

letters

More thoughts on "thinking new"

Laura Nader's "Barriers to thinking new about energy" in February (page 9) was revealing in light of the controversy and myths permeating the forum on the merits of solar power and the supposed danger of nuclear energy. I found it intriguing and significant that a trained anthropologist could miss the most important bias in her observations of technical people discussing energy choices. While reviewing her contacts with engineers and scientists, she states "... There are certain pressures... that encourage people to think similarly... [and] I noticed... a good deal of standardized thinking; lack of respect for diversity; absolute taboo on the word 'solar.'" The author seemed to be cautioning scientists to take care not to approach a problem with a preconceived bias. I suggest that this applies to anthropologists also. To understand that the "standardized thinking" she observed is indeed proper, a review of energy-related scientific literature would be required. Credible engineers and scientists are familiar with this literature, and realize that small-scale solar energy, such as a home hot-water system, is practical now—technologically. (Economically it is the energy source of the wealthy. I recently had my home surveyed for a solar hot-water installation. The equipment came to \$4600, would be paid off in 20 years, and would save me \$18 per month—in August!) Most of us cannot afford such expensive "free" energy. It is also well known that solar power on a scale large enough to achieve the energy independence necessary to free us from the threat of mideast war and oil shortages is an energy fairy tale and totally unacceptable in terms of its absolutely horrendous environmental impact. In addition, human suffering and loss of life associated with power generation systems has historically been inversely proportional to the energy density at the source. Solar can therefore be expected to be more dangerous to people than coal; which is itself orders of magnitude more lethal than nuclear (real lethality, not probabilistic lethality).

Is it a "lack of respect for diversity"

then, that causes knowledgeable people to omit solar and include nuclear while making energy choices? The interpretation that it was a "lack of respect for diversity" is, I think, incorrect, and a fine example of a personal internal bias coloring what should have been a more educated, more objective observation. Obviously both the anthropologist and engineer came with preconceived biases. The question is, who's bias was based on fact and reality, and who's was based on myth and fear? More importantly, which bias was purposefully selected by consideration of scientific data involving technology and economics, and which bias was unrecognized? I submit that (1) when a person sees everyone else out of step it is time for them to reexamine their own position, and that (2) physical laws, their measurement and expression in numbers, and economics are valid constraints on human thought where engineering is concerned.

This bias is apparent in another of Nader's evaluations when she asks "... who says that breeder reactors are the way to go?" She apparently found it unreasonable that "There was no discussion of that question either before or after the talk," yet among people who understand nuclear power and the present need for energy independence in this country it is obvious that there is no other viable option. No other energy source can equal nuclear in the areas of safety, economics, and acceptable environmental impact, regardless of the biases one might hold. (Coal can make us energy independent, but at a considerably higher price measured in human life and environmental damage.) I suggest that it is available technology, economics, and human need that have determined that the breeder reactor is the way we must ultimately go. Nader did not suggest a practical alternative, and, more importantly, she cannot.

Finally, something needs to be said about Nader's statement that "... People in technical areas work with objects or with numbers. They don't work with human beings." The implication is that this is bad for people. I believe history shows that this is a fallacy.

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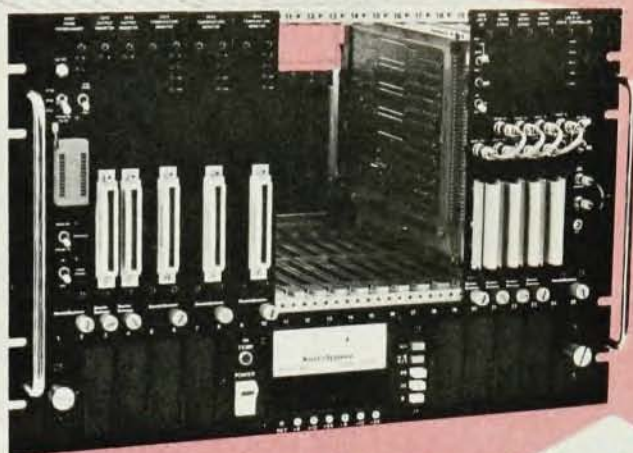
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Gordon and Breach

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Historically it is people who work with people who cause almost all human suffering. Politicians, religious leaders, ideologists, propagandists, media personnel (TMI for example)—it is among these ranks that we find sowers of hatred, distrust, fear, war, terror, and so on. They are the dealers in subjective judgment, metaphysics and opinion. They are not physical scientists or engineers, and they do not practice scientific rationality or objectivity. An overview of human history will reveal that those who work with numbers and objects have, almost without exception, improved the well-being of everyone. Why would an anthropologist try to transmit the idea that technical people do not care about human beings and that they should proceed with some sort of cleansing introspection? To what end? (To bring their view of the physical world into agreement with Laura Nader's?) If the idea was to point out that sometimes "... humans are treated like objects," then this is simplistic humbug in comparison with the benefits technology has bequeathed to mankind.

Nader obviously missed the sarcasm in the comment about 50 000 auto deaths per year, but her missing it illuminates the depth of the bias which I suggest colored her perception of the conferences she attended. A significant portion of those auto deaths are directly related to the misuse of alcohol. Just imagine! If we eliminated alcohol we could save, *every year*, as many people as might be killed in the worst conceivable and unimaginably improbable nuclear accident. Every year! Where are our moral standards and values when we oppose all nuclear power to prevent highly improbable deaths and ignore 50 000 certain fatalities each year? Perhaps a shower before talking to one's children will hide the debasing hypocrisy.

There is much more that could be said, but I think my points have been made. It is entirely proper that in a serious discussion of energy production for today solar should not be considered. Additionally, it would be ludicrous not to consider nuclear power, the one form of energy generation that economically, socially, environmentally and technically meets the needs of the people. Physical laws, economics, and the math describing them are valid constraints to human thought until additional information is gathered to indicate otherwise. Those who cannot contribute additional information of a scientific nature to the point under discussion should not be miffed that their opinions and metaphysical delusions hold no weight in scientific circles, nor should they use their disci-

pline as a prosthesis to support an otherwise untenable position.

V. G. BLANCHETTE JR
San Jose, California

5/81

Laura Nader's "Barriers to thinking new about energy" should be taken very seriously by the physics community because it contains a message we cannot afford to ignore. My experience as a physicist and engineer who has been active in many environmental issues and energy problems and policy, in particular, mirrors those that she has related. She has correctly perceived that most pure and applied scientists have become protagonists for the myth that what is technologically feasible is also societally desirable. This serves to emphasize Nader's point that the energy problem is really a social problem. The momentum for rationalizing and propagating this myth has been the economic role of the high-technology industries in contemporary society and the intellectual attitudes of scientists who work in these industries. I believe that Nader has correctly identified the source of these attitudes as intellectual arrogance untempered by humanism, an unquestioning acceptance of the value and effectiveness of big aggregated business or scientific "from the top down" projects and contempt for disaggregated "from the bottom up" projects.

There has been considerable concern among engineering educators about the need to ensure that their students receive an adequate exposure to humanities and social science courses. It is evident that this exposure has been superficial and thus ineffective particularly when students take "specialty" courses and fail to interact with majors in these areas. Furthermore, it must be concluded that the same criticisms are valid for science—including physics graduates—if Nader is to be believed.

We have graduated a generation of students in pure and applied science who believe that technology can solve all of the problems of society and that the environment is a nuisance to be dominated if possible and otherwise tolerated. The sad truth is that technology is creating new problems faster than it is solving older problems of its making. Sensitive, thinking humans recognize that we will live environmentally benign lives only when we learn to live in harmony with nature. The technocrat rejects this as sentimental rubbish and continues to behave like a bull in the environmental china shop. His dinosaur mind is oriented to the continued propagation of the myth that growth and progress go hand-in-hand.

It is sad but true that the technocrats have been remarkably successful in fostering this myth in our society. It

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letters

may be that this uncritical acceptance is part of a deeper societal malaise in which more and more people are choosing not to play an active, responsible role in society and opting instead for essentially hedonistic lifestyles. 1984 may already be a reality. The big-is-good-and-bigger-is-better attitude seems to contradict the accepted scientific philosophy that Occam's razor should be used to arbitrate between alternate explanations or solutions to problems. It has always been my approach as both a physicist and engineer that the most reliable and safest engineering solutions are usually the simplest; complex solutions should always be anathema to a good pure or applied scientist.

We are in grave danger of losing our integrity and damaging our public image if pure scientists follow their applied brethren into the *cul de sac* of advocacy for high technology. Big science is not necessarily good science. We must provide leadership in the quest for simple, elegant solutions to those problems we tackle that have societal implications. It is only in this way that we can justify the funds necessary for large esoteric projects like meson factories and large optical and radio telescopes. Realistic solutions demand a breadth of understanding and wisdom. The development of breeder reactors, enrichment processes, fusion reactors, solar power satellites, and so on, may involve the solution of fascinating problems of great interest to many physicists, but they should not forget that, fundamentally, these are only complex solutions to the energy problem that undoubtedly has simpler, holistic and environmentally and societally benign solutions. Our public image will be enhanced only if we eschew being technocrats and seek this latter category of solution in the true humanizing spirit of "Renaissance men."

H. A. BUCKMASTER
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8/81

A new era of science?

The time has come for young and future physicists to explicitly recognize, by being taught during their education and as a consequence of their research, that all true scientists develop a supreme regard for the intrinsic worth of *Homo sapiens sapiens* in the process of discovering new knowledge, and that this moral precept should guide their research aims and actions. Laura Nader's article (February, page 9) graphically censures a segment of the pro-android, anti-*H. s. sapiens* world

that has been created by engineering technology using scientific knowledge in a climate of opinion which says that science is amoral, and in a climate of ignorance regarding human origins and the factors which led to the development of our present social institutions. If it should seem strange to some that a cultural anthropologist should directly oppose Edward Teller (February, page 136) in the same issue of a physics journal, then physicists should awaken to the significance of this event. Nader's article is part of the leading edge of a new era of science, while Teller's article is part of the trailing edge of a dying era of classical science. Her view is that growing scientific attention should be diverted to studies of human origins and social institutions. Physicists should reflect on their roles in this matter. It could be intellectually stimulating and rewarding.

CLAIR C. PATTERSON
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4/81

THE AUTHOR COMMENTS: For an incomplete but not irrelevant addition to the comparison of the two articles drawn by Clair Patterson I might emphasize the parallel between Laura Nader's statement "We must build technologies that recognize human frailty," and my own belief: As a physicist deeply and publicly concerned with nuclear reactors it has long since become my favorite statement that, whenever you believe you have a foolproof system, you will find the fool to be bigger than the proof.

I partially agree with Nader's further remark "Because of the way American leaders are handling the problem, I may theorize that the society is having a nervous breakdown instead of an energy crisis." Such a statement pertinent to the previous Administration, however, should be accompanied by a recognition that inflation and energy are closely linked. A governmental nervous breakdown may not be completely denied; the presence of the energy crisis, however, can clearly be asserted.

In regard to the fast breeder reactor which is frequently mentioned, I might remark that I have publicly and repeatedly opposed this reactor in the past years for the simple reason that better solutions are, according to my perception, available.

Clair Patterson rapidly arrives at a judgment that "Laura Nader's article is part of the leading edge of a new era of science while Edward Teller's article is part of the trailing edge of a dying era of classical science." This statement is not obviously false if quantum mechanics is included in the era of classical science. It seems to me, however, that

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