MEMORIAL

Hubert Goenner

Memorial: Peter Havas
(29.3.1916–25.6.2004)

Published online: 6 July 2005
© Springer-Verlag 2005

With the death of our colleague Peter Havas near Philadelphia, Pennsylvania, in June 2004, we have lost one of the renowned elder peers in the field of classical relativistic field and particle theory including Einstein’s special and general relativity theories.

Of Hungarian origin, Peter grew up in Vienna, Austria, and spent his professional life in the United States of America; he reached an age of 88 years and three months. Because of the unfavorable state of political affairs, in Europe, during his university education, he had to endure two abortive attempts at a Ph.D. until he finally could succeed. He started out at the Technische Hochschule in Wien (Vienna) as an experimental physicist, in nuclear physics, with Josef Mattauch. After the Nazi takeover of Austria, in 1938, he had to leave the country, because of both, his socialist activities resisting fascism, and his classification as being of Jewish descent by the infamous rules of the Hitler administration. Starting afresh in Lyon, France, under the guidance of Jean Thibault, again in experimental nuclear physics, he there met theoretical physicist Guido Beck, also exiled, who convinced him to switch to theory. Peter’s first scientific publications resulted from this interaction [1]. After the outbreak of world war II, his stay in Lyon from 1939 to 1941 became marred by his internment, by the French authorities, as a “hostile” German—since Austria had become part of the German “Reich”—and by the subsequent occupation of (part of France) by German troops. He was lucky enough to get free from captivity and to receive an entry visa for the United States; he arrived in New York in June 1941. At Columbia University, under the formal guidance by Willis Lamb but more or less on his own, he wrote his thesis in the field of quantum electrodynamics still in its infancy [2]. He believed that his resistance to weapons research during wartime had barred him
from being accepted into the circle of theoreticians—many of them to become very famous—involving in the eventual development of quantum field theory.

Nevertheless, his original interest in quantum fields and elementary particles became a partial motivation for his subsequent research in classical theory: he aimed at a possible uncovering of the difficulties of quantum field theory through the study of its underlying classical basis. Thus, in the 50s and 60s, Peter Havas dealt with the classical scattering of mesons, and, in particular, with the equations of motion of point particles [3]; in the 70s and 80s this included classical Yang-Mills-Higgs fields [4]. In a well-known paper with Joshua Goldberg, Peter introduced the (relativistic) “fast-motion-approximation” for the alternate solution of field equations and equations of motion in General Relativity, a much more convincing method than the one used in the famous EIH-(Einstein-Infeld-Hoffmann) paper [5]. This problem of determining the motion of particles is relevant for the (approximate) calculation of gravitational radiation emitted by a point source and its back-reaction upon the source; the debate concerning a convincing theoretical fundament for Einstein’s quadrupole formula lasted well into the 70s [6]. In both fields, equations of motion and radiation reaction, Peter Havas wrote numerous papers and gave many lectures during summer schools and international conferences [7].

His broad interests also brought him into applied or even mathematical physics; e.g. he investigated which systems of PDEs could be derived from a Lagrangian, or in which coordinate systems important classical equations like the Hamilton-Jacobi or the Schrödinger equation could be separated [8]. The connection between equations of motion, conservation laws, and symmetries led to interesting publications [9]. As to conservation laws, he considered not only the Lorentz group but also the Galileian group, its possible invariants, and the Lagrangians to be built from them. This research included a post-Galilean approximation, in connection with the center-of-mass law, also in particle theories [10]. In his endeavor to precisely formulate Newton’s gravitational theory as a limit to Einstein’s, he developed a 4-dimensional representation of what now is called the Newton-Cartan theory [11]. In addition to field theories, he also did research on special relativistic particle theories (direct interaction), and on a relativistic formulation of statistical mechanics [12].

As to general relativity proper, he became interested in Birkhoff’s theorem and tried to extend its range to alternative theories of gravitation, e.g. those with Lagrangians of higher-order in the curvature tensor. In this context, his interest in a (local) classification of spaces with constant Ricci scalar and, in connection with it, in a very special PDE like Emden’s equation emerged [13]. In fact, our taking up, again, of research results obtained years before, lead to Peter’s last two research papers—just before his eyesight became severely inflicted by macular degeneration [14].

Conceptual clarity, curiosity as to where concepts came from, and simplicity in the representation of results were dear to Peter Havas. He also showed a keen interest in the philosophy and history of the field he was working in. He wrote about causality, determinism, and other concepts fundamental to relativity [15]. His historical papers are concerned with conceptual developments like in “the early history of equations of motion”, and with prosopographical and biographical