

ISSUES AND EVENTS

Lane Leaves White House for Rice University

With just two days left in his job as science adviser to President Clinton, Neal Lane was in his fourth-floor office in the Old Executive Office Building on 18 January, taking care of the seemingly endless details involved in shutting things down.

He was eager to head to his new job teaching science and technology policy at Rice University in Houston, and perhaps even visiting colleagues in their laboratories and working on real physics problems. It had been a long time, almost a decade, since he left Rice and came to Washington.

"I've missed the students, and I've missed being close to the research labs, so that when somebody makes a new discovery I can see it in real time," Lane said in the midst of packing up his office.

Lane had a long career teaching physics before shifting to science policy issues and government work. He began as an assistant professor of physics at Rice in 1966, then became a full professor of physics, space physics, and astronomy at the school in 1972. From 1984 to 1986, he served as chancellor of the University of Colorado, then returned to Rice as a physics professor and provost.

For the past 2½ years, he served as President Clinton's science adviser and as director of the White House Office of Science and Technology Policy (OSTP). Prior to that, Lane spent five years as the director of the National Science Foundation.

During his time at OSTP, Lane earned a reputation for being an unusually effective advocate for science among policy-makers, especially within the White House. "Neal actually figured out how to communicate with the West Wing and the president's chief advisers," a long-time congressional staff member said. "And they listened to him because he made an effort to become more adept politically . . . and suddenly you had the White House chief of staff actually talking to the science adviser. And you had the economic council actually talking to the science adviser. He did that through his own personality, which is a good one. He's a nice guy."

In an interview with PHYSICS TODAY just before he left Washington, Lane talked about a range of subjects, from the morale problems at the

Federal science spending is on an upward trajectory and should track overall economic growth, Lane says.

national defense labs to Clinton's personal interest in science.

PT *During the past two years science budgets generally have increased. What do you attribute that to?*

LANE It's really true that this [Clinton] administration, for 8 years in a row, has proposed increasing public research and development investments. And the reason was the recognition that what we get out of R&D—the knowledge and the technologies—are critically important to our economy, our environment, the health of our people, and national security.



NEAL LANE

Despite the need to get hold of the budget early in the administration and turn the red ink into black ink, it's still the case that the president and vice president kept science and technology a high priority. So now the total federal R&D budget exceeds \$90 billion, an increase of 9% over last year, and the civilian share is now over half of the total R&D budget. And we have a much better-balanced portfolio, recognizing that you can't just pick one area of science or engineering and decide that's where we need to put all our money. You never quite know where the major discoveries are

going to be made.

PT *Are you optimistic that R&D spending will continue to increase?*

LANE I see us on a new trajectory, so this is not just about one year's budget. Support needs to go up. We need to at least track with overall economic growth, not year by year, but over time, because everything we do is increasingly technologically based. We need to ensure that we're making the investments now that are going to pay off in 10 or 20 years, because that's the history of our investment in R&D.

PT *In a speech two years ago you said you were pleased by the growth of private sector investment in R&D. Do you see that continuing, and what are the differences in the roles of the government and the private sector in funding research?*

LANE Growth in private sector investment was made possible by a business climate developed in this [Clinton] administration that encouraged and enabled companies to invest more in R&D. The R&D they invested in was mainly focused on more applied needs and product development, so it did not mean that the federal government could step back. In fact, companies continue to emphasize the importance of the federal role because that is where the basic research gets done. You're not going to see the private sector shifting its support to basic science and engineering, for reasons we all understand.

PT *In a speech at a National Academies forum on national security last October, you criticized the congressional reaction to allegations of Chinese espionage and lax security at the nuclear weapons laboratories as "ready, fire, aim." You described a "siege mentality" at Los Alamos and Sandia in particular. Is that still true?*

LANE I was deeply troubled by the morale situation at the labs and there is still a great challenge there. We cannot expect to do the job we need to do in the laboratories, and that of course is stockpile stewardship, without truly outstanding people. We have outstanding scientists in the laboratories right now and we have to have the next generation of those people. I remain concerned about that.

[Former] Energy Secretary Bill Richardson has, from the outset, spo-

ken strongly in support of the excellence of the science at the laboratories and ensuring that the secrets that need to be protected, are protected. So the issue is improving security, but doing it in such a way that does not hurt the quality of the science. I believe that [Richardson] tried very hard to do that, but this is still a tough challenge and we're not there yet.

PT *Given the high costs and increasingly international nature of big science projects, what does the US government, and Congress in particular, do to be a credible, reliable partner in such projects?*

LANE We've seen very positive developments in the last 8 years on that. Let me pick out the LHC [Large Hadron Collider at CERN] as an example. I think we really did cross a threshold with the LHC. I mean DOE

and NSF . . . committed quite substantial amounts of money in support of the accelerator, the detector, and the experiments at CERN. I think that's a sign of maturity on the part of our US political process. We have to be a real partner [in international projects]. We have to be a credible partner and honor our commitments. I just point to the LHC as a recent example of us moving in the right direction. But we'll continue to be challenged to figure out how to do that.

PT *During your tenure at OSTP you urged scientists to leave their labs occasionally and interact with the media or give talks about science to school and community groups. In other words, put a more human face on science. How has that message been received in the science community?*

LANE I think for the most part, all

of our colleagues understand that it is important. Everybody isn't equally good at doing some of these sorts of things, but for God's sake, even if you don't want to do it, support those people who are good at it. Support those who want to give a little of their time communicating through the media, or giving talks in the schools and communities. It's a long-term issue that we all have to focus on.

PT *Is Bill Clinton personally interested in science?*

LANE Science and technology are the areas in which I've spent most of my time talking with him, and he loves the stuff. Sometimes he sends me an article he's read in a magazine and he marks it up and makes some comment on it when we're together. He's a very intellectually curious and enormously intelligent person. **JIM DAWSON**

Electron Holography Lab Pushes Resolution Limit

Driving through the bucolic countryside just east of Dresden in the former East German state of Saxony, you wouldn't expect to see one of the world's top labs for advancing electron microscopy. And you don't, because it's off the road, concealed by trees the Soviets planted when they used the same patch of land for a radar spy station before German reunification.

The isolation of the spot, atop a hill called Triebenberg, plus a specialized building design, will improve resolu-

By minimizing electromagnetic, mechanical, and other disturbances, physicists in Dresden, Germany, aim to perfect electron holography and popularize its use in semiconductor, superconductor, and other materials studies.

tion in transmission electron holography, says Hannes Lichte, the new lab's director. Over the past 70 years, he adds, "electron microscopes have been developed to achieve brilliant performance down to atomic dimensions. But often they cannot be exploited because the disturbance level of the lab is too high."

It was no different at the Technical University of Dresden, Lichte discovered soon after moving there a few years ago from Tübingen in western Germany. "There were vibrations from streetcars and noise from the building."

So Lichte and retired physicist Dietrich Schulze tested some 30 sites on the outskirts of town. At the former radar station, says Lichte, "we found an AC stray field of about 1–2 nanotesla. This is a factor of a hundred better than is usually found in such labs. The site of Triebenberg is simply fantastic."

The ultimate site

Scientists always strive to reduce vibrations and other disturbances to their electron microscopes. But the Triebenberg lab, which was completed just over a year ago, is the first to have been designed from the outset to minimize electromagnetic, mechanical, acoustic, and thermal interference. Power supplies, air conditioning, heating and cooling units, and other utilities are structurally isolated from the electron microscopes. "Lichte has recognized that the building is an integral part of the whole instrument," says Abbas Ourmazd, director of the Institute for Semiconductor Physics in Frankfurt on the Oder, Germany. "The time is ripe. Instruments and algorithms only recently got to the point that they are limited by buildings. Now he is truly limited by the aberrations of the instruments."

Lichte aims to take electron holography to the limits of resolution, to define those limits, and to refine the method so that it becomes attractive for widespread use. Analogous to optical holography,

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THE TRIEBENBERG electron holography lab (above), 13 km east of Dresden, Germany, is designed to minimize disturbances to microscopes, which are housed in the rightmost part of the building. Offices and utilities are on the left, with a separate foundation. Triebenberg lab founders (right) Hannes Lichte (left) and Dietrich Schulze (center), with the lab's technical director, Michael Lehmann.

