serotonin in the brain suggest that the mental changes caused by the drugs are the result of a serotonin-deficiency which they induce in the brain. If this be true, then the naturally occurring mental disorders—for example, schizophrenia—which are mimicked by these drugs, may be pictured as being the result of a cerebral serotonin deficiency arising from a metabolic failure rather than from drug action. Possibly, therefore, these natural mental disorders could be treated with serotonin.

Those professionally qualified for clinical experimentation are urged to apply these biochemical and pharmacological findings. Experiments in animals revealed that serotonin injected peripherally fails to penetrate the blood-brain barrier. Consequently, it is suggested that a serotonin-like compound which will penetrate to the desired site may be required.

News and Notes

Radio Astronomy Conference

A 3-day conference on radio astronomy, jointly sponsored by the National Science Foundation, the Carnegie Institution of Washington, and the California Institute of Technology, was held in Washington, January 4–6, 1954. The organizing committee of the conference consisted of Jesse L. Greenstein, chairman, Bart J. Bok, J. B. Wiesner, Merle A. Tuve, and John P. Hagen, secretary. A special fund was provided by the National Science Foundation for the conference. The conference was called to bring together some 75 astronomers, physicists, and electronic engineers to discuss the current status of research in this country and abroad, the nature of the problems in radio astronomy, and profitable directions for future work in this relatively new field, which has become a promising new method of attacking astronomical problems.

The group was welcomed by Lee DuBridge, of the California Institute of Technology, Paul A. Scherer, of the Carnegie Institution of Washington, and Raymond J. Seegar, of the National Science Foundation. Dr. Seegar, noting the international character of the gathering, called attention to the presence of distinguished visitors from other countries: H. Alfven, from Sweden; L. Owren, from Norway; B. Y. Mills and E. G. Bowen, from Australia; R. Hanbury-Brown, C. G. Little, F. Graham Smith, and F. Hoyle, from England; A. E. Covington, from Canada; H. C. van de Hulst, from the Netherlands; A. P. Mitra, from India. United States participants included representatives of leading universities, industrial and government laboratories.

Discrete sources of radio radiation of both galactic and extragalactic origin

B. Y. Mills presented the work of the Radio Physics Laboratory on the spectra, shapes and sizes of the stronger radio point sources. The intensity was shown to follow a law, $I = \lambda^n$, where $n = 1.7$ for three sources Cygnus A, Virgo A, and Centaurus, and $n = 0.7$ for Taurus. When the work at the longest wavelength, 16 m, was included, n was scattered with a grouping around $n = 1$ and $n = 2$. Interferometric measurement of the size and shape were made using two instruments with base lines at right angles to each other. The shapes were roughly oval with an angular size of 5′ to 10′. *R. Hanbury-Brown* continued the discussion with a description of the work at Manchester. Observation of those sources within the field of view of the 218-ft parabola (focal length 126 ft, $\lambda = 1.9$ m, which is a band on the celestial sphere bounded by the two latitude circles $+40°$ and $+70°$), shows that the intense sources seem to lie near the galactic plane. Among the sources seen in this strip are Cygnus X and one at the position of Tycho Brahe's supernova. A new type interferometer capable of operating at extremely long base lines and depending for its operation upon the correlation between the low-frequency components in the envelope of the signal was described. This instrument was used to measure the angular diameter of Cassiopeia and Cygnus A. Cassiopeia had a diameter of about 5′ of arc. Cygnus A, however, appeared asymmetrical. The simplest model fitting the observations consists of two objects 50″ × 30″ separated by 1′28″. Five of the discrete sources seen have been associated with extragalactic nebulae. In each case, the radio flux agrees with the light flux. Variations in the background radiation have been associated with aggregates of nebulae and with irregularities in their distribution.

C. G. Little, of Jodrell Bank, described the work on the measurement of ionospheric winds through the motion of meteor trails. He also pointed out that measurement of the winds through scintillation of radio stars has revealed that the ionospheric irregularities are about 4 km in size and have a predominantly westerly motion in the evening and easterly in the morning. *F. G. Smith* then discussed some of the work now in progress at Cambridge and described the new interferometer system consisting of four aerial systems, each 18,000 ft² in area, placed at the corners of a rectangle 1800 by 180 ft. With this system, a new source IC443 has been identified. Observation of the occultation of the Taurus source by the solar corona reveals that the radio waves are scattered by inhomogeneities in the corona out to 15 solar radii, indicating that the outer corona is more extensive and dense than thought previously. *F. T. Haddock,* of the Naval Research Laboratory, reported on the new measurements with the 50-ft radiotelescope at wavelength 9.4 cm. Radiation from several of the radio sources has now been measured at this short wavelength, thus extending the short-wave limit of the radio spectrum of the sources. Radiation from the Orion Nebula and other emission nebulae was measured for the first time.

G. Reber, of the Research Corporation, described his new installation on a mountaintop in Hawaii overlooking the short-wave limit of the radio spectrum of the height to obtain high resolution at long wavelengths in the measurement of the size, position, and intensity of the sources. Ionospheric effects are larger than anticipated and are being evaluated.

J. D. Kraus, of Ohio State University, presented some of the results obtained with the new antenna, an array of helices fixed in hour angle but capable of being trained in declination. The survey made with this antenna at 1.2 m wavelength has revealed many radio sources and, in addition, shows a background irregularity that can be associated with an irregularity in the distribution of extragalactic nebulae. *J. P. Hagen,* of the Naval Research Laboratory, described some of the results of solar research using the high resolution obtainable with the 50-ft antenna at centimeter and millimeter wavelengths and by using eclipse observations. Both the eclipse measurements at these wavelengths and the measurements with the high-resolution antenna at millimeter wavelength show limb brightening on the sun; this is in accordance with predictions of the earlier theory of the quiet sun. The 8-mm observations relating to radiation from deeper regions in the sun's atmosphere require an extension of the theory. The observations can best be explained by a two-fluid model of the chromosphere. *E. G. Bowen,* of Australia, reported that Christiansen, with two multiple-beam interferometers, has found that at a wavelength of 20 cm the sun appears asymmetrical with pronounced limb brightening along the E-W direction and no limb brightening in the N-S direction. Wild's spectrometer has been extended to cover the range 40 to 240 Mc/sec. Flare records can be interpreted to show particles emitted with velocities from 500 to 1000 km/sec. At the same time, the new records show particles with a velocity one-fifth to one-tenth the velocity of light. This latter result may have some bearing on the origin of the aurora and cosmic rays. *A. E. Covington,* of the National Research Council, Canada, gave a review of his measurement of the solar flux at 10-cm wavelength dating back to 1947. There is a strong correlation between the 10-cm enhanced radiation and sunspot activity. Bursts of radiation have been classified according to a system of a few terms. A 150-ft linear array having a $0.125° \times 20°$ beam is now in use to locate radio sunspots. *C. R. Burrows* told of the work at Cornell University. He described the instruments available there and at Sacramento Peak, N.M., and their calibration. Combining pencil-beam and interferometer measurements, the workers at Cornell have shown that 200-Mc/sec bursts are in general elliptically polarized. Work relating to the polarization of bursts to position of origin on the sun is continuing.

Helen Dodson reported on two cooperative studies by the McMath-Hulbert Observatory with Dr. Burrows and Mr. Owren, of Cornell University, and with A. E. Covington, of solar radiation at 1.5 m and 10 cm at the time of solar flares. The studies showed that distinctive events at 1.5 m are more likely to be associated with flares than are events at 10 cm, 78 against 40 percent. On the other hand, flares with associated events at 10 cm are more likely to occur as the importance of the flare increases. At 1.5 m, the percentage of flares associated with radio events is independent of flare importance. Sudden ionospheric disturbances are more probable as the flare importance increases and are more probable when a 10-cm burst accompanies the flare. *H. C. van de Hulst,* commenting on the preceding papers, reported some work of Seegar, when at Cornell, where fast recordings of the 1.5-m signal from the sun were made. Recent examination of these records shows that small bursts associated with flares are longer (about 3 sec) than similar bursts occurring on "stormy" days. Also, major bursts associated with flares may have an associated small burst occurring as much as half an hour before the main event. *W. O. Roberts* discussed the relationship of spicules to the structure of the chromosphere and suggested that they also play a part in the formation of the corona. He pointed out that the larger rays and streamers in the corona are associated with plages and spots. Dense, hot material from flare regions diffuses with a velocity of 0.5 to 1 km/sec into the solar atmosphere. This can be a source of radio emission. *F. T. Haddock* reviewed the eclipse measurements in the centimeter region. He pointed out that the high resolution offered by an eclipse, coupled with the fact that the radio sun is little larger than the moon, makes such measurements ideal for studying the brightness distribution over the surface of the sun. The Naval Research Laboratory measurements at Khartoum, Sudan, show the effect of localized regions of enhanced emission and, when analyzed for radial brightness distribution, show the limb brightening predicted by theory.

Problems and theory in radio astronomy

R. Minkowski opened the subject of problems and theory with a progress report on astronomical observations of radio sources. Cygnus A, the strongest of the sources identified with peculiar extragalactic systems, is an 18th magnitude nebula consisting of two galaxies in collision. The radio emission appears to come from regions too faint to be seen visually, and the inference is that the radio emission comes from the interaction of the moving gas clouds, since most of the stars will not be affected by the collision. The galactic sources are of three types characterized by the following three sources: Cassiopeia, Crab Nebula, and IC443. Each of these is a mass of gas with high random internal motions. This, therefore, suggests a connection between random motions and radio emission with a suggestion that greater velocity spread is associated with greater radio emission. *Jesse L. Greenstein* discussed thermal emission from gases and some energy considerations in nonthermal sources. Radiation from H II regions, such as that in the Orion Nebula recently discovered at the Naval Research Laboratory, is related to the emission measure

$n_i\ n_e l$ (n_i, n_e per cm^3, l in parsecs). Isolated regions of small E.M. require high-resolution antennas, such as those obtained with the 50-ft Naval Research Laboratory radiotelescope used at 30-cm or shorter wavelength, for their detection and measurement. Calculation of the total energy available in the moving gas clouds of nonthermal sources shows that the energy emitted in the Cygnus source is only 5 percent of the total kinetic energy. Similar calculations have been made for Cassiopeia source. *F. Hoyle* continued the discussion of the strong radio sources and suggested synchrotron-type emission by relativistic electrons as a possible mechanism.

F. G. Smith discussed some of the pressing problems in radio astronomy. An understanding of the nature of the galactic and extragalactic backgrounds will require a study over a wide frequency range to determine the spectrum. This work needs to be supplemented by the use of high-resolution antennas. The mechanism of radiation in unusual bodies, such as the disturbed sun and radio stars, must be sought out. *Hari K. Sen* discussed his extension of the small-signal theory of noise generation by oscillating plasma to the nonlinear case. One success of this theory was to predict the presence of higher harmonics in the generated radiation; such an effect was observed by the Australian workers in burst radiation associated with solar flares.

Antenna and equipment problems

J. D. Kraus described the linear array of helical antennas used at Ohio State University at a wavelength of 1.2 m. This type of antenna is very convenient to work with, since little coupling exists between adjacent elements. The antenna has a further advantage over older linear array designs in that it is usable over a wide (approximately 2 to 1) range of wavelengths. *B. Y. Mills* discussed the method now being tried in Australia to obtain a pencil beam with low effective aperture. This is effected by connecting two linear arrays disposed at right angles to each other to the same receiver in such a way that only signals present in the two beams simultaneously register in the output. Discussion by Hanbury-Brown brought out the fact that such an arrangement augmented the effect of side lobes. *R. Hanbury-Brown* discussed the large paraboloid under construction at Jodrell Bank. The steerable paraboloid will have an aperture of 250 ft and focal length of 62.5 ft. The shortest usable wavelength will be determined by the surface tolerance, which cannot be stated with certainty yet. The possible use of the central portion of the dish at 20-cm wavelength was discussed. Partial operation is expected by 1955. *John P. Hagen* then described the high-resolution 50-ft reflector at the Naval Research Laboratory. This antenna differs from those previously discussed in that the solid surface is accurately machined to allow its use at wavelengths as short as 8 mm, where the beam width is 3′ of arc. The use of high resolution in studying the brightness distribution of the sun and moon was discussed.

In an informal discussion of the relative merits of various means of constructing large antennas, led by *E. G. Bowen,* it was the consensus that future work in radio astronomy will require the use of the largest antennas feasible. Bowen proposed and illustrated a method of mounting a large paraboloid by securing it to a sphere which is then floated in a shallow pool of water. This method of mounting should reduce the total weight of the structure by a factor of 3 or 4.

H. I. Ewen described the new 21-cm radiometer equipment now in use at Harvard with a 25-ft paraboloid; this equipment differs from earlier models in that the signal at the hydrogen-line frequency is continuously compared with the noise signal in a comparison band displaced a few megacycles. *C. G. Little* described the Manchester 21-cm receiver, which uses a 30-ft paraboloid; the receiver is of the switching type but uses two IF channels separated in frequency by 1 Mc/sec, thereby making it possible to observe the signal full time and also to suppress interference. *H. Tatel* described the equipment in use and under construction at the Carnegie Institution of Washington. The present equipment is used with a signal band width somewhat narrower than that used by the Dutch. The higher resolution obtained is shown by deeper minima in the frequency sweeps.

N. T. Lavoo, of the General Electric Company, discussed amplifier tubes suitable for use at the short wavelengths used in radio astronomy. Modern close-spaced triode amplifiers, such as the L-29, when used in the input circuits of IF amplifiers reduce the noise figure to 0.3 db, thus helping to reduce the over-all noise figure of the receiver. The tubes can also be used effectively as amplifiers at signal frequency for all but the shortest (centimeter and decimeter) wavelengths. *Cornell H. Mayer,* of the Naval Research Laboratory, described a method of improving the ability of a radiometer to measure small noise powers through the use of ferrite elements adjusted for unidirectional transmission. In this way, the deleterious effects of variations in input impedance are minimized. A radiometer using a ferrite element as a chopper was described with an improvement of a factor of 50 over a conventional rotating disk chopper.

Galactic research

H. C. van de Hulst described the Dutch work. There is some effort being put on solar observations at 1.5 and 2 m. Work is under way to complete a survey of galactic radiation at 75 cm to bring Reber's early survey up to date. The 21-cm hydrogen-line survey has continued with an attempt to better estimate the center frequency, to correct the observations for antenna pattern, and to come to a better estimate of temperature by correcting for saturation and for the continuous background. New work on the extension of the spiral arms into the region inside the sun's orbit was described. *C. H. Townes,* of Columbia University, discussed line spectra in the microwave region of atoms and molecules of astrophysical interest. In addition to the known 21-cm line, there are several lines that fall in an available part of the spectrum. The most prom-

ising of these would seem to be the OH line in the neighborhood of 18 cm wavelength. *B. Y. Mills* reported on the observation of radio radiation from the Magellanic Clouds both at 3-m wavelength and in the line radiation from neutral hydrogen at 21 cm. The ratio of gas to dust is found to be very different in the two systems, being higher for the smaller cloud. The hydrogen-line measurements also showed a motion of rotation of the two as a binary system combined with a translation.

R. H. Dicke, of Princeton University, described the mechanism for the 21-cm line emission and showed that collision cross sections are such that collision caused by the thermal motion of the hydrogen atoms is responsible for the excitation of the radiation and that there is a consequent equilibrium with the kinetic temperature of the gas. *B. J. Bok* then described the work at Harvard using the 21-cm equipment described earlier by Ewen. Regional surveys of the galactic center and anticenter are being conducted first. In the direction of the center, a secondary maximum at 20° north galactic latitude was found, and in the direction of the anticenter a similar extension to the south of the plane of the galaxy appeared. These secondary maxima are associated with the positions of the Ophiucus and Taurus dark nebulae regions.

The conference closed with a discussion of special topics. Solar research and the generation and amplification of radio noise in plasmas and electron streams were the topics of most interest.

JOHN P. HAGEN

Naval Research Laboratory
Washington 25, D.C.

Science News

Nearly a third of the December issue of *Arctic,* recently published by The Arctic Institute of North America, is devoted to "A preliminary field report" of the **Baffin Island Expedition, 1953.** This is the first scientific report of the findings of this important venture which last summer brought a diverse group of specialists to the study of the Cumberland Peninsula, until then largely a scientific blank. The enormity of the effort and the hazards involved in the undertaking, to which one of the scientists sacrificed his life, are suggested in the reports presented by various members of the party and covering studies in glaciology, meteorology, geology, geomorphology, zoology, and botany, and also mountaineering, surveying, and photography. Expedition leader was Patrick D. Baird, glaciologist, former winner of the Founder's Medal of the Royal Geographical Society and director of the Arctic Institute's Montreal Office.

A prime objective of the 13-man team was study of the Penny Icecap in order to improve understanding of the physics of ice-masses and their relation to weather patterns, water supply, and long-range climatic changes. A camp was established on May 16 on the highest dome of this 20-by-90 mi ice sheet lying 1¼ mi above sea level. Later investigations carried members of the party the full length of one of its typical outflowing glaciers. Although the "ablation" or melting season at the head of this glacier lasted a total of only 190 hr, an extraordinarily high ablation rate in the lower reaches is reported by W. H. Ward, English glaciologist, who writes that up to 7 ft of the original ice in the terminal region had melted away by the end of August. At the height of the ablation season, amid "atrocious" conditions for walking and transportation, 1000 ft of telephone cable used in connection with seismic measurements of ice thickness was swept away by the sudden outbreak of a meltstream.

Measurements of the movement of the glacier, which showed flowage rates of from 10 to 52 ft in a little over a month, were confirmed by observation of the rate at which "crevasses visibly opened and closed around one of our tents on the glacier." A further hazard was caused by fog which at the highest icecap station occurred on 25 days in June, 27 in July, and 8 of the first 9 days of August.

The spectacular nature of the terrain is indicated by Ward who describes ice cliffs atop "3000-foot-high rock walls which form the troughs of the valley glaciers." D. J. Kidd, Canadian geologist, refers to "hanging valleys" carved out by numerous glaciers. Dr. Kidd reports that rocks of volcanic origin exist for 55 mi along the Cumberland Peninsula Coast and suggests that the land mass they represent has risen 800–1400 ft above sea level since its formation. Geologists have long speculated on whether the "belt" of Tertiary volcanic rocks which extends from Scotland through Iceland to eastern and western Greenland can also be found in Baffin Island.

Zoological investigations are reported by A. Watson of McGill University, who conducted a special study of the breeding biology and behavior of a colony of snowy owls from incubation time until the young could fly. A continuous record was kept of hatching, food, and growth rates of the young, a study which resulted in "aggressive and often distraction behavior" on the part of the adult owls whose reactions became markedly confused by the necessary invasion of the nests. Botanical studies are reported by F. H. Schwarzenbach, one of four representatives of the Foundation for Swiss Alpine Research who took part in the expedition.

Eight peaks up to 7000 ft were scaled by members of the expedition between periods of scientific work. One of these, Mt. Battle, was named for W. R. B. Battle, young geomorphologist of McGill University whose tragic death by drowning in a glacial stream occurred in mid-July. Sixteen additional place names bestowed by members of the Arctic Institute party have been approved by the Canadian Board on Geographical Names. Among them are Coronation Fiord and Coronation Glacier, first reconnoitered on the day Queen Elizabeth was crowned.

The **World Health Organization** has issued a report for 1953 that reveals WHO's widening responsibilities

in fighting epidemics, improving sanitation, and promoting maternal and child health. Aid was furnished to 74 countries, involving 330 projects of which 106 were completed in 1953. Main efforts were directed against malaria, yaws, venereal infections, and tuberculosis.

"Off with their heads" was the title of this editorial in *The Washington Post-Times Herald* for April 17:

Secretary Wilson seems to consider himself competent to carry on the scientific research work of the Defense Department all by himself. As though geniuses were a dime a dozen, he indicated the other day that he will not utilize the services of Dr. J. Robert Oppenheimer for the Defense Department regardless of the decision of the Atomic Energy Commission board now considering security risk charges against the physicist. Mr. Wilson said he had "the greatest sympathy for any one who made a mistake and reformed." And then he added: "I think they ought to be reformed somewhere else than in the military services."

There is reflected in this not only a calloused prejudgment of the case, but also an appalling ignorance concerning the relation of science to security. . . . The point is that scientists of Dr. Oppenheimer's brilliance and experience are altogether too rare in this country. Only a small handful of men share his practical knowledge of nuclear physics. If he is cleared by the Security Board, he has a unique contribution to make to the national defense. The clearance ought to be complete—and without the narrow qualification Mr. Wilson would so patronizingly attach to it.

And on the same page, the following item appeared under the heading "Signpost":

At the Nurnberg trials in Germany, the following exchange took place between Supreme Court Justice Robert H. Jackson, then chief of counsel for the United States, and Albert Speer, Reich Minister for Armament and Munitions:

Q. And certain experiments were also conducted and research conducted in atomic energy, were they not?

A. Unfortunately, because our best experts we had in atom research had gone to America, we hadn't advanced as far as we wanted to. We suffered setbacks in atom research and actually we were about one to two years from achieving results—the results of splitting the atom.

Q. The policy of driving people out who didn't agree with Germany hasn't produced very good dividends, has it?

A. That, as far as we were concerned, had a very decisive disadvantage particularly in this sector.

Scientists in the News

Harriet Allen, professor of physics at Western College for Women, Oxford, Ohio, has commenced a 3-yr leave of absence to serve as visiting professor at the American College for Girls in Arnavutkoy, Istanbul, Turkey, where she is teaching mathematics and physics.

Six engineers and industrialists will be cited for outstanding accomplishment at the annual University of Wisconsin Engineers Day celebration on May 7. Those to be honored are:

Arne J. Asplund, president of the Defibrator Corp., Stockholm, Sweden.

Adolph J. Ackerman, consulting engineer, Madison.

Mack C. Lake, formerly president and now consultant of the Orinoco Mining Co., New York.

David W. McLenegan, manager of technical personnel and education at the Hanford Atomic Products Operation of the General Electric Co., Richland, Wash.

Robert C. Siegel, chief engineer of the Wisconsin Telephone Co., Milwaukee.

John Slezak, undersecretary of the Army, Washington, D.C.

Walter Baade is to receive the Gold Medal of the Royal Astronomical Society, its highest honor, "for his observational work on galactic and extra-galactic objects." He is a staff member of the Mount Wilson and Palomar Observatories, which are jointly operated by the Carnegie Institution of Washington and the California Institute of Technology.

Dr. Baade has also been appointed to the honorary Charles M. and Martha Hitchcock professorship at the University of California. In this capacity he will be in residence at Berkeley during the month of May and will deliver a series of public lectures, "Galaxies, their composition and evolution."

Firman E. Bear, since 1940 professor of agricultural chemistry and chairman of the Soils Department at the New Jersey Agricultural Experiment Station, Rutgers University, will retire on June 30. He will be succeeded by **Russel B. Alderfer,** professor of soil technology at Pennsylvania State University. Dr. Bear will continue as editor-in-chief of *Soil Science* and will maintain an office on the campus. Immediately following his retirement, he will spend some time in South America, stopping in Peru, Chile, Argentina, and Brazil.

Dr. Bear received the B.S. and M.S. degrees from Ohio State University, where he specialized in agricultural and general chemistry. The University of Wisconsin later awarded him a Ph.D. after he had completed investigations in bacteriology, biological chemistry, and soils. He was instructor in soils at Ohio State University from 1908 to 1910, and he lectured at over-the-state schools for farmers in Ohio from 1910 to 1912, before the days of the now familiar county agent. After an interval as head of the soils department at the University of West Virginia, he returned to Ohio State as head of the Department of Soils, which position he held from 1916 to 1929.

From 1929 to 1938, as director of agricultural research for the American Cyanamid Company, Dr. Bear traveled throughout the United States, over much of Europe, and in Canada, Mexico, and Central America. For 2 yr, before his appointment to Rutgers, he was science editor of *Country Home Magazine.* He has been in constant demand as a speaker

at meetings of scientific and business organizations throughout the United States.

Dr. Bear is past president and fellow of the American Society of Agronomy, past president of the Soil Science Society of America, past president and fellow of the Soil Conservation Society of America, past vice-president of Section O and fellow, AAAS, and past chairman of the National Joint Committee on Grassland Agriculture. He is the author or coauthor of five books and of many bulletins, circulars, and journal articles, both scientific and popular. Many of this country's best known soil scientists have taken their advanced degrees with Dr. Bear or have worked under his direction.

John R. Bowman, who has been head of the Mellon Institute's Department of Research in Physical Chemistry and is also a member of the executive staff since 1948, is now a director of research. The Department of Physical Measurements has been united with the Department of Research in Physical Chemistry, with **Charles B. Willingham** as the head.

At the 91st annual meeting of the National Academy of Sciences the following awards were made:

To **Vannevar Bush,** president of the Carnegie Institution of Washington, the John J. Carty Medal for noteworthy and distinguished accomplishment. The Carty Fund committee stated: "Very few men in the history of our country have exerted so profound and so diversified an influence on science and its ramifications in our society. . . ."

To **William Shockley** of the Bell Telephone Laboratories, the $400 Comstock Prize "for his pioneering investigations and exposition of electric and magnetic properties of solid materials; in particular for his researches in the conduction of electricity by electrons and holes in semiconductors."

To **Raymond Carroll Osburn,** emeritus professor of zoology at the Ohio State University, the Daniel Giraud Elliot Medal for his publication *Bryozoa of the Pacific Coast of America.*

To **Alan Gregg,** vice president of the Rockefeller Foundation, the Public Welfare Medal " . . . to mark the appreciation of the National Academy for eminent service to the public, performed without a view to great monetary gains and by methods which, in the opinion of the Academy, are truly scientific."

Daniel C. Darrow, professor of pediatrics at Yale University School of Medicine, has accepted appointment to a newly created chair, the Children's Mercy Hospital professorship, in the Department of Pediatrics at the University of Kansas School of Medicine. The appointment becomes effective on July 1.

Cora Du Bois, anthropologist and director of research for the Institute of International Education at Washington, D.C., has been appointed by Harvard University and Radcliffe College to the Samuel Zemurray Jr. and Doris Zemurray Stone-Radcliffe professorship, effective July 1. The professorship is open to an outstanding woman scholar who may represent any field of learning. Dr. Du Bois, an authority on cross-cultural studies in personality, is known especially for her studies of California Indians and of the peoples of Indonesia and South Asia. Since 1951 she has been conducting research on student exchange programs and now is writing a book on the foreign student in the United States.

Kathryn Helm, a former captain in the Army Nurse Corps, has been appointed director of the School of Nursing and Nursing Service at St. Luke's Hospital, New York City.

Victor K. La Mer has returned to his teaching duties in the Chemistry Department of Columbia University after a sabbatical leave spent as guest professor at the University of Copenhagen, where he was supported by a Fulbright lectureship. The subject of his lectures was "Light scattering and colloid science." Prof. La Mer is editor-in-chief of the *Journal of Colloid Science.*

On April 16 **John B. Lucke,** professor of geology at The University of Connecticut, assumed the office of director of the Connecticut Geological and Natural History Survey; he succeeds **Edward L. Troxell,** who is retiring. Communications for Prof. Lucke should be addressed to him at the University of Connecticut.

A. C. McGuinness, dean of the University of Pennsylvania Graduate School of Medicine, has announced that he will leave his post to become clinical consultant for 10 hospitals being built by the United Mine Workers Welfare and Retirement Fund.

Harold Schlosberg has been appointed chairman of the Department of Psychology at Brown University as of Mar. 22, the 65th birthday of **Walter S. Hunter,** chairman of the department since 1936. Prof. Hunter will continue as an active member of the staff.

In the Laboratories

The **Commonwealth Scientific and Industrial Research Organization's Section of Methametical Statistics,** which has headquarters in Adelaide, Australia, has now become the Division of Mathematical Statistics E. A. Cornish, is chief of the new division, which will provide research workers with special help in planning their projects and analyzing and interpreting their experimental results.

The **Du Pont Company** has dedicated a $2,000,000 structure that will provide enlarged facilities for the company's **Haskell Laboratory for Toxicology and Industrial Medicine** which since its establishment in 1935 has been in operation at the Experimental Station in Wilmington. The new Haskell Laboratory is a single-story, air-conditioned building of 33,000 ft², situated near Newark, Del., about 17 mi from Wilmington. Originally the laboratory was established to test Du

Pont products and manufacturing processes to eliminate as far as possible every potential health hazard to employees and customers. Its activities have expanded to include broad studies in toxicology, biochemistry, pathology, physics, and physiology. Today the research staff is searching for basic knowledge of the causes and effects of fatigue, factors that make clothing comfortable, and methods for the early determination of abnormal heart conditions, as well as investigating the toxicity of chemicals made or used by the company.

The **General Electric Company,** Schenectady, N.Y., recently held a ground breaking ceremony in Waynesboro, Va., for a new plant that will manufacture electronic controls for industrial and aviation use. Expected to be in full operation sometime next year, the plant will employ about 550 people. Facilities on the 70-acre site will include a large manufacturing area, warehouse, laboratory, personnel facilities, and offices.

The first linear accelerator built for medical purposes and intended for cancer research and therapy with fast electrons has been installed at the **Michael Reese Hospital** in Chicago. It was constructed by Helene Curtis Industries, Inc., of Chicago, on the pattern of the Stanford University units developed in the Palo Alto Microwave Laboratory, and has a maximum capacity of 45 mev. The klystron, accelerator tube, electron gun, and pulse transformer were built at Stanford University.

The accelerator is housed in a reinforced concrete building with walls 3 ft thick. The instrument itself is separated from the patients' treatment room, and this in turn is separated from the control room. The 10-ft-long tube is suspended from the ceiling 7 ft above ground level and terminates in a window between the machine and the treatment room. Two magnets are to be installed for directing the electron beam and for swinging the beam in a 90° arc from the vertical line. Experiments on biological objects will be started by July 1.

The project, which involves the expenditure of approximately $250,000 entirely financed by private donations, is under the direction of Erich M. Uhlmann, director of the hospital, and Charles Hsieh, chief physicist of the Tumor Clinic.

Increased effectiveness is expected to result from the recent reorganization of the research department of the **Naval Research Laboratory,** Washington, D.C. The reorganization, the first major one since the end of World War II, was based on the recommendations of a team of three NRL scientists. Their report was made after a 6-mo study of the Laboratory's scientific organization and program-planning, and after supplemental visits to other Government and industrial research laboratories.

As before, the research department is headed by a director of research, E. O. Hulburt. Under the new plan, he has three associates, one each in the fields of electronics, materials, and nucleonics; they are R. M. Page, O. T. Marzke, and E. H. Krause, respectively. There are now 13, instead of 12, scientific divisions which conduct research, development, and evaluation work in the physical sciences. The names of these divisions suggest the scope of the laboratory's scientific program: Applications Research; Atmosphere and Astrophysics; Chemistry; Electronics; Mechanics; Metallurgy; Nucleonics; Optics; Radar; Radiation; Radio; Solid State; and Sound. New superintendents and their divisions are: R. C. Guthrie, Radar; J. P. Hagen, Atmosphere and Astrophysics; W. S. Pellini, Metallurgy; A. H. Schooley, Electronics; and C. V. Strain, Nucleonics.

The **New Jersey Zinc Company** has contracted to buy the Gloucester City, N.J., titanium dioxide plant of the American Cyanamid Company.

The **Stanford Research Institute,** Stanford, Calif., is starting the operation of its new Pacific Northwest Division with the establishment of an office in Portland, Ore. Through this office, the Institute expects to launch a research program on problems connected with the long-range development of power and water resources of the Pacific Northwest, working closely with other groups and interests in the area.

The **Will Corporation** of Rochester, N.Y., has announced two name changes. Its Atlanta laboratory supply house is to be called the Will Corporation of Georgia instead of Southern Scientific Co., Inc., and the Buffalo Apparatus Corporation will be Will-Buffalo, Inc. Ownership, services, and personnel remain the same in both places.

Grants and Fellowships

The **Brooklyn Botanic Garden** has announced a gift to endowment of $100,000 from the estate of the late Anna L. Hills.

Ciba Pharmaceutical Products, Inc., Summit, N.J., awarded the following research grants during March:

New York University-Bellevue Medical Center. C. Rein, Dept. of Clinical Dermatology and Syphilology.
New York University College of Medicine. H. S. Kupperman, Dept. of Therapeutics.
University of California, Los Angeles. T. A. Geissman, Dept. of Chemistry.
University of Southern California School of Medicine. D. M. Green, Hypertension Clinic.
Northwestern University School of Medicine, E. C. Texter, Jr., Dept. of Medicine.
Jewish Hospital, St. Louis, Mo. M. Alex.
University of California, San Francisco. T. L. Althausen, Dept. of Medicine.
University of Utah School of Medicine. L. S. Goodman, Dept. of Pharmacology.

The **National Science Foundation** has announced the award of 657 predoctoral graduate fellowships in the natural sciences to United States citizens for the year 1954–55. Successful fellows were selected from 2865 applicants from all parts of the continental United States, Alaska, Hawaii, and Puerto Rico. In addition,

1355 applicants were accorded honorable mention. A list of fellowship recipients follows:

Alabama

R. R. Odom, Fairfield; Birmingham-Southern Coll., Chem.
C. M. Steinberg, Montgomery; Vanderbilt U., Biophys.
P. Toulmin, Birmingham; Harvard U., Earth Sci.

Arizona

D. G. Bryant, Tuscon; U. of Arizona, Earth Sci.
B. D. Bucher, Phoenix; Princeton U., Math.

Arkansas

J. F. Hays, Little Rock; Columbia U., Earth Sci.

California

D. L. Abell, Fresno; U. of California, Zool.
E. M. Acton, Morgan Hill; Massachusetts Inst. of Tech., Chem.
D. E. Applequist, Berkeley; California Inst. of Tech., Chem.
J. B. Applequist, Berkeley; U. of California, Chem.
G. A. Baker, Jr., Davis; California Inst. of Tech., Phys.
A. M. Barnes, Richmond; San Diego St. Coll., Zool.
E. D. Becker, Berkeley; U. of California, Chem.
D. R. Bennion, Los Altos; Stanford U., Eng.
I. S. Bjorklund, Los Angeles; Stanford U., Eng.
A. T. Bottini, Petaluma; U. of California, Chem.
J. D. Britton, Los Angeles; California Inst. of Tech., Chem.
M. E. Browne, Long Beach; U. of California, Phys.
D. L. Bunker, Simi; California Inst. of Tech., Chem.
S. J. Carlquist, San Marino; U. of California, Bot.
J. A. Carlson, Pasadena; California Inst. of Tech., Eng.
M. Cher, Los Angeles; California Inst. of Tech., Chem.
J. W. Crump, Sebastopol; U. of Illinois, Chem.
N. H. De Nevers, San Francisco; Stanford U., Eng.
W. E. Dibble, Glendale; California Inst. of Tech., Biophys.
L. R. Doherty, San Diego; U. of Michigan, Phys.
W. J. Downhower, Altadena; Stanford U., Eng.
R. L. Dressler, Inglewood; Harvard U., Bot.
W. P. Eatherly, Temple City; U. of South. California, Phys.
S. D. Elliott, Jr., Independence; Yale U., Phys.
R. Fuchs, Altadena; California Inst. of Tech., Phys.
R. H. Good, Berkeley; U. of California, Phys.
A. L. Gram, III, San Marino; U. of California, Eng.
B. Harris, Arcadia; Yale U., Math.
B. J. Hartz, Albany; U. of California, Eng.
R. S. Hoffmann, Albany; U. of California, Zool.
C. A. Hopson, Mill Valley; Johns Hopkins U., Earth Sci.
M. L. Houston, San Francisco; U. of California, Zool.
C. D. Joel, Vista; Harvard U., Biochem.
R. E. Jones, Watsonville; M.I.T., Eng.
G. H. Keitel, Palo Alto; Stanford U., Eng.
J. H. Kennedy, Los Angeles; U. of California, Chem.
R. P. Kraft, Albany; U. of California, Phys.
R. E. Levin, Santa Ana; Stanford U., Eng.
J. C. Little, Stockton; U. of California, Chem.
J. Mathews, Sierra Madre; California Inst. of Tech., Phys.
D. S. Matteson, Berkeley; U. of California, Chem.
E. A. Meyer, Berkeley; Johns Hopkins U., Microbiol.
J. C. Mitchell, Van Nuys; California Inst. of Tech., Chem.
J. D. Mohler, Berkeley; U. of California, Gen.
J. E. Monson, Palo Alto; Stanford U., Eng.
L. N. Morrisett, Jr., Los Angeles; Yale U., Psych.
A. Parducci, Berkeley; U. of California, Psych.
P. M. Ray, Saratoga; Harvard U., Bot.
W. B. Ray, Saratoga; California Inst. of Tech., Earth Sci.
R. A. Reeves, Los Angeles; U. of California, Chem.
J. H. Richards, Berkeley; U. of California, Chem.
L. W. Richards, Riverside; California Inst. of Tech., Chem.
K. W. Robinson, Los Angeles; Princeton U., Phys.
W. N. Runquist, Green Valley Lake; Northwestern U., Psych.
J. Sandweiss, Berkeley; U. of California, Phys.
R. L. Shreve, Bishop; California Inst. of Tech., Earth Sci.
J. W. Sidman, Berkeley; U. of California, Chem.
H. K. Sinclair, Los Angeles; U. of California, Chem.
F. T. Smith, San Francisco; Harvard U., Chem.
R. D. Smith, Oakland; M.I.T., Chem.
E. A. Stern, Los Angeles; California Inst. of Tech., Phys.
R. W. Tankersley, Jr., Stanford; Stanford U., Microbiol.
R. B. Taylor, Claremont; U. of Minnesota, Earth Sci.
J. B. Thomas, Stanford; Stanford U., Eng.
W. R. Thorson, Los Angeles; California Inst. of Tech., Chem.
E. O. Thorp, Los Angeles; U. of California, Phys.
W. M. Walsh, Los Angeles; Harvard U., Phys.
H. Weitzner, San Francisco; U. of California, Phys.
A. E. Wennstrom, Los Angeles; M.I.T., Eng.

Colorado

A. Benson, Boulder; U. of Colorado, Zool.
A. Danti, Colorado Springs; Colorado Coll., Chem.
R. C. Gunning, Longmont; Princeton U., Math.
V. C. Kennedy, Denver; U. of Colorado, Earth Sci.
F. B. Knight, Fort Collins; Duke U., Agri.
J. A. Laswick, Boulder; U. of Colorado, Chem.
J. R. Nazy, Denver; Regis College, Chem.
L. T. Reynolds, Denver; Harvard U., Chem.

Connecticut

N. C. Blais, New Haven; Yale U., Phys.
F. G. Carey, Rockville; Coll. of William & Mary, Zool.
W. T. Doyle, New Haven; Yale U., Phys.
G. B. Field, Pomfret; Princeton U., Phys.
D. L. Gilman, Storrs; M.I.T., Earth Sci.
C. L. Kilbourne, Woodmont; Brown U., Chem.
F. B. Mallory, New Haven; Yale U., Chem.
H. D. Peck, Jr., Middletown; Western Reserve U., Microbiol.
W. R. Reitman, Middletown; Wesleyan U., Psych.
M. F. Singer, New Haven; Yale U., Biochem.
W. G. Tifft, Seymour; Harvard U., Phys.
J. V. Trumbull, Stonington; U. of Connecticut, Earth Sci.
C. F. Wilcox, Cos Cob; U. of California, Chem.

District of Columbia

T. A. Farley, Washington; George Washington U., Phys.
R. B. Kellogg, Washington; U. of Chicago, Math.
F. L. Lambert, Washington; Harvard U., Zool.
P. C. Reynolds, Washington; Trinity Coll., Chem.
L. B. Schlegel, Washington; U. of Maryland, Math.
J. Spanier, Washington; U. of Chicago, Math.

Florida

H. C. Curl, Tallahassee; Florida St. U., Gen. Biol.
D. J. Foulis, South Miami; Tulane U., Math.
I. M. Kiem, Miami; U. of North Carolina, Microbiol.
A. R. Marshall, Miami; U. of Miami, Gen. Biol.
R. D. McWilliams, Fort Myers; U. of Tennessee, Math.
W. A. Moser, Bradenton; Vanderbilt U., Phys.
R. C. C. Pilger, W. Palm Beach; U. of Notre Dame, Chem.
R. S. Silas, Gainesville; U. of Florida, Chem.

Georgia

W. A. Hagins, Oliver; Cambridge U., Med. Sci.
Z. Levine, Savannah; Georgia Inst. of Tech., Eng.
A. H. Neal, Atlanta; Emory U., Chem.

Illinois

J. S. Aagaard, Chicago; Northwestern U., Eng.
G. E. Backus, Chicago; U. of Chicago, Phys.
R. E. Baron, Chicago; U. of Chicago, Phys.
C. E. Barr, Elmwood Park; Iowa St. Coll., Bot.
W. S. Bartky, Chicago; Illinois Inst. of Tech., Math.
A. H. Cromer, Chicago; U. of Wisconsin, Phys.
D. D. Davis, Salem; U. of Minnesota, Chem.
D. H. Ezekiel, Urbana; U. of Illinois, Microbiol.
R. W. Fulmer, Champaign; U. of Illinois, Chem.
D. S. Gage, Palatine; Stanford U., Eng.
R. B. Garland, Elgin; M.I.T., Chem.
D. M. Geller, Oak Park; Harvard U., Biochem.
J. W. Gewartowski, Chicago; Stanford U., Eng.
R. W. Glade, Urbana; U. of Illinois, Zool.
R. D. Hamilton, Colfax; U. of Detroit, Microbiol.
R. Harder, Jr., Gibson City; U. of Illinois, Chem.
R. H. Hardin, Champaign; U. of Illinois, Eng.
H. D. Hartzler, Downers Grove; U. of Chicago, Chem.
A. Heller, Chicago; U. of Chicago, Med. Sci.
D. R. Hoff, Galesburg; M.I.T., Chem.
D. L. Johnson, Monmouth; Purdue U., Eng.
G. J. Kacek, Jr., Berwin; Illinois Inst. of Tech., Eng.
M. V. Klein, Highland Park; Northwestern U., Phys.
A. A. Krawetz, Evanston; U. of Chicago, Chem.
J. H. Law, Jr., Park Forest; U. of Illinois, Biochem.
S. Lederberg, Urbana; U. of Illinois, Microbiol.
A. D. Liehr, Chicago; Harvard U., Phys.
T. D. Little, Marissa; USAF Inst. of Tech., Eng.
H. M. Loux, St. Joseph; U. of Illinois, Chem.
L. W. Mednick, Chicago; U. of Chicago, Anthrop.
R. L. Metzenberg, Highland Park; California Inst. of Tech., Biochem.
R. L. Mieher, Waverly; U. of Illinois, Eng.
F. P. Peterson, Naperville; Princeton U., Math.
W. J. Peterson, Chicago; U. of Pennsylvania, Zool.
L. I. Rebhun, Chicago; U. of Chicago, Biochem.

F. Scardiglia, Chicago; U. of Illinois, Chem.
T. D. Schultz, Glencoe; M.I.T., Phys.
J. I. Simon, Wheaton; Northwestern U., Chem.
D. A. Speer, Morton Grove; U. of California, Chem.
E. O. Stejskal, Berwyn; U. of Illinois, Chem.
R. A. Swanson, Chicago; U. of Chicago, Phys.
R. S. Thomas, Champaign; U. of California, Biochem.
H. R. Waite, Chicago; Northwestern U., Chem.
J. W. Wilt, Chicago; U. of Chicago, Chem.
J. W. Winchester, Western Springs; M.I.T., Chem.

Indiana

I. G. Carroll, W. Lafayette; Purdue U., Microbiol.
J. P. Chesick, New Castle; Purdue U., Chem.
W. W. Cleland, Bloomington; U. of Wisconsin, Biochem.
W. R. Frazer, Indianapolis; Carleton Coll., Phys.
R. E. Gerkin, South Bend; U. of Chicago, Chem.
T. M. Hallman, W. Lafayette; Purdue U., Eng.
J. D. Harris, West Lafayette; Purdue U., Biophys.
J. B. Hemwall, West Lafayette; Purdue U., Agri.
M. M. Hiatt, Indianapolis; Hanover Coll., Microbiol.
L. M. Horger, W. Lafayette; Purdue U., Zool.
K. A. Johnson, Hobart; Harvard U., Phys.
J. J. Jones, Indianapolis; U. of Wisconsin, Bot.
R. P. Kaiser, South Bend; Purdue U., Eng.
W. C. Lordan, Gary; Wesleyan U., Math.
D. J. Mason, Cutler; Purdue U., Microbiol.
T. R. Mertens, St. Joe; Purdue U., Gen.
D. J. Meschi, Hammond; U. of California, Chem.
J. P. Mutschlecner, Fort Wayne; Indiana U., Phys.
M. E. Senko, Crown Point; U. of California, Chem.
W. D. Shephard, Gary; Wesleyan U., Phys.
F. S. Stephens, Wabash; U. of California, Chem.
T. L. Swihart, Elkhart; U. of Chicago, Phys.

Iowa

J. R. Anderson, Ames; Iowa St. Coll., Phys.
G. E. Collins, Adel; Cornell U., Math.
S. E. Darden, Sioux City; U. of Wisconsin, Phys.
D. H. Hug, Davenport; Iowa St. Coll., Microbiol.
J. S. Hyde, Des Moines; M.I.T., Phys.
C. G. King, Jr., Cedar Rapids; St. U. of Iowa, Eng.
B. O. Nolf, Iowa City; St. U. of Iowa, Earth Sci.
W. D. Ohlsen, Ames; Iowa St. Coll., Phys.
J. F. Pauls, Washington; Iowa St. Coll., Math.
L. M. Roth, Waterloo; Radcliffe Coll., Phys.
W. W. Rozeboom, Ottumwa; U. of Chicago, Psych.
R. M. Sanders, Waterloo; U. of Wisconsin, Phys.
R. L. Sass, Davenport; Augustana Coll., Chem.
C. F. Schumacher, Ames; Iowa St. Coll., Psych.
T. E. Stevens, Ames; Iowa St. Coll., Chem.
H. D. Young, Osage; Carnegie Inst. of Tech., Phys.

Kansas

N. P. Baumann, Sylvan Grove; U. of Kansas, Phys.
R. R. Brownlee, Zenith; Indiana U., Phys.
T. M. Burford, Wichita; U. of Wisconsin, Eng.
R. H. Capps, Wichita; U. of Wisconsin, Phys.
H. B. Hamilton, Wichita; U. of Oklahoma, Eng.
E. D. Hornbaker, Louisburg; U. of Virginia, Chem.
F. E. Ladd, Jr., Lawrence; U. of Kansas, Psych.
A. J. Lundeen, Fowler; Southwestern Coll., Chem.
F. W. Prosser, Lawrence; U. of Kansas, Phys.
R. W. Rydjord, Wichita; Municipal U. of Wichita, Psych.
R. L. Shaffer, Kinsley; Cornell U., Bot.

Kentucky

J. W. Cable, Murray; Florida St. U., Chem.
A. S. Horowitz, Ashland; Ohio St. U., Earth Sci.
W. W. Hunt, Franklin; Ohio St. U., Chem.

Louisiana

P. J. Beaver, New Orleans; Newcomb Coll., Microbiol.
P. E. Conner, Lafayette; Princeton U., Math.
R. E. Weaver, New Orleans; Tulane U., Eng.

Maine

R. A. Deering, Brooks; U. of Maine, Biophys.
D. B. Stewart, East Sumner; Harvard U., Earth Sci.

Maryland

R. W. Bass, Baltimore; Johns Hopkins U., Math.
F. D. Bedard, Baltimore; Johns Hopkins U., Phys.
A. L. Berman, Baltimore; Johns Hopkins U., Zool.
P. A. Cook, Baltimore; Princeton U., Eng.
A. W. Currier, W. Annapolis; St. U. of Iowa, Math.
R. H. Gilpin, Cumberland; U. of Illinois, Bot.
J. J. Hopfield, Bethesda; Swarthmore Coll., Phys.
E. Huff, Bethesda; Western Reserve U., Biochem.
J. E. Laynor, Bethesda; Carnegie Inst. of Tech., Eng.
H. I. Mandelberg, Baltimore; Johns Hopkins U., Phys.
L. S. Rodberg, Baltimore; Johns Hopkins U., Phys.
L. E. Scriven, II, Elkton; U. of Delaware, Eng.
T. D. Thomas, Chevy Chase; Haverford Coll., Chem.
C. V. Truss, Baltimore; Johns Hopkins U., Psych.

Massachusetts

M. S. Bryan, Cambridge; Copenhagen U., Bot.
E. C. Clarke, Concord; Radcliffe Coll., Biochem.
L. A. Currie, Somerville; U. of Chicago, Chem.
L. S. Harris, Brookline; Harvard U., Med. Sci.
R. J. Herrnstein, Newton; Harvard U., Psych.
W. T. Jenkins, Cambridge; M.I.T., Biochem.
H. M. Kaplan, Northampton; M.I.T., Math.
F. T. Kenney, Springfield; Johns Hopkins U., Biochem.
T. B. Knapp, Newton; M.I.T., Math.
J. K. Kopp, Dorchester; Harvard U., Phys.
A. M. Lacy, Newton Center; Wellesley Coll., Gen.
E. H. Lieb, Boston; M.I.T., Phys.
R. M. Lurie; Cambridge; M.I.T., Eng.
G. E. Mahoney, Norwood; Boston U., Math.
R. B. Marr, W. Bridgewater; Harvard U., Phys.
E. J. Ofengand, Taunton; M.I.T., Biochem.
R. S. Palais, Brookline; Harvard U., Math.
J. W. Pratt, Concord; Stanford U., Math.
S. A. Rice, Cambridge; Harvard U., Chem.
P. W. Robbins, Leominster; U. of Illinois, Biochem.
R. H. Romer, Cambridge; Princeton U., Phys.
F. W. Stahl, Needham; U. of Rochester, Gen.
R. D. Stolow, Brookline; U. of Illinois, Chem.
R. W. Thrasher, Greenfield; Williams Coll., Phys.
B. Tugendhat, Webster; Radcliffe Coll., Psych.
P. H. von Hippel, Weston; M.I.T., Biophys.
E. S. Weaver, Andover; Yale U., Chem.
C. A. Whitney, Cambridge; Harvard U., Phys.

Michigan

A. L. Albee, Mt. Clemens; Harvard U., Earth Sci.
J. W. Albrecht, Detroit; U. of Detroit, Phys.
S. A. Brady, South Haven; Western Michigan Coll., Chem.
G. W. Camiener, Detroit; Wayne U., Microbiol.
M. R. Dawson, Ferndale; U. of Kansas, Earth Sci.
H. M. Dess, Ann Arbor; U. of Michigan, Chem.
J. M. Gary, Kalamazoo; U. of Michigan, Math.
D. M. Green, Ann Arbor, U. of Michigan, Psych.
R. A. Hefner, Ann Arbor; U. of Michigan, Psych.
W. S. Jewell, Detroit; Cornell U., Eng.
L. E. Kaechele, Allegen; Stanford U., Eng.
D. F. Morrow, Detroit; Wayne U., Chem.
M. E. Munk, Detroit; Wayne U., Chem.
E. H. Poindexter, Lansing; U. of Michigan, Phys.
G. L. Schott, Huntingdon Woods; California Inst. of Tech., Chem.
O. J. Sexton, Pinckney; U. of Michigan, Zool.
A. E. Siegman, Pontiac; U. of California, Eng.
W. D. Slawson, Grand Rapids; Princeton U., Phys.
H. L. Smith, Ann Arbor; U. of Michigan, Eng.
G. A. Vidaver, Detroit; U. of Chicago, Biochem.
T. F. Waters, East Lansing; Michigan St. Coll., Zool.
A. M. Weitzenhoffer, Ann Arbor; U. of Michigan, Psych.

Minnesota

N. H. Anderson, Minneapolis; U. of Wisconsin, Psych.
T. E. Dickelman, Minneapolis; St. Olaf's Coll., Chem.
M. A. Eliason, Moorhead; Concordia Coll., Chem.
W. C. Erickson, Duluth; U. of Minnesota, Phys.
M. S. Fawcett, Winona; Northwestern U., Chem.
C. F. Giese, Minneapolis; U. of Minnesota, Phys.
R. E. Grant, St. Paul; U. of Texas, Earth Sci.
J. C. Holmes, South St. Paul; U. of Minnesota, Zool.
N. Horwitz, Minneapolis; U. of Minnesota, Phys.
F. J. Lyon, Minneapolis; U. of Minnesota, Eng.
R. L. Nickelson, Minneapolis; U. of Minnesota, Eng.
A. E. Ogard, Ada; U. of Chicago, Chem.
J. H. Osborn, Winona; U. of Minnesota, Chem.
J. F. Ready, Minneapolis; Coll. of St. Thomas, Phys.
P. C. Royce, Brainerd, Western Reserve U., Zool.
R. M. Straw, St. Paul; Claremont Graduate School, Bot.
J. D. Swalen, Minneapolis; Harvard U., Chem.
W. F. Wade, Minneapolis; U. of Minnesota, Eng.
N. M. Wolcott, St. Paul; Oxford U., Phys.

Mississippi

T. B. Breazeale, Brandon; U. of Virginia, Phys.
C. J. Brown, Utica; Mississippi Coll., Chem.
J. F. Garst, Jackson; Mississippi St. Coll., Chem.
E. E. Grace, Corinth; U. of North Carolina, Math.
A. B. Grossberg, Gulfport; Illinois Inst. of Tech., Chem.
J. F. Howell, Cleveland; Louisiana St. U. & A & M Coll., Microbiol.
N. C. Merwine, Leakesville; Mississippi St. Coll., Agri.

Missouri

E. Becker, Williamsville; U. of California, Chem.
R. L. Becker, Kirkwood; U. of Wisconsin, Phys.
J. H. Bell, Ferguson; Northwestern U., Eng.
R. E. L. Black, Harrisonville; U. of Washington, Zool.
A. M. Bolsterli, St. Louis; Washington U., Phys.
R. M. Cantwell, St. Louis; Washington U., Phys.
G. A. Cohen, University City; California Inst. of Tech., Eng.
A. J. Fairbanks, St. Louis; Washington U., Biophys.
L. Gruen, Kansas City; Cornell U., Chem.
P. G. Hallof, Kirkwood; M.I.T., Earth Sci.
J. Hower, Jr., St. Louis; Washington U., Earth Sci.
L. S. Kisslinger, St. Louis; Indiana U., Phys.
L. H. Crone, Jr., Jennings; Washington U., Eng.
D. E. Leventhal, St. Louis; U. of Illinois, Biochem.
C. A. Mead, Webster Grove; Carleton Coll., Chem.
R. M. Moberly, Jr., Ferguson; Princeton U., Earth Sci.
J. M. Parks, Clinton; Carnegie Inst. of Tech., Chem.
J. W. Rittenhouse, Rolla; Purdue U., Eng.
B. P. Roe, St. Louis; Washington U., Phys.
G. H. Stout, St. Louis; Harvard U., Chem.
L. J. Tichacek, St. Louis; U. of Illinois, Eng.
K. G. Wernicke, Kansas City; U. of Kansas, Eng.

Montana

M. T. Beatty, Bozeman, U. of Wisconsin, Agri.
J. E. Butcher, Albion; Utah St. Agri. Coll., Agri.
J. C. Clifford, Great Falls; Coll. of Great Falls, Eng.
J. A. Poirier, Harlowton; Notre Dame U., Phys.

Nebraska

H. L. Golding, Omaha; Municipal U. of Omaha, Biochem.
R. W. Kilb, Lincoln; Harvard U., Chem.
D. C. McGarvey, Omaha; Yale U., Math.
J. R. Munkres, Broadwater; U. of Michigan, Math.
R. L. Schelkopf; Shickley; U. of Nebraska, Agri.
W. F. Vogelsang, Lincoln; U. of Pittsburgh, Phys.
J. M. Yos, Lincoln; U. of Nebraska, Phys.

Nevada

I. P. Crawford, Reno; Stanford U., Microbiol.
F. R. Jenson, Reno; Purdue U., Chem.
R. D. Smyth, Reno; U. of Chicago, Zool.

New Hampshire

D. D. Fitts, Keene; Harvard U., Chem.
W. F. Hoffmann, Manchester; Bowdoin Coll., Phys.
F. A. Johnson, Concord; U. of New Hampshire, Chem.

New Jersey

R. R. Berggren, Short Hills; Yale U., Phys.
R. C. Breslow, Rahway; Harvard U., Chem.
S. U. Chase, Princeton; Princeton U., Math.
G. A. Condouris, Passaic; Cornell U., Med. Sci.
R. J. Dietz, New Brunswick; M.I.T., Chem.
P. B. Eveleth, Neptune City; U. of Grenoble, Anthrop.
P. E. Gray, Livington; M.I.T., Eng.
O. W. Greenberg, Newark; Princeton U., Phys.
P. H. Greene, East Orange; U. of Chicago, Gen. Biol.
N. R. Harris, Port Norris; U. of Pennsylvania, Med. Sci.
R. Hobart, Jr., Ramsey; M.I.T., Phys.
B. B. Howard, Jr., Plainfield; Princeton U., Chem.
D. J. Kleitman, Morristown; Cornell U., Phys.
P. C. Laris, Perth Amboy; Princeton U., Zool.
R. M. Mazo, Camden; Yale U., Phys.
V. C. Pare, Woodbury; Cornell U., Phys.
W. Rusch, Lambertville; Princeton U., Eng.
J. A. Shropshire, New Gretna; Rutgers U., Chem.
M. S. Steinberg, Highland Park; U. of Minnesota, Zool.
R. G. Swan, Boonton; Princeton U., Math.
P. J. Warter, Jr., Trenton; Princeton U., Eng.
H. O. Werntz, Margate; Yale U., Zool.
P. J. Wojtowicz, Linden; Yale U., Chem.
W. G. Zoellner, East Orange; New York U., Chem.

New Mexico

L. E. Agnew, Jr., Los Alamos; U. of New Mexico, Phys.
W. R. Kane, Los Alamos; U. of Washington, Phys.
G. W. Lecompte, Los Alamos; U. of New Mexico, Eng.
J. C. Phillips, Albuquerque; U. of Chicago, Phys.

New York

L. R. Abramson, New York; Columbia U., Math.
E. A. Allton, Bronx; City Coll. of New York, Phys.
M. K. Bach, Flushing; U. of Wisconsin, Biochem.
R. J. Ballengee, New Rochelle; Notre Dame U., Eng.
E. Baskir, Rochester; U. of Rochester, Phys.
L. E. Baum, Brooklyn; Harvard U., Math.
R. G. Beard, Oswego; Miami U., Zool.
A. M. Benson, New York; U. of Illinois, Eng.
J. Berkowitz, Brooklyn; U. of Illinois, Chem.
S. D. Berkowitz, Bronx; Columbia U., Math.
M. B. Brilliant, Brooklyn; M.I.T., Eng.
W. Browder, Yonkers; M.I.T., Math.
E. R. Byrne, Kenmore; Notre Dame U., Eng.
F. V. Caccavo, Upton; Brooklyn Poly. Inst., Eng.
M. I. Cohen, New York; Columbia U., Zool.
P. J. Cohen, Brooklyn; U. of Chicago, Math.
W. C. Cohen, Brooklyn; Pratt Inst., Eng.
M. A. Cynkin, Brooklyn; Cornell U., Microbiol.
D. F. de Santo, New Rochelle; New York U., Eng.
R. W. Detenbeck, Kenmore; U. of Rochester, Phys.
G. H. Dinsmore, Ridgewood; Queens Coll., Math.
R. J. Drachman, Brooklyn; Columbia U., Phys.
P. R. Drouilhet, Poughkeepsie; M.I.T., Eng.
G. Dudek, Binghamton; California Inst. of Tech., Chem.
H. L. Ennis, Brooklyn; Northwestern U., Microbiol.
D. S. Falk, Long Island City; Cornell U., Phys.
G. Feinberg, New York; Columbia U., Phys.
M. Feldman, Brooklyn; New York U., Psych.
D. G. Foster, Ithaca; Cornell U., Phys.
M. L. Freimer, Brooklyn; Harvard U., Math.
A. J. Friedland, Bronx; Columbia U., Eng.
W. Gilbert, New York; Harvard U., Phys.
M. J. Goldstein, New York; Columbia U., Chem.
M. S. Gordon, Brooklyn; Cornell U., Zool.
J. M. Greene, Rochester; U. of Rochester, Phys.
R. Hammer, Franklin Square; Cornell U., Microbiol.
R. Hecht, Bronx; City Coll. of New York, Phys.
J. P. Heicklen, Rochester; Cornell U., Chem.
D. Hertzig, Brooklyn; Sorbonne, Math.
L. A. Herzenberg, Brooklyn; California Inst. of Tech. Biochem.
R. H. Hillsley, Larchmont; Cornell U., Eng.
D. Horowicz, New York; Johns Hopkins U., Zool.
S. Krause, New York; Rensselaer Poly. Inst., Chem.
A. F. Kuckes, Yonkers; Gottingen U., Phys.
A. D. Laderman, New York; Columbia U., Zool.
H. J. Landau, New York; U. of Paris, Math.
D. B. Lewin, New York; Harvard U., Math.
M. Litt, New Rochelle; Oberlin Coll., Biochem.
J. D. Livingston, Brooklyn; Harvard U., Phys.
R. G. Loomis, Mt. Vernon; New York U., Math.
I. J. Lowe, Brooklyn; Washington U., Phys.
E. Lubkin, Brooklyn; Columbia U., Phys.
D. W. Lynch, Ithaca; Rensselaer Poly. Inst., Phys.
D. E. McCumber, Rochester; Yale U., Eng.
E. Mendelson, Brooklyn; Cornell U., Math.
J. J. Metzner, Long Island; New York U., Eng.
J. D. Musa, Farmingdale; Dartmouth Coll., Eng.
J. Nachmias, Brooklyn; Harvard U., Psych.
M. I. Nathan, New York; M.I.T., Phys.
N. P. Neureiter, Genesco; Northwestern U., Chem.
M. M. Nicely, Mount Kisco; U. of Berne, Zool.
D. S. Ornstein, Harrison; U. of Chicago, Math.
R. Pearlman, Long Beach; Harvard U., Math.
T. S. Piper, Elmira; Harvard U., Chem.
E. C. Posner, Brooklyn; U. of Chicago, Math.
D. Pratt, Ithaca; Cornell U., Agri.
L. Rosler, Brooklyn; Yale U., Phys.
D. Rothman, Bronx; U. of Wisconsin, Math.
J. L. Sackman, Rome; Cooper Union, Eng.
P. E. Sarachik, Flushing; Columbia U., Eng.
R. M. Scribner, Snyder; U. of Minnesota, Chem.
H. Seiwatz, Ithaca; Cornell U., Biophys.
R. F. Seiwatz, Ithaca; Cornell U., Biophys.
C. M. Sommerfield, Brooklyn; Harvard U., Phys.
D. Spielberg, Richmond Hill; New York U., Phys.
E. M. Stein, New York; U. of Chicago, Math.
S. Stein, New York; City Coll. of New York, Eng.
W. J. Stein, Flushing; Manhattan Coll., Eng.
L. A. Steiner, Kew Gardens; Swarthmore Coll., Math.
S. H. Sternberg, Bronx; Swarthmore Coll., Math.

M. J. Tausner, Bronx; City Coll. of New York, Phys.
D. A. Treffs, South Schroon; New York St. Maritime Coll., Eng.
U. V. Victor, Pleasantville; Yale U., Gen.
A. W. Wachtel, Irvington; Columbia U., Zool.
R. S. Wagner, Jackson Heights; Columbia U., Chem.
W. D. Wales, Oneonta; Carleton Coll., Phys.
E. Wasserman, Brooklyn; Harvard U., Chem.
S. Weinberg, New York; Cornell U., Phys.
D. E. Wilcox, Farmingdale; U. of Michigan, Eng.
L. M. Winer, Spring Valley; U. of Pennsylvania, Math.
E. Wolman, Rye; Harvard U., Math.
A. C. Zemach, New York; Harvard U., Phys.

North Carolina

A. R. Erwin, Jr., Concord; Harvard U., Phys.
R. W. Heath, Chapel Hill; U. of North Carolina, Math.
K. Rondthaler, Ocracoke Island; Duke U., Bot.
W. V. Wright, Wilson; Harvard U., Math.

North Dakota

J. Adler, Grand Forks; U. of Wisconsin, Biochem.
W. P. Brown, Stanley; North Dakota Agri. Coll., Eng.
D. J. Parker, Fargo; North Dakota Agri. Coll., Chem.
P. E. Thomas, Fargo; Princeton U., Math.

Ohio

J. N. Baptist, Olmsted Falls; Case Inst. of Tech., Biochem.
N. A. Bates, Cleveland; U. of Illinois, Biochem.
E. G. Daniels, Lorain; De Pauw U., Biochem.
R. L. Deininger, Dayton; Ohio St. U., Psych.
H. C. Dunathan, St. Marys; Ohio Wesleyan U., Chem.
M. P. Ernstene, Cleveland; Cailfornia Inst. of Tech., Phys.
A. E. Fein, University Hts.; M.I.T., Phys.
P. W. K. Flanagan, Dayton; Ohio St. U., Chem.
E L. Garwin, Cleveland; Case Inst. of Tech., Phys.
J. E. Gordon, Columbus; U. of California, Chem.
W. E. Harrison, Toledo; U. of Illinois, Phys.
H. O. Heisey, Louisville; Wheaton Coll., Biochem.
R. T. Hersh, Cleveland Hts.; U. of California, Biochem.
F. D. Hoerger, Wadsworth; Purdue U., Chem.
J. H. Holloway, Shaker Heights; M.I.T., Phys.
R. A. Howald, Perrysburg; U. of Wisconsin, Chem.
W. H. Kasner, Killbuck; U. of Pittsburgh, Phys.
D. R. Krieg, Lorain; U. of Rochester, Gen.
L. C. Lawrence, Cincinnati; Cornell U., Psych.
D. Leidnicer, Columbus; Ohio St. U., Chem.
W. L. Meyer, Oak Harbor; M.I.T., Chem.
J. T. Morse, Mentor; M.I.T., Math.
G. R. Murray, Dayton; M.I.T., Chem.
G. A. Rebka, Jr., Cincinnati; Harvard U., Phys.
C. F. Rothe, Lima; Ohio St. U., Zool.
D. Ryeburn, Goshen; Kenyon Coll., Math.
D. A. Slough, Findlay; Bowling Green St. U., Earth Sci.
D. A. Strang, Girard; Ohio St. U., Eng.
A. A. Weaver, Wooster; U. of Wisconsin, Zool.
P. N. Wolfe, Columbus; Ohio St. U., Phys.

Oklahoma

R. H. Bradford, Lawton; U. of Oklahoma, Biochem.
L. J. Bruner, Ponca City; U. of Chicago, Phys.
R. J. Cooper, Mutual; Oklahoma A & M, Agri.
C. R. Crane, Barnsdall; Florida St. U., Biochem.
J. H. Esslinger, Oklahoma City; Rice Inst., Med. Sci.
J. P. D. Hull, Tulsa; Columbia U., Earth Sci.
H. J. Kidd, Red Rock; Washington U., Gen.
E. B. Kilpatrick, Durant; U. of Oklahoma, Zool.
O. Kircher, Fairland; U. of Wisconsin, Eng.
C. F. Knutson, Ponca City; Stanford U., Earth Sci.
J. E. McCune, Tulsa; Carnegie Inst. of Tech., Eng.
M. A. Melton, Norman; Columbia U., Earth Sci.
G. L. Nelson, Stillwater; Oklahoma A & M, Eng.
J. V. Parcher, Stillwater; Oklahoma A & M, Eng.
C. W. Reich, Oklahoma City; Rice Inst., Phys.
R. L. Willham, Stillwater; Oklahoma A & M, Agri.

Oregon

R. L. Baird, Portland; U. of California, Chem.
J. W. Daly, Portland; Oregon St. Coll., Biochem.
B. G. Dick, Jr., Portland; Cornell U., Phys.
D. O. Geymer, Clackamas; U. of Washington, Chem.
M. P. Gray, Eugene; U. of Oregon, Anthrop.
B. L. Manley, Medford; Willamette U., Zool.
I. K. Mills, Corvallis; Oregon St. Coll., Bot.
E. Norbeck, Milwaukee; U. of Chicago, Phys.
D. L. Van Fleet, Portland; Lewis and Clark Coll., Biochem.

Pennsylvania

W. L. Baily, Jr., Waynesburg, Princeton U., Math.
P. B. Barton, Jr., Pittsburgh, Columbia U., Earth Sci.
J. M. Bridges, McKees Rocks; Carnegie Inst. of Tech., Chem.
A. J. Buslik, Philadelphia; U. of Pennsylvania, Phys.
K. J. Cohen, Pittsburgh; Cornell U., Math.
V. H. Cohn, Jr., Reading; Harvard U., Med. Sci.
R. B. Curtis, Ardmore; U. of Illinois, Phys.
R. T. Denton, State College; Pennsylvania St. U., Eng.
R. H. Depue, Rutledge; U. of Illinois, Biochem.
R. E. Dessy, Blawnox; U. of Pittsburgh, Chem.
T. M. Devlin, Philadelphia; Johns Hopkins U., Biochem.
J. Engelberg, Philadelphia; U. of Pennsylvania, Biophys.
B. S. Fisher, Philadelphia; M.I.T., Chem.
R. T. Folk, Allentown; Lehigh U., Phys.
H. N. Garber, Philadelphia; M.I.T., Eng.
A. M. Goodman, Philadelphia; Princeton U., Eng.
M. P. Gouterman, Philadelphia; U. of Chicago, Biophys.
P. B. Green, Bala Cynwyd; Princeton U., Bot.
J. J. Higgins, Philadelphia; U. of Pennsylvania, Phys.
F. S. Houck, Newville; Columbia U., Chem.
P. M. Hurst, Jr., Hellam; Pennsylvania St. U., Psych.
N. R. Johnson, McKeesport; Carnegie Inst. of Tech., Eng.
T. A. Liss, Temple; M.I.T., Chem.
W. A. Love, Pittsburgh; Carnegie Inst. of Tech., Phys.
L. N. Lukens, Philadelphia; U. of Pennsylvania, Biochem.
P. S. Martin, West Chester; U. of Michigan, Zool.
T. J. Mathia, Strabane; Carnegie Inst. of Tech., Chem.
J. E. Meyer, Pittsburgh; Carnegie Inst. of Tech., Eng.
R. K. Miller, Harrisburg; U. of Delaware, Chem.
J. O. Montague, Pittsburgh; Carnegie Inst. of Tech., Phys.
J. T. Mullhaupt, Warren; U. of Rochester, Chem.
F. C. Neidhardt, Bucks Co.; Harvard U., Microbiol.
R. C. Newman, State College; Pennsylvania St. U., Eng.
C. J. Noel, Philadelphia; Villanova U., Chem.
R. E. Norton, Philadelphia; U. of Pennsylvania, Phys.
A. S. Obermayer, Philadelphia; M.I.T., Chem.
J. M. Olson, Philadelphia; U. of Pennsylvania, Biophys.
A. Plantz, Pittsburgh; U. of Illinois, Chem.
J. R. Powell, Bradford Woods; M.I.T., Eng.
H. A. Reiff, Allentown; U. of Minnesota, Chem.
K. Reibel, Philadelphia, Temple U., Phys.
J. A. Richman, Philadelphia; U. of Illinois, Math.
J. A. Romberger, Hershey; Pennsylvania St. U., Bot.
R. R. Sauers, Irwin; U. of Illinois, Chem.
R. F. Sawyer, Bethlehem; Harvard U., Phys.
L. R. Schissler, Alburtis; M.I.T., Eng.
A. E. Schraeder, Nanticoke, Carnegie Inst. of Tech., Phys.
D. A. Semenow, Pittsburgh; California Inst. of Tech., Chem.
F. V. Shallcross, Philadelphia; Brown U., Chem.
P. H. Squires, Ambridge; U. of Wisconsin., Eng.
W. Teutsch, Philadelphia; U. of Pennsylvania, Phys.
K. F. Wissbrun, Philadelphia; Yale U., Chem.
J. W. Woll, Jr., Newtown; Princeton U., Math.

Rhode Island

P. R. Chagnon, Woonsocket; Johns Hopkins U., Phys.
L. Ekstrom, Providence; M.I.T., Chem.
R. Hermann, Kingston; Princeton U., Math.
J. N. Palmieri, Providence; Brown U., Phys.

South Carolina

V. W. Laurie, Columbia; U. of South Carolina, Chem.

South Dakota

K. M. Bandt, Revillo; South Dakota Sch. of Mines, Earth Sci.
R. R. Rankin, Draper; South Dakota Sch. of Mines, Earth Sci.

Tennessee

J. R. Cox, Jr., Nashville; Vanderbilt U., Chem.
L. Durand, III, Koxville; Yale U., Phys.
W. P. Flatt, Newbern; Cornell U., Agri.
F. R. Redwine, Chattanooga; U. of Tennessee, Eng.
J. C. Stewart, Sewanee; California Tech., Phys.
A. Stockell, Nashville; U. of Utah, Biochem.
S. G. Taylor, Jr., Memphis; U. of Alabama., Earth Sci.

Texas

W. C. Agosta, Dallas; Rice Inst., Chem.
D. L. Amsbury, Houston; U. of Texas, Earth Sci.
C. L. Barker, Dallas; California Inst. of Tech., Eng.

R. L. Belford, Laporte; U. of California, Chem.
J. E. Cooper, III, Waxahachie; North Texas St. Coll., Chem.
J. W. Cronin, Dallas; U. of Chicago, Phys.
R. F. Curl, Jr., San Antonio; Rice Inst., Chem.
P. L. Donoho, Houston; California Inst. of Tech., Phys.
M. Dworkin, Austin; U. of Texas, Microbiol.
J. F. Gibbons, Texarkana; Stanford U., Eng.
W. C. Herndon, El Paso; Texas Western Coll., Chem.
L. S. Lockingen, Austin; U. of Texas, Biophys.
E. M. Magee, San Augustine; U. of Wisconsin, Chem.
J. B. Marion, Houston; Rice Inst., Phys.
J. S. Mecham, Austin; U. of Texas, Zool.
P. E. Peterson, Denison; California Inst. of Tech., Chem.
I. P. Trotter, Jr., Bryan; Texas A & M, Eng.
G. R. White, Abilene; U. of Wisconsin, Phys.

Utah

D. A. Brodie, Salt Lake City; U. of Utah, Med. Sci.
R. Davis, Provo; Brigham Young U., Microbiol.
D. W. Esplin, Salt Lake City; U. of Utah, Med. Sci.
D. M. Grant, Salt Lake City; U. of Utah, Chem.
R. L. Snow, Salt Lake City; U. of Utah, Chem.

Vermont

N. A. Frigerio, Lyndonville; Yale U., Biochem.
R. C. Woodworth, Bennington; Pennsylvania St. U., Chem.

Virginia

J. H. Boyden, Wytheville; Carnegie Inst. of Tech., Phys.
K. C. Brannock, Independence; Emory U., Chem.
C. E. Coffey, Bristol; U. of North Carolina, Chem.
H. Everett, III, Alexandria; Princeton U., Phys.
M. M. Levine, Charlottesville; U. of Virginia, Phys.
W. W. Rennie, Richmond; U. of Wisconsin, Agri.

Washington

L. L. Anderson, Spokane; U. of Rochester, Biophys.
C. Ballantine, Seattle; Stanford U., Math.
D. M. Fahey, Walla Walla; St. Coll. of Washington., Chem.
M. P. Freeman, Seattle; U. of Washington, Chem.
P. A. Johnson, Seattle; U. of Washington., Eng.
D. B. Masson, Pullman; St. Coll. of Washington., Chem.
D. D. Nyberg, Camas; Oregon St. Coll., Chem.
R. A. Olsen, Pullman; St. Coll. of Washington, Microbiol.
D. L. Peterson, Seattle; U. of Washington., Chem.
C. J. Smiley, Mt. Vernon; U. of California, Earth Sci.
L. E. Wilson, Mount Vernon; U. of Washington, Chem.

Wisconsin

M. Alexander, Madison; U. of Wisconsin, Microbiol.
W. F. Battig, Wauwatosa; U. of Wisconsin, Psych.
R. J. Blattner, Milwaukee; Cambridge U., Math.
F. C. Brown, Madison; U. of Wisconsin, Psych.
S. D. Darling, Appleton; U. of Wisconsin, Chem.
S. C. Frautschi, Madison; Harvard U., Phys.
B. J. Hamilton, Manitowoc; U. of Wisconsin, Bot.
R. N. Hazelwood, Milwaukee; Marquette U., Biophys.
R. J. Holl, Madison; U. of Wisconsin, Phys.
J. W. Humbert, Kohler; U. of Wisconsin, Eng.
W. E. Magee, Madison; U. of Wisconsin, Biochem.
R. J. Plano, Merrill; U. of Chicago, Phys.
J. E. Quinlan, Milwaukee; U. of Arkansas, Chem.
J. W. Riese, Kaukauna; M.I.T., Phys.
D. F. Root, Madison; U. of Wisconsin, Eng.
J. H. Schneider, Madison; U. of Wisconsin, Med. Sci.
E. F. Silversmith, Madison; U. of Wisconsin, Chem.
R. A. Sneen, Menomonie; U. of Illinois, Chem.
E. C. Thiel, Wausau; U. of Wisconsin., Earth Sci.
J. D. Walecka, Wauwatosa; Harvard U., Chem.

Hawaii

A. S. L. Hu, Honolulu; U. of California, Zool.

Meetings and Elections

At the spring meeting of the **AAAS Cooperative Committee on the Teaching of Science and Mathematics** held in Chicago, Apr. 3–4, John R. Mayor of the University of Wisconsin was elected chairman. Dr. Mayor, for several years the representative of the Mathematics Association of America on the committee, succeeds Morris Meister, representative of the National Science Teachers Association. Laurence L. Quill of Michigan State College, representing the Division of Chemical Education of the American Chemical Society, was elected vice-chairman. Bernard B. Watson of the Operations Research Office of Johns Hopkins University, representing the American Association of Physics Teachers, was reelected secretary. Harold K. Schilling of Pennsylvania State University has recently been appointed to represent the AAAS Board of Directors on the committee.

Over 1500 engineering educators will attend the annual meeting of the **American Society for Engineering Education,** June 14–18, at the University of Illinois. The theme this year, "Evaluation of engineering education," will feature a thorough analysis of all phases of engineering education. This will conclude the Society's 2-yr study of the subject.

The meeting will include conferences sponsored by two component organizations of the ASEE, the Engineering College Administrative Council and the Engineering College Research Council. These groups will also hold a joint dinner to commemorate the 50th anniversary of the founding of engineering experiment stations in engineering colleges, a movement that has contributed very substantially to research progress in this country.

Educators and engineers from other countries who are visiting in the United States are cordially invited to attend. Foreign guests should write to Prof. Robert K. Newton, ASEE Housing Chairman, University of Illinois, Urbana, Ill., for information and reservations.

The whole of the 1954 **British Institution of Radio Engineers Convention**—which is being held at the University of Oxford, July 8–12—will be devoted to the application of electronics to industrial controls, processes, and computation. Over 30 papers are being presented, but there will be adequate time and facilities for discussion and demonstration. The program is divided into six sessions which include "Industrial applications of electronic computors," "Electronic methods of testing" (x-rays, ultrasonics, radioactive devices, etc.), and "Electronic control" (transducers, actuators, motor control, magnetic amplifiers, welding, etc.).

The final session, on "How electronics can increase production," will be opened by Sir Walter Puckey, president of the Institution of Production Engineers. For information write to the General Secretary, 9 Bedford Sq., London, W.C.1.

The **Summer Meeting of the American Association of Physics Teachers** will be held at the University of Minnesota, June 28–30, concurrently with meetings of the American Physical Society. In addition to a program of invited and contributed papers, round table

discussions on "Performance-type laboratory tests" and "The preparation of college teachers of physics" are being planned. A group breakfast is also scheduled for the morning of the total eclipse of the sun, which will be viewed from the University Airport.

The **Tennessee Academy of Science** has elected the following officers: pres., Myron S. McCay, University of Chattanooga; v. pres., Fred Wolfe, Vanderbilt University; treas., James W. White, University of Tennessee; sec., Isabel H. Tipton, University of Tennessee. The representative to the AAAS Council is Clinton Baker, Southwestern at Memphis.

Plans have now been completed for outstanding authorities on rocket development, astronautics and allied subjects to participate in the **Third Symposium on Space Travel** to be held at the American Museum-Hayden Planetarium on May 4. Joseph M. Chamberlain, chief astronomer and general manager of the Planetarium will open the program and introduce Arthur C. Clarke, author and rocket authority, who will serve as symposium coordinator. Mr. Clarke will also discuss "Astronautics—the historical perspective." Walter R. Dornberger, missile consultant of Bell Aircraft Corporation, will consider the subject, "Rocketry in Western Europe after World War I." The topic, "Russian rocket developments and their potential application to space flight," will be examined by George Sutton, supervisor of the Aerophysics Department of the North American Aviation Corporation, while R. C. Truax of the Guided Missiles Division of the Navy Bureau of Aeronautics will discuss "A national space flight program."

Harry Wexler, chief of the Scientific Services Division of the U.S. Department of Commerce, Weather Bureau, will discuss, "Observing the weather from a satellite vehicle." Fred S. Singer, professor of physics at the University of Maryland will speak on "The 'MOUSE'—minimum orbital unmanned satellite (earth), for astrophysical research" and Claude E. Shannon of the Technical Staff of Bell Telephone Laboratories will consider "Establishing communication with extraterrestrials." Among the guests expected to attend will be prominent representatives of the fields of astronomy, aviation, engineering, electronics, and medicine.

Necrology

Harold K. Barrows, 80, authority on hydraulic engineering, author, and professor emeritus at Massachusetts Institute of Technology, Cambridge, Mass., Mar. 15; **John E. Blackburn,** 80, retired topographic engineer for the U.S. Geological Survey, Washington, D.C., Mar. 6; **Marston T. Bogert,** 85, authority on synthetic organic chemistry, and professor emeritus at Columbia University, New York City, Mar. 21; **Henry E. Breed,** 76, civil engineer, author, lecturer, and former associate professor of highway engineering at New York University, New York City, Apr. 6; **Richard A. Burian,** 83, internationally prominent physiologist, Iowa City, Apr. 6; **Henry T. Chickering,** 68, pneumonia specialist and former chief of the tuberculosis clinic at Presbyterian Hospital, New York City, Mar. 14; **Cornelius J. Connolly,** 71, author and former head of the Department of Anthropology at Catholic University, Washington, D.C., Apr. 5; **Arnold Dresden,** 72, author, professor emeritus of mathematics, and chairman of the Department of Mathematics and Astronomy at Swarthmore College, Swarthmore, Pa., Apr. 10; **John F. Erdmann,** 90, professor emeritus of surgery at University Hospital, New York City, Mar. 27; **C. P. Fenwick,** 63, director of medical services for the Canadian Army in World War II, Montreal, Canada, Mar. 20; **Ludwig Jekels,** 87, psychiatrist and author, New York City, Apr. 3; **Sir Nelson Johnson,** 61, director of the Meteorological Office, London, England, Mar. 23; **Michael S. Kovalenko,** 65, retired assistant professor of mathematics and astronomy at Swarthmore College, Swarthmore, Pa., Apr. 2.

Clarence G. Lane, 71, author, professor emeritus, and former head of the Department of Dermatology at the Harvard University Medical School, Boston, Mass., Mar. 12; **Ralph M. Lecomte,** 68, retired professor of urology at Georgetown University Medical School and director of the Washington Medical Center, Washington, D.C., Mar. 11; **Jacques M. Le Mee,** 72, surgeon, author, and otorhinolaryngologist, Paris, France, Mar. 26; **Richard W. Linton,** 55, research chemist, author, and special assistant to the director of the International Department at Lederle Laboratories, Pearl River, N.Y., Mar. 29; **Fritz London,** 54, chemical physicist, author, and professor of physics at Duke University, Durham, N.C., Mar. 30; **Auguste Lumière,** 92, physician, physicist, chemist, botanist, inventor, and author, Lyon, France, Apr. 10; **Urban Maes,** 75, former professor and head of the Department of Surgery at Louisiana State University School of Medicine, New Orleans, La., Mar. 15; **Howard J. Milks,** 74, professor emeritus of therapeutics and small animal diseases in the New York State College of Veterinary Medicine at Cornell University, Ithaca, N.Y., Mar. 30; **Albert W. Morris,** 74, research metallurgist and inventor, Springfield, Mass., Apr. 1; **Oliver S. Ormsby,** 80, author and professor emeritus of dermatology at the University of Illinois College of Medicine, Chicago, Ill., Apr. 9; **Edsel A. Ruddiman,** 89, former professor of pharmacy and materia medica at Vanderbilt University, author, and research chemist for the Ford Motor Co., Detroit, Mich., Mar. 21; **Horace Seely Brown,** 77, professor emeritus of mathematics at Hamilton College, Clinton, N.Y., Mar. 27; **Willard Thompson,** 55, endocrinologist and clinical professor of medicine at the University of Illinois College of Medicine, Chicago, Ill., Mar. 23; **S. Burt Wolbach,** 73, eminent pathologist, retired Shattuck Professor of Pathological Anatomy at the Harvard Medical School, and director of the division of nutritional research at the Children's Medical Center, Boston, Mass., Mar. 19.