SPACE SCIENCE

Building a Bridge Between The Big Bang and Biology

In the segmented world of science, it is rare for cosmologists, planetary scientists, and microbiologists to find themselves in the same room. But last week researchers from a host of disciplines gathered in Washington to build a case for protecting and expanding work on the origins of the universe, planetary systems, and life itself. Their goal is to convince the Clinton Administration that further cuts to NASA's science budget will endanger efforts to understand how life emerged.

The opportunity will come at a December symposium to be convened by Vice President Al Gore in the wake of a recent rash of dramatic findings, including evidence of planets circling other stars and possible fossil microbes on meteorites from Mars. The conference—which will be followed in January by a space summit between White House and congressional leaders—will give space scientists their best chance ever to escape from a severe funding squeeze. "Our productivity has been going up, but our budget has been going down," says Wes Huntress, NASA space science chief, in reviewing how the agency's budget has fallen behind the pace of discovery. Jack Gibbons, the president's science adviser, calls it a "dilemma [that] is coming to a head."

To prepare for that event, Gibbons asked NASA, which in turn asked the National Research Council (NRC), to assemble researchers in fields ranging from astrophysics to geology and biochemistry to review NASA's scientific portfolio. Last week, while meeting for 3 days, the 40 participants hatched the idea of focusing on the concept of origins—of the galaxies, stars, planets, and life—as the thread tying together work in a range of disciplines. The suggestion for a way to connect the big bang with current molecular biology even comes with a whimsical name sure to catch a politician's eye: the yellow brick road to life.

"This is something that 10 years ago would have been more in the realm of philosophy," says David Black, a planetary scientist who heads the Lunar and Planetary Institute in Houston. Black argues that the findings from NASA's Cosmic Background Explorer, the Hubble Space Telescope, and the Martian meteorites provide researchers with a chance to connect the Copernican view that revolutionized astronomy with Darwin's theory that did the same for biology. "And this is not just a marketing thing," he adds. "It makes scientific sense." The group, which will submit its report later this month, cannot make firm recommendations about specific programs or budgets, and workshop leaders say they have no plans for large and expensive new initiatives. But they will suggest areas that deserve greater attention.

The new focus on origins, however, may be bad news for a few fields. For example, work on the interstellar medium would be a lower priority, because it has an apparently small effect on the development of galaxies, stars, and planets. "I sensed a lot of tension in the room over this," said one workshop participant. And not everyone agrees that the recent discoveries are fueling a new era of science. "I don't see anything new here," says Norman Pace, a biochemist at the University of California, Berkeley, who attended the first day of the workshop. Pace sees the linkup with biology as a way for space scientists to attract political support. "I don't blame them," he adds. "If they can sell the program that way, then great."

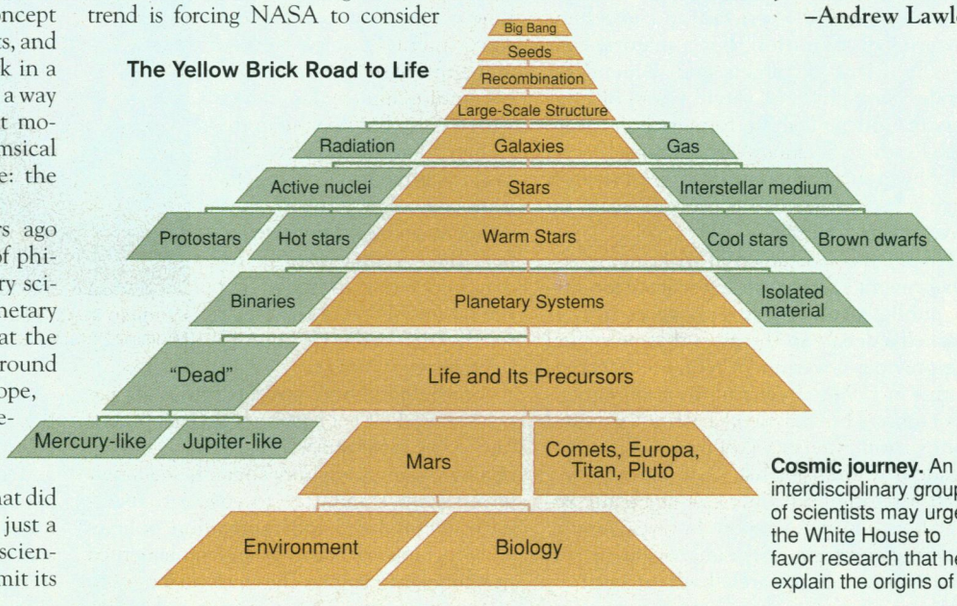
For the most part, participants agreed that NASA's current priorities for space science are in tune with the search for origins: "There is a remarkable consensus that NASA's program is roughly the right one," says Claude Canizares, workshop co-chair and a Massachusetts Institute of Technology x-ray astronomer. And the researchers thought that space science's 12% share of the agency's overall $13.7 billion budget—which has declined while funding for Earth, life, and microgravity sciences has risen or remained stable—should not fall any further even if NASA's overall budget decreases. That trend is forcing NASA to consider shutting down instruments on board some spacecraft, such as the Compton Gamma Ray Observatory and the Extreme Ultraviolet Explorer, and to depend more heavily on international cooperation.

Part of the problem is the cyclical nature of space science projects. In the past, Huntress's office could use any excess from one year to gear up for the next mission. But that so-called wedge funding has disappeared as NASA copes with a shrinking budget. "If we can keep the wedge, we can go somewhere," says Anneila Sargent, a California Institute of Technology astronomer and co-chair of the NRC workshop. "But if funding slips, then this whole thrust will go poof."

Presenting a solid front to politicians is not easy for scientists used to defending their own turf. "Each of us has a stake in each other's fields," says Eugene Parker, a University of Chicago physicist. "But we tend to go full blast for our own specialty." Astrophysicist John Bahcall of the Institute for Advanced Study in Princeton, New Jersey, told the workshop that researchers have little choice but to hang together. "We can judge for ourselves what is most interesting and important in science, or else someone less qualified will do it."

For now, at least, the politicians say they are willing to listen. The unusual opportunity to make a case directly to Gore, and through him to the January space summit, flows from the August announcement of evidence of past life on Mars. "It certainly was the catalyst for action," says Richard DalBello, who handles space matters at Gibbons's Office of Science and Technology Policy. And Gore's December symposium gives the White House a chance to mute Republican complaints that the Democratic administration has favored Earth observation programs at the expense of space science. The challenge for scientists is to make the most of this unusual conjunction of events.

–Andrew Lawler



Cosmic journey. An interdisciplinary group of scientists may urge the White House to favor research that helps explain the origins of life.