

Phillip Frank

The successor to Ernst Mach and Albert Einstein as professor of theoretical physics at the University of Prague, physicist and philosopher Phillip Frank, died on 21 July in Cambridge, Mass. He had taught mathematics and physics at Harvard University since 1938.

Frank was born in Vienna in 1894. He received his PhD at the University there in 1907, and in 1910 joined its faculty as privatdozent of physics. Two years later, Einstein, who was then at Prague, decided to return to Zurich (on his way to Berlin), and recommended Frank to replace him.

Frank remained in his chair at Prague for 26 years. In 1938, Harvard University invited him to come to the US as a visiting lecturer on quantum theory and the philosophy of modern physics. As he was about to begin a scheduled 20-university tour, the Germans invaded Czechoslovakia, and he never returned to Prague. He taught mathematical physics and the philosophy of science at Harvard from 1938 until his retirement in 1954.

Frank first was drawn toward experimental psychology and physiology, but quickly decided that he could not properly understand them without a knowledge of physics and mathematics. These studies, along with the influence of Ludwig Boltzmann, changed his orientation completely. In 1906, Frank also spent some time at Göttingen, where he was further influenced by David Hilbert and Felix Klein. Among his interests at that time were analytical mechanics and its relations with the calculus of variations, electronic theory and the fundamental problems of physics.

About 1908, Frank became acquainted with the special theory of relativity, and this proved a decisive turning point in his intellectual activity. Although he continued to teach mathematical physics until his retirement, he is best known as a philosopher of science, and founder of a

small group of like-minded individuals that came to be known as the Vienna Circle of logical positivists. Their meeting place was one of the old Viennese coffee houses, and the most active members besides himself were the mathematician Hans Hahn and the economist Otto Neurath. Reminiscing in the introduction to his book, *Modern Science and its Philosophy*, Frank wrote: "Our field of interest also included a great variety of political, historical and religious problems which we discussed as scientifically as possible. Discussions about the Old and New Testaments, the Jewish Talmud, St. Augustine, and the medieval schoolmen were frequent in our group. Otto Neurath even enrolled for one year in the Divinity School of the University in order to get an adequate picture of Catholic philosophy, and won an award for the best paper on moral theology."

Frank's first paper on the topic, *The Principle of Causality and Experience*, was published in 1907. It attracted two world-renowned commentators: Lenin and Einstein. Despite Frank's reputation as a positivist, Lenin thought he detected in his interest in the relations between Kant and Poincaré a taint of idealism, and said so in his book, *Materialism and Empiriocriticism*. With Einstein, he fared somewhat better, and this interchange marked the beginning of a lifelong friendship between the two. Some years later Frank wrote *Einstein, His Life and Times*, the definitive biography.

By 1929 the Wiener Kreis was able to arrange joint meetings with the German Physical Society, and two years later established its own journal, *Erkenntnis* (Cognition). That same year, Frank arranged Rudolph Carnap's appointment as the first professor of natural philosophy in the faculty of science at Prague, and a new center of "scientific world conception (the term preferred by the Circle to logical positivism) had been established. In



FRANK

the following years a series of meetings on the "unity of science" were held in various European cities. In 1936, while one of these international congresses was in session in Copenhagen, one of the group, Moritz Schlick, was assassinated by a student near his lecture hall at the University of Vienna. His murderer pleaded the extenuating circumstances of indignation over Schlick's "vicious philosophy," and was released from prison two years later after the Anschluss. By the end of 1938, logical positivism had been driven from its birthplace in Central Europe to the United States and Great Britain.

While Frank was at Harvard, he began to take a more historical approach, and this shift of orientation is reflected in all his papers published after 1940. A few years later, he began a reexamination of metaphysical systems as interpretations of science.

Georges Lemaître

The originator of the "Big Bang" theory of cosmology, Georges Lemaître, died in Louvain, Belgium, on 20 June, at the age of 71. Lemaître had spent a year in the mid-twenties touring the big observatories in the United States where he talked to the astronomers involved in the spectacular discovery that many "nebulae" were in fact extragalactic spirals receding at phenomenal velocities. In 1927, he published his solution to the problem en-

THEORY OF GROUPS IN CLASSICAL AND QUANTUM PHYSICS

Vol. 1: Mathematical Structures and the Foundations of Quantum Physics

T. Kahan in collaboration with P. Cavailles, R. Govarner, T. D. Newton, G. Rideau, G. Lochak, and R. Nataf. Complete and self-contained study of the theory of groups applied in theoretical physics and chemistry.

July \$37.50

THE MAGNETIC PROPERTIES OF MATTER

D. E. G. Williams. Presents essential points of magnetism. Emphasizes that modern magnetic theory is developed from quantum theory, comparing results of theory with experiment.

Nov. \$8.50

ELECTRONIC THEORY OF HEAVILY DOPED SEMICONDUCTORS

V. L. Bonch-Bruyevich. All available information on Russian progress in heavily doped semiconductors. Translated from the Russian.

July \$7.50

PHYSICS OF NUCLEAR REACTORS

D. Jakeman. An up-to-date treatment of neutron transport, neutron thermalization, criticality of fast and thermal reactors, properties of nuclear fuels, reactivity changes and control.

1966 \$10.00

PHYSICS OF INDUSTRIAL RADIOLOGY

R. Halmshaw. The first book on this subject. It contains essential reference information.

1966 \$20.00

NOBEL LECTURES IN PHYSICS

(Covering 1901-1962 in 3 volumes)

With publication of Vol. 1 (1901-1921) in October, all three volumes of the collected Nobel Prize Lectures in Physics, 1901 through 1962, are now available in English for the first time. Price for 3-volume set: \$85.00

ELECTRICAL MACHINE THEORY

Morris Jevons. Determines the 'port-to-port' characteristics of the electromagnetic machine in terms suitable for linking the machine into a system; either to an electrical supply or a mechanical load.

Oct. \$15.75

THE EVOLUTION OF THE NUCLEAR ATOM

G. K. T. Conn and H. D. Turner. Historical survey of research into the atom and its nucleus, in the words of those who carried out the research.

1966 \$10.00

SOLAR RADIATION

N. Robinson. Fundamentals of solar radiation physics, the radiation reaching the earth and the geographical, astronomical, and atmospheric effect thereon.

1966 \$24.50

THEORY OF THE MICROSCOPE

L. C. Martin. Updates optical theory of the microscope and discusses functional techniques.

1966 \$19.50

AMERICAN ELSEVIER PUBLISHING COMPANY, INC.

52 Vanderbilt Avenue, New York, N. Y. 10017—Telephone (212) MU 6-5277

LOW ACTIVITY SCINTILLATING GLASSES

Extensive development has resulted in the commercial availability of NE 912 and NE 913 scintillating glasses with:

- 5 to 10 fold decrease in background count
- alpha activity < 20 dpm/100g glass
- lower Ce₂O₃ content
- improved pulse height performance

For Further Details Write To:

NUCLEAR Enterprises Ltd.

Scintillator Division

550 BERRY ST., WINNIPEG 21, CANADA PHONE (204) 774-1991
or Harshaw Chemical Co., Cleveland, Ohio. (216) 721-8300
or h-nu systems inc., Palo Alto, Calif. (415) 326-1591
Assoc. Co. Nuclear Enterprises (G.B.) Ltd., Edinburgh, Scotland

2112-1

IRON SINGLE CRYSTALS

for basic studies in:

Mössbauer spectroscopy
magnetics
diffusion
electrochemistry
corrosion
metallurgy

cylindrical shape—1/8" to 1/2" diam.
up to 4" long

\$50—\$600

RESEARCH CRYSTALS INC.

P. O. Box 8512

Richmond, Virginia 23226

titled: *A homogeneous universe of constant mass and increasing radiation, taking account of the radial velocities of extragalactic nebulae.*

Lemaître was born in Charleroi. He first came to Louvain to study humanities at the College du Sacre-Coeur and then at the Ecoles speciales. He had achieved the status of first-grade civil mining engineer in 1914 when the first world war began and he joined the Belgian army. While he was serving as an artillery officer, he read Henri Poincaré's *Electricité et optique* and began to waver in his choice of a career. When he returned to Louvain after the armistice he began to study physics and mathematics. His thesis, prepared in 1920 under de la Vallée-Poussin, was on the approximation of functions of several real variables.

In 1923, after receiving his doctorate, and after having studied at a seminary and been ordained a priest, he won fellowships that took him to England and to the United States. He studied with Sir Arthur Eddington for a year and then went to the Massachusetts Institute of Technology. It was during this period that he became familiar with the work of V.M. Slipher, Edwin Hubble, Harlow Shapley and others on the red shifts of the receding galaxies. Models of expanding universes had been conjectured by Willem de Sitter and Alexander Fridman, but Lemaître's is the most widely accepted theory, starting with an initial condensed state and an explosion. In 1934 he was awarded the Prix Francqui. One of his sponsors was Albert Einstein; among his judges were Eddington and Langevin.

Since the early 30's, Lemaître had taught at Louvain, done research, and collaborated with other scientists. His interests included cosmic rays, the three body problem, spinors, and calculating machines. At the time of his death, he was a monsignor and President of the Pontifical Academy of Sciences at Rome.

Robert C. Jopson

Senior physicist Robert C. Jopson, of the Lawrence Radiation Laboratory died on 11 July at the age of 42. He had been at LRL since 1954, working on accelerator design and construc-

tion, nuclear spectroscopy and atomic physics.

Jopson was born in San Jose, Calif., and received his undergraduate training at the California Institute of Technology. After wartime Naval service he returned to Cal Tech for graduate studies and received his PhD in 1950.

At Livermore, Jopson worked on the high-current accelerator project, and was a member of the group that used the machine to make high-precision measurements of nuclear energy-level spectra. He contributed to the design of the Astron thermonuclear device and for three years was physicist-in-charge of the laboratory's 90-in cyclotron. His last publication was as co-author of a comprehensive review article on atomic fluorescence yields.

Robert Hamilton Boyer

A man believed to be mentally deranged took the life of Robert Hamilton Boyer, a mathematical physicist, on 1 August, as Boyer was walking across the University of Texas campus. Firing a rifle equipped with a telescopic sight from a high tower on the campus, Boyer's assailant also killed or wounded more than 40 other persons before he was killed by police. Boyer, who was 34, had stopped in Austin on his way to the Center for Research and Advanced Studies in Mexico City.

A native of Johnstown, Pa., Boyer took both his BS and MS at the Carnegie Institute of Technology. In 1953, he became a Rhodes Scholar at the University of Oxford, where he was awarded a PhD in theoretical physics in 1957. When he returned to the United States, he joined the staff of Westinghouse Research Laboratories as a research mathematician, and remained there until 1960, when he went first to McGill University and then to the University of Liverpool. In 1964-65, he spent a year with the Center for Relativity Theory at the University of Texas before returning to Liverpool.

Boyer's special interest was general relativity. At the time of his death he was involved, with Alfred Schild, director of the Texas relativity center, and others, in the search for a solution to Einstein's equations for the gravitational field of a rotating body. □

SHONKA ELECTROMETER



New high-sensitivity instrument measures ultra-small dc signals

The new Shonka Electrometer is an extremely sensitive instrument for indication of very small dc potentials from extremely high impedance sources.

It depends for its operation upon the unique application of a simple principle—the interaction of a charged body and an electrical field produced by an alternating current.

ADVANTAGES

Unlike any other electrometer, the Shonka instrument is completely independent of drifts in ac power and it has a means for precise determination of its own environmentally-caused contact potentials. Thus, it is particularly well-suited for long-term measurements and comparative studies. It is rugged, portable, and its measurements are immune to effects of geotropism and ordinary vibration.

APPLICATIONS

Shonka Electrometer applications include radiation measurements in radiological physics and radiobiology; precise measurements of contact potentials, of extremely high resistances, and of capacitance; calibration of radiation instruments; biochemical determinations of energy in a living cell; and measurement of minute changes of glass electrode potentials in pH studies. The electrometer is valuable in industrial and research laboratories, for academic demonstrations of electrical and radiation phenomena, and field studies.

SPECIFICATIONS

Sensitivities—10,000 div./volt or 5.7×10^{15} div./coulomb.

Input insulation—much greater than 10^{17} ohms. Input capacity, 1.75 pF.

Input power—95/125 or 190/250 volts, 50/60 cps, 20 w. Readily convertible.

Write for EMDECO Bulletin EB-5



THE ELECTRO-MECHANICAL DEVELOPMENT CO.
A Subsidiary of Coleman Instruments Corporation