TEKTITE II

A scientific emphasis

Last year's Tektite I program (SN: 2/15/69, p. 161) demonstrated that divers can live and work safely under the sea for extended periods. The general success of that civilian effort, in which four divers stayed 50 feet below Great Lameshur Bay off St. John Island in Virgin Island National Park for 60 days, helped soothe some of the pains caused by the troubles and tragedies of the Navy's ill-fated Sealab III experiment.

Tektite II (SN: 11/8, p. 423) is now set to begin on April 1, using the same site and same habitat at the same level as its predecessor. But there many of the similarities end. Tektite II intends to put not four but 62 divers beneath the sea in a series of 17 missions extending over seven months. There are to be no endurance tests or depth-record attempts. The planners are confident that man is now ready, or at least about ready, to move to the next stage of undersea activity: the use of a manned habitat capability primarily to do scientific work on the marine environment.

Forty of the 62 divers are scientists selected on the basis of their research credentials, although they must also have had diving experience.

Lead responsibility for Tektite II has shifted to the Department of the Interior from the Navy, which managed the successful Tektite I, and participation has been broadened. Contributing are the National Aeronautics and Space Administration, National Science Foundation, Smithsonian Institution, Virgin Islands Government, the Navy, Coast Guard, Department of Health, Education and Welfare and the General Electric Co., supplier of the main habitat.

One mission will have an all-female crew. The women, also selected for their scientific qualifications, are Dr. Sylvia Earle Mead of Harvard University, Dr. Renate True of Tulane University and, tentatively, Mrs. Ann Hartline and Alina N. Szmant, graduate students at Scripps Institution of Oceanography. They will perform fish, plant and ecological studies for 14 days in July and will receive logistical assistance from Margaret Ann Lucas, a graduate student in ocean engineering at the University of Delaware.

One engineer has been added to each mission's four-member scientific team to free the scientists from habitat-operation duties.

The final mission of the Tektite II program, in October, will have an all-foreign crew, whose members have not been named. Proposals have been received from scientists in Japan, Britain, France, Australia, Canada and West Germany. In addition, the Soviet Union has been invited to send surface observers at any time during the seven months.

The first mission will last 14 days. Richard W. Curry and Roger J. Dexter, graduate students in chemical oceanography at the University of Miami, will analyze the daily fluctuation in acidity, oxygen concentration and calcium-magnesium concentration. Dr. Alan J. Beardsley and William L. High of the Bureau of Commercial Fisheries will attempt to determine essentially how and why fish react to certain traps placed on the bottom.

Seven missions at 100 feet will attempt to show that a nitrogen-oxygen breathing mixture can be used at that greater depth. The tests will take place in a smaller, two-man habitat.

TECHNOLOGY ASSESSMENT

Feeling their way

New technologies trigger profound complex and often unforseen results in society and the environment. The automobile is a unique device for mass transportation; it is also the source of much air pollution and of far-reaching social effects, not all of them desirable. DDT reduced the horrors of pestilence and it allowed great increases in food production. But it also damages organisms other than those it was intended to kill.

This is all wisdom in retrospect; the need for assessing emerging technologies in advance so as to recognize and anticipate possible harmful effects has been evident for several years (SN: 12/24/66, p. 532).

The National Science Foundation is asking for $28 million in fiscal 1971 for three programs, each of which plans to support some aspect of technology assessment research. And NSF plans soon to begin issuing $6 million in fiscal 1970 funds for its new Interdisciplinary Research Relevant to the Problems of Society (IRPOS) (SN: 2/7, p. 144), one of the three aimed at least in part at evaluating emerging technology.

There appears, then, to be a determination to implement a technology assessment program. But just how is still unclear.

"The waters are still muddy," concedes Harry Piccariello, head of NSF's Office of Planning and Policy. He adds that a total systems analysis approach will have to evolve at its own rate. "We have to walk before we can fly. We'll look at smaller problems, first. When we have enough smaller studies, we can assemble them into larger and more complex models."

So far, practically all proposals for technology assessment emphasize interdisciplinary, approaches as broad as possible (SN: 1/10, p. 44) which will try to come as close as possible to matching specialists, experiments and models to the cross-disciplinary complexity of the systems being studied. But techniques are still embryonic, and NSF is not yet clear about which of its offices will do what, or whether a new Office of Technology Assessment will have to be created.

To some extent, the Science Foundation planners are looking on existing efforts as possible models to follow.

One such potential prototype is a Maryland Academy of Sciences committee study of nuclear power plants now under construction at Calvert Cliffs on Chesapeake Bay. It illustrates at least the complexity of an actual exercise in technology assessment; the mission of the committee was not so much to provide parameters for the soon-to-be-completed plants as it was to plan the research that will be needed before more plants are built. The current plants will in effect be ecological pilot operations. One of the recommendations of the committee was to delay future plants until a Maryland state board has enough data from the earlier plants to extrapolate the effects of additional ones.

The Maryland effort was an interdisciplinary one. Chairman Dr. O. M. Phillips of Johns Hopkins University is an oceanographer; the team also included a biologist, an ecologist, a microbiologist and a nuclear physicist.

Dr. Joel A. Snow, IRPOS chief, sees benefit in NSF's lack of clear-cut guidelines for technology assessment. He is convinced the only preconceived criteria should be for the kind of interdisciplinary diversity represented by the Maryland effort.

"Some want a Rosetta Stone which will unravel all problems," Dr. Snow comments. "There isn't any. Each problem will have to be considered on its own merits, and procedures designed for it alone." Any methodology set up in advance would necessarily be inflexible hogwash, he insists.

But he adds that procedures that apply to a certain kind of problem one place may carry over to a similar problem somewhere else. Matching up data and assessment techniques for nuclear power plants on temperate Chesapeake Bay and subtropical Biscayne Bay (SN: 2/28, p. 219) will turn up common threads and interchangeable procedures.

Nevertheless there are limits. Snow doubts that there will ever be any great degree of comparability between studies