SCIENCE EDUCATION

Graduate Study

Rensselaer Polytechnic Institute is offering a graduate program in astronomy designed to provide the background needed to do research in astronomy and the atmospheric sciences, with particular reference to space exploration and solar-terrestrial relations. Administered by the Department of Physics, the program offers courses in astrophysics, solar physics, space environment, upper-atmospheric physics, celestial mechanics and orbital determination, dynamics of the galaxy, and extragalactic systems.

Research projects now in progress include solar radio astronomy, the ionosphere, tropospheric phenomena, solar-terrestrial relations, and the nature of the interstellar medium. Equipment at the RPI observatory in Troy and its field station in Grafton, N. Y., includes a 12-inch reflector, a 3-inch Ross camera, several smaller telescopes, a 517-megacycle swept-lobe interferometer, and an 18-megacycle cosmic-noise recorder. Staff members and students may participate in cooperative arrangements with the National Radio Astronomy Observatory and the National Astronomical Observatory for gathering research material. RPI has announced that several graduate assistantships with stipends of $1800 to $2000 plus tuition are available.

Correspondence concerning admission, fellowships, assistantships, and scholarships should be sent to the Chairman of the Committee on Graduate Admissions, Rensselaer Polytechnic Institute, Troy, N. Y. Requests for further information about astronomy programs should be addressed to Dr. Robert Fleischer, Professor of Astronomy.

A graduate program leading to the degree of Doctor of Philosophy in physics will be offered at Arizona State University in Tempe, starting in September. Laboratories for research in solid-state physics, molecular structure and spectra, and low-temperature physics have been developed to provide opportunities for thesis research. Further details can be obtained by writing to Dr. Arnold G. Meister, acting chairman of the Department of Physics.

The University of Illinois' Board of Trustees has approved the establishment of an advanced educational program leading to the PhD in nuclear engineering. Two years ago the University established a program of graduate study in nuclear engineering at the master's degree level, and during that period thirteen degrees have been awarded and the school's nuclear facilities have been considerably expanded. The latter now include a TRIGA reactor, three subcritical assemblies, a heat transfer loop, a radio-chemistry laboratory, and a nuclear metallurgy laboratory. The new doctoral program is under the direction of a "nuclear committee" of graduate faculty members representing all departments of the University's College of Engineering.

Students of the University of Illinois chapter of Tau Beta Pi, the engineering honor society, have prepared a booklet entitled *The Road to Graduate School* as an aid to engineering students who are considering graduate study. Published by the Committee on the Development of Engineering Facilities of the American Society for Engineering Education, the pamphlet contains information on the kinds of study and degrees available, where and when to apply, financial support and how to apply for it, housing for married students, jobs for wives, etc. The booklet was published with the support of the Ford Foundation and is being distributed through the offices of engineering deans and individual chapters of Tau Beta Pi.

Testing

Those having reservations about the current large-scale use of machine-graded multiple-choice tests as an objective statistical means of measuring individual ability may be interested in the views of Banesh Hoffmann, a skeptical professor of mathematics at Queens College in New York, whose article, "The Tyranny of Multiple-Choice Tests," appears in the March 1961 issue of *Harper's Magazine*. The particular targets are the College Board tests and the National Merit Scholarship tests, both of which are intended to operate on a mass scale in selecting the most able candidates among the hundreds of thousands of high-school students wishing to attend college. The author's contention, fortified with examples and with the supporting views of other critics, is that questions used in the tests are in fact likely to discriminate against the most gifted individuals, those who are outstandingly original and intelligent and capable of doing creative work. Dr. Hoffmann, who concedes that the problem of large-scale testing offers no easy solution, advocates a thorough inquiry, perhaps by a committee appointed by such organizations as the National Academy of Sciences and the American Council of Learned Societies which "should include creative people of commanding intellectual stature who could bring fresh vision to the testing situation, especially as it affects those gifted young people whose talents do not conform to the statistically based norms of the multiple-choice testers".

Summer Programs

The Holloman Summer Scientific Seminars, co-sponsored by the University of New Mexico and the Air Force Missile Development Center, will take

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place again this year at the Little Theater of the Cloudcroft Lodge in Cloudcroft, N. M. The dates are June 19–30 and the subject is astrophysics. The program will consist of five lectures on ergodic theory by Eberhard Hopf, five lectures on celestial mechanics by R. S. Richardson, and two lectures each by Otto Struve, Donald H. Menzel, Gerard P. Kuiper, Carl Sagan, Seth B. Nicholson, John D. Strong, Herbert Friedman, N. U. Mayall, John D. Kraus, and George Gamow. A day-by-day program is available and arrangements to attend any or all of the lectures may be made by writing to Dr. J. R. Foote, P. O. Box 1053, Holloman AFB, N. M.

Arizona State University is planning a one-week (August 7–11) summer course in Infrared and Ultraviolet Absorption Spectroscopy designed particularly for persons from industrial laboratories which employ spectrophotometric equipment. From August 21 to September 1, Arizona State will offer its annual intensive summer course in Modern Industrial Spectroscopy for persons from industrial laboratories using optical emission techniques. Both programs will include basic theoretical considerations and practical instrumental training and both are to be under the direction of Jacob Fuchs. Additional information on the courses is available from Dr. Fuchs at Arizona State University, Tempe, Ariz.

Polytechnic Institute of Brooklyn will again conduct a series of intensive summer courses in the use of specialized tools in physics and chemistry. Designed for industrial scientists, this year's program includes a two-week course (May 29–June 9) on industrial application of x-ray diffraction and three one-week courses (June 5–9) on applied infrared spectroscopy, polarography and related techniques, and the chemistry of high polymers. Inquiries should be addressed to Mrs. Doris Cattell, Polytechnic Institute of Brooklyn, 333 Jay St., Brooklyn 1, N. Y.

Boston College has announced plans for its annual two-week (July 17–28) intensive course in modern industrial spectrography. The course is designed for chemists and physicists from industry who wish to learn the techniques of emission spectroscopy for use in analytical work. Correspondence should be directed to the Rev. James J. Devlin, S.J., Department of Physics, Boston College, Chestnut Hill 67, Mass.

Among the summer programs being offered by the Massachusetts Institute of Technology for 1961 are a course on fundamentals and applications of selected surface phenomena (June 26–July 7) under the direction of H. J. Bixler of the Chemical Engineering Department and an intensive course in infrared spectroscopy (July 17–24) under the direction of Richard C. Lord, director of the MIT Spectroscopy Laboratory. Enrollment is in progress. Application forms and additional information on these and other courses can be obtained from the Director of the Summer Session, Dr. James M. Austin, Room 7–103, Massachusetts Institute of Technology, Cambridge 39, Mass.

The Twelfth Annual Fisk University Infrared Spectroscopy Institute will be divided into three sessions, two on infrared spectroscopy and one on gas chromatography. The first infrared session (on an elementary level) and the gas chromatography session will be conducted during the same four-day period (August 23–26). The second infrared session (August 28–September 1) is for those with experience in the field as well as for those who have completed the preceding first session. Address requests for further information to the Director, Fisk Infrared Institute, Fisk University, Nashville 8, Tennessee.

A two-week course in electron microscopy for research workers in the physical sciences will be given from September 3 to 15 by Pennsylvania State University's Electron Microscopy Laboratory. The program will consist of lectures by laboratory staff members and personnel from industrial and government research laboratories. Topics covered will include basic theory of electron optics, instrumentation, electron diffraction, specimen preparation techniques, applications, etc., and instruction will be given on both the RCA EMU-2D and Hitachi HU-11 microscopes. Further information can be obtained from Prof. Joseph J. Comer, College of Mineral Industries, Pennsylvania State University, University Park, Pa.

NATO Advanced Study Institutes

Under the sponsorship of the North Atlantic Treaty Organization, a number of advanced study institutes will be held in NATO countries during the coming summer and fall. Those dealing with physics and related areas are listed below. Requests for further information should be sent directly to the individual institutes.

Theoretical Physics, August, Montreal, Canada (Dr. L. E. H. Trainor, Theoretical Physics Division, University of Alberta, Edmonton, Alberta, Canada)

Solid-State Theory, July, Gent, Belgium (Prof. W. Dekeyser, Laboratorium voor Kristallografie en Studie van Vaste Stoffen, Rijksuniversiteit-Gent, Gent, Belgium)

Statistical Mechanics, August 1–16, Breukelen, Netherlands (Prof. B. R. A. Nijboer, NUFFIC, 27 Molenstraat, The Hague, Netherlands)

The Influence of Meteorological and Astronomical Factors on the Propagation of Radio Waves in Communication, August, Corfu, Greece (Prof. M. Anastassiades, University of Athens, Solonos Street 104, Athens, Greece)

Physical Oceanography, Especially Hindcasting Problems, August or September, Hamburg, Germany (Prof. W. Hansen, Institut für Meereskunde, Abteistrasse 15, Hamburg 13, Germany)

Fluctuations and Irreversible Processes, July 31–August 19, Newbattle Abbey, Dalkeith, Scotland (Dr. G. A. P. Wyllie, Natural Philosophy Dept., The University, Glasgow W.2, Scotland)

Elementary Particle Theory and the Many-Body Problem, June 26–August 5, Cargese, Corsica (Prof. M. Lévy, Université de Paris, Physique Théorique et Hautes Energies, B. P. No. 12, Orsay (S.-et-O.), France)

Cosmic Radiation and Space Research, May 23–June 3, Varenna, Italy (Prof. B. Peters, Universitetets Institut for Teoretisk Fysik, Blegdamsvej 17, Copenhagen, Denmark)