International Society for Neuroethology

Newsletter - November 1999

Section 2

SPECIAL ESSAY

Several of us recently had the opportunity to hear Dr. Jane Mainschein speak on the history of our field. The talk was interesting and provocative. Thus, we imposed upon Dr. Maienschein to write an essay for the newsletter on the topic. Dr. Maienschein is Professor of Philosophy and Biology, and Director of Biology and Society Program, Arizona State University. We are grateful to Dr. Mainschein for her willingness to write this piece, and we hope that all members of ISN find it as interesting as did those of us priveleged to hear Jane's wonderful presentation.

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TOWARDS NEUROETHO-EVO-DEVO-ECOLOGY: ONE VIEW OF THE MOUNTAIN

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Once upon a time, I conducted a course at the Marine Biological Laboratory entitled "History of Biology: Neurobiology and Behavior." That led to connections with John Hildebrand, which led to my having been invited as the opening speaker for an international conference on neuroethology. Since my own research focuses on historical and philosophical aspects of heredity and development (including neuroembryology), this was a stretch, but with John's assurance that this was a great group and his promise that it would be fun, I agreed. In many ways, this was one of the most enriching and educational conferences I have attended, and I hope it signaled the beginning of a beautiful friendship.

With all the naïve enthusiasm of an interested visitor to a foreign field, I sought to bring my broader historical and philosophical perspective to ask three questions: (1) What is neuroethology, anyway? (2) Where did it come from? (3) And where is it going (or who cares)? Art Popper then invited me to write up my comments for the Newsletter, and after considerable reflection, revision, and rethinking, here they are. I offer this essay as a supplement to the lively set of autobiographical pieces that have graced the newsletter pages and offer valuable insights into the larger questions that are all-important for science about what it means to be a scientific discipline.

What is neuroethology, anyway?

And, we might add, and who says? As Zvi Wollberg noted in his November 1998 autobiographical sketch in this Newsletter, "I am a member of the Neuroethology Society. I pay my dues. I attend the meetings, and I faithfully read the Newsletter. Namely, I am a neuroethologist. But I still don't know exactly what this means." As the by-laws for the International Society for Neuroethology note, "The purpose of the Society shall be to advance the understanding of the neural bases of behavior in all animals, vertebrate and invertebrate." While this seems clear on the face of it, it does not offer much in the way of criteria to demarcate what should be in or out of this range of studies.

For any field or discipline, we have the same problem: what is it, and who gets to decide who belongs? Having one primary society helps, because anybody who joins can be one -- of whatever it is. Or somebody can set out official rules or definitions and then police them with laws of various sorts, as we do with medicine. For science, however, the simple act of "card-carrying" or having passed some test or fit some entry requirement does not matter as much as particular products. Scientists largely accept that being in field x is defined, as a matter of convention, as doing the relevant work.

Neuroethologists are those who do neuroethology, in short. And neuroethology is what neuroethologists do. Great. That actually isn't as completely empty as it might sound, but we need something more. Some common sense and standard research methods take us to the fact that neuroethology equals neuro(biology) and ethology, and hence has something to do with neurons, neural systems, and neural action on the one hand. The other hand points to ethology, behavior, and maybe even the evolution and ecology of behavior. Furthermore, these two hands should be connected in some significant way since the word "neuroethology" isn't even hyphenated and hence separated, but conjoined. Neuroethology, then, seeks to bring together the study of neural goings-on and behavior, in a way that goes beyond "just" neurophysiology or "just" study of behavior. A survey of internet, print sources, and talks with my colleagues suggests that the "somehow" in the bringing together shows a delightful range of diverse possibilities. Many people think of themselves as neuroethologists, and they want to be included in this club. They mostly have vague criteria for what counts but all have clear and sometimes strong views about what does not. Apparently most eliminable are those reductionists who slice and dice their organisms with no interest in the life, the behavior, and the neural functioning-in-context. These are "mere" neurobiologists. Psychologists with no interest in animals or neurons, and especially those who babble about "mind" are unwelcome at the other extreme. This community agrees that when neuroethology brings together neurobiology and the study of behavior, it is synthetic and interdisciplinary in its goals. But the range of possible ways to do that is rich and broad. The question, then, is whether there is just a large bunch of people doing a long list of things that have been stapled together and that disguise deep differences, or whether there is really a core "neuroethology."

2. Where did it come from?

Kenneth Roeder gives us a great starting point for considering this question. Amidst various biochemical and genetic studies of behavior in 1963, he wrote in his classic Nerve Cells and Insect Behavior (Harvard University Press, reissued in 1998 with foreword by John Hildebrand) "most workers are still occupied with methods and with the empirical assembly of data. From many directions workers are tunneling hopefully into the mountain, some with steam shovels and others with dental drills. Some travel blindly in a circle and come out close to their point of entrance; some connect, usually in a mismatched fashion, with the burrows of others. Some have chosen to disregard the random activities of their fellows and have worked out in a small region an elegant system of interconnecting tunnels of their own. Both the attraction and the confusion of this multitudinous excavation lie in the fact that none of the workers know precisely what they are looking for or what they are likely to find." (p. 11) As Roeder pointed out, part of the undirectedness results from the fact that different people, with different methods, are at work on

what look like the same general problem. Until recent decades, this was largely true: the "neuro" and the "etho" worlds drew on largely separate traditions, with various points of overlap but essentially remaining distinct. In summary, the stereotypical list of distinctions go something like this (full of exceptions as any stereotype is):

Neurobiology	Ethology
study nerves, cells, nervous systems	study behaviors, acts, organisms as actors
laboratory	field
experimentation	observation
control	"natural"
analysis	synthesis
internal causes	external patterns
more proximate	more ultimate
asks how	asks why and what for (more evolutionary)
love machines	love nature (and its messiness)
wears lab coats and ties	wears baggy pants

If we accept the standard biological organization chain from molecules, genetics, cells, systems, organisms, communities, and ecosystems, neurobiologists reside somewhere in the bottom half, while ethologists work in the upper half -- or at least are statistically much more likely to do so.

Individual variations notwithstanding, these are largely accurate characterizations of the "neuro" and "etho" worlds. Most individuals reside more in one rather than the other world, and tenure cases, grants, publications, and other indications of success are determined by one or the other.

Yet there are not "natural kinds," and these fields are not necessarily and inevitably distinct. Neuroethology is a way to bring the two together and blur the boundaries by generating some terrific and exciting work in between. The approach dates back to at least the late nineteenth century, with examples in Charles Otis Whitman's work at the Marine Biological Laboratory and several German research approaches. Ron Hoy's piece in this newsletter last November describes the establishment and acceptance of Cornell's Department of Neurobiology and Behavior in 1966, a first effort at institutionalizing neuroethology and neuroethologists. Research in the 1970s led to textbooks in the 1980s, the formation of the International Society, and increased publication in the field -- which had now become a field. As Ewan wrote in 1980, "Neurothology... is a young discpline." (Jorg-Peter Ewan, *Neuroethology*, Springer-Verlag, 1980, preface). But it was a field!

Interestingly, many who consider yourselves neuroethologists now do not point to the same textbooks as "founders," some gravitating more toward the neuro works, others toward the etho pioneers, and still others classifying themselves in terms of organisms studied. What is clear is that by the 1980s, something called neuroethology existed. And if you "paid your dues" - literally and through interaction with the right people, study in the right places, and publishing in the right outlets, you could be one. It would probably be a productive research topic for an historian/philosopher/sociologist of science to trace the institutional factors in the establishment of neuroethology, and to explore how this field identified itself in relation to others such as neurophysiology, ecology of behavior, psychology, cognitive neuroscience and such.

Where is Neuroethology going (or who cares)?

We could look at the trajectory of recent advances and project into the future, but that is often misleading. Recent history is but a small blip and does not give us enough points on which to base

meaningful extrapolation. We do see that neuro and etho work have come closer together, at least for some people and some research projects and programs. We also see an increased interest in underlying biochemical and molecular mechanisms, in evolution, genetics, and development, and in ecological and environmental factors shaping the neural basis of behavior. Therefore, neuroetho is embracing evo, devo, and even eco approaches. This neuroetho-evo-devo-eco approach is still hyphenated because it is not yet fully synthetic nor integrated. But it could be, and perhaps it will be. Brains, stem cells, flight responses, speech, and so on: there are many ways to divide up the questions and approaches, and there are researchers interested in doing just that: dividing up the field. But, more important, with a discipline and a community of those committed to neuroethology, we have people inspired to work together and go beyond what any of the individual approaches could do.

As Roeder noted in 1963, "a wide gap remains between the mechanisms and the behavior; in other words, the hole that we have dug in the mountain is both small and shallow, and our main comfort must be that we have not yet lost our bearings with the surface realities of basic morphology and physiology." (p. 196) He took heart in the fact that those tunneling had not completely lost their bearings. But today, we can take heart in much more. There are new bearings for tunneling in the mountain of behavior. And, indeed, perhaps even new metaphors that provide even more hope.

If the mountain is the mountain of living, behaving organisms, then perhaps our neuroetho-evo-devo-eco researchers can see the whole mountain more clearly, and can use modern approaches to work in the enlightening light of day outside the mountain rather than having to tunnel blindly in the interior darkness. Perhaps we do not have to destroy life to study it, nor to divide it into so many little pieces that we lose track of the whole. The community, working together and communicating across what used to be formidable boundaries can go much farther, much faster, and with a much better sense of where it is going than ever before. Neuroethology seems to be on the verge of becoming such an exciting field, and I thank John and Art for inviting me to participate in a small part of the process.

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MEMBERSHIP IN ISN

You can obtain a membership form to join ISN or update your membership information at the ISN Website. Please encourage colleagues to consider joining ISN.

MATERIAL FOR FUTURE NEWSLETTERS

Send news, job advertisements, meeting announcements and other related information for the next newsletter (to be published in early March) to Arthur Popper at AP17@umail.umd.edu. All material should be sent via E-mail.

Advertisements for jobs and graduate/postdoctoral positions should be no more than 150 words. Suggestions for feature articles, including autobiographical sketches, research group reports, and Neuroethological Viewpoints, should also be sent to Art Popper. However, please do not submit full articles of this type without a response from the Editorial Board. Feature articles may be up to 1,500 words in length. We also welcome research commentaries, book reviews, and other material that might be of interest to the ISN community. These should be no longer than 450 words in length and should only submitted after consultation with the editor.

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COURSES, MEETINGS, WORKSHOPS

The 27th International Ethological Conference will be held in Tuebingen, Germany, from August 22 to August 29, 2001. It is our intention to bring together the various branches of ethology and related disciplines to enhance communication between conference participants. Therefore, the conference is open to all ethologists and scientists working in related fields. Main topics will be presented by six plenary sessions and corresponding sessions with contributed spoken and poster papers. Of course there will be amble room for other and more general topics. Symposia and roundtable discussions on hot topics will supplement the program. For further information/ preliminary registration please contact us by E mail: ethology01@uni tuebingen.de. Postal address for correspondence is: XXVII IEC, Raimund Apfelbach, University of Tuebingen, Dept. of Zoology / Animal Physiology, Auf der Morgenstelle 28, 72076 Tuebingen, GERMANY, Phone: ++49 7071 2972624, FAX: ++49 7071 294634, http://homepages.uni tuebingen.de/ethology01

The Symposium "Chemical Signals in Vertebrates IX" will take place in Cracow, Poland, from July 26 until July 31, 2000. Multidisciplinary studies of chemical signals (olfaction and taste) in all vertebrates including humans will be presented and discussed. For further information contact: Dr. Anna Marchlewska Koj, Institute of Environmental Biology, Jagiellonian University, Ingardena 6, 30 060 Krakow, Poland, Tel/FAX: (4812) 633 4003, E mail: csv@eko.uj.edu.pl

Undergraduate Summer Program: Tropical Neuroethology, University of Puerto Rico. Dates: July 24 - August 25 2000. LOCATION: Institute of Neurobiology, San Juan PR. DESCRIPTION: A hands-on program in Tropical Neuroethology for advanced undergraduate students. Methods will include: field observations, underwater photography, electrophysiological recording (intracellular, extracellular, and chronic), dye injection of neurons, nerve backfills, immunohistochemistry, and confocal microscopy. Funding: Students will receive housing, funds for travel, and a stipend (NSF support). Credit: To be arranged through student's home university. Application Information: http://www.neurobio.upr.clu.edu/neuroethology/.
Contact: Dr. Mark W. Miller, Institute of Neurobiology, 201 Blvd del Valle, San Juan, PR 00901, M_MILLER@rcmaca.upr.clu.edu.

Summer course in "Chemosensory Neurobiology in the Marine Environment" at the Bermuda Biological Station for Research, 4 23 June 2000 1 (3 weeks) Faculty: Drs. Hank Trapido Rosenthal and Charles Derby. In this course, we will study chemosensory neurobiology in the marine environment at the physiological, biochemical, and molecular levels. We will use the olfactory system of the spiny lobster, Panulirus argus, as the main teaching and research tool. Receptor cell electrophysiology and activity labeling, immunocytochemistry, biochemistry of receptor and perireceptor phenomena, and the application of the tools of molecular biology (such as PCR and differential display) to the study of chemosensory systems will be among the techniques that students will have the opportunity to learn and apply to novel research questions. For more information, visit
http://www.gsu.edu/~biocdd/Chemosensory2000.htm, www.bbsr.edu, or contact Charles Derby at cderby@gsu.edu or 404 651 3058

The Animal Behavior Society Annual Meeting will be held 5 9 August 2000 in Atlanta, GA, co hosted by Morehouse College and ZooAtlanta. Along with contributed talks and posters, the meetings will include special symposia on 'Dispersal Behavior' and invited papers on 'Comparisons between Primates and Cetaceans'. Plenary speakers include Chris Boake, Hugh Drummond, and Dee Boersma. For further information see http://www.animalbehavior.org/ABS/Program/

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FACULTY POSITIONS

Cell/Molecular Biologist: The Department of Zoology, University of Oklahoma, has a tenure track Assistant Professor position for Fall, 2000. Teaching will be one course/semester, periodically

including cell biology. Candidates must have: (1) proven record of good teaching, (2) demonstrated ability to conduct significant independent research, and (3) Ph.D degree. Postdoctoral experience is preferred. Send CV, reprints of published papers, statements of research interests and teaching experience, and four letters of recommendation to: James N. Thompson, jr., Chair, Department of Zoology, University of Oklahoma, Norman, OK 73019,USA. Tel: (405) 325 4821; Fax: (405) 325 6202; E mail: zoology@ou.edu. Additional details are available on the Zoology web page: http://www.ou.edu/cas/zoology. Screening of candidates will begin 31 October 1999 and continue until position is filled. OU is an AAE/EEO employer and is responsive to the needs of dual career couples. Women and minorities are encouraged to apply.

Developmental Biologist: The Department of Zoology, University of Oklahoma, has a tenure track Assistant Professor position beginning fall 2000, for an individual addressing fundamental questions in animal development. Teaching will be one course/semester, periodically including animal developmental biology. Candidates must have: (1) record of good teaching, (2) demonstrated ability to conduct significant independent research, and (3) Ph.D. degree. Postdoctoral experience is preferred. Send CV, reprints of published papers, statements of research interests and teaching experience, and four letters of recommendation to: James N. Thompson, jr., Chair, Department of Zoology, University of Oklahoma, Norman, OK 73019 USA. Tel: (405) 325 4821; Fax: (405) 325 6202; E mail: zoology@ou.edu. Additional details are available on the Zoology web page: http://www.ou.edu/cas/zoology. Screening of candidates will begin 31 October 1999 and continue until position is filled. OU is an AAE/EEO employer and is responsive to the needs of dual career couples. Women and minorities are encouraged to apply.

Behavioral Neuroscientist. The Department of Biological Sciences and the Center for Neuroscience and Behavior at Bowling Green State University invite applications for a tenure track assistant professor position in behavioral neuroscience beginning August 2000. A Ph.D. and postdoctoral experience are expected. Preference will be given to candidates with a research interest in mechanisms of sensory biology and its interface with population biology. Interaction with a strong ecology group, developing a funded research program involving M.S./Ph.D. students, and undergraduate/graduate courses in behavior or population biology/genetics and the area of specialization are expected. Further information can be found at http://www.bgsu.edu/departments/biology. Send a CV, statement of research and teaching interests, reprints, and three letters of reference by November 1, 1999 to: Eloise Clark, Behavioral Neuroscience Search, Department of Biological Sciences, Bowling Green State University, Bowling Green, OH 43403 0212 USA. BGSU is an AA/EEO employer and encourages applications from women, minorities, veterans and persons with disabilities.

The Department of Biology at the University of Maryland, College Park (www.life.umd.edu/biology), has a tenure-track assistant or associate professor position for a neurobiologist, with a preference for an individual working at the molecular level. Candidate must have a strong record of publication and funding. Teaching includes a graduate level course in area of the investigator's interest and an undergraduate course in neurophysiology or related areas. The position complements the strong and growing campus program in neuroscience and cognitive science (www.life.umd.edu/nacs). Send letter of interest, CV, statements of research and teaching interests, several representative publications, and three letters of reference to: Chair, MNB Search, Department of Biology, University of Maryland, College Park, MD 20742 USA. For best consideration submit materials by January 6, 2000. Applications are especially encouraged from women and minorities, The University of Maryland is an EEO/Affirmative Action employer.

Assistant Professor of Neuroscience: Faculty Position in the Biology Department of Washington University in St. Louis (http://www.biology.wustl.edu) Candidates should have significant research accomplishments and a commitment to excellence in both undergraduate and graduate teaching. Candidates with expertise in neuroethology, systems neuroscience and behavior, developmental neuroscience, or cellular neuroscience will be viewed with particular interest. Review of

applications will begin January 2. Applications will be accepted until the position is filled. Letters of application for the position should be accompanied by a curriculum vitae, brief statements of research and teaching interests, reprints of up to three selected papers, and the names and affiliations of three persons who have been asked to send letters of recommendation to: Chairman, Department of Biology, Campus Box 1137, Washington University, One Brookings Drive, St. Louis, MO 63130 4899, USA. Washington University is an Affirmative Action/Equal Opportunity employer.

GRADUATE AND POSTGRADUATE

One or two postdoctoral positions in the Center for Neurodynamics will be available Dec. 1, 1999, for studies on electrosensory reception in paddlefish. The positions will be for one year with possible renewal for a second year. We seek highly motivated individuals who have recently received the Ph.D. degree in neurobiology, biophysics or physics and who have experience in electrophysiological and behavioral techniques. Essential knowledge includes data analysis, modeling using nonlinear dynamics, and excellent communication skills. Current research topics are focused on organization of the passive electrosensory system in the paddlefish brain, and synchronization, bifurcation, and chaos in sensory signaling in the presence of noise. Studies of the spatio temporal behavior of noisy excitable systems are also of interest. Interested individuals should apply by e mail and arrange to have three letters of reference sent to Dr. Lon Wilkens (lon_wilkens@umsl.edu) or Dr. Frank Moss (mossf@umsl.edu). The University of Missouri St. Louis is an AA/EOE.

Pre and Postdoctoral positions in Biopsychology, Ruhr-Universität Bochum, Germany. The Department of Psychology (AE Biopsychology) at the Ruhr-Universität Bochum, Germany, is seeking both a post-doctoral researcher and PhD candidates to participate in a new, interdisciplinary program of research in the perception and neurophysiology of biological motion patterns and their role in social recognition. The major animal model used is the pigeon and its complex social behaviour. Applicants should have a background in biological sciences, psychology or physics and experience in one (or several) of the following areas: a. electrophysiological and neuroanatomical methods, b. mathematical/computational approaches and pattern recognition, c. visual perception and ethology. Applications should be sent to: Dr. Nikolaus Troje, AE Biopsychologie, Fakultät für Psychologie, Ruhr-Universität Bochum, 44780 Bochum, Germany

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