

News and Notes

Current Thoughts in the History of Science

A truism now widely believed is that science is more genuinely understood by one who is familiar with its historical background and, conversely, that history which fails to include an account of scientific development is but half the story—and perhaps not the better half. But things taken for granted easily may be overlooked; and a report on recent work in the history of science may serve as a reminder of the part that this relatively young discipline plays in relation to the traditional subjects of which Herodotus and Thales are said to be the founding fathers.

One might expect that a paper on “The true place of astrology in the history of science” would be of interest primarily to the antiquarian; and yet when Lynn Thorndike (Columbia University) spoke on this topic at the annual meeting of the History of Science Society in New York, 29–30 Dec. 1954, the result was a lively discussion of the aims of modern science. The main thesis of Thorndike’s paper was that the basic characteristics of the science of our times can be found in medieval astrology. The detection of regularities was then, as now, one of the chief aims; the tendency to fuse all sciences into one was just as pronounced then as today; the use of mathematical method was as much a part of Kepler’s astrology as of his optics; and the principle of causation and the hypothesis of universal natural law were clearly in evidence in the medieval astrological belief that it was appropriate for higher bodies (the heavens) to govern the lower (including man), or, in other words, for celestial virtues to generate terrestrial results. Any comparison of medieval astrology with modern science must, of course, distinguish between the legitimate and the spurious, between natural and judicial astrology; and such distinction was clearly made during the Middle Ages.

In commenting on this paper, Francis R. Johnson (Stanford University) pointed out that, if astrology held that the stars incline but do not compel, this is not very different from the modern doctrine of the inheritance of a tendency toward a disease. Comment from the floor suggested that a universal principle, such as “God wills it,” from which all phenomena are deducible as consequences, may in itself, by explaining everything, explain nothing; and a fragmentarian view of science may well be preferred to the assumption of a broad general law that cannot be tested.

Comparison of the science of earlier days with that of today was made also in other papers of the session devoted to *Medieval and Early Modern Science*. Francis J. Carmody (University of California) presented “Notes on Thabit b. Qurra’s astronomical works,” in which revisions in data from Ptolemy and early Arabic writers were indicated. It was on the basis of the accumulated mass of stellar observations that Thabit was led to accept the now outmoded theory, known

as trepidation, that the precession of the equinoxes was subject to an oscillatory variation.

In a paper on “William Gilbert and experimental science,” Duane H. D. Roller (University of Oklahoma) pointed out that the word *experiment* meant different things to Gilbert and Galileo. For Galileo, who was interested in a theoretical structure that permitted extensive scientific prediction, the word sometimes designated what now should be referred to as a “thought experiment.” In spite of the single-mindedness of the author of *De magnete*, Gilbert was less concerned with theoretical unity than with specific experiences. (Although he accepted the diurnal rotation of the earth, he seems not to have been concerned with the other Copernican motions.) And yet in his work one discerns two types of “experiments,” those which he had carried out for himself, and others which clearly were not intended to be performed. In view of the scanty knowledge concerning Gilbert’s life, Roller called attention to certain persistent biographical errors.

The meeting of the History of Science Society opened with a session on *Science in Antiquity*; here, too, there was an emphasis on relationships to modern counterparts. This was most pronounced in the “Remarks on ancient psychopathology” by I. E. Drabkin (City College of New York). It was remarked that Greek science held mental derangement to be a disease which was to be approached rationally and treated naturally. The role of heredity, the effects of body constitution (especially through humoral imbalance), and the importance of psychotherapeutic and somatic measures were appreciated. Violent measures, equivalent to shock treatment, generally were shunned for gentle and sympathetic approaches.

A different way of relating ancient and modern thought was suggested by Mark Graubard (University of Minnesota) in a demonstration of the use of “Ancient instruments in teaching modern science.” Graubard displayed devices that he had constructed for use in classes to stimulate interest in the science of remote periods. He reported that nothing serves so effectively to awaken in the blasé college student a wholesome respect for the work of Ptolemy as the awareness that modern mechanical astronomical models, including planetaria, are without exception Ptolemaic rather than Copernican.

An unfamiliar facet of Ptolemy’s work was presented in the opening paper of the meeting by William D. Stahlman (Massachusetts Institute of Technology), speaking on “Ptolemy’s post-Ptolemaic cosmology.” Stahlman pointed out that in a treatise on the *Hypotheses of the Planets*, composed after the better known *Almagest*, Ptolemy had advocated, presumably under Platonic influence, the use of “sphere pieces” in a physical representation of the geometric scheme of cycles and epicycles. The use of complete spheres in the celestial mechanism was felt to be a violation

of the principle of parsimony; and by the same type of reasoning, Ptolemy postulated for the ether an east-to-west motion in which the planets shared, thus simplifying the necessary celestial gear mechanism.

Science and the French Revolution was the theme of a joint session with the American Historical Association. L. Pearce Williams (Yale University), speaking on "The organization of science during the Revolution," pointed out that France had been far behind England in encouraging inventiveness, and that when such a program was undertaken by decree of the Assembly in 1790, the main emphasis was on agriculture. The provincial academies had become inactive, following 1789; but by 1805 there were at least 70 French agricultural societies. Napoleon appreciated more fully the importance of industrial enterprise, but developments in this direction were obstructed by his international policies.

Another aspect of scientific organization was presented by Henry Guerlac (Institute for Advanced Study) in a paper on "The anatomy of vandalism." Guerlac analyzed factors underlying the attack on the Académie des Sciences which led to its dissolution in 1793, at a time when the prestige of the Jardin du Roi (later the Musée d'histoire naturelle) was in the ascendant. It was indicated that the Académie, which stressed mathematical and physical science, had been attacked by Rousseau, an enemy of formal science, and later by Marat; the science of the Jardin, on the other hand, was more compatible with Romanticism and the Cult of Civic Virtue which Robespierre had embraced. In other words, the Jardin, rather than the Académie, was the guardian of "approved science." Then, too, the more conservative wing of the Académie, of which Lavoisier was a guiding spirit, had triumphed over the more liberal faction of which Condorcet was the spearhead, with the consequence that the affairs of the Académie remained closely linked with the royal government. The Jardin, during the early years of the Revolution, included a significant number of younger men who, carrying the institution toward the Left, had placed themselves under the Assembly as the Jardin des Plantes.

In the third paper of the session, Paul Beik (Swarthmore College) presented "Some reflections of the revolution in political science." Comparing Robespierre's suspicion of government by the majority with Condorcet's faith in representative government, Beik concluded that Condorcet was right in the wrong century. In commenting on the papers of this session, Pierre Donzelot, permanent representative of French universities in the United States and formerly president of the Jardin des Plantes, pleaded for a sympathetic judgment on the closing of the Académie, attributing this error to stress during a period of crisis, rather than to antiscientific bias.

The fourth session, on *American Science in the Colonial Period*, centered about Puritan and Quaker faith and scientific activity. Margaret Denny (University of Rochester), in a paper on "The science of two Puritans of Massachusetts Bay," noted similari-

ties between the duties of a fellow of the Royal Society and the obligations of a Puritan under the Doctrine of the Covenant. The Puritan training of Cotton Mather and Paul Dudley, with its emphasis on zealous cooperation and the idea that the study of nature is an aid to religion, was appropriate to their later election to the Royal Society, for the fellowship of saints was not so different from that of scientists. However, church rivalry, personal antipathy, and strong individualistic tendencies made the lines of communication with England stronger than those between the Colonists themselves.

Brooke Hindle (New York University) made a somewhat corresponding analysis of "The 'Near' Quakers of Philadelphia and the American Philosophical Society." Hindle noted that it was not exclusively the moderate or Puritan background that furnished fertile ground for the growth of science. The Quakers, with their rational pursuit of knowledge, and more especially through their concern for things rather than words, were among the radical sects with scientific proclivities; and it was peripheral Quakers, former Quakers, and "near" Quakers who were important in the formation in 1769 of the American Philosophical Society, even though the Quakers were at the time a minority of roughly 13 percent in Philadelphia. Perhaps, too, Quaker inhibitions played a part here, for the wealthy Philadelphians evinced but little interest in science.

The picture of Quaker influence in science was continued by Frederick B. Tolles (Swarthmore College) in an account of "The scientific activities of James Logan." Tolles lauded especially Logan's contributions to botany and mathematics, calling him "the most distinguished American scientist before Franklin." Logan made, independently of Mather, observations on sexuality in plants; and he submitted to the Royal Society a paper in which he simplified the calculations of Huygens.

In commenting on the papers of the session, I. Bernard Cohen (Harvard University) called attention to the fragmentary state of knowledge of scientific activity in other colonial religious communities, such as that of the Huguenots. Cohen pointed out also that Franklin had been able to make an easy transition from the society of Boston to that of Philadelphia; but since he was so successful also in adjusting to British and French modes of life, this may simply be a mark of his versatility. Noting that Quaker empiricism did not lead to deep mathematics or to a truly great scientific discovery, Cohen conjectured that perhaps a great scientist is a freak of nature rather than a product of his environment.

The meeting of the History of Science Society closed with the annual dinner. Dorothy Stimson, president of the society, presided and introduced the speaker of the evening, Raymond J. Seeger, assistant director of the National Science Foundation. In an address entitled "On the history and philosophy of science," Seeger called attention to characteristics of the separate disciplines designated by the nouns in

the title and then to the functions of the history and philosophy of science. He pointed out that the National Science Foundation is prepared to encourage and support projects in the fringe area between natural science and social science, including in particular the field of the history of science. This assurance was a fitting note on which to close the meeting of the History of Science Society, for in a general sense the theme of the meeting had been the part that the history of science can play in the understanding of modern science.

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Science News

The Joint Congressional Committee on Atomic Energy has established an eight-member citizens' panel to help expedite the peaceful uses of nuclear energy. Robert McKinney, editor and publisher of the *Santa Fe New Mexican*, will be chairman of the group of scientists, industrialists, and civic leaders. He is a former Assistant Secretary of the Interior, and during World War II he served as a lieutenant in the U.S. Navy's Bureau of Ordnance. Other panel members are Ernest R. Breech of Detroit, chairman of the Ford Motor Co.; George R. Brown of the construction firm of Brown and Root, Houston, Tex., chairman of the Texas Eastern Transmission Co., and a former member of President Truman's Materials Policy Commission; Sutherland C. Dows of Cedar Rapids, Iowa, chairman of the Iowa Light and Power Co.; John R. Dunning, physicist and dean of engineering, Columbia University, and director of the Oak Ridge Institute of Nuclear Power; Frank M. Folsom, president of the Radio Corporation of America, New York; T. Keith Glennan, president of Case Institute of Technology, and former member of the AEC; and Samuel B. Morris, general manager and chief engineer of the Los Angeles Dept. of Water and Power, and chairman of the atomic energy commission of the American Public Power Association.

The panel, which may be enlarged, will have four main duties:

- 1) To appraise the present and future impact of all aspects of the development of atomic energy on our way of life, economy, industry, and natural resources, including the effect upon employment. While this appraisal will be concerned principally with the peaceful applications of atomic energy, it must take into consideration its military applications as they affect or concern peaceful uses.

- 2) To consider the effects of the application of atomic energy upon industries abroad. Although the study will be concentrated upon United States industry and economy, it must take into account the interlocking effects that such development and application abroad might have on our own economy and industries.

- 3) To study the activities of the Atomic Energy Commission as they affect the foregoing, both in the

AEC programs directed toward developing peaceful uses of atomic energy and in the AEC role as the regulatory agency.

- 4) To recommend to the Joint Committee any legislative or policy actions needed to speed the development, under both Government and private auspices, of peaceful uses of atomic energy.

The National Academy of Sciences will undertake a broad appraisal of the effects of atomic radiation on living organisms and will seek to identify questions upon which further intensive research is urgently needed. This project was announced on 8 Apr. by Detlev W. Bronk, president of the National Academy. The study has been assured financial support by the Rockefeller Foundation, which has already made an initial grant for planning purposes.

Lewis L. Strauss, chairman of the U.S. Atomic Energy Commission, has assured the Rockefeller Foundation and the National Academy of the commission's full cooperation. Extensive investigation of radiation effects has been sponsored by the commission since its establishment, and data obtained from this research will be made available for the new study. Expenditures for the AEC's biological and medical program have totaled more than \$165 million since 1950, and more than half of this sum has been expended for research on the effects of atomic radiation on living organisms.

Wide differences of opinion exist regarding the nature and degree of human hazards involved in the use of atomic energy, and Bronk said that the academy welcomed the opportunity to make a dispassionate and objective effort to clarify the issues, which are of grave concern, as well as of great hope, to mankind.

The academy will appoint a committee of scientists, supported by an appropriate staff, to carry out the study. Some of the committee members will have an intimate contact with the work of the Atomic Energy Commission and will, therefore, be particularly well informed concerning the background of the problems under consideration. The investigations, deliberations, and ultimate reports of the committee would deal with all phases of the biological effects of the increasing use of atomic energy. The study will collect and evaluate scientific information bearing on these problems; formulate whatever conclusions are, in its judgment, warranted by the available evidence; identify problems that require further research; and initiate such investigations. A searching appraisal of the state of medical knowledge regarding therapy and protection is also envisioned. Finally, the academy will evaluate the availability of information to scientists, physicians, and the general public.

Harvard University has received a grant of \$132,000 from the National Science Foundation for the construction and operation of a 60-ft parabolic radio-telescope antenna to be located at the George R. Agassiz Station of the university observatory. The radio-telescope installation will be able to receive and plot

radiations from neutral hydrogen atoms in interstellar space. It overcomes limitations of optical telescopes, which, with the aid of photography, must confine astral scanning to areas only slightly beyond the visual wavelengths of light. It penetrates the cosmic dust clouds and water vapor of the earth's atmosphere that seriously hamper or cut off optical viewing. Donald H. Menzel, director of the Harvard College Observatory, estimates that construction of the radiotelescope, which will be the largest university-operated one in the United States, will be completed in about 1 yr. The new telescope will supplement a 24-ft radiotelescope (also sponsored by NSF) that has been operating at the Agassiz Station since 1953.

The new antenna will permit more accurate plotting of the sources of radio energy than the 24-ft antenna, because its beam width will be about 0.5° compared with the older antenna's beam width of 1.5° . Therefore it is expected that investigations of the fine details of the spiral structure of the Milky Way system, as well as studies of "radio stars," can be carried out.

Physicists have known since the 1930's that the neutral hydrogen atom produces microwave radiation. H. C. van de Hulst of Leiden, Holland, theorized in 1944 that the radiation resulting from changes in the relative orientation (parallel to antiparallel) of the magnetic axes of the proton and the electron in the hydrogen atom—which had already been demonstrated in the laboratory—would also occur in space. He placed the wavelength of radiation at 21 cm. Although such changes would probably be relatively rare occurrences, Van de Hulst reasoned that there were enough neutral hydrogen atoms performing at any one time to permit detection of the radiation by sensitive receivers. The radiation on the 21-cm band was first observed by Ewen and Purcell in 1951 and very shortly thereafter by J. H. Oort, C. A. Miller, and Van de Hulst in Holland, and by Australian radio astronomers. The Dutch astronomers then began radio exploration of the spiral structure of the galaxy.

The radiotelescope permits the blending of the results of electronic and optical observations. The radiotelescope is an extension to astral explorations. Optical astronomy is confined to about 5 octaves of the electromagnetic spectrum. The radiotelescope adds 12 octaves to the observable electromagnetic spectrum. Its range in wavelength is from less than 0.5 in. to 100 ft.

Astronomers are generally agreed that there are at least two varieties of stellar "broadcasting stations." One is the relatively motionless hydrogen gas that makes up most of the matter in interstellar space and an estimated 10 percent of the Milky Way. The other is known as a discrete radio source or radio star that appears to be associated with highly turbulent gas masses.

The radiation signals are received by the parabolic reflector and focused on a small dipole that picks up the signal and converts it to electric energy. The resulting current is fed into a receiver where it is amplified and transferred graphically to a pen moving

across a sheet of paper. The graphs reveal the shape and extent of particular gaseous spiral arms in the Milky Way system or the amount of neutral hydrogen along a particular line-of-sight. The result is in effect a new mapping of space, giving electronic form to outer and hitherto optically unseen regions.

Studies of sites in space where new stars may now be forming make up one of the major research programs now under way at the Agassiz Station. These sites are small and very dense clouds of cosmic dust, marked by concentrations of neutral hydrogen. Many astronomers believe these clouds to be likely sources for the birth of new stars.

Another of the Agassiz Station research projects concerns planned regional surveys of the spiral structure of our galaxy. Some 200 galaxy "centers" are now under study. Two-thirds of the studies are concerned with the relationships between cosmic dust and gas, the remainder with spiral structures.

Observations on the first living coelacanth are reported by James Millot, director of the Institut de Recherche Scientifique de Madagascar, in the 26 Feb. issue of *Nature* (p. 362). The eighth *Latimeria* to be captured since 1938, the specimen was caught at a depth of 255 m on 12 Nov. 1954, about 1000 m offshore opposite Mitsamudu jetty. The fish, a near-adult female, weighed 41 kg and measured 1.42 m in length.

Biological observations of the previous specimens were impossible because the fishermen either battered the fish to death with oars or killed it with harpoons and knives to prevent it from struggling and making it difficult to hoist the fish into the narrow pirogue. The fishermen also feared to tow the fish into harbor because a shark or barracuda might take the fish and lose them the reward. Because of these difficulties, a double reward was offered for a live coelacanth.

The eighth *Latimeria* was placed in a sunken small boat off the end of the jetty about 11:30 P.M. It lived there for nearly 24 hr. It was observed that the fish was very dark grayish-blue in color and that the fins had clearer gray-blue reflections. "The greenish-yellow luminescence of its eyes was very pronounced. . . ." The fish swam slowly by "curious rotating movements" of its pectoral fins,

. . . While the second dorsal and anal, likewise very mobile, served together with the tail as a rudder. After daybreak it became apparent that the light, and above all the sun itself, was upsetting the animal very much, so several tent canvases were put over the boat to serve as some kind of protection. But despite this precaution and the more or less constant renewal of the water, the fish began to show more and more obvious signs of distress, seeking to conceal itself in the darkest corners of the whaler.

At 14:45 hr. it was still swimming feebly; but at 15:30 hr. it had its belly in the air and only the fins and gill-covers were making agonized movements.

It was then covered with a sheet and taken immediately to the hospital. There was not a scratch on it, apart from a tiny incision in the centre of the anterior part of the floor of the mouth made by the

fisherman when recovering his hook. Altogether, it was in remarkably good condition, without any rupture of the viscera or suffusions of blood. . . .

Chemical and histological investigations could be made under the best possible conditions on perfectly fresh tissues. . . .

Two principal conclusions emerge from the corroborated statements made by local observers and by myself: (1) the extreme photophobia of *Latimeria*—the sunlight seemed literally to hurt it; (2) the exceptional mobility of the pedunculate fins, correlated with the wealth of musculature which is revealed by anatomical studies. The pectorals, in particular, can move in almost any direction and show themselves capable of assuming practically every conceivable position.

Millot feels that the only way to keep a coelacanth alive for a longer period is by construction of a large cage that could be kept submerged at 150 to 200 m most of the time but could be hauled to the surface for short periods of observation.

Scientists in the News

Norman Dott, professor of surgical neurology, Edinburgh, will deliver the annual Hughlings Jackson memorial lecture, which will be held this year on 13 May in the Montreal Neurological Institute. He will discuss the common features in brain displacements by tumors, by hemorrhage, and by violence.

Karl Lark-Horovitz, head of the department of physics at Purdue University, Lafayette, Ind., is discussing "Irradiation physics of semiconductors" as a Sigma Xi national lecturer at a number of colleges, universities, and research laboratories during this month and next.

H. Limburg, professor of obstetrics and gynecology at the University of Hamburg, Germany, delivered a lecture on "The early diagnosis of cancer in the female genital tract" on 7 Apr. at the University of Texas Medical Branch.

Clifford G. Fick, who has been with General Electric since 1925, has been appointed manager of the research liaison services section of the Research Laboratory at Schenectady. In his new capacity, Fick will direct the activities of the laboratory's liaison scientists, a group responsible for maintaining a two-way flow of information between the Knolls Atomic Power Laboratory and the operating components of the company.

C. Harold Berry, Gordon McKay professor of mechanical engineering at Harvard University and a leader in the field of heat engineering, will retire this summer. Prior to joining the Harvard faculty in 1928, Berry served as assistant to the chief engineer of the Detroit Edison Co. and as associate editor of *Power* magazine. For 25 yr he was a member of the Power Test Codes Committee of the American Society of Mechanical Engineers and chairman of the Individual Committee on Test Codes for Steam Turbines. Re-

cently he was appointed to a committee advisory to the director of the National Bureau of Standards in the field of heat and thermodynamics.

Berry has been a frequent contributor to various technical publications. His book, *Flow and Fan* (1954), dealing with ventilating systems, is an outgrowth of a series of lectures presented at the Harvard School of Public Health. He has served as adviser and expert witness in damage suits and patent infringement litigation involving mechanical and engineering equipment.

In 1912 Berry received the M.E. degree from Cornell University and in 1916 the M.M.E. He was an instructor and assistant professor of heat power engineering at Cornell from 1913 to 1918. During the first world war he was with the Inspection Division, U.S. Army Ordnance Department, as a civilian.

Chauncey D. Leake, professor of pharmacology and toxicology, and of the history and philosophy of medicine and public health at the University of Texas Medical Branch, Galveston, has resigned his position as executive director of the Medical Branch, which he has held since 1942. He will continue to act as director until his successor is chosen. Leake, who is a member of the AAAS board of directors, plans to devote more of his attention to pharmacology and the history of medicine.

During Leake's administration the number of students and staff doubled, endowments were brought to more than \$1 million, and the value of land and buildings at the Medical Branch quadrupled. Also during this period the number of approved residencies in the John Sealy Hospital was expanded to 18, the number of residents in specialty training increased from 20 to 150, and the number of beds in the hospital available for teaching purposes rose from 400 to 930. In addition, five clinical departments were placed on a full-time basis and 16 special research laboratories were established. Recently the James W. McLaughlin fellowship program in infectious diseases and immunity was developed. Leake also founded *Texas Reports on Biology and Medicine* in 1943.

Chester A. Arents, coordinator of research and professor of mechanical engineering at Illinois Institute of Technology since 1947, has been appointed dean of West Virginia University's College of Engineering. He will succeed **R. P. Davis**, who will retire in June after 44 yr of service.

For the invention of the transistor, **Walter H. Brattain** of Bell Telephone Laboratories and **John Bardeen**, professor of physics and electrical engineering at the University of Illinois since 1951, have received John Scott medals and \$1000 premiums from the board of directors of City Trusts of Philadelphia, which administers the award.

Brattain has been associated with Bell Laboratories as a research physicist since 1929. Initially his work was concerned with thermionics, particularly the study of electronic emission from hot surfaces. He also car-

ried on investigations of frequency standards, magnetometers, and infrared phenomena, and for about 20 yr has specialized in the physics of semiconductors.

Bardeen was an assistant professor of physics at the University of Minnesota from 1938 to 1941 and served with the Naval Ordnance Laboratory as a physicist for 4 yr during World War II. On joining Bell Laboratories as a research physicist in 1945, he was primarily concerned with theoretical problems in solid-state physics, including the study of semiconductors. In the course of this work, he and Brattain invented the point-contact transistor.

Arthur Knudson, professor and chairman of the department of biochemistry at Albany Medical College since 1921, will retire as chairman on 30 June but plans to continue in academic work for several years. An expert on the metabolism of cholesterol, which has gained prominence in recent years because of its association with arteriosclerosis, Knudson is well known for his studies on vitamin D and its formation by ultraviolet and other irradiation. He has also carried out experiments on biochemical effects produced by exposure to diathermy, a method of producing artificial fever. On leave of absence from the medical college from 1951 to 1953, Knudson gained wide recognition for his work in the establishment of an experimental nutrition laboratory in Bangkok, Thailand.

The 1955 Research Medal award of the Columbia University Committee on Dental Education has been presented to **Joseph L. T. Appleton**, dean emeritus of the Thomas W. Evans Museum and the School of Dentistry of the University of Pennsylvania "in recognition of [his] lifetime of scholarship and research in dentistry."

Gordon H. Seger, formerly executive officer of the National Cancer Institute, has been appointed chief of extramural programs at the National Institute of Neurological Diseases and Blindness in Bethesda, Md. His new duties involve planning and supervision of the institute's programs of research grants, research fellowships, training grants, and traineeships. He succeeds **Edward P. Offutt**.

Carl N. Shuster, Jr., formerly of Rutgers University, has been appointed director of the Marine Laboratory, department of biological sciences, at the University of Delaware at Lewes. He replaces **L. Eugene Cronin**, who resigned to accept the directorship of the Chesapeake Biological Laboratory at Solomons Island, Md.

Wilson D. Leggett, Jr., rear admiral, USN, chief of the Navy's Bureau of Ships, was appointed vice president of engineering of American Locomotive Co. on 31 Mar., when he retired from the Navy. Under Leggett's leadership, nuclear propulsion for ships became a reality with the completion of the submarine *Nautilus*. Other achievements during his 20-mo tenure as bureau chief include construction of the Forrestal-class of

aircraft carriers and many other new combat ships.

Leggett was formerly commanding officer of the U.S. Naval Engineering Experimental Station, Annapolis, Md. He served overseas during both world wars and was particularly commended for his skillful organization and supervision in the Pacific theater of an effective repair program for battle-damaged fleet units, a program that enabled them to return to duty in minimum time.

In an earlier assignment with the Bureau of Engineering, Leggett was in charge of internal-combustion engine development for all purposes and complete machinery installations for submarines and motor vessels. He was instrumental in initiating and completing a program of diesel-engine development that completely freed the Navy from dependence on German designs and made possible the diesel-electric propulsion that proved to be so successful in World War II.

Meetings

The 47th annual meeting of the **Air Pollution Control Association** will be held in Detroit, 22-26 May. Air pollution control experts from the United States and Canada will report on the latest findings in smoke abatement, air pollution measurements, odor control, and new developments in abatement equipment.

Other technical sessions include "The effect of pollutants on plants and animals" by D. M. Thomas of Stanford Research Institute, and "Meteorological effects" by Maynard Smith, consultant for the Brookhaven National Laboratories. For information write the association headquarters at 4400 Fifth Ave., Pittsburgh 13, Pa.

The 22nd Legislature of the State of New Mexico has passed a resolution, introduced by Senator W. C. Wheatley, to commend the AAAS, the University of New Mexico, and the New Mexico Institute of Mining and Technology for their various contributions to the **International Arid Lands Meetings** that are to be held in Albuquerque and Socorro, 26 Apr.-4 May. The resolution points out that water is the most important resource in New Mexico and in the Southwest as a whole, and indicates that the forthcoming meetings, which will bring together arid lands experts from all parts of the world, may well have results of great value. Governor John F. Simms signed the joint resolution on 21 Mar.

Members of the Naval Research Reserve will discuss **research methodology** in a seminar at the Ohio State University and Battelle Memorial Institute, 13-25 June, under the sponsorship of the Office of Naval Research. The program is planned to encourage maximum audience participation. Talks by skilled investigators will be alternated with small-group discussions in which NRR members will explore topics of interest in more detail. In final sessions, the groups will meet together to summarize their separate findings and question the original speakers further.

Basic concepts in research in the physical, biolog-

ical, and social sciences will be considered, as well as their applications to naval problems. Attention will be directed particularly to correlations between methods and such factors as number and kinds of variables, degree of control, precision, of measurement, and the historical development of the science.

The 5th annual **Conference on Diseases in Nature Transmissible to Man**, under the auspices of the Texas State Health Department, will be held at the University of Texas Medical Branch, Galveston, 22-23 Apr. Visitors will be in attendance from the United States, Mexico, and Canada. Local arrangements are being made by Morris Pollard, professor of preventive medicine and public health.

The 87th annual meeting of the **Kansas Academy of Science** will be held 5-7 May at the University of Kansas. The history of science in Kansas, water, and scientific hobbies will be featured lecture topics at the general sessions. These subjects will be discussed respectively by Robert Taft, professor of chemistry at the University of Kansas and editor of the *Transactions of the Kansas Academy of Science*; Harold E. Thomas, ground-water geologist of the U.S. Geological Survey, Salt Lake City, Utah; and A. C. Carpenter, president of the academy.

The 9th annual meeting of the **American Electroencephalographic Society** will take place at the Palmer House in Chicago, 10-12 June, immediately preceding the annual meeting of the American Neurological Association. In addition to the regular sessions, there will be two symposiums; one on microelectrodes under the chairmanship of Herbert H. Jasper, and another on clinical EEG interpretation (head injuries) under the chairmanship of Frederic A. Gibbs.

Education

The **Wayne University Computation Laboratory** has announced summer courses that will take place 6 June-25 July. Four major areas are to be covered: electronic computers and their business and engineering applications; automatic data processing; mathematical programming of management problems; and numerical methods and advanced programming techniques. In addition to the regular staff, visiting experts in the respective fields will conduct the lectures, discussions, and workshops. For information write to A. W. Jacobson, Director, Computation Laboratory, Wayne University, Detroit 1, Mich.

The University of Florida, North Carolina State College, Virginia Polytechnic Institute, and the Southern Regional Education Board are jointly sponsoring a series of cooperative **summer sessions in statistics**. The first of these cooperative graduate sessions took place during 1954 at V.P.I.; the second will be held at the University of Florida 20 June-29 July. A session is scheduled to be held at North Carolina State College in 1956, and another at V.P.I. in 1957.

The summer courses are designed to carry out a

recommendation of the Southern Regional Education Board's Advisory Commission on Statistics, on which the three institutions initiating the program are represented. The sessions will be of particular interest to (i) research and professional workers who want intensive instruction in basic statistical concepts and who wish to learn modern statistical methodology; (ii) teachers of elementary statistical courses who want some formal training in modern statistics; (iii) prospective candidates for graduate degrees in statistics; (iv) graduate students in other fields who desire supporting work in statistics; and (v) professional statisticians who wish to keep informed of advanced specialized theory and methods.

Each of the summer sessions will last 6 wk, and each course will carry approximately 3 semester-hours of graduate credit. The program may be entered at any session, and consecutive courses will follow in successive summers. This work in statistics may be applied as residence credit at any one of the co-operating institutions, as well as at certain other institutions, in partial fulfillment of the requirements for a master's degree. The catalog requirements for the degree must be met at the degree-granting institution. Each doctoral candidate should consult with the institution from which he desires to obtain the degree regarding the applicability of the summer courses in statistics.

The total tuition fee will be \$35; the holder of a doctorate degree, upon acceptance, may register without the payment of any fee. Inquiries should be addressed to Prof. Herbert A. Meyer, Statistical Laboratory, University of Florida, Gainesville.

A 2-yr training program in which 450 technicians participated has recently concluded at the prosthetics training center of the **University of California**. Under this program, orthopedists, therapists, and artificial-limb makers were instructed in the latest techniques of making and fitting artificial limbs as perfected in a research program carried on in U.C.L.A.'s engineering department since 1945 in cooperation with the Veterans Administration and the National Research Council.

Since completion of the training program, the prosthetics training center has been reorganized into three separate projects: (i) the continuation of artificial-limb research under Craig Taylor; (ii) research on special problems in fitting growing children with artificial limbs; (iii) the educational aspects of artificial limbs, including teacher training and literature publication.

St. John's University of New York has announced the scheduling of a science-pharmacy building at the university's new suburban campus in Hillcrest, Queens. Present plans call for a \$2.5-million structure, with construction to commence when about half this amount has been raised. The building will include a general science library, lecture halls seating 240 students, lecture rooms seating 90, and many student and faculty research laboratories.

In the Laboratories

The Atomic Energy Commission has announced that an agreement has been signed by the commission and by the **Baldwin-Lima-Hamilton Corp.** of Philadelphia, Pa., and the **Denver and Rio Grande Western Railroad Co.** of Denver, Colo., for a study of a nuclear-powered reciprocating engine under the AEC's industrial participation program. The companies will weigh the engineering, technical, and economic aspects of an engine of this type and make recommendations concerning the role of industry in carrying out its development. There are many potential applications of a power generating unit of the kind to be studied, including locomotive propulsion. This is a 1-yr project that will be financed entirely by the companies.

Associated Chemical Engineers, a consulting partnership with offices at 5118 Beeler St., Pittsburgh, Pa., has been established by R. B. Beckman, L. N. Canjar, R. R. Rothfus, H. L. Toor, and D. H. Archer of the department of chemical engineering at Carnegie Institute of Technology.

The consulting firm is a full-time, integrated organization serving the petroleum, chemical, and allied process industries. It will undertake short- or long-range problems in the fields of research, evaluations, and management assistance.

North American Aviation is developing the SM-64 Navaho long-range, surface-to-surface guided missile, the U.S. Air Force has disclosed. Details of the missile and its performance were not revealed.

Work on the SM-64 Navaho has been underway for some time in North American's Missile and Control Equipment operations (MACE) at Downey, Calif. Started in 1945, North American's MACE operations are engaged in all major phases of missile airframe design, rocket engine propulsion, and automatic guidance and control equipment.

The U.S. Atomic Energy Commission has approved a study of reactor technology by **Combustion Engineering, Inc.**, under the Industrial Participation Program. Combustion Engineering, manufacturer of steam generating units, will study design and evaluation of large reactors for central station power production and of small size reactors for special applications, design of reactor fuel elements, and development of fuel element fabrication processes. Work has started on new \$7-million facilities at the company's Chattanooga, Tenn., division.

Convair Division of General Dynamics Corp. has engaged 14 scientists as consultants for the consideration of special problems in the development of military aircraft and missile systems for which Convair is responsible to the armed services. The group also will study problems of basic nuclear research and the industrial applications of nuclear power.

John J. Hopkins, chairman and president of General Dynamics, did not mention the type of "missile systems" the group will work on. It is known, how-

ever, that Convair is at work on Atlas, an intercontinental guided missile.

The scientists engaged are Hans A. Bethe, Cornell University; Kenneth M. Chase, University of Michigan; Charles L. Critchfield, University of Minnesota; Mark M. Mills and Edward Teller, University of California; John A. Wheeler, Princeton University; Robert F. Mehl, Carnegie Institute of Technology; Frederick Seitz, University of Illinois; Lan Jen Chu, Massachusetts Institute of Technology; Richard Courant and Peter D. Lax, New York University; Milton S. Plesset, California Institute of Technology; L. Whipple, Harvard University; and Theodore von Karman, chairman of advisory group on aeronautical research and development, North Atlantic Treaty Organization.

Miscellaneous

The Smithsonian Institution announced 29 Mar. that for a limited time it is offering for sale copies of nine numbers of the **Harriman Alaska Expedition Reports (1910-1914)**. These large cloth-bound volumes are being offered for \$1.25 each (postpaid). Requests and remittances should be sent to the Editorial and Publications Division, Smithsonian Institution, Washington 25, D.C. The volumes available are on glaciers and glaciation; geology and paleontology; cryptogamic botany; insects; crustaceans; nemertans; bryozoans; land and fresh-water mollusks; hydroids; monograph of the shallow-water starfishes of the North Pacific coast from the Arctic Ocean to California.

Book News, published by Stechert-Hafner, recently carried the following announcement concerning an exhibit of French scientific books.

The French Cultural Services Division of the French Embassy, with the cooperation of leading French publishing firms, has organized an exhibit of the most important scientific and technical books published in France since 1949, an exhibit which is available upon request to all interested libraries and institutions. The purpose of the exhibit is to familiarize American scientists with the work being done in France and to "contribute to a fruitful understanding for the greater benefit of science in general."

The first Exhibit was officially opened at New York University on February 11, and the schedule is already full until May. Nearly 400 books on pure and applied science are packed in specially built wooden crates, and these will be circulated among all university centers willing to display the exhibit; then the books will be divided among the exhibitors. Three weeks are scheduled for each institution, but a shorter or longer period can be arranged for.

In the printed catalogs, available to exhibitors, the books are divided into two main groups—science and technology—and then arranged alphabetically under the usual subject headings. . . . The French Cultural Services will reimburse the shipping costs. For further information, please write to M. Pierre Donzelot, Cultural Division of the French Embassy, 972 Fifth Ave., New York 21.