

sition the board had "diverted itself" from serious discussion of alternative management schemes.

When Buchsbaum at the start of the meeting described the work of the study panel, he said that the group, in view of limited time and other factors, had decided to concentrate on the question of whether the university was "willing and able" to manage the labs, rather than on broader issues, such as those of nuclear weapons policy or whether having two weapons labs was desirable.

The narrowness of the scope of the panel's study drew particular criticism from Thomas Cochran of the Natural Resources Defense Council. Cochran

and others asserted that matters such as the quality of management of the labs were germane to the question of the UC-labs relationship. Cochran also expressed reservations about the process by which the study group had been formed and operated. He was joined by Margaret Kivelson of the Space Science Center of the University of California, Los Angeles, who raised the question of how the board should make choices of subjects to be considered.

Joining those who said they would sign at the meeting were John Gibbons, director of the Energy Center at the University of Tennessee, who, during the week the meeting was held, was named new

director of the congressional Office of Science and Technology Policy. The others were Holdren, Kivelson, and Dennis Hayes of the Worldwatch Institute. Other board members who were not present but say they will sign are Cochran and David Pimentel of Cornell.

Whatever the impact of the minority views, it seems clear that the major significance of the study group report is that an officially sanctioned panel made up of members favorable to nuclear weapons research says that the sands may be running out on UC management of the weapons labs and that DOE better be prepared to make other arrangements.

—JOHN WALSH

## Academy Elections Raise Question of Quirkiness

*But quirks may be hiccups of complex machine*

Do the right people get elected to the National Academy of Sciences? Does merit invariably triumph over the natural human instinct for clubbiness? If so, why do some scientists receive the accolade bestowed by a faraway committee in Stockholm before their own compatriots see fit to elect them to the National Academy, a signal but less exclusive honor? Why does the Academy sometimes separate those who by other standards are of equal merit?

This year's intake to the Academy raises several such problems. The Nobel physics prize went last year to Arno Penzias and Robert W. Wilson, both of Bell Telephone Laboratories. But Penzias was elected to the Academy in 1975, Wilson only this year. Winners of last year's Nobel prize for medicine included Daniel Nathans and Hamilton O. Smith, both of Johns Hopkins; Nathans made the Academy this year; Smith has not yet done so. A third separation in this year's intake, though one that does not involve the Nobel system, concerns the husband and wife team of Gertrude and Werner Henle of the Children's Hospital of Philadelphia. Werner Henle was elected in 1975; Gertrude Henle was voted in only this year.

What do these differences tell about the efficiency of the Academy's merit-recognition procedure? With the doubtless temporary exception of the case of Smith, they tend in fact to corroborate Academy officials' claim of how their system works, which is that justice is done in the end, even though it is impos-

sible to elect all worthy candidates at once. On the other hand the discrepancies indicate a certain measure of arbitrariness in the system.

The Nobel prize is a rarer honor than Academy membership and is usually given some 10 years or so after the discovery being recognized. Both are reasons for expecting that Nobel laureates would be members of the Academy first. In the 15 or so cases since 1950 when an American scientist has won the Nobel prize first, the Academy has subsequently elected him, as if agreeing with the Nobel people's judgment.

On the other hand the discrepancies between the two merit-recognition systems do not necessarily mean that the Academy is in error. The systems are viewed as following different criteria. "The prize is given for a single achievement whereas Academy membership is rather more for a body of work," observes Penzias. Academy members value their independence of judgment, and stress that neither system is free of error. "The Academy doesn't want to be pushed by the Nobel prize: Academy people want to do their own thing," says NAS Home Secretary David Goddard, the official responsible for overseeing elections: "We don't believe the Nobel prize people are totally free of error, just as we know we are not free of error."

Both Nathans and Wilson had been nominated for Academy membership before their Nobel prizes were announced last October, and so might well have been elected without the prize. The

Academy may perhaps have been late in electing them, but then it does not claim punctuality.

More difficult to assess is the Academy's arbitrary-seeming separation of individuals of apparently equal standing. The Henles are widely perceived as equal colleagues. "The Henles have worked together as a husband and wife team, in the same lab, on the same projects. It would be very difficult to separate their contributions on any of their projects," says Evelyn Linette, a research associate of Werner Henle. On what basis did the Academy put them asunder?

"I think it was a mistake not to elect her when we elected her husband," says Goddard. He notes that it is "only in recent years that the Academy has been generous in electing women." Last year the husband and wife team of Elizabeth and James Miller was elected simultaneously.

The separation of the Henles may have arisen in part from the complexity of the Academy's election procedures. The Academy's members are grouped in five major classes subdivided into a total of 23 disciplinary sections. The chief, though not the only, route to election is to be nominated and receive at least two thirds of a section's votes. The class committees choose a selection of names from the sections under them but work under a stiff quota: this year the medical sciences class, with three sections, could offer only eight candidates to the final ballot, and the physical and mathematical sciences, comprising six sections, on-



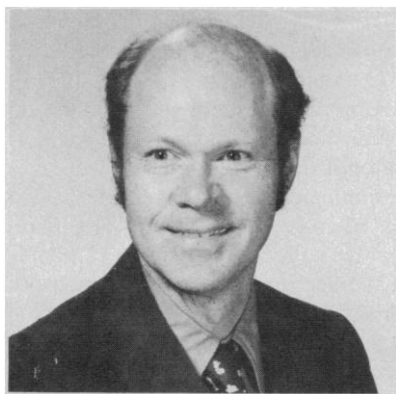
*Daniel Nathans  
Nobel then NAS*



*Hamilton O. Smith  
Nobel, NAS to come*



*Arno Penzias  
NAS then Nobel*



*Robert W. Wilson  
Nobel then NAS*

ly 18. The final vote is taken by those who attend the Academy's spring meeting. Members tend to be guided by the number of votes a candidate has received from his own section, and a difference of one or two sectional votes can influence the final balloting.

Werner Henle was nominated through the medical genetics, hematology, and oncology section. Chairman of the section is Maxwell Wintrobe of the University of Utah College of Medicine. Wintrobe does not remember if both Henles were nominated, but even if they were, election of one and not the other is "a matter of where the chips fall in the election process, and there is no implication that one is better than the other," he says. In his view it is not caprice, but chance, that might separate two equally worthy candidates. The bottleneck imposed by the class quota is so severe that just a vote can make a difference. "This is a game, unfortunately, and those who are not elected have to be philosophical. This whole process is imperfect but those of us involved in making selections are very mindful of that," Wintrobe remarks.

Another separation which the Academy made and then remedied in this year's elections was that between Penzias and Wilson. Their case is different from the Henles: though they have been longtime colleagues, and collaborated in the microwave background discovery recognized by the Nobel committee, their careers have not been identical. Nonetheless, a certain element of arbitrariness might be discerned in the manner of their election. The chairman of the academy's astronomy section is Leo Goldberg of the Kitt Peak National Observatory. "When you have 48 astronomers in the section," says Goldberg, "of many different ages from 35 to 80, and in many different subdisciplines, it is not to be expected that all of them will be familiar with research in all the different subfields of astronomy. It was just a matter of perception by individual members of the section that Penzias was the leader of the team. When Penzias became a member of the Academy, he made it very plain to the members of the section that the collaboration had been a very equal one and that Wilson was just as qualified as him to be a member of the Academy."

Usually only 10 to 12 astronomers come to the spring meeting, Goldberg says, which makes for difficulties in communicating. If it were up to a select committee of astronomers to make members, Wilson would doubtless have been elected earlier: "It's easier for a small committee to make decisions than to get a

name through the complicated system of the Academy." But the system has its purposes, Goldberg believes: "In the long run I think there is more justice done by having the general membership vote because if election were left to small committees there might be a bias toward particular subfields and a danger of people promoting their friends and colleagues."

Penzias confirms that he considers Wilson an equal partner in the discovery of the microwave background and that "Very often you try to get your colleague elected." But, he says, "I am sure I never told anybody it was a mistake to elect me first. Since I have a different career from Wilson's it is not unreasonable that our individual work might be judged differently."

Nathans and Smith, honored by the Nobel committee for their separate findings on DNA restriction enzymes, have not worked together as a team.

Perhaps the most critical stage in election to the Academy is the first, that of being considered for nomination. Three out of four section chairmen queried said they make particular efforts to see that all worthy candidates in their field are at least considered.

Sections sometimes ignore those whose work falls between conventional disciplines. They have also been known to discriminate against radical innovators in their own field. The Academy has various devices for bypassing the sections in getting a candidate's name on the ballot. This year a group of members from different sections successfully proposed Harvey A. Itano, of the University of California, San Diego, who did important work on sickle cell hemoglobin.

Many members of the Academy still come from the East and West Coast academic complexes, leaving those from other regions with the occasional feeling that it is harder for their colleagues to get it. "I tend to give a little preference to someone from off the East and West Coast," says Wintrobe.

The cases of the Henles and of Penzias and Wilson suggest the presence of a certain random element in the Academy's electoral machine. Randomness, however, is different from bias. Members involved in the election process are keenly aware of the pitfalls but believe that the election process is as good as an inherently imperfect system can be. "If we can't build up a distinguished body of members we are not fit to be advisers to the government and we should be closed. The system is not perfect but everyone in the Academy knows it," says Goddard.—NICHOLAS WADE