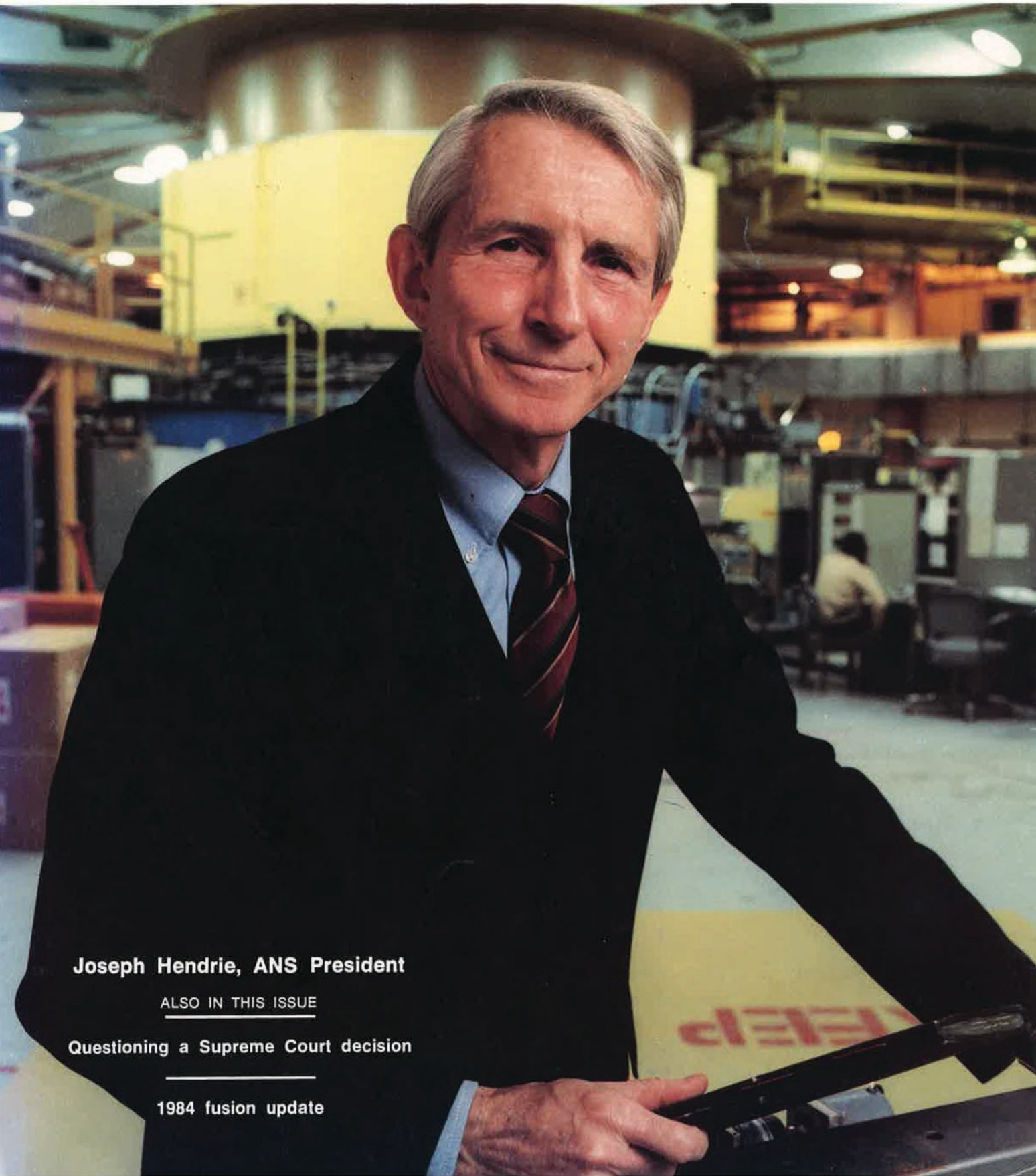
nuclear news

A PUBLICATION OF THE AMERICAN NUCLEAR SOCIETY

JUNE 1984/VOL. 27/NO. 8



Joseph Hendrie, ANS President

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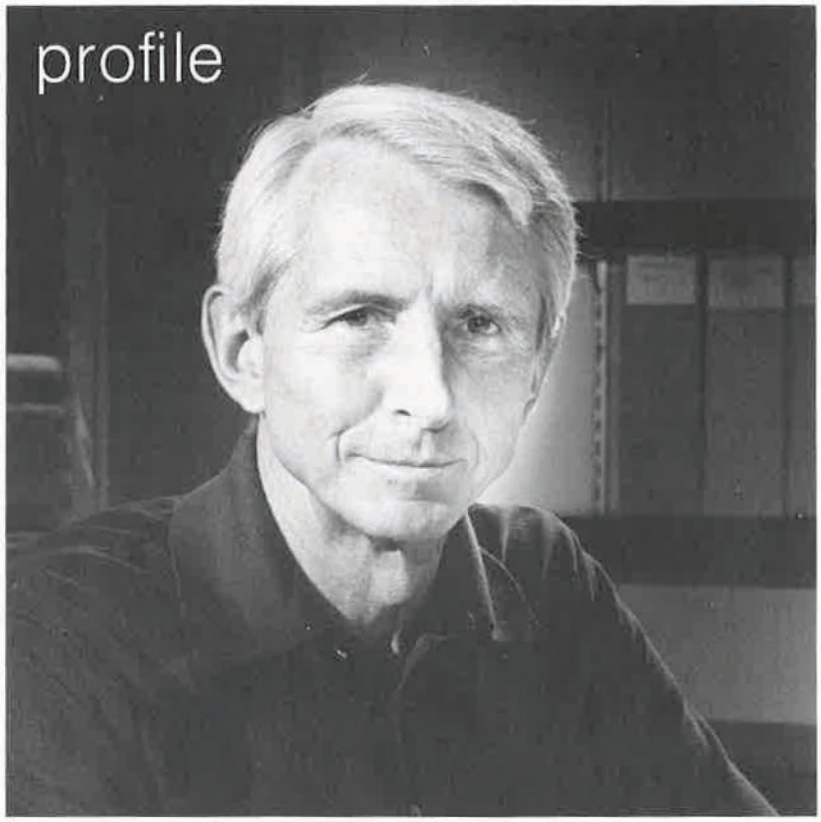

Hendrie—charting a steady course

While he was a graduate student at Columbia University in the early 1950s, Joe Hendrie recalls, "a group of graduate students—none of us had much money, but we made it up in volume—used to rent a sailboat every summer. We'd anchor at Dering Harbor on Shelter Island, and then sail up and down the Coast. The last year or two, we actually bought a boat, in a misdirected adventure, an extremely ancient craft that distinguished itself by sinking at every turn." Despite this minor inconvenience, Hendrie became very enthusiastic about sailing, an enthusiasm that has never diminished and that had much to do with his path to a career.

A native of Wisconsin, Joseph M. Hendrie served with the U.S. Army during World War II, was educated at Case Institute of Technology, and went to study physics at Columbia in 1950. He decided to specialize in the nuclear field because of a seminar given at Columbia by Clarke Williams, then chairman of the Nuclear Engineering Department at Brookhaven National Laboratory. "At that point, I hadn't paid much attention to atomic energy affairs other than the general interest that people had. But Clarke laid out what they were doing at Brookhaven, and it sounded interesting. Also, it was located on Long Island, and that was where the sailing was."

Working at Brookhaven

Hendrie started his Brookhaven career in 1955, working for Herbert Kouts, then chief of the lab's Experimental Physics Group. Hendrie recalls: "It was a great time. We had considerable freedom in program matters. If you had a good idea—something that looked like it was worth trying out—you went and talked to the appropriate people on the [Atomic Energy Commission] staff in Washington, and the funds generally could be worked out one way or another. There were not the extremely cumbersome administrative procedures and restraints there are now. As an experimental group, we could do a lot of things, and could do them in a hurry. In those days, all the laboratories worked that way, that is, had that capability, but this has, to a considerable extent, been lost by virtue of the bureaucratization of the enterprise over the last quarter century."

Hendrie's first job at Brookhaven was the performance of a set of experiments to determine the effect of burnup of the natural uranium fuel on the moderator coefficient of the Graphite Research Reactor, and then to measure the temperature coefficient when the reactor was reloaded with enriched uranium.

Later, he worked with a group performing physics experiments for a liquid-metal-fueled reactor. In the course of this work, he designed and constructed a small reactor to supply neutrons to exponential experiments. "It had a 100-kilowatt capacity," Hendrie explains, "and so, compared to typical power levels in critical experiments, which are a fraction of a watt, it was a substantial engineering step forward for me—sort of a different level of technology." And in 1958, coming out of the successful conclusion of that effort and startup, he was asked to head the design group on the new research reactor for Brookhaven.

"That machine was called the High Flux Beam Reactor," says Hendrie,

"because the intent was to build a machine that would provide very intense external beams of neutrons. The experimental group did very extensive critical experiments, the theory group did a great amount of calculation, and the design group did a lot of design, and we brought it into operation in 1965. It was at 40 MWt then: more recently, the power has been raised to 60 MWt. That reactor has been an outstandingly successful research machine, and the groups that work around it have been in the forefronts of their fields for 20 years now. So I'm very pleased about the success of that design. And also have to give due credit to one of the best operating organizations in the country—the operations group at Brookhaven. They go back to Du Pont and the first production piles, and they can run anything."

With the HFBR on line, Hendrie became acting head of the Experimental Reactor Physics Division at Brookhaven, while Kouts took a year's sabbatical. His next assignment was project manager of the Pulsed Fast Reactor Project, scheduled to be the lab's next research reactor. It was, according to Hendrie, "a very exotic machine. We worked on the design for several years, and it was technically a much more difficult job than the HFBR."

The project began encountering problems early on, and after a few years, for various reasons, the project was abandoned. Hendrie explains: "There's a question, if conditions had remained the same, of whether we would have been able to solve the technical problems in a sufficiently clear-cut and satisfactory way to build that machine at Brookhaven. If you've got an experimental machine that you think will work but that may be a little quirky, there are places like Idaho to site it. For a Brookhaven machine, there had to be essentially no question about safety. From the standpoint of a reliable research machine, there were equally important questions of whether it would run steadily and reliably. I think, over the long haul, we probably would have beaten those problems down, but it was technically a very difficult machine.

"But conditions changed. By that time, the hardening of the AEC arteries had set in, and funds for research reactor development, along with funds for all kinds of other reactor development, were squeezed in order to support the breeder program. At the end of the sixties and beginning of the seventies, the breeder research and development work simply ate the entire general reactor development budget of the AEC. The PFR project closed down; in fact, the assorted reactor development projects at Brookhaven—not just research reactors, but power reactor technology as well—were closed out, one after another."

With the PFR project down, Hendrie was appointed associate head of the lab's Engineering Division, working under Thomas V. Sheehan. These were the lean years at Brookhaven. "In those years—the end of the sixties and beginning of the seventies—we lost 55 professionals out of 85 in the division because of the squeezing out of programs. The rest survived by getting out and scratching. We had all sorts of peculiar enterprises going all over the place. As the Engineering Division, we supplied engineering services to whichever of these enterprises were going forward. These things began to accumulate, and we survived.

"For example, those were the days when I learned to design concrete pressure vessels. About this time, Bernie Manowitz and his group devised a way of impregnating concrete with a polymer that they would then treat with radiation, and the result was a concrete that was extremely strong and quite impermeable, and that's how we got into concrete vessels. Brookhaven's not a concrete laboratory, but Bernie's people had devised this ingenious way of bucking up the material, and so for a while we ran around and sold it for all kinds of applications. We sold it to the Office of Saline Water as a building material for desalination plants—that's where the concrete vessels came from. We sold it to the Bureau of Mines as a material that had the potential for stabilization of coal mines. And we subsisted for a while on that type of enterprise." To this day, Hendrie retains his membership in the American Concrete Institute, a remnant from those scrambling years.

Moving to the AEC

Hendrie's accomplishments in reactor physics, reactor design, and reactor safety analysis had led to his being chosen in 1966 to serve on the AEC's Advisory Committee on Reactor Safeguards. He was ACRS vice chairman in 1969, and chairman in 1970. His contributions to the physics and engineering of research reactors and important contributions in promoting the safety of large power reactors were cited when he won the AEC's Ernest O. Lawrence Memorial Award in 1970.

In 1972, Hendrie "got snagged," as he put it, to serve on the AEC regulatory staff. In the early seventies, the agency was weathering some tough times. The Commission was still feeling the aftershocks of the Calvert Cliffs decision, in which the U.S. Court of Appeals charged that the AEC had made a "mockery" of the National Environmental Policy Act (NEPA) by adopting rules that "failed to satisfy the rigor demanded by NEPA." James Schlesinger, AEC chairman at the time, brought in Manning Muntzing as director of regulation, and began a reorganization of the regulatory staff.

"They asked Jack O'Leary to be director of licensing," Hendrie says, "and got me as deputy director of licensing for technical review. This was, in effect, chief engineer. I had all the technical people on the reactor regulation side under me.

"It was a very turbulent time," he continues. Schlesinger's decision to accept the court ruling "put about an

A light moment at the Commission: a 1981 birthday surprise

The Hendrie family at the Belgian Embassy in Washington, on the occasion of Hendrie's receiving the Order of Leopold II, Rank of Commander, by order of Baudouin, King of the Belgians, in 1982. From left: Elaine, Susan, Barbara, Joe, and Mrs. Joseph Hendrie, Sr.

18-month stop on all licensing. Great efforts were expended to construct an organization, gather the expertise, get it organized, and carry out environmental reviews. And to do it not only for plants that were in the pipeline, so those plants could go ahead, but also for plants that had already gone through, meaning backfits, new sets of hearings, and so on.

"On the reactor design and safety side, we had all these reactor cases stacked up for construction permits, and it didn't look like there was any way we could possibly move them in a timely fashion through the process. And although the paperwork was not as binding as it is now, it was still pretty sticky. So that was a big challenge.

"We felt that the technical staff simply didn't have the resources to deal on an equitable basis with the reactor designers—the people who were making the applications—so we went out and we recruited. We brought in people on a temporary basis from the laboratories—I think at one point I had some 150 scientists from the national laboratories on temporary duty in my office. When I got there in 1972, there were about 60 working professionals in the technical review office, not counting branch chiefs and other managers; when I left in the latter part of 1974, we had something like 360 working professionals in the shop.

"At the time, it was clear to me that that was what we had to do, both to handle the work load and to put the staff on the basis where they could go into sufficient depth with independent calculations, using their own expertise and analyses, and check to see if the applications were sound. One of the results of that, of course, was an enormous surge in regulatory requirements. You can't put a crowd of competent, aggressive people together reviewing things, without having them come up with all kinds of propositions for perfecting a world that is always going to be something less than perfect, no matter what you do. So, some of the effects of that I'm not too fond of, in hindsight, but it seemed the right thing to do at the time.

"It was a great two or three years down there," he concludes. "But it was very hard work. The disruptions to the family were substantial. I promised Schlesinger I'd stay two years; I stayed two and a half, but by then was really ready to leave."

Back at the lab

On leave of absence from Brookhaven during the AEC stint, Hendrie returned to the lab in late 1974. He continued with some work for the AEC, however, including editing the Standard Review Plan, which he instituted.

In 1975, he was chosen to replace Warren Winsche (who was promoted to deputy lab director) as chairman of the Applied Science Department, which had evolved from the Nuclear Engineering Department to reflect the broader scope of endeavors the department was getting into. He served in that capacity until 1977. "It was a time of expansion," he says. "The AEC had just separated into the Nuclear Regulatory Commission and the Energy Research and Development Administration. ERDA had a mandate that went well beyond atomic energy, so we were into all kinds of things. We were into fossil fuels, conservation, environmental effects of energy, systems analysis—it was a great time with all kinds of initiatives, and the department grew by leaps and bounds."

At the NRC

In 1977, Hendrie was tapped to become chairman of the Nuclear Regulatory Commission. His years at the Commission helm might have been a time for him to continue in his quiet, competent way to bring the NRC to greater technical capability had it not been for one event—the March 28, 1979, accident at Three Mile Island-2. Almost immediately, the NRC—both staff and commissioners—became headline fodder. Licensing was stopped as the Commission attempted to deal with the ramifications of the U.S. nuclear industry's worst accident. In its wake, the NRC—its format and its way of doing business—was severely criticized, and most of the energies of the agency went toward responding to TMI-related matters.

President Carter appointed a commission to study the accident—the President's Commission on the Accident at Three Mile Island, popularly known as the Kemeny Commission—which produced a report especially critical of the NRC. It was apparent that, for political reasons, heads would roll, and Hendrie's became the designated head. He was removed as chairman of the Commission in late 1979, and fellow commissioner John Ahearne was appointed chairman. Hendrie remained on the Commission, however.

In early 1981, when the Reagan Administration took over, Hendrie was reappointed NRC chairman, and served in that capacity until the end of his term in mid-1981. Today, looking back, Hendrie says, "On balance, I'm glad to be out of it. The stress level is high enough so that it's a very wearing proposition. You just drain down your internal reserves. But it's also a very exciting enterprise, and I miss the hurrah from time to time."

Home to Long Island

His term on the Commission over, Hendrie returned to Long Island and to a position as senior scientist at Brookhaven. Today, he divides his time between the lab and his own consulting work. He also just began a term on the Advisory Council of the Institute of Nuclear Power Operations.

Home for the Hendries is Bellport, N.Y., a small town on the southern

coast of Long Island. Wife Elaine is a partner in a successful public relations firm, Hendrie & Pendzik. Their two daughters, Susan and Barbara, are out of school and working—Susan as a consultant on energy controller systems for a large industrial firm in Milan, Italy, and Barbara as public information officer for Oxfam America, an international disaster relief organization. Sailing remains the family's favorite recreational activity, although there has been little time for it the past few years.

At the ANS helm

Hendrie has always been a strong believer in the importance and function of professional societies. In addition to ANS, he is a fellow of the American Society of Mechanical Engineers; has memberships in the Institute of Electrical and Electronics Engineers, the American Physical Society, and the American Concrete Institute; is a member of the National Society of Professional Engineers, registered in New York and California; and was elected to the National Academy of Engineering in 1976.

At ANS, he served on the editorial advisory board for *Nuclear Technology* from 1967–77, and as a member of the Board of Directors in 1976–77.

As for his goals as ANS president, Hendrie sees several areas where he feels emphasis is needed in the coming year. None of these is new or radical, he cautions: "In many ways, they're a continuation from the past, but I think they are vitally important for the society."

- Continue the membership drive. "We are now in the third year of the membership drive started by Manning Muntzing," he says, "and we've made progress. I think it ought to continue to be a goal for ANS presidents for several years." Hendrie feels that ANS must not only recruit new members, but must also work to keep the members already on the rolls. A third area of membership focus involves the student members. "We need to encourage good people to come into the field," he says. "In part, it's a matter of the natural self-renewal of the society and its membership. It has a broader context, too, in the sense that this industry is probably going to have a people shortage. So, I think it's an important thing for us to do, both for the society's sake and from the standpoint of the health of the field in general."
- Public information and public education. The society must continue to assert its authority and right to speak as a factual voice on nuclear matters, Hendrie feels. He notes that while the work by the U.S. Committee for Energy Awareness is good on a national level, it is equally important that we reach such specialized audiences as high school science teachers. "It seems to me," he says, "that the society ought to concentrate its public information and public education efforts on the grass-roots levels. It's where we probably work best, and I think we have an opportunity to go back to industry and get some improved support for this type of program."
- More responsiveness to the assorted needs of the membership. "We have to recognize—we all know it but it occasionally drifts from mind—that the society membership is composed of people in a large number of disciplines," Hendrie points out. "And we need to keep in mind that our members are associated with a wide variety of institutions—government, the national labs, industrial labs, architect-engineering firms, reactor manufacturers, service organizations, to name just a few." He feels that the society can best respond to the many varied needs of the membership through the professional divisions and technical groups and through the ANS local sections as well.
- Focus on key issues in the nuclear field. The essential nature of a professional society, Hendrie feels, is that it is a communication means—it is the avenue by which professionals talk to each other. Such intrasociety communication can be used to focus attention on what he feels are some of the key issues facing the nuclear industry today—including nuclear power plant construction costs, waste disposal, and fusion. "We need to generate discussion of the problems," he says, "let the ideas flow out from that into government, private institutions, laboratories, and become, in a real sense, a catalyst of action that deals with these issues."
- Maintain the high specific standards of the society's refereed publications and continue to work to improve the technical quality of the meeting papers.
- Maintain the fiscal stability of the society.

"So," Hendrie concludes, "that amounts to a handful of principal directions. I'm not proposing in any sense to lead the society off in some radical new direction; these are, for the most part, the sorts of directions that the society has already been following. I think we've had sensible leadership in the past, and that means that the direction the society has moved, the goals recent presidents have had, are very much the sorts of directions and goals that I have."—*Nancy Zacha Godlewski*