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

naturally occuring mixtures." The conference is planned for this fall; the date and location will be designated later. The meeting will stress the solution of actual problems, such as those encountered in the isolation and identification of steroids from blood, tissues, and urine. Persons who wish to present papers are invited to submit an abstract of at least 250 words. The program of the meeting will be decided on the basis of information received. (M. M. Graff, Endocrinology Study Section, Division of Research Grants, NIH, Bethesda, Md.)

Meeting Notes

The Congress of **Scientists on Survival** will hold its third annual conference 19–21 June in New York. The program is designed to encourage international cooperation to avoid the danger of nuclear war, and to bring scientists and others together to discuss the world's resources and the possibilities of eliminating poverty and racial conflict as sources of strife. (Scientists on Survival, 101 West 42nd St., New York 36)

The **Soil Conservation** Society of America plans its 19th annual meeting 23–26 August in Jackson, Mississippi. Its theme, "time, space and demand for natural resources," aims at pointing up the problems of resource use and management. (Soil Conservation Society of America, 7515 Northeast Ankeny Rd., Ankeny, Iowa)

Chicago will be the site of the American Vacuum Society's 11th national **vacuum symposium**, 30 September to 2 October. Papers are invited on both theoretical and experimental aspects. Abstracts of 150 words are required, in triplicate. Deadline: *1 July*. (G. H. Bancroft, Bendix-Balzers Vacuum, Inc., 1645 St. Paul St., Rochester, New York 14621)

Courses

A course on **nuclear methods in geochemistry** will be presented at Oak Ridge Institute of Nuclear Studies, Oak Ridge, Tenn., 6–20 October. Lecture and laboratory sessions will be held on trace-element and gross-compounds determinations by activation analysis with slow and fast neutrons in geological samples; absolute dating by various techniques; and techniques and developments in geological problems such as sediment transport, soil and beach erosion, and water balance. (R. T. Overman, Special Training Division, ORINS, P.O. Box 117, Oak Ridge, Tenn. 37831)

A course designed to update the knowledge of practicing **metallurgical engineers** is scheduled at the Polytechnic Institute of Brooklyn, 21–25 September. It is aimed at metallurgists who completed their formal training more than 10 years ago. (G. E. Moore, Continuing Professional Studies, Polytechnic Institute of Brooklyn, 333 Jay St., Brooklyn, N.Y. 11201)

A course in **fermentation technology** is scheduled 6–10 July at M.I.T. Chemists, engineers, and microbiologists with prior training or experience in the field are eligible to attend. (Director, Summer Session, Room 7–103, M.I.T., Cambridge, Mass.)

Publications

The National Heart Institute sponsored a meeting in January during which 15 invited scientists discussed types of research they felt would further the knowledge of relationships between smoking and cardiovascular diseases. The participants' suggestions are contained in a 6-page report, *Research Problems Relating to Smoking and Cardiovascular and Respiratory Disease,* available free of charge from the Collaborative Studies Program, National Heart Institute, NIH, Bethesda, Maryland 20014.

The U.S. Department of Agriculture has issued a revised handbook on **recommended uses for insecticides.** The publication details effective uses for insecticidal chemicals and emphasizes the necessary safety precautions for persons handling them. (*Agriculture Handbook No. 120: Insecticide Recommendations of the Entomology Research Division for the Control of Insects Affecting Crops, Livestock and Households—1964;* Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. $1)

The American Institute of Biological Sciences, in cooperation with AEC, has published the first in a series of three monographs on **radiation biology,** *Radiation, Radioactivity, and Insects,* by R. D. O'Brien and L. S. Wolfe. The book discusses nongenetic effects of radiation, tagging, insect control by irradiation, insects and light, organophosphorous insecticides, chlorinated hydrocarbons, and miscellaneous insecticides. (Available from Academic Press, 111 Fifth Avenue, New York, N.Y. $5.95, cloth; $3.45, paper.) The other monographs of the series, both in press, are: *Radiation, Isotopes and Bone,* by F. C. McLean and A. M. Budy; and *Radiation and Immune Mechanisms,* by W. H. and L. G. Taliaferro and B. N. Jaraslow.

Scientists in the News

The 1964 Vetlesen prize has been awarded to **Arthur Holmes**, former geology and mineralogy professor at the University of Edinburgh, and to **Pentti Eelis Eskola**, professor emeritus of geology and mineralogy at the University of Helsinki. The $25,000 prize, which is presented biennially by the G. Unger Vetlesen Foundation at Columbia University, honors Dr. Holmes for his work in isotope geology in measuring the age of the earth and Dr. Eskola for his application of physical chemistry to the origins of crystalline rocks.

Warren L. Bostick, formerly pathology professor and director of laboratories at the University of California Medical Center, San Francisco, has been named dean of the California College of Medicine, Los Angeles.

Walter J. Kenworthy, associate professor of biology at Brown University, has been appointed professor of biology and dean of the college at Wheaton College, Norton, Mass., effective 15 June.

The Agency for International Development has appointed **Lee M. Howard** to head its world-wide malaria eradication program. He was regional malaria adviser for AID in the Far East.

Matthew S. Meselson, associate professor of molecular biology at Harvard, has been named to receive the 1964 Eli Lilly and Company award in microbiology and immunology, for his work in "developing the technique of density gradient equilibrium centrifugation."

Mildred Cohn, professor of biophysics and physical biochemistry at the University of Pennsylvania, has received a lifetime appointment as career investigator, from the American Heart Association. She is the first woman to receive the award, which provides the investigator's entire salary plus $10,000 a year for laboratory expenses.

Roger J. Thibert, associate chemistry professor at the University of Windsor, Canada, has been appointed associate dean of the school's faculty of arts and science.

Elizabeth C. Crosby, professor emeritus of anatomy at the University of Michigan, has been appointed professor emeritus of anatomy at the University of Alabama Medical Center, effective with the fall term. She will teach comparative anatomy of the nervous system, conduct special lectures in neuroanatomy, and help supervise graduate students in neuroanatomical fields.

Frederick Seitz, president of the National Academy of Sciences, has been elected to the Board of Trustees of the Rockefeller Foundation.

At M.I.T., **Arthur J. Freeman**, leader of the theoretical physics group, has been appointed associate director of the National Magnet Laboratory. **Lawrence Rubin**, formerly of the Raytheon Research Laboratory, has been appointed leader of the instrumentation and operations group.

The American Society of Experimental Pathology award was presented recently to **Frederick Stohlman, Jr.**, director of research and hematology at St. Elizabeth's Hospital, Boston, and associate professor of medicine at Tufts University. He received the $1000 prize for his "contributions to the understanding of the regulation of red blood cell production and of the role played in this process by the hormone, erythropoietin."

The 1964 Stanley R. Dean research award has been presented to **Ralph W. Gerard**, director of special studies and professor of biological sciences at the University of California, Irvine. The $2000 prize is given by the Fund for the Behavioral Sciences "for basic research accomplishment in the behavioral sciences contributing to our understanding of schizophrenia."

The new chairman of the Federation of American Scientists is **Peter K. Bergmann**, chairman of the physics department, Yeshiva University, New York.

Russell Ramon de Alvarez, professor of obstetrics and gynecology at the University of Washington Medical School, Seattle, has been appointed chairman of the obstetrics and gynecology department at Temple University, Philadelphia, Pa., effective 1 July.

Paul A. M. Dirac, Lucasian professor of mathematics at Cambridge University, England, has been named visiting professor of physics for the coming academic year at Yeshiva University.

The U.S. Department of Agriculture has appointed **Willis A. Gortner** director of the human nutrition research division. He has been administrator at the Pineapple Research Institute, Honolulu.

Fritz F. Fuchs, gynecologist-in-chief at the Kommunehospitalet, Copenhagen, Denmark, has been named Given Foundation professor and chairman of the department of obstetrics and gynecology at the Cornell medical school, effective 1 January. He will succeed **R. Gordon Douglas**, who plans to retire this year.

William M. Hart, director of the Eye Research Foundation of Bethesda, Maryland, has been appointed clinical professor of neuro-ophthalmology at the University of Maryland. **Robert H. Peckham**, head of the biophysics department at the Foundation, has been appointed research professor in physiological optics at the university.

The American Astronautical Society has presented the Melbourne W. Boynton award to **Hubertus Strughold**, chief scientist at the Air Force Systems Command's aerospace medicine division, Brooks Air Force Base, Texas. The award is presented annually to a physician who has "performed distinguished research contributing to the safety of aerospace flight."

The new president of the Central Association of Electroencephalographers is **Donald W. Klass**, of the Laboratory of Electroencephalography at the Mayo Clinic.

W. A. de Haas, president of the Netherlands Atoomforum, has been elected president of Foratom, a confederation of atom forums in many of the Western European nations. The organization was established in 1960 to promote peaceful application of atomic energy.

Lawrence B. Hein, formerly with Olin Mathieson Chemical Corporation, has been appointed head of the department of chemistry and chemical engineering at Michigan Technological University.

Roy L. Wooldridge, dean of Northeastern University, Boston, Mass., has been elected president of the recently founded Cooperative Education Association. The organization was begun by representatives of private companies and institutions of higher learning to expand the concept of work/study cooperative education to a larger number of colleges and universities, and to promote public understanding of the program.

A. Baird Hastings, head of the division of metabolic research at Scripps Clinic and Research Foundation, La Jolla, Calif., recently received the American College of Physicians award, the organization's highest recognition. He was cited for "distinguished contributions in science as related to medicine."

Walle J. H. Nauta, professor of medicine at the University of Maryland, has won the $2000 K. H. Lashley award in neurobiology.

Norman Hillberry, senior scientist and former director of Argonne National Laboratory, has been appointed professor of nuclear engineering at the University of Arizona.

Johannes A. G. Rhodin, anatomy professor at New York University's medical school, has been appointed chairman of the department of anatomy at the New York Medical College.

John C. Slater, director of the M.I.T. solid state and molecular physics group, has been appointed graduate research professor of physics and chemistry at the University of Florida, effective 1 September. He will spend 8 months of the year at the University of Florida, and 4 months at M.I.T.