Journal of Comparative Physiology A (2022) 208:213–223
https://doi.org/10.1007/s00359-021-01526-x

EDITORIAL

The Journal of Comparative Physiology A: rooted in great tradition, committed to innovation and discovery

Günther K. H. Zupanc[1]

Received: 15 November 2021 / Revised: 15 November 2021 / Accepted: 19 November 2021 / Published online: 23 December 2021

Abstract
The current volume of the *Journal of Comparative Physiology A* marks a transition in editorship. This event provides the opportunity to reflect on the 98 years of the history of the *Journal*; on the impact of its legacy on the evolution of neuroethology and the comparative branches of sensory physiology and neurobiology; and on future changes in editorial organization and content.

Keywords Comparative physiology · Friedrich G. Barth · Hansjochem Autrum · Karl von Frisch · Neuroethology

Navigating the landscape of comparative physiology

Throughout the 98 years of its existence, the *Journal of Comparative Physiology A* has provided a trusted platform for communicating research discovery and methodological innovation in the areas of sensory physiology and neurophysiology. However, unlike most other physiology journals, its aims and scope have never been restricted to exploration of just the function of nervous systems. Instead, its editors have always stressed the inseparability of structure and function. At the same time, they have debunked the notion that brains of different species can be reduced to the 'generic' brain, as suggested by the common use of its singular by numerous publications and journals—a misconception that diverts scientists from appreciating diversity as a reflection of evolutionary solutions to different biological problems. Moreover, the editors have continuously reminded authors to relate physiological mechanisms, whether studied at the molecular, cellular, or tissue level of organization, to the natural behavior of the whole animal. By subjecting submitted manuscripts to rigorous but constructive peer review, the *Journal of Comparative Physiology A* has established, and maintained, an excellent reputation within the scientific community. Many of the studies first reported in the *Journal* have become an integral part of biology textbooks.

Grounded on this editorial philosophy, the *Journal of Comparative Physiology A* has navigated well the changing landscape—not only of biology but also of scientific publishing. It began as the *Zeitschrift für Vergleichende Physiologie*, with authors overwhelmingly from German academic institutions and articles written in German only. Gradually, it transformed into an international journal, with an increasing number of authors from outside of Germany, and English becoming the universal language of communication. Under its new name, *Journal of Comparative Physiology*, it followed the general trend of specialization by separating into two daughter journals. Since then, sensory physiology, neurophysiology, and neuroethology have been covered by the 'A' journal, whereas the 'B' journal has published papers in biochemical, systemic, and environmental physiology. Like most other scientific journals, the *Journal of Comparative Physiology A* went from print to online publication. And, more recently, its business model expanded from subscription-only to hybrid, offering now an open-access option within the framework of a subscription journal.

Considering these fundamental changes and its long history, what has been a remarkably steady force behind the *Journal* is its Chief Editors. Over the past 98 years, there have been only three, and each of them has been a key contributor to comparative physiology. I, therefore, feel honored and privileged to be trusted with leading the *Journal's* Editorial Board as its fourth Editor-in-Chief, after having served as a member of its Advisory Board and subsequently as an

✉ Günther K. H. Zupanc
g.zupanc@northeastern.edu

[1] Laboratory of Neurobiology, Department of Biology, Northeastern University, 360 Huntington Avenue, Boston, MA 02115, USA

Associate Editor for the past 15 years. The acceptance of this responsibility provides me with the opportunity to reflect on the history of the *Journal*, its impact on the evolution of comparative physiology, and the continued commitment of its editors to support authors in disseminating their research in the best way possible.

Ninety-eight years and three chief editors

Karl von Frisch

The *Zeitschrift für Vergleichende Physiologie* was founded by Karl von Frisch and Alfred Kühn in 1924 as Section C of the *Zeitschrift für Wissenschaftliche Biologie*, and it continued to appear under this imprint until 1934. Karl von Frisch (1886–1982) (Fig. 1), a zoologist by training, had foreseen a great need for such a journal, and he was successful when he presented this idea to Ferdinand Springer, the son of Julius Springer, founder of the academic publishing house known today as Springer Science + Business Media. Comparative physiology did not exist as an independent discipline at that time, and physiological experiments on animals were primarily conducted as a proxy to achieve a better understanding of physiological processes in humans. However, although research in the area of comparative physiology was still in its infancy, there was an increasing interest in applying rigorous physiological approaches to address fundamental biological questions in a broad range of animal taxa. This is reflected by the topics of the articles published in the first issue: digestion in *Hydra*; olfaction in newts; color vision in *Daphnia*; color vision in fish; thermoception in insects; and swimming in platyhelminths.

Fig. 1 Karl von Frisch. This portrait photo was taken around 1926 by Stephanie Ludwig, owner of the Atelier Veritas in Munich. (S. Ludwig died in 1943, so this work is in the public domain in Germany, where the copyright term is the author's life plus 70 years; source: http://www.digiporta.net/index.php?id=763897247)

Karl von Frisch who, in 1973, received the Nobel Prize for Physiology or Medicine for his pioneering contributions to the study of animal behavior, was deeply devoted to the *Journal* throughout his life. It not only provided him with a forum to publish his own work and that of his students, but also enabled him to exert a major influence on the emerging field of comparative physiology. In a letter to his mother, Marie Exner von Frisch, dated January 31, 1925, he wrote: "Comparative physiology is a relatively young branch, and our journal is the only one dedicated specifically to this field. Thus, the majority of what is produced in this area in Germany comes to me or my co-editor, Kühn, with whom I am very much of a mind. I see now how this type of position, provided one takes it seriously, affords one influence over the publication practice of an entire discipline" (p. 67, Munz 2016).

Von Frisch published many of his key studies in the *Journal*. They include his first publication in the *Zeitschrift für Vergleichende Phsyiologie*, in which he presented the first experimental evidence that fish eyes contain a dual receptor mechanism mediating achromatic low-intensity vision and chromatic high-intensity vision, as postulated by the duplicity theory (von Frisch 1925). One year later, he and one of his early Ph.D. students reported the discovery that an important function of the honey bee dances is to transfer olfactory information associated with the floral scents from the bodies of the forager to other hive mates (von Frisch and Rösch 1926). And in the midst of World War II, he succeeded in the first demonstration of *Schreckstoff* in the skin of several cyprinids, including minnows. The alarm substance is released when a fish is injured by a predator, thereby resulting in increased alertness and avoidance by other members of the fish school at the site where the attack by the predator took place (von Frisch 1942).

Hansjochem Autrum

In 1960, 36 years after the *Zeitschrift für Vergleichende Physiologie* had been founded, Hansjochem Autrum (1907–2003) (Fig. 2) succeeded Karl von Frisch as Editor-in-Chief. Like von Frisch, Autrum was a brilliant scholar. He had majored in physics and mathematics, with a minor in biology, and subsequently did his Ph.D. thesis on the physiology of hirudinean muscles. This diverse background enabled him, during his research career, to rigorously apply methods and concepts from physics to the study of physiological phenomena, yet at the same time, maintain

a biologist's perspective. Such an approach was rare at that time but encapsulated the portrayal by the Scottish physiologist John Scott Haldane of the relation of physiology to physics and chemistry: "Physiology depends at every turn on physics and chemistry… [but] biology is something more than physics and chemistry" (p. 693 and p.696, Haldane 1908). In 1958, 2 years before becoming Editor-in-Chief of the *Journal*, Autrum had succeeded von Frisch as head of the Zoological Institute at the University of Munich. Besides the *Zeitschrift für Vergleichende Physiologie* (which became the *Journal of Comparative Physiology-A* under his editorship), he edited the journal *Naturwissenschaften*. He was also an influential figure in German science politics and played an eminent role in the foundation of three academic institutions, the Universities of Regensburg, Bayreuth, and Konstanz.

The contributions made by Autrum and his students to physiology, particularly in comparative sensory physiology, have been enormous. The following papers published in the *Journal* can only give a glimpse of the significance of these accomplishments. In 1941, he reported astonishingly low thresholds of vibration amplitudes in the range of atomic dimensions that still elicited neural responses in the green bush cricket (*Tettigonia viridissima*) and the American cockroach (*Periplaneta americana*) (Autrum 1941)—a finding that paved the path for numerous subsequent studies on mechanoreception in arthropods. Among his later achievements, he is best known, perhaps, for his work on color vision. While behavioral studies by von Frisch and his school had suggested color vision in bees (Daumer 1956, 1958), Autrum and his school provided strong support for this idea by determining, through electrophysiological means, the spectral sensitivity of individual photoreceptor cells (Autrum and von Zwehl 1962, 1964).

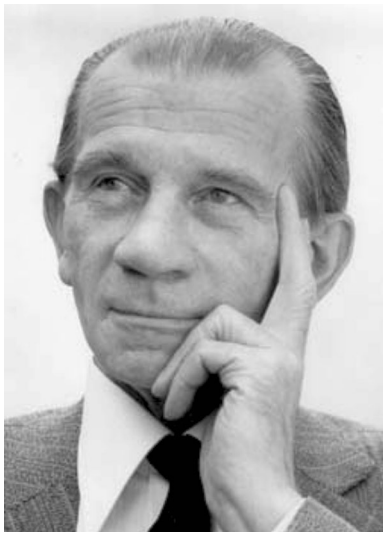

Fig. 2 Hansjochem Autrum. (The heir, S. Autrum-Mulzer, of this photograph's copyright holder, has released this work into the public domain; source: https://commons.wikimedia.org/wiki/File:Hansjochem_Autrum.jpg)

Friedrich G. Barth

In 1996, after 36 years of service, Hansjochem Autrum retired as Editor-in-Chief and transferred the overall editorial responsibility for the *Journal* to one of his former Ph.D. students, Friedrich G. Barth (born 1940) (Fig. 3). In the best tradition of the Autrum School, Barth has addressed important biological questions, particularly in the context of social communication, by combining sensory physiology with physics and engineering; and by complementing laboratory experiments with field observations in search of matches between properties of sensors and behavior and ecology. One of his major research interests has been vibratory communication in spiders and the functional biomechanics of cuticular strain receptors, a class of sensors that includes the spider vibration receptor. By presenting electronically synthesized dummy signals of male courtship vibration to females and monitoring their responses through their own vibration, he and Wolfgang Schüch studied the importance of various parameters of the signal for the attractivity of the male signals (Schüch and Barth 1990). This paper published in the *Journal of Comparative Physiology A* paved the path for many other investigations on vibratory communication, a mode of communication widely found among arthropods. The power of interdisciplinary approaches to advance the understanding of behaviorally relevant sensory structures was demonstrated by extensive computational biomechanics and developing a finite-element model of a tarsal tactile hair of the spider *Cupiennius salei* (Dechant et al. 2001). Since the turn of the millennium, Barth has increasingly turned

Fig. 3 Friedrich G. Barth. (Photograph by Foto Wilke)

his attention also to the analysis of the signals and cues used by stingless bees for the recruitment of nestmates to food sources, research largely based on field work in Brazil (for review see Barth et al. 2008). Whereas relatively little physiology is known related to the behavior of stingless bees, investigations in this area are interesting especially from a comparative view, given that stingless bees and honeybees are two sister groups.

In May 2021, Barth co-authored what was his last regular article, a Review-History paper, in the *Journal* during his tenure as Editor-in-Chief (Dyer et al. 2021). It includes the publication of a previously unknown letter written by Albert Einstein in 1949. In this letter, Einstein addressed the work of Karl von Frisch (whom he had met in April of that year at Princeton University) and commented on how understanding of animal perception and navigation may lead to innovation in physics. Only 6 months after its publication in May 2021, this article was assessed 190,000 times, almost the same number that all the articles ever published in the *Journal* had been accessed in the entire previous year. It thus makes the Dyer et al. (2021) paper the by far most popular article ever published in the *Journal of Comparative Physiology A*, the very journal that Karl von Frisch, who inspired Einstein to write this letter, had founded 98 years earlier—history has come full circle!

Impact on the evolution of comparative physiology and related disciplines

Between 1924 and 2021, a total of 9286 articles were published in 207 volumes and 1067 issues of the *Journal of Comparative Physiology A*. The impact of these publications on the scientific disciplines for which the *Journal* provides its platform is perhaps best appreciated by the impressive body of knowledge created by their totality—a notion in line with the observation made by science historians that most scientific advances are brought about by scientists engaging in 'normal' research rooted in scientific tradition (Kuhn 1991). Nevertheless, readers frequently ask about original research papers that have had a particular high impact. Again, what science history tells us is that even revolutionary shifts in methodologies and concepts are most commonly initiated by scientists who know the old so well that they are able to revalue and reorder the old when they assimilate the new—very aptly epitomized by the remark once made by the 'father' of quantum mechanics, Werner Heisenberg, that "only a true conservative can be a true revolutionary" (p. 424, von Weizsäcker and Boone 1977–1978).

I think that the importance of the *Journal of Comparative Physiology A* can be well characterized in the above sense—as a catalyst of innovation and discovery, rooted in tradition. The *Journal* has played a vital role in establishing what has become textbook knowledge in many areas of sensory physiology and comparative neurobiology. To help readers organize the traditional information and integrate it into the bigger picture, a new article type, Review-History, was introduced a few years ago. The *Journal* even midwifed a new scientific discipline, neuroethology. However, scientists have used the *Journal* not only as a repository for adding information within existing paradigms but, grounded on this large body of 'traditional' knowledge, they have also relied on it for communicating experimental innovation and landmark discoveries. The following highlights a select few, without implying that studies not mentioned here have been less impactful.

Dietrich Schneider and the sensory physiology of olfaction

In 1957, still 2 years before the chemical identification of bombykol (Butenandt et al. 1959), Dietrich Schneider published a comprehensive study in the *Journal* in which he recorded sum potentials from the male antenna of the silkworm moth (*Bombyx mori*), induced by enriched elutes from female glands. He called this odor-induced electrical response 'electroantennogram' (Schneider 1957). The development of this new approach was followed shortly by electrical recording from single bombykol receptor cells (Schneider and Boeckh 1962). Such recordings opened the door for insect pheromone research and, using the electroantennogram as a simple biotest, the development of synthetic pheromones to control insect pest species.

Franz Huber and the introduction of focal brain stimulations to neuroethology

In 1960, Franz Huber published two seminal studies in the *Journal* in which he identified, for the first time, structures in the insect brain involved in neural control of specific behaviors (Huber 1960a, b). By employing focal brain stimulations, he introduced this powerful technique to what was just about to become neuroethology. Some years later, David R. Bentley, a postdoctoral fellow in Huber's lab, developed intracellular-recording techniques to monitor the activity of motor- and interneurons in the mesothoracic ganglion during the production of song patterns in the European field cricket (*Gryllus campestris*) (Bentley 1969). One can hardly overstate the importance of such electrical stimulation and intracellular-recording techniques, which, more than any other approaches, have defined neuroethology until today.

Colin Pittendrigh and Serge Daan: defining the conceptual framework of chronobiology

In 1976, Colin Pittendrigh and Serge Daan co-authored an entire issue of the *Journal*, by contributing five original research articles (Daan and Pittendrigh 1976a, b; Pittendrigh and Daan 1976a, b, c). The research reported in these papers was ground-breaking and established Pittendrigh (together with Jürgen Aschoff and Erwin Bünning) as one of the co-founders of chronobiology, and Daan as the leading chronobiologist in the Netherlands. Each of the five studies centered on the rodent circadian clock, yet many of the findings turned out to be of universal relevance to all organisms, including humans. For example, Pittendrigh and Daan showed that, although the clock's period is remarkably precise and stable, it changes with age. They coined the term 'aftereffects of lights,' which describes the phenomenon that the photoperiod (long summer day or short winter day) can, under experimental conditions, temporarily alter the clock's period. They also introduced phase–response curves (representing a quantitative description of the relation between the clock's period and its ability to shift the phase in response to light pulses) as a standard tool to chronobiology. Analysis of such curves has played a critical role in developing an understanding of how the clock is synchronized to the daily 24-h rhythm, a process known as entrainment. It was also in these papers that Pittendrigh and Daan first proposed the dual circadian oscillator model. This model assumes the existence of two coupled circadian oscillators, E (=evening) and M (=morning), which mediate entrainment of the organism's evening and morning activities, respectively.

Walter Heiligenberg and the elucidation of the neural pathway controlling a vertebrate behavior

In 1973 and 1978, Walter Heiligenberg published two key papers in the *Journal* on the jamming avoidance system in the weakly electric fish *Eigenmannia* sp. This reflex-like social behavior consists of a gradual shift in frequency of the fish's electric organ discharge in the presence of a neighboring fish with a small frequency difference. Based on a previous, incomplete model presented in two articles that appeared in the *Journal* (Bullock et al. 1972a, b), Heiligenberg first demonstrated that an important function of this behavior is to avoid deterioration of electrolocation under 'jamming' conditions (Heiligenberg 1973). He and his students then deciphered the basic computational rules that drive this behavior (Heiligenberg et al. 1978). These studies prepared the way for the subsequent identification of all the essential components of the pathway, from sensory input to motor output, involved in neuronal control of the jamming avoidance response—a ground-breaking achievement with many of the foundational investigations appearing in the *Journal* (for reviews see Heiligenberg 1991; Metzner 1999).

Editorial board

The success of the *Journal of Comparative Physiology A* depends on numerous individuals, foremost the authors, but also the reviewers, who volunteer their time and expertise to provide constructive criticism on the submitted manuscripts. The link between these two groups are the editors. Although the Editor-in-Chief exercises control of the editorial development and assumes responsibility for the editorial content, he/she can meet these tasks only through the support received from the Associate Editors. Together, they form the Editorial Board. As a team of internationally renowned experts in their fields, they work collaboratively with reviewers and the Advisory Board to ensure fair, fast, and constructive editorial handling of submitted manuscripts. As of January 1, 2022, the Editorial Board consists of the following members:

Editor-in-Chief

Günther K.H. Zupanc (Fig. 4), studied Biology and Physics at the University of Regensburg, Germany, and was awarded a Ph.D. in Neurosciences from the University of California, San Diego. He received his *Habilitation* in Animal Physiology from the University of Tübingen, Germany. His past research and faculty appointments included positions at the Scripps Institution of Oceanography in La Jolla, California; the Max Planck Institute for Developmental Biology in Tübingen, Germany; the University of Ottawa, Canada; the University of Manchester, U.K.; and the International University Bremen/Jacobs University in Germany. Since 2009, he has been a Professor in the Department of Biology at Northeastern University in Boston, Massachusetts. During

Fig. 4 Günther K.H. Zupanc. (Photograph by M. M. Zupanc)

his career, he has served in several leadership positions, including Department Chair at Northeastern. The focus of his research is on neural plasticity of the adult central nervous system (especially in relation to behavioral plasticity) in teleost fish. In addition to approximately 170 journal articles and book chapters, he has authored or edited 14 books and Special Journal Issues, including *Behavioral Neurobiology: An Integrative Approach* (Oxford University Press), which, since the publication of its first edition in 2004, has evolved as a standard text in teaching neuroethology.

Associate editors

Kentaro Arikawa (Fig. 5) studies color vision of invertebrates, particularly in butterflies. To understand what and how butterflies see, he employs a broad spectrum of techniques, including behavioral analysis, physiology, anatomy, molecular biology, as well as computational modeling and simulation. He graduated from Jiyu-Gakuen College in Tokyo in natural sciences and Sophia University Graduate School in Tokyo in behavioral biology. During his graduate study, he discovered that yellow swallowtail butterflies can sense light with their genitals, an ability mediated by a photoreceptive system that he subsequently analyzed in terms of its mechanism and function. After a 20-year tenure as a biology professor at Yokohama City University, he joined the Graduate University for Advanced Studies (SOKENDAI) in 2006. Arikawa was also a visiting fellow at the Australian National University and an NIH research fellow at Indiana University, Bloomington. In addition to about 150 peer-reviewed papers, he has contributed chapters to several books, including several Japanese textbooks on sensory biology.

Fig. 5 Kentaro Arikawa. (Photograph by G.K.H. Zupanc)

Fig. 6 Charlotte Helfrich-Förster. (Photograph by C. Helfrich-Förster)

Charlotte Helfrich-Förster (Fig. 6) studied Biology at the Universities of Stuttgart and Tübingen, Germany. She received her Ph.D. in Plant Physiology and her *Habilitation* in Zoology from the University of Tübingen. Her past research and faculty appointments included positions at the Max Planck Institute for Cybernetics, Tübingen and the University of Tübingen. From 2001 to 2009, she was Associate Professor of Zoology at the University of Regensburg. Since 2009, she has been Professor for Neurobiology and Genetics at the Julius-Maximilians University of Würzburg, Germany. She served as *Dekan* (Head) of the Faculty of Biology (2019–2021), Speaker of the Biocenter of the University of Würzburg (2014–2016) and Speaker of a Collaborative Research Center of the German Research Foundation (DFG) on Insect Timing (2013–2017). Her main research interest is on circadian rhythms and their neuronal control in insects (with particular focus on *Drosophila melanogaster*). She has published about 150 peer-reviewed journal articles and over 15 invited book chapters, review papers, and popular science articles.

Uwe Homberg (Fig. 7) studied Biology at the University of Hannover and the Freie Universität Berlin, Germany. He received a doctorate for his thesis research on sensory coding in the brain of honeybees from the Freie Universität Berlin. Following studies on moth olfaction during postdoctoral positions at Columbia University, New York and the University of Arizona, Tucson, he received his *Habilitation* at the University of Konstanz. Subsequently, he worked as a Heisenberg-Fellow at the Universities of Konstanz and Regensburg on signal processing in the central complex of desert locusts and on neural mechanisms of circadian rhythms in cockroaches. Since 1997, Homberg has been Professor at Philipps-Universität Marburg, Germany. He served as Acting Director of the Zoological Institute at the University of Regensburg (1996–1997) and as *Dekan* (Head) of the Faculty of Biology in Marburg (2009–2011). His research

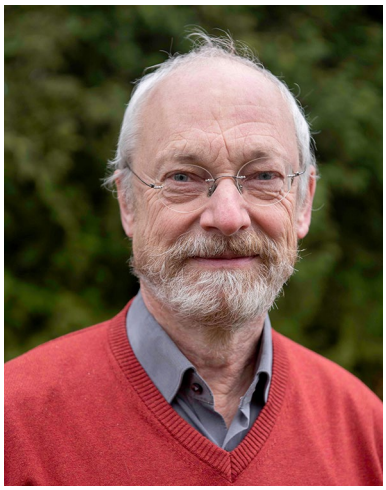

Fig. 7 Uwe Homberg. (Photograph by E. Staudacher)

focuses on the anatomical, neurochemical, and functional analysis of the insect brain, in particular neural mechanisms of sky compass coding and spatial orientation, as well as the organization of the circadian system. In addition to over 130 peer-reviewed publications, he has contributed chapters to several books, including a standard German textbook on animal physiology.

Peter M. Narins (Fig. 8) received the Bachelor's and Master's degrees in Electrical Engineering and his Ph.D. in Neurobiology and Behavior, all from Cornell University in Ithaca, New York. Since 1978, he has been a Professor in the Department of Integrative Biology & Physiology at the University of California Los Angeles (UCLA) with a joint appointment in Ecology & Evolutionary Biology. His research has involved understanding the mechanisms by which animals communicate, the meaning of their signals, and how we can learn from them better treatments for the hearing impaired. He directs an integrated research program at UCLA that combines laboratory measurements of the auditory systems principally of amphibians and mammals, and a field research program in which communication behavior in the animals' natural habitats is examined. He has participated in, or lead, 57 overseas expeditions to conduct acoustic and seismic research on a variety of animal species on all 7 continents, and has published 200 peer-reviewed journal articles, book chapters and popular science articles.

Wolfgang Rössler (Fig. 9) studied Biology, received his Ph.D. in Zoology/Neurobiology, and completed his *Habilitation* in Animal Physiology at the University of Marburg, Germany. Supported by a fellowship from the German Research Foundation (DFG), he joined the Arizona Research Laboratories Division of Neurobiology, University of Arizona as a Research Associate. His past faculty appointments include positions as Assistant Professor in Molecular Neurophysiology at the University of Göttingen and as Associate Professor of Neuroethology at the University of Würzburg, Germany. Since 2011, he has been Professor of Behavioral Physiology & Sociobiology at this institution. He served as *Dekan* (Head) of the Faculty of Biology (2011–2013) and Vice-Speaker and Speaker, respectively, of two Collaborative Research Centers of the German Research Foundation (DFG). Since 2019, he has been vice-speaker of the Biocenter of the University of Würzburg. His research focusses on the neuroethology of social insects. Using ants and bees as experimental models, he studies the neuronal basis of multimodal navigation, olfactory perception, and behavioral plasticity. He has authored approximately 140 journal articles and book chapters, co-authored a textbook on animal physiology, and co-edited special journal issues.

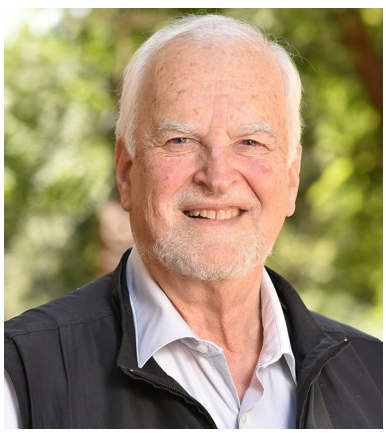

Fig. 8 Peter M. Narins. (Photograph by Todd Cheney, ASUCLA Photography)

Fig. 9 Wolfgang Rössler. (Photograph by H. Duchêne-Rössler)

Fig. 10 Andrea Megela Simmons. (Photograph by A. Tuninetti)

Fig. 11 Eric J. Warrant. (Photograph by S. Warrant)

Andrea Megela Simmons (Fig. 10) received her Bachelor of Arts degree at the University of Pennsylvania, where she studied Biopsychology under the direction of Norman T. Adler as well as European Medieval History. She was awarded a Ph.D. in Psychology, with a focus on the biopsychology of auditory perception, from Harvard University. Her formal introduction to neuroethology occurred while a postdoctoral research associate at Cornell University in the laboratory of Robert R. Capranica. She is currently Professor of Cognitive, Linguistic, and Psychological Sciences (primary appointment) and of Neuroscience (secondary appointment) at Brown University. The focus of her research is the neuroethology of acoustic communication and auditory perception, primarily in adult and developing anuran amphibians but recently expanded to include echolocating bats. She teaches courses on Animal Behavior (from a neuroethological perspective), Brain Evolution, and Psychology of Hearing on both undergraduate and graduate levels. She has published over 100 journal articles and book chapters, and co-edited the volume on Acoustic Communication (2003) of the Springer Handbook of Auditory Research.

Eric J. Warrant (Fig. 11) is Professor of Zoology at the University of Lund in Sweden. He studied Physics and Entomology at the University of New South Wales and completed a Ph.D. in visual science at the Australian National University. Following a postdoc and research fellowship at the University of Lund, he became Professor in 2002. He is currently president of the International Society of Neuroethology. Warrant leads a research group studying vision and visual navigation in nocturnal animals. His research has led to the discovery of neural principles that permit vision in dim light. In recent years, his group has turned its attention to the sensory basis of long-distance migration in nocturnal insects, particularly the role of the Earth's magnetic field and the stars in migratory navigation. Warrant has published almost 200 original papers, reviews, and commentary articles, has co-edited 2 books and 3 Special Journal Issues, and has co-authored the book *Visual Ecology* (Princeton University Press), which won a 2015 Prose Award.

Looking ahead

When Karl von Frisch once reflected on the balance of tradition and innovation and how it defined the success of the Springer publishing house, he wrote: "*Die Erhaltung des Bewährten, verbunden mit sinnvoller Anpassung an den Wandel der Zeit, ist die Grundlage des Bestehens*" (p. 115 in von Frisch 1977), which translates freely as "safeguarding what has stood the test of time, while making meaningful adjustments over time in response to changing circumstances, that is the foundation for sustainability".

Guided by these thoughts and building on the *Journal's* legacy of distinction, we have recognized a need for change primarily in the four areas detailed below. These changes aim to further engage our authors and reviewers, and help our readers to develop knowledge and perspectives beyond the sheer collection of research data.

Advisory board

The Advisory Board plays a vital role in the editorial process. Its members regularly review submitted manuscripts in their field of expertise. To be able to exercise this responsibility adequately, it is critical that the composition of the Advisory Board reflects diversity in a multitude of dimensions, such as research expertise, geographic

affiliation, level of seniority, gender identity, and ethnicity. The Editorial Board, therefore, strives to ensure a high degree of diversity among the Advisory Board—not only as a matter of equality but also as a mechanism to promote creativity. As reviewers, Advisory Board members influence the Editor's decision of which manuscripts are accepted for publication. As frequent guest editors of Special Issues, they have a major say in who will contribute to this highly visible publication channel.

While we are actively promoting diversification of the Advisory Board, we also aim for increasing its size from 47 in the year 2021 to 70 by the end of 2022. Among the new members, we particularly seek individuals who are at a rather early stage of their careers (e.g., assistant professors or equivalent) and have contributed in the past to the *Journal of Comparative Physiology A*, as authors and perhaps also as reviewers. If you feel that you are qualified and would like to become an active part of the sustained success of the *Journal*, you are welcome to contact the Editor-in-Chief or any of the Associate Editors.

Perspectives: a new article category

Modern biology is dominated by the production of experimental data. Comparative physiology is no exception to this. The ability to generate unprecedented amounts of data through large-scale technologies has only accelerated this trend at an exponential pace. The relative ease by which huge amounts of data can be obtained bears an inherent temptation: to confuse the means with the goal. In comparative physiology, the goal should not be to compile a catalogue of data or observations but to advance knowledge—the theory—of sensory and neural mechanisms in the context of the organism's natural behavior and evolutionary history. Just imagine physics without theory, consisting of an experimental branch only! This neglect of knowledge and the use of data as its substitute is what has motivated Paul Nurse (a *bona fide* experimentalist whose numerous achievements include the discovery of cyclin-dependent kinase as a regulator of the cell cycle) to recently call for a shift in research culture by placing a greater emphasis on the generation of ideas—in addition to data (Nurse 2021).

The Editors of the *Journal of Comparative Physiology A* would like to catalyze this shift by creating a new article category, 'Perspectives'. Manuscripts that fall under this heading are viewpoints and opinion pieces that aim to provoke discussion among the Journal's readership. They are about future directions in the field, with bearings for research, funding, and institutions. They will, most commonly, be invited, but we also welcome unsolicited submissions. We recommend that potential authors discuss their ideas with the Editor-in-Chief prior to submission of their manuscripts.

Special issues

In June 2006, the first Special Issue of the *Journal of Comparative Physiology A* appeared, containing ten articles around the topic 'Electric Fish: Model Systems for Neurobiology—A Tribute to Walter Heiligenberg.' Since then, 20 Special Issues have been published (Table 1). They have become a popular feature of the *Journal*, as indicated by article access and citation statistics.

We will continue this tradition and, as done in the past, invite distinguished experts in the field to contribute to a specific Special Issue. As a new feature, forthcoming Special Issues will be announced on the *Journal's* homepage and made open to submission of unsolicited manuscripts of original research papers and review articles that fit the topic. Thus, these authors will benefit from the same high visibility of their articles that invited contributors enjoy.

Readers' Choice Award and Editors' Choice Award

Every year, many excellent articles are published in the *Journal of Comparative Physiology A*. To recognize these accomplishments, we will launch two annual awards, starting in 2022—the 'Readers' Choice Award' and the 'Editors' Choice Award'. Each of these awards will be given in the categories 'Original Research Paper' and 'Review Article' (the latter category includes 'Review History' and 'Perspectives' articles).

The winners in these two categories of the 'Readers' Choice Award' will be determined by the number of online accesses of articles published two years preceding the award year (i.e., for the 2022 award, articles will be considered that appeared in 2020). This will ensure that each article published in a given year is available online for at least 12 months before a decision is made.

The selection of the winners of the 'Editors' Choice Award' will be based on nominations by the members of the Editorial Board and subsequent vote. For this award, articles are eligible that were published in the year prior to the award year (i.e., for the 2022 award, articles will be considered that were published in 2021). The authors of the awards will be presented in an Editorial. The winners of the 2022 competition will be announced in the next issue and on the website of the *Journal*.

Table 1 Special Issues of the *Journal of Comparative Physiology A*

Volume (Issue), Year	Topic	Editor	URL
192 (6), 2006	Electric Fish: Model Systems for Neurobiology—A Tribute to Walter Heiligenberg	Günther K.H. Zupanc	https://link.springer.com/journal/359/volumes-and-issues/192-6
192 (11), 2006	Dynamic Adhesion in Animals—Mechanisms and Biomimetic Implications	W. Jon P. Barnes	https://link.springer.com/journal/359/volumes-and-issues/192-11
194 (2), 2008	In Memoriam of Theodore H. Bullock	Günther K.H. Zupanc	https://link.springer.com/journal/359/volumes-and-issues/194-2
196 (10), 2010	Comparative Biology of Pheromonal Communication in Vertebrates	Matthieu Keller	https://link.springer.com/journal/359/volumes-and-issues/196-10
197 (5), 2011	Current Topics in Bat Echolocation—A Tribute to Gerhard Neuweiler	Benedikt Grothe, Björn Siemers, Lutz Wiegrebe	https://link.springer.com/journal/359/volumes-and-issues/197-5
199 (6), 2013	Sensory Biology of Aquatic Mammals	Wolf Hanke, Guido Dehnhardt	https://link.springer.com/journal/359/volumes-and-issues/199-6
199 (11), 2013	Insect Chemoreception	Wolfgang Rössler, Monika Stengl	https://link.springer.com/journal/359/volumes-and-issues/199-11
200 (6), 2014	Insect Color and Polarization Vision	Kentaro Arikawa, Adrian Dyer	https://link.springer.com/journal/359/volumes-and-issues/200-6
201 (1), 2015	Insect Hearing—From Physics to Ecology	Bernhard Ronacher, Heiner Römer	https://link.springer.com/journal/359/volumes-and-issues/201-1
201 (6), 2015	Insect Orientation and Navigation	Ken Cheng, Bernhard Ronacher	https://link.springer.com/journal/359/volumes-and-issues/201-6
201 (9), 2015	Invertebrate Neuroscience	Alison R. Mercer, Bing Zhang	https://link.springer.com/journal/359/volumes-and-issues/201-9
202 (9/10), 2016	Stingless Bees (Meliponini)—Senses and Behavior	Michael Hrncir, Stefan Jarau	https://link.springer.com/journal/359/volumes-and-issues/202-9
203 (6/7), 2017	Bird Migration	Franz Bairlein, Wolfgang Wiltschko	https://link.springer.com/journal/359/volumes-and-issues/203-6
203 (9), 2017	The Presidential Symposium at the International Congress of Neuroethology, ICN 2016 in Montevideo, Uruguay	Peter M. Narins	https://link.springer.com/journal/359/volumes-and-issues/203-9
204 (1), 2018	Hormonal Control of Behavior	Barney A. Schlinger	https://link.springer.com/journal/359/volumes-and-issues/204-1
205 (3), 2019	Insects and Flowers: New Views of an Old Partnership	Friedrich G. Barth	https://link.springer.com/journal/359/volumes-and-issues/205-3
206 (2), 2020	Visual Circuits in Arthropod Brains	Uwe Homberg	https://link.springer.com/journal/359/volumes-and-issues/206-2
206 (3), 2020	The Presidential Symposium at the International Congress of Neuroethology, ICN 2018 in Brisbane, Australia	Catharine Rankin	https://link.springer.com/journal/359/volumes-and-issues/206-3
207 (2), 2021	Arachnid Locomotion and Kinematic	Jonas O. Wolff	https://link.springer.com/journal/359/volumes-and-issues/207-2

Acknowledgements I thank Kentaro Arikawa, Charlotte Helfrich-Förster, John G. Hildebrand, Uwe Homberg, Alison R. Mercer, Peter M. Narins, Hans-Joachim Pflüger, Wolfgang Rössler, Andrea Megela Simmons, Eric J. Warrant, Christina M. Zupanc, and Marianne M. Zupanc for stimulating discussions and constructive comments. My special thanks are due to Friedrich G. Barth, whose ongoing support has ensured a smooth transition in editorship.

Declarations

Conflict of interest The author declares no conflicts of interest.

References

Autrum H (1941) Über Gehör und Erschütterungssinn bei Locustiden. Z Vergl Physiol 28:580–637. https://doi.org/10.1007/BF00297960

Autrum H, von Zwehl V (1962) Zur spektralen Empfindlichkeit einzelner Sehzellen der Drohne (*Apis mellifica* ♂). Z Vergl Physiol 46:8–12. https://doi.org/10.1007/BF00340351

Autrum H, von Zwehl V (1964) Die spektrale Empfindlichkeit einzelner Sehzellen des Bienenauges. Z Vergl Physiol 48:357–384. https://doi.org/10.1007/BF00299270

Barth FG, Hrncir M, Jarau S (2008) Signals and cues in the recruitment behavior of stingless bees (Meliponini). J Comp Physiol A 194:313–327. https://doi.org/10.1007/s00359-008-0321-7

Bentley DR (1969) Intracellular activity in cricket neurons during generation of song patterns. Z Vergl Physiol 62:267–283. https://doi.org/10.1007/BF00395740

Bullock TH, Hamstra RH, Scheich H (1972a) The jamming avoidance response of high frequency electric fish. I. General features. J Comp Physiol A 77:1–22. https://doi.org/10.1007/BF00696517

Bullock TH, Hamstra RH, Scheich H (1972b) The jamming avoidance response of high frequency electric fish. II. Quantitative aspects. J Comp Physiol A 77:23–48. https://doi.org/10.1007/BF00696518

Butenandt A, Beckmann R, Stamm D, Hecker E (1959) Über den Sexuallockstoff des Seidenspinners *Bombyx mori*: Reindarstellung und Konstitution. Z Naturforschg 14b:283–284

Daan S, Pittendrigh CS (1976a) A functional analysis of circadian pacemakers in nocturnal rodents. II. The variability of phase response curves. J Comp Physiol A 106:253–266. https://doi.org/10.1007/BF01417857

Daan S, Pittendrigh CS (1976b) A functional analysis of circadian pacemakers in nocturnal rodents. III. Heavy water and constant light: homeostasis of frequency? J Comp Physiol A 106:267–290. https://doi.org/10.1007/BF01417858

Daumer K (1956) Reizmetrische Untersuchung des Farbensehens der Bienen. Z Vergl Physiol 38:413–478. https://doi.org/10.1007/BF00340456

Daumer K (1958) Blumenfarben, wie sie die Bienen sehen. Z Vergl Physiol 41:49–110. https://doi.org/10.1007/BF00340242

Dechant HE, Rammerstorfer F, Barth FG (2001) Arthropod touch reception: stimulus transformation and finite element model of spider tactile hairs. J Comp Physiol A 187:851–851. https://doi.org/10.1007/s00359-001-0255-9

Dyer AG, Greentree AD, Garcia JE, Dyer EL, Howard SR, Barth FG (2021) Einstein, von Frisch and the honeybee: a historical letter comes to light. J Comp Physiol A 207:449–456. https://doi.org/10.1007/s00359-021-01490-6

Haldane JS (1908) An address on the relation of physiology to physics and chemistry: delivered before the Physiological Section of the British Association for the Advancement of Science, Dublin, 1908. Br Med J 2:693–696

Heiligenberg W (1973) Electrolocation of objects in the electric fish *Eigenmannia* (Rhamphichthyidae, Gymnotoidei). J Comp Physiol A 87:137–164. https://doi.org/10.1007/BF01352158

Heiligenberg W (1991) Neural nets in electric fish. MIT Press, Cambridge

Heiligenberg W, Baker C, Matsubara J (1978) The jamming avoidance response in *Eigenmannia* revisited: the structure of a neuronal democracy. J Comp Physiol A 127:267–286. https://doi.org/10.1007/BF01350117

Huber F (1960a) Experimentelle Untersuchungen zur nervösen Atmungsregulation der Orthopteren (Saltatoria: Gryllidae). Z Vergl Physiol 43:359–391. https://doi.org/10.1007/BF00298069

Huber F (1960b) Untersuchungen über die Funktion des Zentralnervensystems und insbesondere des Gehirnes bei der Fortbewegung und der Lauterzeugung der Grillen. Z Vergl Physiol 44:60–132. https://doi.org/10.1007/BF00297863

Kuhn T (1991) Scientific revolutions. In: Boyd R, Gasper P, Trout JD (eds) The philosophy of science. MIT Press, Cambridge, pp 139–147

Metzner W (1999) Neural circuitry for communication and jamming avoidance in gymnotiform electric fish. J Exp Biol 202:1365–1375. https://doi.org/10.1242/jeb.202.10.1365

Munz T (2016) The dancing bees: Karl von Frisch and the discovery of the honeybee language. University of Chicago Press, London

Nurse P (2021) Biology must generate ideas as well as data. Nature 597:305. https://doi.org/10.1038/d41586-021-02480-z

Pittendrigh CS, Daan S (1976a) A functional analysis of circadian pacemakers in nocturnal rodents. I. The stability and lability of spontaneous frequency. J Comp Physiol A 106:223–252. https://doi.org/10.1007/BF01417856

Pittendrigh CS, Daan S (1976b) A functional analysis of circadian pacemakers in nocturnal rodents. V. Pacemaker structure: a clock for all seasons. J Comp Physiol A 106:333–355. https://doi.org/10.1007/BF01417860

Pittendrigh CS, Daan S (1976c) A functional analysis of circadian pacemakers in nocturnal rodents: IV. Entrainment: Pacemaker as clock. J Comp Physiol A 106:291–331. https://doi.org/10.1007/BF01417859

Schneider D (1957) Elektrophysiologische Untersuchungen von Chemo- und Mechanorezeptoren der Antenne des Seidenspinners *Bombyx mori* L. Z Vergl Physiol 40:8–41. https://doi.org/10.1007/BF00298148

Schneider D, Boeckh J (1962) Rezeptorpotential und Nervenimpulse einzelner olfaktorischer Sensillen der Insektenantenne. Z Vergl Physiol 45:405–412. https://doi.org/10.1007/BF00340462

Schüch W, Barth FG (1990) Vibratory communication in a spider: female responses to synthetic male vibrations. J Comp Physiol A 166:817–826. https://doi.org/10.1007/BF00187328

von Frisch K (1925) Farbensinn der Fische und Duplizitätstheorie. Z Vergl Physiol 2:393–452. https://doi.org/10.1007/BF00572190

von Frisch K (1942) Über einen Schreckstoff der Fischhaut und seine biologische Bedeutung. Z Vergl Physiol 29:46–145. https://doi.org/10.1007/BF00304445

von Frisch K (1977) Fünfzig Jahre ‚Verständliche Wissenschaft'. In: Springer KF (ed) Semper Attentus: Beiträge für Heinz Götze. Springer, Berlin

von Frisch K, Rösch GA (1926) Neue Versuche über die Bedeutung von Duftorgan und Pollenduft für die Verständigung im Bienenvolk. Z Vergl Physiol 4:1–21. https://doi.org/10.1007/BF00341784

von Weizsäcker F, Boone CC (1977–1978) Werner Heisenberg. Cross-Currents 27:417–425