The laboratory has close ties with the Weather Bureau's Research Flight Facility. The Weather Bureau's small but doughty air force has headquarters in Miami, convenient to the hurricanes which its planes also probe, but operates out of Tinker Field, Oklahoma, during the tornado season, which trails off just as the hurricane season begins in earnest in the Caribbean.

The laboratory in its relatively brief history has contributed several refinements to operational radar, which is regarded now as the primary data-gathering tool in the forecasting of severe local storms.

The lab staff is interested in other aspects of tornado research—upper-air sounding, for example—but the staff of 23, with its mix of meteorologists, radar operators, electronics engineers, and technicians, seems to be concentrating on improving weather radar. Especially needed are ways to increase radar's useful range and to reduce the importance of the state of maintenance of a particular radar set and the skill and experience of a particular radar operator—now rather large factors.

In the realm of forecasting, experience seems still to be the great teacher. As House wrote in a journal article in 1962, "The forecast itself will, for some time, continue to be based largely upon empirical relationships and objective techniques devised and developed from experience gained as a consequence of completely objective analyses."

As to the possibility of learning to forestall or dissipate tornadoes, a fairly typical statement came from one meteorologist, who said, "If we find out more about energies in storms, we might be able to apply opposite energies." But that possibility, at this point at least, like the form of the statement, is highly hypothetical.—JOHN WALSH

Announcements

The University of North Carolina at Chapel Hill has established a department of **information science**. The department will offer graduate degree programs and will undertake research in the design and application of automatic information processing systems. Frederick P. Brooks, Jr., is chairman. Information on the instructional and research programs and on opportunities for graduate fellowships and assistantships is available from the department.

The Thomas Alva Edison Foundation last month presented its tenth annual awards for contributions by the mass media to education and service for youth. The **science education awards** were given to the following:

Mutual of Omaha, "Wild Kingdom," best science television program for youth.

University of Michigan Television Center, special citation for educational television.

Columbia Pictures, *World Without Sun*, best science film for youth.

William Bixby, *The Universe of Galileo and Newton*, published by American Heritage, best children's science book.

Kirtley F. Mather, *The Earth Beneath Us*, published by Random House; best science book for youth. [This was reviewed in *Science* **147**, 852 (1965)]

A report entitled "The Integrity of Science" is to appear in the June 1965 issue of *American Scientist*. The report was prepared by the Committee on Science in the Promotion of Human Welfare of the American Association for the Advancement of Science. Membership of the committee during the preparation of the report included Robert B. Brode, T. C. Byerly, Ansley J. Coale, John T. Edsall, Lawrence K. Frank, Margaret Mead, Walter Modell, and Barry Commoner, Chairman (Department of Botany, Washington University, St. Louis, Mo. 63130).

The Humble Oil and Refining Company announced last month that it plans to give its **earth sciences observatory** to the University of Oklahoma. The installation was built in 1961 at Leonard, Okla. (about 27 miles southeast of Tulsa), and includes facilities for simultaneous measurements of local and distant earthquakes, earth tides, earth tilts, geomagnetic field variations, magnetic micro-pulsations, earth current fluctuations, and micro-barometric pulsations. The gift includes all the observatory's sensitive instruments, and all the records compiled there since its opening. The observatory and its facilities are valued at more than $600,000. It will be turned over to the university 1 July.

A cooperative study of the **Gulf Stream**, coordinated by the Coast and Geodetic Survey, will begin in July. Work will be concentrated on a large area of the Gulf Stream from the Florida straits past Cape Hatteras, North Carolina into the North Atlantic. The study, estimated to need a least a year to complete, aims at increasing ability to evaluate the role of the Gulf Stream in weather modification, fisheries utilization, and commerce. Besides the C&GS, participants will include the Weather Bureau, M.I.T., Woods Hole Oceanographic Institution, the University of Rhode Island, Lamont Geological Laboratory of Columbia University, and the University of Miami. Harris B. Stewart, Jr., chief oceanographer of the C&GS, will be the project director.

Meeting Notes

The call for papers has been issued for the 12th **nuclear science** symposium, sponsored by the group on nuclear science of the Institute of Electrical and Electronics Engineers. The meeting, scheduled 18–20 October in San Francisco, will be concerned with nuclear detectors, instruments, and on-line computers for application in high-energy physics research, space power and propulsion development, and power and research reactors operation. Abstracts of 100 to 300 words are required. Deadline: *1 July*. (J. M. Harrer, Argonne National Laboratory, Argonne, Illinois)

The University of Michigan division of biological sciences will hold its 16th annual **biological** symposium, 12–14 July. The title of the meeting is Biological Excitability and Membrane Phenomena. The program will present a discussion on the general problems of tissue excitability and membrane events which play a role in the initiation, maintenance, and propagation of excitation. (L. B. Mellett, Department of Pharmacology, University of Michigan Medical School, Ann Arbor)

The 18th annual conference on **engineering in medicine and biology** is scheduled 10–12 November in Philadelphia. It will be sponsored by the Institute of Electrical and Electronics Engineers, Instrument Society of America, and the American Society of Mechanical Engineers. Papers on all phases of engineering in medicine and biology are invited. Persons who wish to submit a paper should request an "author packet" by 1 July. Deadline for receipt of abstracts: *15 July*. (H. P. Schwan, Electromedical Division, Moore School of Electrical Engineering, University of Pennsylvania, Philadelphia 19104)

The American Institute of Aeronautics and Astronautics will sponsor a conference **on aerothermochemistry of turbulent flows**, 13–15 December in San Diego, California. The subject areas to be covered include the following: fundamentals of transport in simple free turbulent processes for nonreactive or simple reactive systems; interaction between turbulent motion and chemical reactions; theory and experiments on turbulent wakes and jets with chemical reactions; and applications. Papers are invited on these topics, and six unclassified sessions will be held. Extended abstracts of 1000 words are required in quadruplicate. Deadline: *12 July*. (H. Yoshihara, Space Sciences Laboratory, Mail Zone 596–00, General Dynamics/Astronautics, Kearny Villa Road, San Diego, California 92112)

The American Medical Association is accepting applications for attendance at a western hemisphere congress on **nutrition**, 8–11 November in Chicago. Participation will be limited to 1000 persons. The topics to be discussed include characteristics of malnutrition in the infant and preschool child, food control and regulations, nutritional ecology of the infant and preschool child, food protection and toxicology, nutrition in medical and paramedical education, development of food products, nutrition in the practice of medicine, nutrition in public health. Deadline for applications: *1 July*. (Department of Foods and Nutrition, AMA, 535 North Dearborn, Chicago, Illinois 60610)

Wayne State University, Detroit, will present a **positron annihilation** conference 27–29 July. The purpose of the meeting is to discuss the use of positron annihilation as a probe in studies of the condensed state of matter. In addition to invited papers, short reports of recent work are welcomed. Abstracts of 200 words are needed. Deadline for receipt: *18 June*. (A. T. Stewart, Physics Department, University of North Carolina, Chapel Hill)

The second conference on **research program effectiveness** will be held 27–29 July in Washington, sponsored by the Naval Analysis Group and the Mathematical Sciences Division, Office of Naval Research. The objective of the meeting is to "identify high priority opportunities for advancing the theory and practice of research program management through the application of scientific methods." Attendance is limited to invited specialists in the scientific analysis of research processes and in research management. (Secretary, Research Conference Committee, Room 808 Old Post Office Bldg., 12th St. and Pennsylvania Ave., Washington, D.C. 20368)

Courses

The Instrument Society of America will present its second course on **gas chromatography** 23–27 August at Colorado Women's College, Denver. The course aims to provide advanced training in industrial and laboratory applications of the field, for technical people responsible for process and laboratory instrumentation. The $165 fee includes tuition, materials, room, and board. Deadline for registrations: *1 July*. (C. E. Borchers, Graduate Institute of Technology, University of Arkansas, Little Rock)

Applications are being accepted for a course in **electromagnetic measurements and standards**, scheduled 9–20 August in Boulder, Colo. It will be sponsored by the National Bureau of Standards and the University of Colorado. Topics to be covered will include the theory of measurement and errors, review of basic electromagnetic theory, and specification of the fundamental quantities of electromagnetic standards and their operational realization. Emphasis will be on the use of standards to obtain the highest precision. Prerequisites are education equivalent to a bachelor's degree in electrical engineering or engineering physics and a year or more of work experience. The tuition for the course is $200. Deadline for registration: *15 July*. (Bureau of Continuation Education, University Memorial Center, Room 328, University of Colorado, Boulder)

A course in **gas surface interactions** will be offered 6–16 July at Massachusetts Institute of Technology. Emphasis will be on recent experimental and theoretical work on thermal and momentum accommodation coefficients. The program will include lectures, seminar and discussion sessions, and a visit to M.I.T. laboratories where gas surface interaction research is in progress. The course is intended for engineers in the space or radio electronics industry, and for researchers in surface physical chemistry. Tuition is $350. (Office of the Summer Session, Room 7-103, M.I.T., Cambridge 39, Massachusetts)

Colorado State University, Fort Collins, will present its 8th annual institute in **technical and industrial communications**, 6–10 July. The theme of this year's course will be "communication—matrix for the social process." It will include lectures, panel sessions, and workshops, and "problem clinics" for individual counseling on communication problems. The tuition fee is $75, and accommodations, meals, and extracurricular activities will be about $50. The course carries two quarter-system credits. (H. W. Weisman, Colorado State University, Fort Collins 80521)

A workshop in **thermodynamics** will be conducted at M.I.T. 19–30 July. It will concentrate on the fundamental concepts of work, the laws of thermodynamics, temperature, heat, energy, entropy, availability, closed and open systems, and equilibrium. Emphasis will be on free discussion and the solution of problems. (Summer Sessions Office, M.I.T. Bldg. E19-356, Cambridge, Massachusetts 02139)

The Texas A&M Marine Laboratory will present a graduate course in **biology of the mollusca**, 19 July to 27 August. It will deal primarily with living mollusca of the area, emphasizing life histories, systematics, anatomy, physiology, diseases, parasites, and predators. (Director, A&M Marine Laboratory, Texas A&M University, Bldg. 311 Fort Crockett, Galveston, Texas)

The University of Minnesota will offer two courses this summer in **infrared spectroscopy**: techniques, 20–24 July, and chemical interpretation, 26–30 July. The courses are related, but independent, and participants may register for one or both. The lectures will include fundamentals as well as recent developments; discussion seminars will stress advanced topics, and laboratory sessions will also be provided. Enrollment for each course is limited. (Director, Center for Continuation Study, University of Minnesota, Minneapolis 55455)

Boston College will conduct its annual course in modern **industrial spectrography** 19–30 July. The course is designed for chemists and physicists from industry who are interested in

learning techniques of emission spectroscopy for use in analytical work. (J. J. Devlin, S.J., Department of Physics, Boston College, Chestnut Hill, Mass. 02167)

Applications are invited for a **medical teacher training** program 20 September to 29 October at the University of Illinois center for the study of medical education. The course is designed for the examination of "the practical usefulness of contemporary educational science for educational medicine." Seminars and working sessions will be included with emphasis on the process of learning, methods of teaching, and evaluation of students and programs. Deadline for receipt of applications: *1 July*. (T. C. King, University of Illinois College of Medicine, P.O. Box 6998, Chicago)

Publications

The National Aeronautics and Space Administration has published a report containing ten diversified views of **transforming and using space research knowledge**. The 110-page book includes papers delivered last June during a symposium and workshop sponsored by NASA and U.C.L.A. The titles included are: "The NASA program for technology utilization," "Bonding and welding of dissimilar metals," "The usefulness of aerospace management techniques in other sectors of the economy," "Advances in pumping technology and rocket-engine turbopump applications," "Some questions of the economics of technological transformation," "Biochemical engineering conversion employing human waste as a fuel," "Application of space biomedical research to problems of rehabilitation," "Transformation of new knowledge for economic growth," "Glass-fiber-reinforced plastic structures," and "Advanced computer applications." (*Transforming and Using Space Research Knowledge*, NASA-SP-5018, Superintendent of Documents, U.S. Government Printing Office, Washington, D.C 20402; 70 cents)

The Atomic Energy Commission has published its annual report summarizing recent developments made under **AEC-sponsored research programs**. The report, "Fundamental Nuclear Energy Research—1964," is a supplement to the AEC's annual report transmitted to to Congress in January. It covers biology and medicine; physical, chemical, metallurgical, and controlled thermonuclear research; and nuclear reactor development and safety. It also includes short summaries on isotope development research and the management of nuclear wastes. (Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. 299 pages; $2)

The research results of the **X-15 flight program** have been summarized in a semitechnical publication by the National Aeronautics and Space Administration. The 126-page booklet, by NASA's scientific and technical information division, stresses the scientific research achievements of the joint program by NASA, the Air Force, and the Navy. It traces the 10-year history of the X-15 from early hypersonic flight studies by the National Advisory Committee for Aeronautics through the first 120 flights of the three rocket-powered research planes. (Superintendent of Documents, U.S. Government Printing Office, Washington, D.C.; 55¢)

Oklahoma State University recently published a 24-page manual for engineering students on the **uses of the slide rule**. Its purposes are to give a basic review of logarithms, to explain the construction, basis and history of the slide rule, and to analyze and apply the operations performed on the slide rule to basic engineering problems. (*The Slide Rule . . . For Engineering Students*. Publication No. 144; $3. Engineering and Industrial Extension, Oklahoma State University, Stillwater 74075)

Three new pamphlets dealing with various aspects of **radiological health** have been published by the U.S. Public Health Service division of radiological health. Single free copies of each are available from the Public Inquiries Branch, U.S. Public Health Service, Washington, D.C. 20201. The pamphlets are:

X-Ray Equipment Survey in Polk County, Florida, September 1961–August 1963. (PHS Publication No. 999-RH-8). A field study on human patient exposure in x-ray diagnosis; includes methodology, keeping of patient data records, attitudes toward keeping records, measuring acceptance of recommendations, devising an improved means of communication with the practitioner, limited measuring of radiation exposure reduction of the population, and transfer of findings to data processing cards.

An Emanation System for Determining Small Quantities of Radium 226. (PHS Publication No. 999-RH-9). Detailed account of the construction, operation, and characteristics of the system.

Procedures for Determination of Stable Elements and Radionuclides in Environmental Samples. (PHS Publication No. 999-RH-10). Methods used at the PHS Southeastern Radiological Health Laboratory, Montgomery, Ala.; includes sections on milk, food, biota, silt, soil, water, and counting procedures.

Films

The American Cancer Society plans to produce about 20 films presenting information on detection, diagnosis, and treatment of **cancer**. The films will be aimed primarily at general practitioners, but will also be of use to medical students and specialists in the various disciplines. The subjects thus far approved for production include chemotherapy; cancer in children; the dentist's role in cancer detection; hormonal treatment; and the diagnosis and treatment of cancers of the vital organs. More information is available through the society's national office (219 East 42 St., New York 10017) or its divisions.

Basic Mechanisms in Neurology. (16 mm; 35 minutes, color, $350). Refresher course for residents in neurology and psychiatry; includes generation of potentials in receptors, conduction of action potentials along the axon; excitatory and inhibitory synaptic mechanisms; neuromuscular transmission. (Netherlands Central Institute for Brain Research, Ijdijk 28, Amsterdam-Havens-Oost, Netherlands)

The Pharmaceutical Manufacturers Association has published a **catalog of films** available from pharmaceutical research houses. A total of 184 films are listed, aimed at various age and educational levels. All are 16 mm, in sound, and available on a free loan basis from the sponsors. Subjects include the following: disease prevention, mitigation, and cure; drug discovery, development, and manufacturing; drugs in agriculture; the elderly; hospitals; health careers; and the young. The films do not present commercial messages, except

the identification of the sponsoring company. The films must be ordered from the sponsor; copies of the catalog may be obtained at no cost from the PMA. (W. Kloepfer, Jr., Office of Public Information, PMA, 1155 15th Street, NW, Washington, D.C. 20005)

Scientists in the News

The American Psychiatric Association this month presented its first Distinguished Service award to **Karl Augustus Menninger**, chief of staff of the Menninger Foundation, Topeka, Kansas. He received a scroll citing his "exceptional contributions to the advancement of psychiatry." The association awarded its $1500 Hofheimer prize for research to **Jack H. Mendelson**, a research associate in psychiatry at Boston City Hospital, for his work on alcohol problems. **George K. Stürup**, superintendent of the Detention Institute for Abnormal Criminals at Herstedvester, Glostrup, Denmark, received the Isaac Ray award and $1000 for "furthering understanding between psychiatry and the law."

This year's Alfred P. Sloan awards were recently presented to three men for their contributions in cancer research. The recipients will each receive $10,000 plus funds for travel and other expenses during a year's work in a research institution, other than their own, in the U.S. or abroad. The recipients, all from both the Sloan-Kettering Institute for Cancer Research and Cornell University's medical college, are:

Irwin H. Krakoff, for his work on the care of advanced cancer patients and on the biochemical mechanisms involved in response to chemotherapy.

Henry T. Randall, for his work as a surgeon, laboratory scientist, and medical administrator; and his contributions to the understanding of the effects of surgical procedures on metabolic processes.

C. Chester Stock, for his work in developing the cancer chemotherapy program in the United States.

Clement L. Markert, professor of zoology at Johns Hopkins University, is to become head of the department of biology at Yale University, 1 July.

Philipp Gerhardt, professor of microbiology at the University of Michigan, has been named chairman of the department of microbiology and public health at Michigan State University, effective 1 July. He will succeed **Jack J. Stockton**.

John C. Houck, director of the biochemical research laboratory at Children's Hospital, Washington, D.C., has received a $1000 prize from the American Dermatological Association for his work on the effects of anti-inflammatory drugs on the chemistry of necrosis.

H. J. A. Chivers, a senior scientist with the space environment task group, National Bureau of Standards, Boulder, Colo., has become the first scientific director of the Central Radio Propagation Laboratory's high altitude space environment monitoring station, Anchorage, Alaska.

Lynne L. Merritt, Jr., has been named vice president for research and dean of advanced studies at Indiana University, as of 1 July. He is associate dean of faculties at the school.

Preston C. Hammer, chairman of numerical analysis and professor of mathematics at the University of Wisconsin, has been appointed professor of mathematics and head of the section on computer science at Pennsylvania State University. The appointment is effective at the start of the summer term in June.

Leslie Corsa, Jr., has been appointed director of the center for population planning and professor of population planning in the University of Michigan's school of public health, as of 1 July. He is now chief of the bureau of maternal and child health, State Department of Public Health, Berkeley, California.

Indiana University has announced the appointment of **Kenneth E. Penrod** as provost of the medical center, effective 1 July. He is vice president for the West Virginia University medical center.

Charles M. Herzfeld, deputy director of the Advanced Research Projects Agency, will become director on about 1 July. He will succeed **R. L. Sproull**, who will return to Cornell University as vice president for academic affairs.

Paul R. Gross, associate professor of biology at Brown University, will become a professor of biology at M.I.T., effective in July.

The University of Pennsylvania has named **Dorothy A. Mereness** to succeed **Theresa I. Lynch** as dean of the school of nursing, as of 1 July. She is a professor of education and director of the graduate curriculum in psychiatric mental health nursing at New York University.

William J. Sparks, science adviser of the Esso Research and Engineering Company, Linden, N.J., has received the American Chemical Society's Priestley medal, the society's highest honor.

Recent Deaths

Sir **Edward Appleton**, 72; principal and vice chancellor of Edinburgh University and winner in 1947 of the Nobel Prize for physics; 21 April.

Paul M. Fitts, Jr., 52; psychology professor at the University of Michigan and director of the Human Performance Center; 2 May.

Childs Frick, 81; trustee of the American Museum of Natural History and founder of the Frick Laboratory of Vertebrate Paleontology; 9 May.

Darnley E. Howard, 68; retired head of the department of mechanical engineering at Howard University; 23 April.

Franz J. Kallman, 67; chief of psychiatric research in medical genetics at the New York State Psychiatric Institute and professor emeritus of psychiatry (genetics) in Columbia University's College of Physicians and Surgeons; 12 May.

James William Slesser Marr, 62; principal scientific officer of the National Institute of Oceanography of Great Britain; 23 April.

Ernst Albert Scharrer, 59; head of the department of anatomy at Albert Einstein College of Medicine; drowned in an undertow while swimming off Sarasota, Florida; 29 April.

Carl C. Sorensen, 71; retired head of the vertebrate paleontology department at the American Museum of Natural History; 7 May.

Zip

After 31 December 1966 addresses used for second-class mail must include the zip code. If this copy of *Science* does not show your correct zip code, please insert the code on your addressing label and send it to AAAS–Zip, 1515 Massachusetts Avenue, NW, Washington, D.C. 20005