NAE Strives to Re-Engineer Itself

The new leaders of the National Academy of Engineering face problems over its internal workings and its relationship to the National Academy of Sciences

The ouster of Harold Liebowitz as president of the National Academy of Engineering (NAE) last week marks the end of the most tumultuous year in the institute's 32-year history. But many of the underlying causes of the commotion remain. The organization is still deeply divided over two issues that Liebowitz highlighted during his short and stormy tenure—the need for internal reforms, and NAE's relations with its older and wealthier spouse, the National Academy of Sciences (NAS) (*Science*, 22 December 1995, p. 1915). How the new leadership—a new council chair and interim president take office this month—deals with those issues could have profound consequences for the way the academies advise the government on technical and scientific matters.

"Liebowitz tapped into a sense of unease that I don't think has gone away [with his departure]," says Albert Wheelon, an NAE member and retired aerospace executive. At the heart of that unhappiness is a perception among some that the organization is run by a cabal with connections to a few prominent engineering institutions, that the rank and file is being ignored, and that engineers are playing second fiddle to scientists within the academy complex. These feelings helped Liebowitz win a close race last year against the governing council's anointed candidate, Association of American Universities President Cornelius Pings (*Science*, 21 April 1995, p. 359).

While members of the NAE council scoff at charges of elitism, they acknowledge the need for broader participation and plan to address the issue with a series of modest reforms similar to those proposed by Liebowitz during his campaign. The reforms include changing the nomination process for various NAE offices to give rank-and-file members a greater say, involving more members in academy studies, and giving the NAE a higher profile in joint NAE-NAS business.

Much of the responsibility for charting a new course for the beleaguered organization will fall to Alan Lovelace, who on 1 July became NAE chair, and to William Wulf, a University of Virginia computer scientist whom the council named interim president until new elections are held. Lovelace, a retired General Dynamics executive from California who received the backing of Liebowitz, insists he has an open mind on NAE's future. "I am not adopting Liebowitz's agenda or anyone's agenda," he told *Science*. "Somehow we need to find out from the members where they want the academy to go."

That will not be easy. Members voted overwhelmingly to remove Liebowitz after the council charged that he had alienated staff, damaged relations with the NAS, and failed to carry out a clear agenda (*Science*, 28 June, p. 1863). Although many say they still believe in the need for reform, it is not clear how far they want to go. "Something needs to be done to find out how the members really feel," says Bruce Alberts, NAS president and an ex officio NAE council member. "Now only the squeaky wheels are being heard." A small but vocal group of NAE members has pledged to keep the volume turned up. "You can't put the genie back in the bottle," says Rustum Roy, an engineering professor at Pennsylvania State University. "You need major structural reform. You can't go back to the status quo."

ACADEMIES AT A GLANCE

	NAS	NAE	IOM
Year created	1863	1964	1970
Number of members, 1995	1760	1841	519
Size of endowment, 1995*	$127 million	$34 million	$26 million
Number of members on NRC panels, 1995	418	395	335
Percent of NRC panelists who are academy members	6.3%	6.0%	5.1%

* Jointly funded activities are not included. SOURCE: ANNUAL REPORTS, NAS, NAE, IOM

No honeymoon

The status quo was established after bitter battles during the academy's early years. NAE was set up in 1964 under the same charter, passed by Congress and signed by President Abraham Lincoln, that created the NAS a century earlier to provide independent advice to the government. [The Institute of Medicine (IOM) was formed in 1970 as the NAS's health policy arm.] But tensions quickly mounted over NAE's relationship with the NAS and the National Research Council (NRC), which was formed in 1916 to carry out the academy's bread-and-butter work, its scientific studies. The struggle centered on how to divide up government work.

Those tensions nearly led to an early separation between the NAE and NAS before they agreed in 1973 to make the NRC their joint operating arm. They drew up a statement of principles saying that neither academy will compete against the NRC for its major source of funding—the federal government—in commissioning studies. The statement also named the NAS president as NRC chair, in recognition of the science academy's larger membership and bigger endowment at the time, with the NAE president acting as vice chair. The science academy continues to hold the financial reins: The more than 1100 NRC employees, for example, receive paychecks from the NAS.

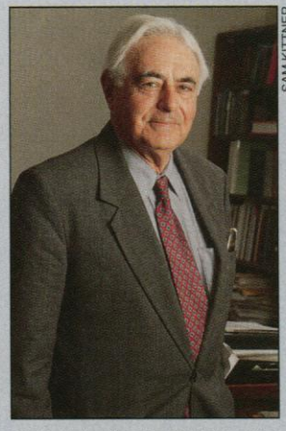
Alberts does not deny that the NAS exerts a greater influence over the NRC's activities. "It isn't a completely equal relationship," he says. "The NAS has the financial responsibility. We have more responsibility and more pain if something goes wrong." And Morris Tanenbaum, NAE vice president, agrees that "from a legal point of view, there is no question that the NAS has final authority." But he maintains that in most aspects the two academies enjoy a "full and equal partnership." As proof, both he and Alberts note that roughly equal numbers of NAE and NAS members participate in NRC studies, for example. But many NAE members nevertheless say they feel like second-class citizens, citing instances in which NRC panels focusing on engineering issues are chaired by scientists.

Another bone of contention between the NAE and NRC is the comparative absence of elderly engineers—a significant portion of the NAE membership—on the panels that carry out NRC studies. "Older people don't get called on to do much, and Liebowitz was catering to that," one retired NAE member says. NRC officials acknowledge that they consciously limit the number of older white males on study panels to increase racial and gender diversity—and

Will There Be *Liebowitz* v. *NAE*?

When the governing council of the National Academy of Engineering (NAE) met 26 June, the mood was somber rather than celebratory. Two days before, NAE members had voted to support the council in its attempt to oust NAE President Harold Liebowitz, ending a 1-year tenure marked by bitter recriminations on both sides. But the ballot results were overshadowed by fears that the George Washington University professor will sue the NAE, which could prove costly and generate unwanted publicity.

Liebowitz did not respond to repeated phone calls from *Science*, but NAE sources say that the council's fears are based on Liebowitz's statements and his track record of litigation. "He's been threatening lawsuits and then saying, 'Make me an offer,'" says Simon Ostrach, the NAE home secretary. Other academy members and former colleagues confirm that Liebowitz has discussed legal action. "I don't think anybody discounts the possibility of a suit," says Alan Lovelace, who this week became chair of the NAE council. The council is now considering whether to pay Liebowitz all or a portion of his $250,000-a-year salary for the remaining 5 years of his term. Such a move would likely anger many of those members who voted him out. But the alternative, say Ostrach and others, may be a long and costly legal battle.



SAM KITTNER

Suited for battle? Liebowitz is no stranger to litigation.

Liebowitz is a veteran of such battles. One pitted him against George Washington University, where he is on a leave of absence. In 1991 he sued the university over what one university official called "contractual arrangements" when he stepped down as dean of engineering. The university eventually reached a private settlement with Liebowitz that provides him with additional retirement benefits, sources say.

Right now he is embroiled in long-standing litigation over the ownership of 14 engineering and computer journals published by the Dutch-based Elsevier Inc. Liebowitz claims that his company—the Advanced Engineering Research & Development Corp. (AERDCO)—owns the journals, which were published by Pergamon Press until it was bought by Elsevier. He argues that the publisher has meddled in the appointment of journal editors, a responsibility that he says rests solely with him. In 1991 Liebowitz asked the U.S. District Court of southern New York for $20 million in compensation for breach of his contract, which dates back to 1967 and is now worth more than $200,000 annually.

Elsevier representatives maintain that their contract with Liebowitz makes him an editor and consultant, but not owner, of the journals. "What is really going on in this suit is that Liebowitz is trying to get retirement at full salary forever, although none of the claims in his case say that," says Jim Dabney, Elsevier's lawyer on the case. "The guy failed to negotiate for a retirement pension."

Last month Elsevier filed a countersuit in the case. The publisher's suit alleges that Liebowitz failed to conduct proper peer review between 1992 and 1995 for the two journals that he edits, *Engineering Fracture Mechanics* and *Computers and Structures*, and that he hid the fact from Elsevier. (Liebowitz oversees the other journals, but does not act as editor.) It also alleges that Liebowitz overstepped the boundaries of his contract in 1991 by naming himself and his son, Jay Liebowitz, as co-editors of another Elsevier journal, *Computers and Education*. The company overruled that move.

Elsevier claims that the number of citations from one of the journals, *Engineering Fracture Mechanics*, has dropped substantially in the past few years. Some readers believe that the quality of the journal has declined. "There is a perception, widely felt, that there's been very little quality control in that journal for a long time," says John Hutchinson, a Harvard University mechanical engineer. "And there's a perception that [peer review] is not well handled."

In addition to its complaints about the management of the journals, the company claims that Liebowitz and AERDCO misled the U.S. Patents and Trademarks Office in seeking trademarks for the journals by claiming his company, rather than Pergamon, controlled the journals. It charges that Liebowitz tried to defraud Elsevier in post and wire transmissions through a "pattern of racketeering," including mail fraud, wire fraud, and money laundering.

Liebowitz's lawyers at the New York law firm Kenyon & Kenyon deny that Liebowitz is trying to win a pension, and they reject the other charges made by Elsevier. "This is the fourth complaint that they've answered, and they've never until now alleged any of this," says attorney Howard Shire.

He says the charges of fraud are unfounded, and that Liebowitz's contract with Elsevier does not specify that the company owns the journals. Shire adds that Liebowitz did not mislead the patent office and was not required to inform it about the litigation. As to journal content, Shire says the written agreements do not require Liebowitz to conduct peer review. He adds that he has not looked into the validity of the claim about declining citations. Shire says he intends to file a response to the countersuit by 15 July.

Both sides have rejected proposals for an out-of-court settlement, despite a plea last September from the court. They are now scheduled to meet with the judge later this month to discuss a jury trial, which could begin within a year. In the meantime, NAE councilors are hoping that they can resolve their own disagreements with Liebowitz outside a courtroom. **–A.L.**

that it's an unfortunate fact that the vast majority of NAE members fit that category. They add that the NRC strives to find people who are still active in their fields and in touch with the latest technological developments. And both NRC and NAE officials complain that the media too often gives credit for studies to the NAS, rather than explaining the cooperative relationship between the two academies.

All this rankles, particularly now that the NAE is slightly larger than the NAS and has its own substantial endowment (see table). The resentment is fueled by a feeling among some NAE members that the NRC's work is too costly, bureaucratic, and of questionable value. "There are grave misgivings about the NRC's purpose," says one NAE member. "I voted for Liebowitz sight unseen because I wondered what the hell its purpose is." Alberts dismisses such talk as outdated criticism, while Tanenbaum blames ignorance: "Many of the members know very little about the NRC and the way it is run."

Nevertheless, Liebowitz struck a chord in his campaign when he called for a stronger

and more independent NAE that would not be afraid to compete with the research council. "That is why he was elected—Liebowitz threatened the NRC," says John Gilman, a materials scientist at the University of California, Los Angeles.

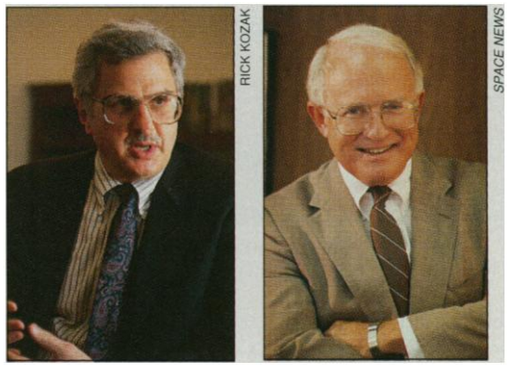
Once in power, Liebowitz alarmed the NAS and NRC staffs by pursuing government funding for studies that the NAE would carry out on its own. He tried, for example, to get the Defense Department to fund an NAE study on aging aircraft—work that traditionally would be done by the NRC. That conduct, says one academy source, "is tantamount to treason," and it sparked a crisis. "It was very disturbing to everybody," recalls Alberts. "People at the NRC and the agencies were totally confused and bewildered." In reaction, the NRC council in February stripped Liebowitz of his authority as vice chair (*Science*, 1 March, p. 1222). Liebowitz failed to respond to numerous phone messages from *Science* for comment on this and other matters discussed in this story.

Liebowitz's removal from the NRC demonstrates NAE's secondary role in the relationship, say some critics of the current system, and they want changes ranging from a rotating NRC chairmanship to complete independence. "You know how much a vice presidency is worth," scoffs Gilman. He and others argue that the NRC chair should be held jointly by the two academy presidents, or rotated on a regular basis. Alberts flatly rejects that notion. "An alternating presidency is untenable," he says. "Our members won't vote for it—it just can't happen."

In that case, says Penn State's Roy, NAE should opt for independence and seek its own charter from Congress. Roy says he has discussed the possibility with Representative William Clinger (R–PA), who chairs the House Government and Reform Oversight Committee. "It can be done," Roy says. "If we can't get a rotating chairman, then we'll get a new charter." Alberts, not surprisingly, thinks it would be a mistake for NAE to secede and begin offering independent advice. "Our predecessors looked into that," he says. "We don't want two policy organizations that conduct studies, [one] only about engineering and [one] only about science. Almost everything we do involves both." And Lovelace adds that such a radical move is unrealistic. "I don't see secession from the union in the cards," he says.

But it is not just a handful of rabble-rousers who question the NAE-NAS relationship. Last summer a panel of 16 well-known NAE members issued a report on NAE's future that called for talks between the two organizations to work out a more equitable arrangement. "We felt there was not necessarily a gain in pursuing [a separate charter], but that there is a lack of symmetry between the two academies," says Pings, who co-chaired the so-called Fourth Decade panel. "One model would be to alternate the NRC chairmanship," he added. Lovelace also says he wants to focus attention on the issue of a more equitable sharing of power. "Relationships need maintenance, and this might not be a bad time" to take stock, he notes.

NAE may not be in a strong position to negotiate, however. One longtime NAE member sympathetic to reform says that the controversy involving Liebowitz has reinforced a feeling among some scientists that the NAE lacks the stature of the NAS and has trouble managing itself. "You don't take on an opponent when you're struggling on the floor and he's standing over you," he says.



Teaming up. NAS's Alberts and NAE's Lovelace look for ways to ease tensions between the two academies.

Old boys at work

The members' complaints aren't limited to the NAS and NRC; there's plenty of unhappiness about the NAE's own management. Liebowitz tapped that resentment when he cast Pings as an example of the perceived old-boy network that dominates the NAE council and, because a council-appointed team currently nominates all candidates, its offices. In particular, some members grouse that a small group tied to the Massachusetts Institute of Technology (MIT) and AT&T have a disproportionate amount of power.

"That is just nonsense," says Simon Ostrach, NAE home secretary and an engineering professor at Case Western Reserve University in Cleveland. In addition to citing his own Midwestern background, Ostrach notes that there is plenty of turnover on the council: Nine of its dozen members are elected every 3 years on a staggered basis, and no one can serve for more than 6 years. He's even done a geographic analysis that at least partially backs up his assertion: From 1983 to 1995, he found, the percentage of council members from the South, Midwest, and Mountain states exceeded their share of the total membership, while the Pacific states held fewer seats than their due. Ostrach did, however, find that the Northeast accounted for 38% of the councilors but only 25% of the membership.

Ostrach also found that 20% of NAE councilors had MIT connections—a figure some might point to as proof of a cabal but which Ostrach says merely reflects MIT's importance in the field. "It *is* a bunch of good old boys—but that's the way the world works," says one senior NAE member with close ties to the council. "But I don't know of any particular group that is being shortchanged as a result."

Still, the council will consider changing the way NAE officers are nominated to give greater voice to the academy's 12 geographic sections. Instead of relying on the council to make nominations, each section would choose one industry representative and one academic to act as members of the nominating committee, according to Ostrach. The goal would be a better geographical and a professional balance among NAE officers. Recruiting women and minorities remains a challenge, however, says Tanenbaum, given their relative scarcity in the overall membership.

Cultural divide

Whatever the fate of these internal and external reforms, what is certain to remain when the dust from the Liebowitz saga settles is the old rivalry between scientists and engineers. Many civil engineers, for example, are critical of scientists for their ivory tower approach to the world, says Ostrach. Alberts adds that "some of our older members say that doing engineering is not doing intelligent work, that it doesn't deserve the same status as science." Tanenbaum, who has extensive experience in both worlds, agrees that the cultural divide is deep. "Engineers say scientists daydream, while scientists say engineers just fool around with something until it works, but don't understand why."

It is the engineers, however, who feel underappreciated by a public that reveres Einstein and uses the term rocket scientist to describe designers of launch vehicles. "There is a lack of self-confidence in the engineering community," Roy says with disgust. Overcoming that feeling appears to be the driving force in the struggle to revitalize the NAE's internal workings and to rethink relations with the science academy.

Tanenbaum and Alberts insist, however, that neither community can go it alone. They say the rapid pace of today's technological developments inevitably will require even stronger links between the two. For NAE and NAS officials, the challenge is to engineer a more cordial marriage—or at least avoid an ugly divorce.

–Andrew Lawler