IN MEMORIAM: EBERHARD GWINNER, 1938–2004

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Eberhard Gwinner, founding director of the Max-Planck-Institut (MPI) für Ornithologie (Max Planck Research Center for Ornithology) and Corresponding Fellow of the AOU since 1975, passed away suddenly on 7 September 2004, after a brief battle with cancer. His pivotal studies provided the foundation on which our understanding of biological clocks and their role in organizing migration, breeding, and other life-history events are based. His energy, wit, and charming smile, along with his expansive warmth and generosity, will be deeply missed. He is survived by his wife, Helga, their three children, and four grandchildren.

Gwinner, fondly known as “Ebo,” was born in Stuttgart, Germany, on 26 December 1938 and attended schools in Ludwigsburg and Tübingen. His enthusiasm for the natural world began early, with his first scientific publication on birds at the age of 17. In 1964, he received the doctoral degree from the University of Tübingen for his work on ravens. His mentors, Gustav Kramer and Konrad Lorenz, served as cornerstones for Ebo’s work. He remained an enthusiastic field ornithologist throughout his life. An interest in biological clocks and his long association with MPI developed during post-doctoral study with Jürgen Aschoff, at the MPI für Verhaltensphysiologie at Andechs from 1964 to 1966. While working with Aschoff, Ebo began his quest to uncover the underlying processes of bird migration and breeding schedules. During 1965–1966, Ebo traveled to Zaire as a Fellow at the Institut pour la Recherche Scientifique en Afrique Centrale. In the tropics, unlike temperate areas, photoperiod and temperature provide less obvious cues for birds to coordinate their activities with the environment. Africa provided Ebo with the evidence that helped him unravel the complex nature of migratory behavior that results from interactions between internal timing mechanisms and seasonally appropriate external cues. His ideas about internal control mechanisms continue to provide the framework for investigating the organization of key components of the annual cycle.

In 1967, Ebo provided the first empirical evidence of endogenous circannual rhythms in birds. Throughout most of those studies, he monitored key markers of annual cycle events, particularly the expression of migratory restlessness, termed Zugunruhe. He demonstrated that different populations of migrants had unique “signatures” or patterns of Zugunruhe; those observations led to his discovery that differences in migratory timing, intensity, and preferred orientation have a genetic basis.

The idea that an endogenous direction and distance program (vector navigation) guides first-time migrants toward their unknown wintering area was considered a cornerstone of bird migration theory. Yet throughout his career, Ebo felt that vector navigation was inadequate to account for the details of an individual’s first migration. This eventually led to important studies elucidating the interactions of endogenous components and environmental variables. The discovery of circannual rhythms led to an explosion of research into the endogenous nature of locomotor activity, migratory behavior, molt, and testicular cycles in a variety of species. From those studies, with colleagues that included Peter Berthold, Wolfgang Wiltsko, and John Dittami, came the groundbreaking idea that a steroid hormone, testosterone, could act as a key organizer for the synchronization of internal rhythms with photoperiod.

The role of melatonin, the pineal gland hormone, in the circadian and circannual cycles of birds received attention for many years. Ebo demonstrated that melatonin synchronized and entrained circadian rhythms and developed a
multiple-oscillator model of circadian organization that remains viable and important today. Along with his colleagues, he demonstrated that the tissue producing rhythms of melatonin production, even when isolated in culture, can "remember" information about day length (and thus season) long after they have been transferred to constant darkness. Other studies revealed differences in pineal biology between long-distance migrants and nonmigrants, which suggested that changes in clock behavior may enable migrants to accommodate nocturnal migration, large longitudinal displacements, and other aspects of a life on the move. Ebo also performed innovative studies on differences in cognitive abilities and brain structure (especially of the hippocampus) in long-distance migrants. He returned to Africa whenever possible, and eventually developed a long-term comparative study on endogenous timing mechanisms in temperate- and tropical-breeding Stonechats.

Although established early as a leader in the field of bird migration, Gwinner continued to expand his skills and explore new areas. He learned about reproductive endocrinology with Donald Farner at the University of Washington (1969–1970), and spent 1970–1971 studying circadian rhythms with Colin Pittendrigh at Stanford University. Before returning to the MPI in 1979, he studied at the Ludwig-Maximilians-Universität in Munich where he received the prestigious Erwin Stresemann Award from the Deutsche Ornithologen Gesellschaft (German Ornithological Society). He would later receive the Irving Scholander Award from the University of Alaska in 2001. In 1979, Ebo became head of the Vogelwarte Radolfzell at the MPI für Verhaltensphysiologie for two years. He was appointed the institute's Director in 1991 and served as the head of the Vogelwarte Radolfzell until 1998. In 1998, he founded and became director of the Max Planck Research Center for Ornithology at Andechs, a position he held at the time of his death.

Ebo chaired a Gordon Research Conference on Chronobiology in 1999 and served on the editorial or advisory boards of several prestigious journals, including Behavioral Ecology and Sociobiology, Hormones and Behavior, and Journal für Ornithologie. He was an officer in several organizations, including the Society for the Study of Biological Rhythms, Society
for Behavioral Neuroendocrinology, German Ornithological Society, and International Ornithological Committee. Ebo was a member of the Max-Planck Society and an elected foreign member of the Italian Academia Nazionale dei Lincei. He served on the board of trustees for the Institut für Vogelforschung and the Konrad Lorenz Institute of Comparative Behavioral Research and, at the time of his death, was serving on the European Science Foundation’s Coordination Committee.

Ebo published more than 230 publications in such journals as Science (including his recent “Chronobiology: Life’s Daily Beat,” Science 304:1906–1907, 2004), Nature, Journal of Comparative Physiology, Oecologia, Journal für Ornithologie, Naturwissenschaften, Physiological Zoology, Journal of Biological Rhythms, Behavioral Ecology and Sociobiology, Scientific American, and The Auk. He wrote numerous book chapters on endocrinology, endogenous clocks, and migration. With Michaela Hau, a former student, he wrote the chapter on pineal gland activity, circadian rhythms, and photoperiodism for Sturkie’s Avian Physiology. Ebo’s books, Circannual Rhythms (1986, Springer-Verlag, Berlin), Biological Clocks and Environmental Time (coauthored with S. Daan in 1989, Guilford Press, New York), and Bird Migration, Physiology and Ecophysiology (1990, Springer-Verlag, Berlin) remain required reading for today’s students of migration. Ebo worked almost exclusively on Old World taxa, but his discoveries and ideas are applicable to birds (and other major taxa) throughout the world. He organized many symposia, such as the first Symposium of the Physiological and Ecophysiological Aspects of Bird Migration (Tützing, Germany, 1988), a format in which young scientists, in particular, were encouraged to participate and share their ideas with the current leaders of the day. Ebo’s stimulating ideas, his infectious passion for his work, and his great warmth and willingness to involve others have been passed on to another generation of researchers. His many colleagues will miss his leadership and his outgoing personality. Ebo once said that he came up with his best ideas while working in his garden. We don’t know whether that plot produced good crops of vegetables. But for the field of avian biology, it was very fertile ground indeed.

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