solve this problem is unclear. It may be, however, that the NSC and Domestic Council will simply retain their own ad hoc systems of science advice and will call on the new adviser only for supplementary help.

Such details remain to be worked out in the legislation. At the moment, there are wide differences between the concept Ford is proposing and bills before the House and Senate science committees, which emphasize the council format. These differences are certainly one reason Ford invited the congressmen in for consultation, and the gesture was plainly appreciated. Senator Moss noted that Ford had said he could have established a science advisory office by executive order, but that he preferred the legislative route and a congressional charter for the job. "In arguing for one science adviser, rather than a council, he particularly stressed that the science adviser would have the authority, the responsibility that he needed," Moss said. Comments on the session were uniformly positive, and no one expressed objections to the Ford plan. Thornton added that he was "impressed that the President apparently had given a good bit of thought to the question" and indicated a "degree of flexibility as to the specifics."

The briefing ended on a conciliatory note, with neither the science committee leadership nor the President indicating rigid adherence to a particular format for the science adviser's office. "From the beginning," noted Representative Olin Teague (D–Tex.), the House committee chairman, "we have said we're not going to try to create a science adviser to the President that he didn't want. We are going to create one he does want and will use."

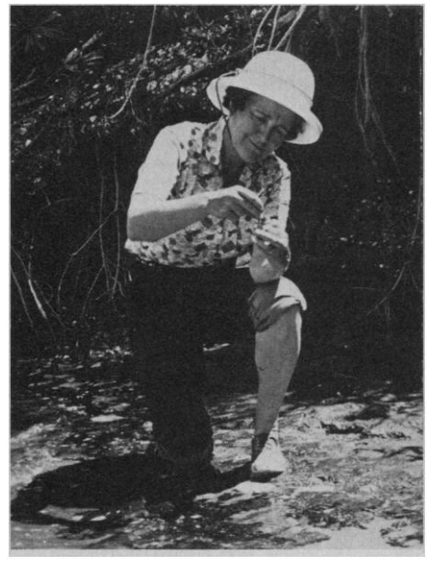
The House Science and Technology Committee has scheduled hearings for 10 June on the Teague-Mosher Science Policy and Organization Act of 1975 (*Science*, 21 March), and the leadoff witness will be Nelson Rockefeller with the Administration's proposal. Committee members see little chance that the House could complete action on a science advisory bill before the August recess, and it could be well into the winter, perhaps early 1976, before a new science adviser actually moves in. In the view of David, Wiesner, Killian, and others, however, *who* moves in is more important that when. For one lesson of the OST decade was that a science adviser is only effective to the extent that the President is willing to listen.—ROBERT GILLETTE

Ruth Patrick: Hard Work Brings Its Own (and Tyler) Reward

Ecologist Ruth Patrick has been fascinated with the flora and fauna of streams ever since she was a tadpole, so to speak, in Topeka, Kansas. She recalls that when she was small, and had been good, she would be unleashed from her nurse and allowed to climb up on her father to peer through his treasured little microscope. Every Sunday Ruth and her sister would go on field trips with their father to woods and streams to collect and classify specimens. Father Frank Patrick was a lawyer, but his heart was with diatoms, the family of microscopic algae renowned for their beauty and ecological significance. It was his dearest wish that his daughters grow up to be scientists.

Ruth Patrick, who this year won the world's largest prize for scientific achievement—the $150,000 John and Alice Tyler Ecology Award—has abundantly fulfilled her father's dream. Now chairman of the board of The Academy of Natural Sciences in Philadelphia, with which she has been associated since 1937, Patrick labored in relative obscurity for a long time. But within the past half-dozen or so years she has been much sought after both as an ecologist and an ecologist who is a woman. Since few people match this description, she has had her hands full.

Patrick's life has been remarkable in that it has followed without deviation the course she set in childhood. Her stolid values and her belief in God, in hard work, and in service to others have apparently left no room for doubt or despair to impede her way. Such a life is conceivable for someone born, as she was, in 1907—more recent times seem unlikely spawning grounds for such consistency.



Ruth Patrick

Ruth Patrick attended Coker College in South Carolina. Her mother had wanted her to go to an eastern woman's college where a proper social milieu seemed better assured than at the state university—Patrick chose Coker because she didn't want to go to Vassar or Smith and therefore refused to take college board entrance examinations. Summers were spent being "broadened" at such places as Cold Spring Harbor, where she met her husband, Charles Hodge IV of Philadelphia. Patrick, who retained her maiden name in honor of her father who underwrote her education, proceeded to the University of Virginia where she obtained her doctorate. She had a habit of being first in her class in scientific research. A perennial optimist, she found it somewhat annoying not to be able to land a good job immediately upon graduation in the midst of the Depression, but she eventually wound up teaching at the Pennsylvania School of Horticulture. She developed an immediate association with the Philadelphia Academy, and in 1945 went there full time.

The woman and the institution seem to have been well suited to each other. The academy, formed in 1812, is the oldest institution in the Western Hemisphere that has been engaged in continuous studies of plants and animals, according to Patrick. Its staff, now numbering around 150, has a sound reputation for studies of stream ecology. "I deeply loved what it stood for," says Patrick, and being part of its heritage was very important to her. The academy, for its part, pretty much let her write her own ticket. In 1947 she established and became director of the academy's limnology department.

She became chairman of the board in

Tyler Ecology Award

The John and Alice Tyler Ecology Award, received this year by Ruth Patrick, is administered from a $5 million fund set up by the Tylers in 1973 with Pepperdine University in California. Tyler, who died the same year at the age of 85, was born in a sod hut in South Dakota when it was still Indian territory. He was co-founder, in the 1920's, of the Farmers Insurance Group. The Tylers were long involved in philanthropic activities, including Indian education, and were great lovers of the outdoors. Pepperdine was the couple's "favorite school," and it has already benefited from their generosity in the form of the $4 million John and Alice Tyler Campus Center.

According to press releases, the award was designed to "honor the person or group that has made the greatest contribution to ecology in the past ten years. Following the original award, each recipient will be honored for their work during the preceding year." Last year the first Tyler winners were G. Evelyn Hutchinson, professor emeritus of zoology at Yale; Arie Haagen-Smit of the California Institute of Technology, discoverer of the chemical nature of smog; and Maurice Frederick Strong, who heads the United Nations Environment Program.

At $150,000, the Tyler Award is the most munificent one in science, outstripping Nobel prizes which last year carried with them $137,500. Indeed, the Tyler Award is designed to compete in prestige with the Nobel awards, or as one press release puts it, "Nobel Prize, step aside!"—C.H.

1973. At present the academy's scientific reputation rests largely on the shoulders of Ruth Patrick. Indeed, some believe that without her and her fund-raising efforts it might have ceased to exist. Its chronic financial problems are reflected in the cosy, musty 1950's aura of the place. Nonetheless it houses a respectable museum with fine dioramas of wild animals, a colossal shell collection, its own dinosaur, and the world's best sample of a fulgurite—a huge branch of annealed sand created when lightning struck a desert. Its latest acquisition is a hummingbird display made possible by Crawford H. Greenewalt, amateur ornithologist and former chairman of the board of E. I. du Pont de Nemours & Co. Patrick's personal friendships with people such as Greenewalt have no doubt made a big difference for the academy.

Ruth Patrick has always impressed people wherever she went, but it is only since the late 1960's that the world started showering its honors in earnest. She was invited into the National Academy of Sciences (NAS) in 1970. She believes recognition might have come sooner if she were a man, but her areas of interest have not until recently had high visibility. Patrick got involved with water pollution long before anyone took it seriously. "Ruth, you're too bright—don't go into pollution," she remembers being advised by one distinguished scientist. "Pioneer" is a word frequently used to describe her. She was out in the field doing consulting work for industry while her fellow scientists were sticking close to their benches. John Cairns of Virginia Polytechnic Institute, who worked with her for 18 years, says: "She has pioneered in the ability to communicate the usefulness of biological assessment to industrial people using their own terms." (That is, she told them cleanliness pays.)

Patrick has kept her feet planted firmly in both basic and applied science. A major opus is a two part work, *Diatoms of the United States*, that she has produced with Charles Reimer of the academy. The first volume appeared in 1966; the second will come out shortly. She also invented a diatometer, a simple device to measure diatom communities in streams; the nature of these populations reflects the nature of pollution. Another landmark accomplishment was a study in 1948 of the Conestoga Basin in Pennsylvania. This study represented a major methodological advance in that the research team studied a diversity of species, rather than a single type of organism, in order to analyze the effects of pollution.

Although she has a history of participation on a bewildering array of boards and advisory committees, Patrick says that at present the really important things are few: the governor's science advisory committee in Pennsylvania, the NAS Committee on Science and Public Policy, three advisory panels for the Environmental Protection Agency, and two boards of directors. One is the Pennsylvania Power and Light Company; the other is du Pont, to whose board she was recently elected as the first woman and first environmentalist. She has made it clear that this job will not mean just sitting around in Wilmington for 3 hours a month—she plans to visit as many plants as possible to inspect their dumping habits. She is also worried about Freon (a du Pont product), and its effects on the earth's ozone layer. On top of all this, Patrick is a full professor at the University of Pennsylvania where at any given time she is teaching one or two courses.

This combination of pursuits exactly reflects her philosophy: "My great theme in life is that academia, government, and industry have got to work closely on all the big problems in the world." She thinks that prejudice within the academic community toward scientists who lend their talents to industry is a terrible problem. "Unless academics and industry get together there will not be many bright young people trained in the future. We have to develop an atmosphere where the industrialist trusts the scientist and the scientist trusts the industrialist. You've *got* to trust people."

Nonetheless, there have been those who felt uncomfortable with Patrick's associations with private industry. The most outspoken is Eugene Cronin of the University of Maryland, who is unsatisfied with the water quality surveys the academy conducted for Maryland utility companies. "Pat," as he calls her, "is a remarkably persuasive and attractive person. [But] she has flirted with, and yielded to pressures to allow her abilities to be used to come down on the side of 'No one's proved damage; therefore there isn't any.' " (Patrick for her part numbers Cronin among the "biopoliticians" she's known.) Gordon J. F. MacDonald, former member of the Council on Environmental Quality, observes that some academy studies have been hurried for lack of time, and that some people have suspected that financial pressures rather than a real feeling for the problem have led to some industry associations. But Patrick's reputation for independence make the latter motivation seem more likely.

Integrity is everything to Ruth Patrick, and she seems to radiate it. Her eyes are steady, like pale blue stones. She has strong teeth and there is a faintly bulldog-like cast to her features that reflects a lifetime of tenacity. Although she makes plenty of speeches, she is not one of those scientists with a desire or flair for publicity. A certain rocklike quality puts one in mind of Margaret Mead. But when it comes to making a splash, she says, "I'm just the opposite of Margaret Mead ... I've never been a very controversial figure because I've always tried to maintain a very low profile." Back in the 1940's, she hid in the library stacks at the academy for

a whole day to avoid being photographed after she was chosen to head a big limnology research project.

Patrick agrees that scientists perform a service when they stimulate public discussion, but "even the best scientific people will veer from the facts when they get emotionally upset about something." Asked if this comment is relevant to vocal fellow ecologist Barry Commoner, she would only say, "No comment." But she emphasizes that "we're only going to travel forward on pure hard research."

Patrick's favorite kind of scientist is embodied in zoologist G. Evelyn Hutchinson of Yale University, her friend and mentor, who last year was one of three winners of the first annual Tyler award. Hutchinson believes Patrick has done more than any individual—with the exception of Charles Elton of Oxford University—to establish ecology as a full-fledged branch of modern science. He notes that her meticulous work with taxonomy has highlighted the enormous importance, both theoretical and practical, of that discipline.

Patrick cherishes homey pieces of wisdom picked up in childhood. Everyone every day should do something to help humanity. Leave the world a little better than you found it. Always do your very best. She has always worked prodigiously. A former colleague recalls her hopping about on top of laboratory benches to inspect diatoms in the final days of her pregnancy. While other ecologists were huddled in their laboratories, she has gone mucking around in streams and industrial outfalls, belying the opinion of many scientists, she says, that "women couldn't do field work well."

To accomplish what she does, she has learned to make constructive use of bits of time here and there, and, as she says, "I've completely given up the kinds of things most people require in life to carry on my work." Patrick's idea of fun and relaxation is to sit around for a few hours doing diatom taxonomy. Absolutely nothing comes close to competing with science in her interests. She keeps up with *Science* (on whose editorial board she also serves) and other major journals, but "it's a rainy day in Spain that I read the daily newspaper." Up at 6:30 on a typical day, she works for an hour, hits the office at 9, and gets home for dinner with her husband and her son, Charles Hodge V, a 24-year-old medical student. She tries to reserve two evenings a week for "recreation," which likely as not means attending some lecture with her husband, who is professor emeritus of entomology at Temple University. There was never any nonsense about youthful rebellion or generation gap in the Patrick family, and the same seems to hold true for the Hodges. Charles V was given the same microscope at age 7 that Frank Patrick gave his daughter at the same age. But, she says, her son was never pressured into a scientific career. The secret of good parenting, believes Patrick, is to instill values that no one with any sense would rebel against, and not to worry about the superficials. "The trouble with most parents," she muses, "is that they pick."

What does Ruth Patrick think the future holds for society in general? Not being a gloom and doom type, nor given to groundless speculation, she will only say that "we have to work harder than ever before." She thinks it would help, however, if people bore fewer children and adopted less wasteful life-styles.

As for how she will dispose of the $150,000 ecology prize, she plans to put together an enormous book about rivers, collecting all available knowledge and filling in the gaps, if necessary, with more field work (she has already personally studied between 800 and 900 river sections throughout the world). "I do not believe money should be spent on personal frivolity," she says, a comment which from her is in no way self-sacrificing.

—CONSTANCE HOLDEN

NSF and Its Critics in Congress: New Pressure on Peer Review

The National Science Foundation's problems with critics in Congress have been compounded by a demand from Representative John B. Conlan (R–Ariz.) for peer review documents. Conlan's action raises the sensitive issue of confidentiality of peer review proceedings; this has broad implications for the system on which most federal agencies rely to enlist the aid of outside experts to evaluate research proposals.

Conlan charged in a press release on 12 May that NSF Director H. Guyford Stever "had ignored several written requests for NSF documents used in awarding more than $2 million for a disputed high school social studies curriculum called Individualized Science Instructional System [ISIS]."

Conlan said that NSF officials have "deliberately edited and misrepresented grant proposal evaluations from outside academic reviewers in order to push through funding of a particular science course." In a letter, Conlan told Stever that he should comply with the request for the documents or resign.

Conlan had requested both the evaluations contributed by outside experts and the names of the reviewers. Stever has declined to provide either, citing the long-standing NSF policy of preserving the confidentiality of comments on grant proposals and the identity of reviewers. He has been strongly backed by the National Science Board (NSB), the policy-making body of NSF. The NSB unanimously reaffirmed the policy in a resolution passed at its 25th annual board meeting on 16 May.

Conlan's charges also elicited a letter from Senator Edward M. Kennedy (D–Mass.) expressing the view that the charges "present a serious threat to the integrity of the Foundation and, if not dealt with fully and promptly, may result in irreparable damage to the Foundation's quarter of a century of excellence." Kennedy, who chairs the Senate subcommittee which handles NSF's authorizing legislation, asked the agency for "full response to these allegations, and all documentation which bears any relevance to them."

The Kennedy letter is being interpreted by informed observers as motivated by a wish to clear up the matter through a public airing of the relevant information. In his letter to Stever he writes, "let me assure you of my belief that the Foundation has diligently adhered to the very highest standards of scientific excellence in the selection of proposals for support, and in monitoring the performance of recipients of federal funds. I have been impressed with your own personal commitment to these high standards, and my own trust in you and in the leadership of the Foundation remains as strong as ever."

The ISIS project which drew Conlan's ire is an interdisciplinary science curriculum for high school students. In his state-