Setting U.S. environmental policy for 1996

Even in Washington, D.C. – referred to locally as "inside the Beltway" – U.S. science policy sometimes seems to bubble up out of nowhere. But last week, the setting of priorities for research in natural resources and the environment became both more public and more systematic when the executive branch committee charged with formulating that policy bared its documents to outsiders.

Not more than a mile from the White House, about 200 academic and government scientists, industry representatives, and members of nongovernment organizations offered their views last week about what was important in air quality, biodiversity, global change, resource use, natural disaster reduction, water resources, marine and coastal environments, risk assessment, toxic substances, and other issues.

The 3-day forum signaled the further integration of interested parties into a policy-making process that now extends well beyond the Beltway.

During his presidency, George Bush set a precedent by creating an interagency committee to deal with the question of global change (SN: 2/3/90, p.71). He set up similar panels for other key science and technology issues (SN: 2/8/92, p.86). In November 1993, as part of the new administration's plan to reinvent government, Bill Clinton increased the status of science and technology by creating the cabinet-level National Science and Technology Council.

As one of the nine committees making up this council, the Committee on the Environment and Natural Resources must create funding priorities for the fiscal 1996 federal budget. It chose to do this by asking outside "stakeholders" to comment on draft policies. In this way, researchers can directly help shape the committee's recommendations, due this fall, says Eileen Shea of the National Oceanic and Atmospheric Administration.

Somewhat surprisingly, agreement emerged not only between the committee and these stakeholders, but also among the different panels charged with evaluating the various issues, says D. James Baker, who cochairs the committee.

For example, among planners for the global change program, "there is real recognition from inside and outside that vulnerability is an important priority that needs to be addressed more strongly," he explains. They call for researchers not only to document global change, but also to assess and predict how people, other organisms, and ecosystems will react to that change.

Some of the consensus reflects a continuation of trends already set in motion. As has been the case in federal science funding for the past 4 years, the stakeholders and the committee stressed the need for interagency coordination and more interdisciplinary research. Almost every panel called for better compilation and improved reliability of data, as well as for easier access to the vast quantities of existing data, be it on species, weather, chemical toxicity, or demographics.

These reviewers argued for greater incorporation of socioeconomic considerations in both research and policies, for more holistic approaches to problems and solutions, and for a greater investment in research addressing all aspects – both long- and short-term – of an environmental issue.

"There's clearly an interest that science doesn't just address today's problems," Shea says. More and more, research needs to anticipate changes, "so we're not only reacting to a crisis," she adds.

There was an almost universal cry for "end-to-end," integrated assessments: programs that follow up on policy decisions with evaluations of the effects of changes on both the environment and society.

"It's a means for integrating science and policy," says Robert T. Watson, Baker's cochair. "I think it's a powerful tool."

– E. Pennisi

Hominids: Down-to-earth or up a tree?

For more than 15 years, the way in which Lucy and other members of *Australopithecus afarensis,* the earliest known species in the human evolutionary family, moved about has sparked considerable debate.

One side argues that these hominids, which lived from about 4 million to 3 million years ago, preferred walking and spent only a small amount of time in the trees. New African fossil finds support this view (SN: 11/20/93, p.324).

However, evidence presented at the American Association of Physical Anthropologists' annual meeting in Denver last week depicted Lucy's species and many subsequent hominids as creatures that balanced walking with substantial tree climbing.

"Australopithecines are more similar to chimpanzees than to modern humans in their inner-ear anatomy," asserts C. Fred Spoor of the University of Liverpool in England. "This supports the view that australopithecines combined arboreal and terrestrial movement."

Inner ears like those of modern humans first emerged in *Homo erectus,* Spoor contends. *H. erectus* lived from around 1.8 million to 300,000 years ago.

A "bony labyrinth" houses the inner ear, which contains sense organs for perceiving sound, movement, and spatial orientation.

Spoor and Frans W. Zonneveld, a radiologist at the University of Utrecht, the Netherlands, took computerized tomography (CT) scans of the area around the ear in modern human, chimpanzee, gorilla, and orangutan skulls. Image enlargement made it possible to visualize each specimen's bony labyrinth.

Although humans and apes share many aspects of inner-ear anatomy, humans display markedly larger semicircular canals relative to body weight, Spoor holds. These structures support a balanced, upright stance, he says.

CT analysis of 35 hominid fossils with preserved bony labyrinths finds humanlike semicircular canal proportions only in *H. erectus,* according to Spoor. The fossil sample also includes specimens attributed to *H. habilis* and three australopithecine species – excluding *A. afarensis.* No fossils of Lucy's kind bearing the bony labyrinth had been found at the time of the study.

However, this structure apparently remains on an *A. afarensis* skull found in Ethiopia (SN: 4/2/94, p.212), says Donald C. Johanson of the Institute of Human Origins in Berkeley, Calif. CT analysis of that fossil may prove difficult, since it must remain in Ethiopia.

"Spoor has applied modern technology to hominid fossils in a new way," Johanson remarks. "There appear to be distinctions between hominid groups based on the bony labyrinth, but this needs further study."

Another study presented in Denver, directed by Randall L. Susman of the State University of New York at Stony Brook, suggests that Lucy lifted her legs rather awkwardly while walking. "It must have looked like a modern human walking at the beach while wearing a pair of flippers," Susman contends.

Susman videotaped two men and two women walking at various speeds while barefoot, wearing fitted shoes, or wearing shoes that boosted foot length by 30 percent relative to leg length. Researchers estimate that Lucy's proportional foot length was 30 percent greater than that of the average human.

Larger feet elicit greater bending at hip and knee joints, resulting in a high-stepping gait, Susman asserts.

Lucy's leg appears well adapted to her foot length, Johanson responds, making it unlikely that people – whose legs are designed to go with a different foot length – can simulate her stride. With tongue half in cheek, he calls Susman's study "the clown-shoe hypothesis."

– B. Bower