ATKINSON

which he joined the astronomy faculty at Indiana University.

He was an unusually versatile scientist with productive interests in stellar structure, relativity and the design of precision astronomical instruments. He is perhaps best known for his pioneering work in the applications of nuclear physics to stellar structure. In 1929 he and F. J. Houtermans produced the first qualitative theoretical description of nuclear energy generation in stars, laying groundwork for later treatments by Hans Bethe and Karl Friedrich von Weizsäcker that identified the specific reactions responsible for converting hydrogen to helium in stellar interiors. In subsequent papers, published in 1931, Atkinson first suggested that the cosmic abundances of the elements could be accounted for by processes in stellar interiors. These papers contained many ideas that are now widely accepted as fundamental aspects of stellar structure, such as the short lifetime of upper main sequence stars and the absence of nuclear energy sources in white dwarfs.

During World War II Atkinson played an important role in coordinating Allied work on two scientific problems of great practical importance to the war effort: From 1940 to 1943 he worked on demagnetizing ships and subsequently served in Washington as Scientific Liaison Officer. In 1944, at the request of Edwin P. Hubble, he went to the US Army Ballistics Research Laboratory at Aberdeen, Maryland, to assist in the application of photogrammetry to ballistics.

Returning to Greenwich in 1946, Atkinson undertook, for the next eight years, the heavy responsibilities of moving the Royal Observatory to its new site at Herstmonceux Castle, Sussex. During this time his research concentrated on instruments and techniques for precision astronometry, which included leading field expeditions to solar eclipses in Kenya, Sudan and Sweden for geodesy measurements. At Indiana Atkinson remained active for 15 years, teaching classes and conducting research in general relativity and fundamental positional astronomy.

While at Indiana, he designed and supervised construction of a unique sundial which, by means of a simple tilting mechanism, reads standard (rather than solar) time to better than one-minute accuracy.

R. KENT HONEYCUTT
Indiana University

Fritz E. Borgnis

Fritz Borgnis, former director of the Institute for high-frequency electronics at the Swiss Federal Institute of Technology in Zurich, died in November 1982.

After basic training in electrical engineering at the Technische Hochschule in Munich, Borgnis studied physics and mathematics at the University of Munich. In 1936 he earned his PhD degree with a thesis in plasma physics. After several stints as lecturer and researcher in Germany, Austria and Switzerland, he became a research associate in the physics departments of Wesleyan University (1950), Caltech (1951–54) and Harvard University (1955–57).

In 1957, Borgnis returned to Europe to assume the directorship of the newly established Philips Research Laboratories at Hamburg and Aachen. In 1960, he was appointed professor of high-frequency electronics at the ETH in Zurich.

Although Borgnis devoted himself primarily to electronics, he saw the commonality of all wave phenomena and contributed effectively to acoustics. Like Erwin Meyer in Germany and Winston Kock in the US, he brought many a fruitful idea (and ingenious demonstration) from microwaves to acoustics and vice versa. Apart from his theoretical work on acoustic radiation pressure and its various effects, he studied acoustic interferometry and invented, among numerous useful devices, an ultrasonic flow meter.

In addition to numerous articles in electromagnetism and acoustics (published in JASA, *Acustica*, *Z. für Physik*, *Reviews of Modern Physics*, and other journals), Borgnis wrote two books (both with C. H. Papas): *Randwertprobleme der Mikrowellenphysik* and *Electromagnetic Waveguides and Resonators*, which appeared as Volume XVI of the *Handbuch der Physik*.

With the death of Fritz Borgnis, the community of acoustical scientists loses an outstanding exponent of the unity between their chosen field and electrical engineering and physics.

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Włodzimierz Trzebiatowski

Włodzimierz Trzebiatowski, Director of the International Laboratory for High Magnetic Fields and Low Temperatures in Wrocław and former president of the Polish Academy of Sciences, died in an automobile accident in Wrocław, on 13 November 1982, at the age of 76.

His scientific career started at the Technical University of Lvov, where he graduated in chemistry in 1929 and obtained a PhD degree in 1930 in physical chemistry. In this period his research was centered on the structure of metals and intermetallic compounds and on sintering mechanisms of metallic powders and physical properties of sintered metals. This work substantially contributed to the understanding of processes important in powder metallurgy.

In 1938 Trzebiatowksi was appointed professor of inorganic chemistry of Jan-Kazimierz University in Lvov. During the Nazi occupation he was active at the underground Polish University. Among other positions he held after the war, he was director of the Institute of Inorganic Chemistry and Metallurgy of Rare Elements of the Technical University, where he worked up to 1968 and, from 1953, the head of the Laboratory of Physical Chemistry of Solids and then of the Laboratory of Structure Research of the Polish Academy of Sciences.

Trzebiatowski conducted research in the physics and chemistry of solids, investigating for the first time in Poland magnetochemistry, x-ray structural analysis and thermodynamics of metallic systems. He also worked on the chemical reactions of solids and the hydrometallurgical processing of copper ores.

His most important achievements are in magnetic properties of uranium compounds. In 1951 he discovered ferromagnetism in uranium hydride, the first representative of the actinide family exhibiting magnetic ordering. Trzebiatowski and his co-workers discovered the vast majority of uranium magnetic phases with magnetic ordering below ambient temperature. Trzebiatowksi is the author of the chapter "Actinide Elements and Compounds" in the compendium *Ferromagnetic Materials* edited by E. P. Wohlfarth.