verbs of nouns and adjectives, asking why NASA didn't see that JPL "rigidize" its system.

Until the troubles with Ranger 5 arose, JPL operated under a "matrix" organization composed of seven technical-discipline divisions with a project organization superimposed.

Under a matrix form, project personnel are drawn as required from various divisions. These people remain responsible to their own department heads.

In management jargon, "projectizing" an organization means that people working on a program like Ranger are brought under the line authority of a project manager and cannot, for example, be transferred elsewhere without the manager's concurrence.

After Ranger 5 fizzled, Project Ranger was partially projectized by JPL but, as was noted in the hearings, it took more than a year and a half to accomplish the job of centralizing power and responsibility.

The leisureliness of the process was traceable in large part to a mutuality clause in the present contract which required agreement by both parties not only on what jobs JPL should take—"tasking," in the aerospace vernacular—but also on how the work should be done.

The new contract, though it has not been signed and the terms have not been made public, will give NASA much greater leverage on these decisions.

Other changes have been made as well. A separate quality-assurance and quality-control section has been set up within the Ranger group, and the number of persons engaged in this pursuit has been increased sharply; for example, accounting and record-keeping procedures have been tightened up. And a NASA "resident office" has been set up at JPL with a staff large enough and competent enough to give NASA headquarters a supervisory conduit to the laboratory.

All these things bring management at JPL closer to the "industrial type" which Webb talked about in his press conference and which seems to be admired by the subcommittee.

In delaying the signing of the new contract, perhaps until near the end of the year, NASA seems to be allowing time to see how these changes and others are implemented and also to permit further negotiation of differences with JPL and Caltech officials.

In the past year or so JPL also has ceased to be NASA's sole agent and prime contractor in unmanned lunar exploration, in part because JPL-Caltech officials were unwilling to see the lab undertake the heavy design and production tasks which proposed new projects would have required. The Surveyor spacecraft, which is scheduled to make soft landings on the moon beginning in 1965, will be built by Hughes Aircraft as prime contractor, with JPL as technical manager. Last week NASA named the Boeing Corporation of Seattle as prime contractor for Lunar Orbiter spacecraft which are expected to fly photo missions around the moon, starting in 1966. Technical management of the orbiter program has been moved to NASA's Langley research center in Virginia. JPL will continue as prime contractor for Ranger and Mariner programs and, presumably, for the Mars probes. The new programs, incidentally, will permit NASA to compare performances on the basis of differing contractual arrangements.

The space committees are certain to keep close watch on Ranger and JPL. But, while the congressional committees are becoming increasingly well informed and inquisitive, the consequences of their investigations and recommendations are unclear.

Well before creation of the oversight committee, Karth's subcommittee on space sciences and applications held investigatory hearings on the Project Anna geodetic satellite system, the Project Advent military communications satellite program, and the Centaur launch vehicle development programs, all of which were experiencing difficulties.

In the case of Centaur, more money and better management moved the project out of the doldrums, but the action appears to have been initiated by NASA. Congressional criticism on these three projects seems to have produced no direct results, although public discussion of faults and expressions of congressional displeasure generally have a stimulating effect on agencies.

Congress has, until now at least, exercised influence on the space program primarily by setting limits on total funds available to NASA. The fact that authority on space-agency matters is divided between House and Senate and between authorization and appropriations committees in each house contributes to Congress's difficulty in influencing specific NASA programs. And the space agency itself, by and large, has made the decisions on which programs to cut and which to fatten.

The latest round of hearings should make clear to NASA that in the future the House committee will be interested not only in the management of the program for the unmanned exploration of space but in results. For the present, the encounter with the censorious Congressmen may actually strengthen NASA's hand in the attempt to reach a *modus vivendi* with JPL which will, in Webb's words, "preserve the values and get the job done."—JOHN WALSH

David M. Bonner Dies

David M. Bonner, chairman of the department of biology and a key member of the original faculty group at the new University of California, San Diego, died 6 May at the age of 47.

At San Diego Bonner had organized a department with special competence and interest in cell biology. He was author of the book *Heredity* and winner, in 1952, of the Eli Lilly medal for achievement in biology. He was a member of the National Academy of Sciences and served on the editorial board of *Science*.

Bonner did his undergraduate work at the University of Utah and earned his doctorate at California Institute of Technology in 1940. He taught and did research at Stanford and served in the Office of Scientific Research and Development during World War II, before going to Yale in 1946.

Announcements

A program leading to the master's degree in **mathematics** has been established at the University of Puerto Rico's Rio Piedras campus. Participants must have had undergraduate work in advanced calculus, modern algebra, and 2 years of German, French, or Russian. Information on the program is available from Francisco Carriga, chairman of the mathematics department, University of Puerto Rico, Rio Piedras, P.R.

The Endocrinology Study Section of the U.S. Public Health Service is seeking expressions of interest in a conference on the "usefulness of currently available **gas chromatographic techniques** for the analysis of steroids in