

there in 1915, was an instructor at the University beginning in 1906 and has served as professor since 1922. In recent years he has written extensively on topics in the history of physics. Dr. Harkins graduated from Western Maryland College in 1905 and received his doctor's degree in 1911. He began his teaching career in 1906 and was promoted to the grade of professor in 1924. His outstanding interest has been in undergraduate instruction and he has had a distinguished career as a teacher at the University of Pennsylvania.

The department of physics at Pennsylvania has also announced that **Julius Halpern** has been promoted to the grade of full professor and **Herbert B. Callen**, **Alfred K. Mann**, and **B. Roswell Russell** to associate professorships. **William F. Love** and **Sherman Frankel** have been named assistant professors. **Vernon Hughes**, formerly an instructor at Columbia University, has accepted an appointment as assistant professor in the Pennsylvania physics department.

George Russell Harrison, dean of science at the Massachusetts Institute of Technology and chairman of the American Institute of Physics, received the honorary degree of doctor of science from St. Lawrence University, Canton, New York, at the university's 96th commencement exercises on June 8th.

Alvin T. Jacques, one of the three new branch chiefs recently assigned to laboratory positions at the Naval Ordnance Laboratories, will head the acoustics systems branch of NOL's acoustic research division.

Robert J. Maurer of the University of Illinois is giving a six-week course in theory of the solid state at the University of Connecticut at Storrs, as part of the regular summer session which began on June 23rd.

Physicists who have recently joined the staffs of the AEC installations operated by Carbide and Carbon Chemicals Co. include **Roy L. McCullough** from the U. S. Rubber Co., **Howard V. Heacker**, formerly with Sears, Roebuck & Co., **Paul E. F. Thurlow**, from Westinghouse Atomic Power Division, and **Phillip McK. Wood**, of E. I. DuPont de Nemours & Co.

The following physicists have recently been elected members of the National Academy of Sciences: **Norman F. Ramsey, Jr.**, Harvard University; **Emilio Segrè**, University of California; **Robert Serber**, Columbia University; **Victor F. Weisskopf**, Massachusetts Institute of Technology; and **John Wheeler**, Princeton University.

John A. Sauer has recently been named to head the department of physics at Pennsylvania State College. The appointment, to become effective July 1, 1952, will fill the vacancy that resulted from the appointment of **H. K. Schilling** to the position of dean of the graduate school in 1950. Dr. Sauer will leave in August for Europe where he will present a technical paper before the 8th International Congress of Applied Mechanics meeting in Istanbul, Turkey. While in Europe Dr. Sauer will visit leading universities to study their programs in the field of physics.

Meetings

Operations Research Society

Morse Elected President of New Group

On May 26th a group of seventy-five scientists from university, industrial, and military establishments in the United States assembled at Columbia University's Arden House in Harriman, N. Y. to organize the **Operations Research Society of America**. The first meeting of the new society was held the following day.

From experience gained during the last war, when operations research teams in this country and in Britain systematically applied scientific methods and techniques of analysis to a broad category of problems involving the relative behavior of men, machines, and environment, it has been widely accepted that operations research methods might profitably be applied to the peacetime problems of government and industry as well as to military problems. The formation of the **Operations Research Society of America** marks it as the first professional organization of scientists devoted to promoting the application of operations research on this side of the Atlantic. Several years ago a group of British scientists founded a similar society, the **Operational Research Club of London**, which has reportedly had an active existence.

The charter members of the ORSA include specialists in physics, mathematics, statistics, chemistry, biology, economics, and other fields. **Philip M. Morse**, professor of physics at the Massachusetts Institute of Technology, was elected first president of the society. **Robert F. Rinehart** of Case Institute of Technology is vice president, **John B. Lathrop** of Arthur D. Little, Inc. is secretary, and **Alfred N. Watson** of the Curtis Publishing Company is treasurer.

At the May 27th meeting, **Bernard Koopman**, chairman of Columbia's mathematics department, discussed examples of partially solved and unsolved problems arising in operations research, showing how conventional mathematics and its theoretical extensions can be used in dealing with such practical difficulties as congestion in air terminals, queuing in cafeteria lines, and overloaded switches in telephone systems. Professor Koopman's talk highlighted the importance of practical and scientific developments in such areas as information theory and analytical probability. **Russell L. Ackoff** of Case Institute of Technology discussed new methods for halving costs of such statistical work as consumer surveys and product life tests. Dr. Ackoff spoke of new laws designed to yield economical procedures, and also presented several little-known process

charts which cut down data handling costs. Speaking on methods for maximizing after-tax income over the long term, Alfred N. Watson of the Curtis Publishing Company pointed out that operations research techniques can be applied to the industrial firm. Dr. Watson said that methods have been applied which increase profits by taking into account shifts in corporate income and expense factors as product output increases. F. B. Llewellyn spoke on operations research as carried on by the Bell Telephone Laboratories. He mentioned studies in the design of transcontinental telephone and television networks, and enumerated several instances in which operations research methods were employed to achieve best technical results at least cost.

Acoustical Society

Spring Meeting in New York

More than four hundred members of the Acoustical Society of America attended the forty-third meeting of the ASA at the Hotel Statler in New York City last May 8-10. A total of seventy-two contributed papers were given in eight sessions during the three-day meeting, and a special feature was a panel discussion concerned with various contemporary unsolved noise problems. A group of invited papers dealing with acoustics in the radio and television industry was also included in the technical program. The contributed papers covered most regions of current interest in acoustics, including reports of recent research in psychoacoustics, hearing, speech communication, noise control, instrumentation, ultrasonics, underwater sound, and waves and vibrations.

The panel discussion on unsolved noise problems, arranged by the Society's Committee on Noise, was under the chairmanship of Haldon A. Leedy of the Armour Research Foundation. Various aspects of the topic were summarized briefly by Gordon D. Hoople, M.D., Syracuse, N. Y.; Leo L. Beranek, Massachusetts Institute of Technology; Robert O. Fehr, General Electric Co.; Richard K. Cook, National Bureau of Standards; and Howard C. Hardy, Armour Research Foundation. There was active discussion from the floor during the panel session.

Dr. Hoople spoke on some unsolved problems relating to hearing loss in industry where it is becoming increasingly important to know how much noise will cause ear damage. In this connection, he pointed out, the problem is complicated by the fact that the same noise may impair the hearing of some individuals but not others. Such factors as the kind, intensity, and duration of noise were considered, as were problems concerning ear protection and the treatment of ear damage. One of Dr. Hoople's recommendations was that industry stress pre-employment audiograms.

Dr. Beranek talked on unsolved military noise problems. For the Navy, the major problems are concerned with suitable instrumentation and techniques for measurement of vibration characteristics of motors, generators, and engines; mechanical impedance of structures

on which such devices are mounted; and the transfer constant between the mounting points of a machine and the water outside the vessel. For the Air Force, Dr. Beranek said, the principal problem is how to reduce noise created by propellers and jet engines while in flight. Basic research aimed at understanding the mechanisms of noise reduction and later development of means for producing forward thrust with less noise can be the approach. As for the Ground Forces, the major acoustic problem is an understanding of the effect of micro-meteorological variations in the atmosphere on sound propagation. A second, though less important, problem is the development of acoustical materials which will absorb sound efficiently, will be durable, and will resist both oil and moisture.

Dr. Fehr discussed unsolved noise problems in the aircraft industry. These include noise in flight, noise reduction for ground running, and general problems such as cabin noise, high sound intensity properties, high temperature microphones for measuring high velocity air streams, and supersonic propellers. He told of specific problems involved in research and development on silencing structures for quieting engines in test cells or in reducing noise in airplanes warming up at ground level.

Dr. Cook discussed unsolved problems in architectural acoustics. The two main problems within buildings are to prevent the ingress of noise from outside and to stop its passage from one part of the building to another. The prevention of plumbing noise and the insulation of a building against the transmission of impact sounds are two problems on which progress has been impeded by a lack of suitable instrumentation and standard methods of measurement. Both laboratory investigations and studies of experimental residences should be included in a well-rounded research program, he said.

Unsolved basic physical research problems in the field of noise were discussed by Dr. Hardy. Pointing out the importance of departing from the classical approach in attacking acoustical problems, he recommended that scientists in acoustics and aerodynamics relate their two branches of mechanics since many noise problems are caused by or are related to turbulence of the medium. There is a need for devices which measure intensity or energy density and high intensity. Ways to measure transient waves, such as those from a forging hammer or gun muzzle, are in demand. Dr. Hardy listed these examples of possible basic projects: a study of the effect of outdoor and atmospheric conditions on sound propagation, a study of the propagation of noise energy through structures by flexural waves, a study of the effect of various geometries of partial enclosures (such as the open phone booth) on the suppression of noise, and a study of the properties of sound absorbing material used as space absorbers (included would be the diffraction effects of various geometries).

The session on radio and television acoustics consisted of invited papers by the following six speakers: