These are the lines of effort I would suggest. In regard to all of them I

would again stress the primacy of our internal situation. It is the central and outstanding factor in the contemporary foreign policy of the U. S.

Some years ago, in the late fifties, Hugh Gaitskell, who was then the chairman of the Labor Party in Britain and heir apparent to the Prime Ministry, was in this country. In a discussion of certain economic difficulties of Britain and of Europe, someone asked Gaitskell: "What is it you want the U.S. to do?" He replied: "The principal thing I want you to do is to have a vigorous internal economy *here*, because if your economy goes down, there will be little hope for the rest of us."

Unless we recover our basic resources—and I here refer to the primary moral, psychological, and social sources of our strength, which have been our strength since the days of the founding fathers—I don't think we're going to be able to conduct a very useful or intelligent or far-sighted policy.

—Milton Katz,  
*Sherman Fairchild Distinguished Scholar,*  
*in an Athenaeum Lecture, "The Question of Peace—Reexamined after Twenty Years,"*  
March 14.

## Energy

The shortages are temporary. There are enough resources in the earth's surface for the whole population of the world, even if it rose to ten billion, to live at the level of Americans for literally millions of years, provided that you go the route of using the lowest grade of all resources, which is the common rock of the earth's crust. This contains everything that is needed to run a high-energy, high-technology society.

The thing is that, because we have allowed ourselves the luxury of napping, we are now caught in a bind of



James Bonner

having to do the research and development work that will enable us to get those low-grade resources.

Copper ore was once considered worthless unless it contained over 30 percent copper, but today ore containing .3 percent copper is being mined. Thus by improved technology it may be possible to mine the minute quantities of various minerals from ordinary rock—granite, for example.

I believe it will take tens of years to develop this kind of technology, and I predict that the biggest changes in lifestyles will occur in these development decades.

—James Bonner,  
professor of biology, in a newspaper  
interview, February 15

## Faith and Reason

Since the beginnings of civilization, man has attempted to predict his future. He has sought to foretell his destiny from the intricate patterns of the star-filled heavens, the entrails of sacrificed chickens, the residue of tea leaves in cups, the turn of tarot cards, and thousands of other signs, symbols, and omens.

Wise men, shamans, gurus, oracles, and yes—even priests, professors, and politicians—are looked to for their visions and foresight. How do we divine the future? What forces shape our behavior and thus, in effect, create the future reality? I see today, as never before, an intense and polarizing struggle for man's mind between the forces of faith and mysticism and science and reason.

Look about us. We live in a bumper-sticker world. In the few letters that can be scrawled and pasted upon the outer limits of automobiles, we see calls for religious dogma and for radical-political action, statements for and against guns, demands for wilderness areas and at the same time for more ski lifts. Our lives and times are motivated by slogans, 30-second commercials, headlines, and the instant mass culture of superficiality.

And yet, this is the very moment when the fundamental problems of man have a base in science and technology and cannot be solved without them. On the other hand, how long have we been lulled into a sense of false security by our scientists and technologists? They continually reach out for more moneys for their research projects, holding forth promises of everlasting health and life, smog-free cities, supersonic transportation, and Elysian fields of a labor-free life—none of which are delivered.

One of the major factors contributing to our schizoid dilemma between mysticism and reason is the apparent crisis

we face in handling the enormous amount of information which is generated, transmitted, and received throughout the world. Each of us continually feels inadequate to come to grips with this superabundance of information—to understand it, to digest it, and to utilize it. We must have a “fluency” with language which enables us to express our complex ideas both in quantitative and qualitative terms.

We must also develop conceptual structures within which the language, both verbal and numerical, can be utilized. Scientists have too often neglected their social responsibility to communicate and explain their ideas and discoveries in language and in concepts which can be understood by interested citizens. Those of us who work in the areas of science and technology must recognize the necessity not only to share our knowledge, but also to point out the diverse social consequences of applying this knowledge. Scientists and technologists must always recognize and identify where their “knowing” is scientific and where it is a function of personal value judgments.

I believe that our feeling of intellectual impotence may be built into our approach to education. We have long been geared to the notion that education should impart facts and data, literally fill up the biological data banks of our brains.

Rarely do we come to grips with developing the skills of mathematics and language, the ability to see fundamental relations and explanations within the data and the facts, and above all, the methods by which to seek and find new knowledge and new relationships. At a time when computers can store far more information for instant recall than can the human brain, it seems a shame not to use the intricacies of the human brain in a more creative and functional fashion.

Furthermore, within the process of education at all levels from preschool through postgraduate, we readily succumb to the fragmentation of knowledge as described in C. P. Snow's *The Two Cultures*. We fail to commit ourselves to the notion of an education for one culture in which the disciplines of science, the social sciences, the humanities, and the arts interrelate and integrate.

Mysticism and reason need not be polarizing forces.

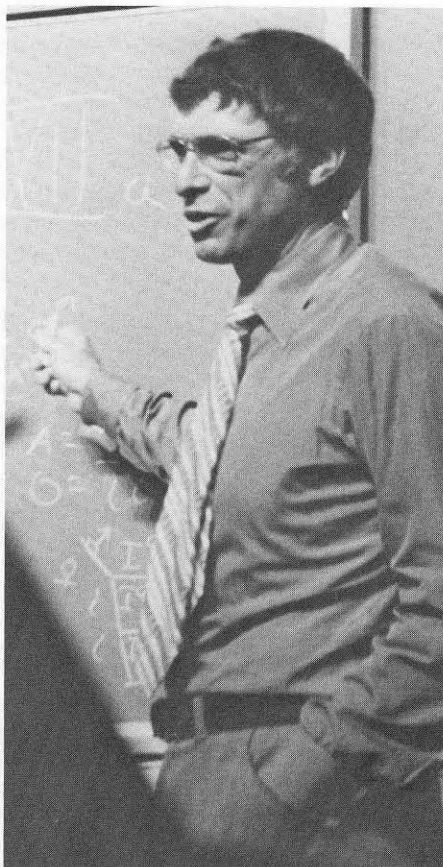
In all of our thoughts and actions these modes of perception are functioning together. How few scientists and technologists recognize and are willing to admit the acts of faith that underlie the very scientific methods that they employ. Conversely, some of the most basic contextual aspects of art, poetry, philosophy, and music are closely related to concepts that are operational in science.

There are three underlying assumptions of faith that every scientist must hold whether he knows it or not. These are:

- (1) There is order in the universe.
- (2) Man can understand that order.
- (3) It is good to understand that order.

Indeed, it is the quest to understand meaningful relationships in the universe that drives all of us who practice science to continue searching.

My concern as a scientist, as a teacher, as a citizen, and perhaps above all as a human being is to live and act in accord with the notion of the one culture of man. Science is only one way of perceiving the universe through its questioning, proposing hypotheses, experimenting and verifying the hypotheses, and ultimately extrapolating from present understanding to new questions and new ideas and new relationships. I think we should bring



Paul Saltman

this same sort of perception into everything we think about and do.

At the same time, we must see that the fundamental issues of the future of man are not solely based on facts or data, but rather lie in the human and social values that we place upon our interpretations of these facts.

Jacques Monod, the French Nobel Prize winner and biochemist, spoke most eloquently when he said: "Man finally knows that he is alone in the indifferent immensity of the universe. No more than his destiny is his duty anywhere preordained. It is up to him to choose between the kingdom and the shadows."

What is to be man's choice? On what

rational or mystical individual and collective premises shall it be made? For me, the answer lies in our commitment to knowing and understanding, our concern for self and others, our sensitivities to our own and our society's needs, and our belief in individual and collective man's ability to change and evolve.

Many years ago, I appeared on a panel program with a delightful and brilliant Canadian author, June Callwood. At that time, we were discussing our value judgments and concerns, and I referred to the biblical credo which has influenced greatly some aspects of my own life, "I am my brother's keeper."

On reflection, June Callwood asked me to reconsider that motto, slightly changed but far more powerful, "I am my brother." If each of us can recognize the reality of this paradoxical and dynamic interaction of existential self and societal others, and at the same time bring into dynamic equilibrium the forces of faith and reason, I believe that the future of man and the societies and nations of this earth will be better. We can and must make it so.

—Paul Saltman (BS '49, PhD '53), from "I Am My Brother" in *Courses by Newspaper, a copyrighted series of lectures*. (Reprinted by permission.)

## Getting Started

I remembered a remark which Professor Richard Tolman had once made to one of his classes: "When you have conceived a new experiment, don't think about all of its possible difficulties too long or you will never attempt it!"

—Jesse W. M. DuMond, professor of physics emeritus, in *Autobiography of a Physicist* □