INTERNATIONAL SOCIETY FOR BEHAVIORAL ECOLOGY

ISBE NEWSLETTER

Newsletter Editor: Bart Kempenaers, KLIVV,
Konrad Lorenz-Institute for Comparative Ethology
Savoyenstrasse 1A, A-1160 Vienna, AUSTRIA
Tel. +43-1-486 21 21-31, Fax. +43-1-486 21 21-28
Email: b.kempenaers@klivv.oeaw.ac.at

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From the president

I am pleased to tell you that the 8th ISBE Congress will be held at the University of Zürich in the year 2000. The organising committee comprises: Paul Ward (main organiser), Wolf Blanckenhorn, Barbara König and Paul Schmid-Hempel. The dates are: 8 to 12 August 2000. This is a great venue: the Irchel campus of the university has excellent facilities, the airport is just 20 minutes from the city centre - Zürich has a wonderful public transport system and typically in August it is dry with daytime temperatures around 20°C. We look forward to seeing you there.

Tim Birkhead

Editorial

Please note that although the journal became bimonthly, the newsletter will continue to appear only twice a year. The next issue will be send out with the May/June issue of *Behavioral Ecology*, so copy that reaches me before 15 April can be included.

Many thanks to all who contributed to this issue and to Jennifer Kickert for her help with lay-out.

Bart Kempenaers
Newsletter Editor

The Current Executive

President

Tim Birkhead
Dept. of Animal and Plant Sciences
The University
Sheffield S10 2TN U.K.
Tel.: +44 (0)114 282 4622
Fax: +44 (0)114 276 0159
E-mail: t.r.birkhead@sheffield.ac.uk

Past-President

Nancy Burley
Dept. of Ecology and Evolutionary Biology
University of California, Irvine
Irvine, CA 92717-2525 U.S.A.
Tel.: +1 714 824 8130
Fax: +1 714 824 2181
E-mail: ntburley@gandalf.bio.uci.edu

President-elect

Steve Emlen
Neurobiology and Behavior
Cornell University
323 Mudd Hall
Ithaca New York 14853 U.S.A.
Tel.: +1 602 255 4751
E-mail: stel@cornell.edu

Secretary

Patty Parker
Dept. of Zoology
Ohio State University
1735 Neil University
Columbus, Ohio 43210 U.S.A.
Tel.: +1 614 292 0378
Fax: +1 614 292 2030
E-mail: parker.3@osu.edu

Treasurer

Carl Gerhardt
Division of Biological Sciences
Trucker Hall
University of Missouri at Columbia
Columbia, MO 65201 U.S.A.
Tel.: +1 314 882 7219
Fax: +1 314 882 0123
E-mail: bioscarl@mizzou1.missouri.edu

Councillors

Rauno Alatalo
Dept. of Biological and Environmental Sciences
University of Jyvaskyla
P.O. Box 35
40351 Jyvaskyla Finland
Tel.: +358 41 602 306
Fax: +358 41 602 321
E-mail: alatalo@jylk.jyu.fi

Anders Berglund
Dept. of Zoology
University of Uppsala
Villavägen 9
S-752 36 Uppsala Sweden
Tel.: +46 18 182643
Fax: +46 18 559888
E-mail: Anders.Berglund@zoologi.uu.se

Janis Dickinson
Hastings Natural History Reservation
38601 E. Carmel Valley Road
Carmel Valley CA 93924 U.S.A.
E-mail: sialia@uclink2.berkeley.edu

Mark Elgar
Dept. of Zoology
University of Melbourne
Parkville, Vic 3052 Australia
Tel.: +61 3 344 4338
Fax: +61 3 344 7909
E-mail: elgar@ariel.ucs.unimelb.edu.au

Members of the Council are asked to check this listing and provide any corrections or additional information to the Newsletter editor.

Society News

Conference News

7th INTERNATIONAL BEHAVIORAL ECOLOGY CONGRESS IN 1998

The next ISBE congress will be held from 28 July (first day of talks) to 2 August (departure date) at the Asilomar Conference grounds on the Monterey Peninsula in central coastal California. The meeting will include a reception at the Monterey Bay Aquarium as well as a lot of beautiful weather and scenery. Registration materials will be sent out to members before the end of the year. Current information can be obtained from our web site at:

http://socrates.berkeley.edu/~isbe98/

Report from the Journal Editors (1996)

This past year has been an active one for Behavioral Ecology. The journal published 69 research articles and 4 Forum discussions in a total of 505 pages. This represents an increase of 40 pages from 1995. The European office handled 101 new manuscripts in 1996. Of these, 18 were accepted, 47 were rejected, and 36 are pending or were returned to the authors for revision. The North American editors considered 95 new manuscripts and accepted 34 of these, while rejecting 56, and asking for resubmissions/revisions on 5. The acceptance rate of approximately 40% is unchanged from 1995.

We thank all authors who submitted manuscripts for consideration. The continued high quality of the journal depends on receiving high quality manuscripts to review. Unfortunately, our rejection rate must remain high to keep the backlog of accepted manuscripts within reasonable numbers to ensure that the lag between acceptance and publication does not increase.

The editors would like to encourage submission of manuscripts that are as inclusive as possible. We have noticed a tendency toward

shorter manuscripts that approach least publishable units (LPUs). We are aware of the role of publications in job searches and the current funding climate. However, the journal does not favor publication of LPUs and the editors may return manuscripts that they judge to be LPUs to the author(s) without review.

Our formal thanks to the reviewers of manuscripts in 1996 will appear in an upcoming issue of Behavioral Ecology. However, we want to take this opportunity to thank all who gave their time to help us decide which manuscripts should be published and to advise authors on ways to improve their already high quality manuscripts. We again encourage all reviewers to act promptly on manuscripts they receive. The longest delay between receipt of a manuscript in the editors' offices and a decision usually is waiting for the reviews. Authors understandably like to have a decision as soon as possible and late reviews increase the work load of the editors when they have to remind reviewers to return their comments.

The heavy workload of the European editor has necessitated adding another co-editor. We are extremely pleased to welcome Innes Cuthill as the fourth editor of Behavioral Ecology and appreciate very much the commitment of time that he has made to the society. Manuscripts for the European editors should still be sent to Paul Schmid-Hempel in Switzerland and he will route manuscripts to Innes.

Negotiations have been ongoing for some time to renew our contract with Oxford University Press to publish Behavioral Ecology. For 1997, we are operating under the old contract.

At the biennial meeting, new members of the editorial board were selected to replace the retiring members. We thank all the retiring members for their contributions to the success of the journal and look forward to working with the new members. The names of the new members of the board appear in the journal (volume 8, no 2).

We do not expect any increase in pages in the journal for 1997, but we have changed the publication schedule to 6 issues per year in an attempt to shorten the lag between final acceptance and publication of a manuscript. Again, we remind members that the number of papers we can publish depends on the pages available each year. Increasing pages increases costs and can be met either with an increase in dues or by increasing membership, and especially by increasing the number of subscriptions by libraries. We hope to keep dues increases as low as possible to ensure that all who are interested in behavioral ecology are able to join the society. We encourage members to solicit additional members and also to ask their libraries to subscribe to Behavioral Ecology.

Several changes to the Instructions to Authors have been and will be published soon in Behavioral Ecology. At the recommendation of the editorial board, we added plants to the specific list of organisms that can be the subject of papers in behavioral ecology. We also reiterate our interest in publishing papers on human behavioral ecology. Authors will be encouraged to submit diskettes of their manuscripts only with the final version that has been accepted and is ready to go the press. The board of editors recommended that we begin to publish book reviews in the newsletter. The newsletter editor, currently Bart Kempenaers, will coordinate book reviews. Members wishing to offer a review for the newsletter or to suggest a book for review should contact Bart.

We call your attention to two items related to changes in the cover of Behavioral Ecology. First, we now will have a single color for all six issues in a volume, with the color changing between volumes. Second, the description of the cover photo for each issue has been moved from the title page to the following page with information for members and subscribers. The editors would be glad to have comments from members about either change.

Respectfully submitted,

Marc Mangel
Paul Schmid-Hempel
Larry Wolf

Election of ISBE Officers

Every two years, the ISBE elects new officers whose terms begin at the next society meeting. We are fortunate to have assembled a wonderful slate of candidates for this year's election. We provide below brief biographical summaries for all candidates. The ballot and voting instructions can be found on the last page of this newsletter. Everyone receiving this newsletter is eligible to vote. Your attention and participation are appreciated.

Candidates for PRESIDENT-ELECT (the President-Elect will become President at the 2000 meeting and serve in that capacity for 2 years):

Nick B. Davies

1973, B.A., Cambridge. 1976, D.Phil., Oxford. 1994, F.R.S. 1996 ASAB medal. Professor of Behavioural Ecology, Department of Zoology, Cambridge University. Co-editor of Behavioural Ecology: an evolutionary approach (1978, 1984, 1991, 1997), co-author of An Introduction to Behavioural Ecology and author of Dunnock Behaviour and Social Evolution. My research interests include territory economics, social systems and cuckoo-host coevolution. I have supervised 29 PhD students.

Andrew Cockburn

Currently, Professor and Head of the Division of Botany and Zoology at the Australian National University. Since my doctoral studies at Monash University, I have held postdoctoral positions at the UC Berkeley, Monash University, and the CSIRO Division of Wildlife and Ecology, and visiting fellowships at Gøteborg Universitet and the University of Cambridge. My recent research has focused on the bizarre and complex life histories and social systems for which Australian birds and mammals are renowned, and their use in tests of theory in behavioural ecology. My main present interest is a long-term study which measures the lifetime reproductive success of offspring produced by free-living female fairy-wrens which I) differ in their opportunity to choose mates and ii) in the amount of information they possess on which to base that choice. These data should discriminate between the competing theories of intersexual selection.

SECRETARY (the Secretary will take office in 1998 and serve a 4-year term):

Marion Petrie

I started my research career in Behavioural Ecology in 1977 when I embarked on a PhD project looking at competitive and mating behaviour of moorhens. After taking time out to have 2 daughters, I started my first post-doc in 1987 working at the Open University on sexual selection in peafowl. Since that time I have mainly concentrated on the question of what benefits maintain female mating preferences. After several post-docs at the Open University and at Oxford, I am now a Senior Lecturer at the University of Newcastle, working on variability in female mating preferences.

Gunilla Rosenqvist

I received my Ph.D. in 1990 from the Department of Zoology, Uppsala University, Sweden. Currently, I am an associate professor in the Department, of Zoology, Norwegian University of Technology and Science, Trondheim, Norway. My research interests include: sexual selection (how and why secondary sexual characters evolve - both in females and in males), the evolution of sex roles, reproductive strategies, and social organisation. My main study objects have been fishes, especially pipefishes, guppies and cleaning wrasse.

COUNCILLOR (2 councillors are elected to 4-year terms beginning in 1998):

Andrew Bourke

Degrees: 1983, B.A., University of Cambridge; 1987, Ph.D., University of Bath. Positions held: 1988-1991, Junior Research Fellow (Jesus College), Department of Zoology, University of Cambridge; since 1992, I have been a Research Fellow at the Institute of Zoology of the Zoological Society of London. Research interests include kin selection and sex allocation in social insects, especially ants. My current research focuses on the social and genetic structure of species of ants whose colonies contain multiple queens.

Jane Brockmann

Jane Brockmann, Professor and Chair of Zoology at the University of Florida, Gainesville, FL. I received my graduate training at the University of Wisconsin - Madison studying the nesting behavior of a ground-nesting wasp. Post-doctoral research with Dr. Richard Dawkins at Oxford University began my life-long fascination with alternative strategies and ESSs. Since then I have studied variable sex ratio and life-history patterns in mud-daubing wasps and variable mating strategies in horseshoe crabs. I am also interested in the evolution of paternal care and sociality, the economics and evolution of decision making and variable mating strategies.

André Dhondt

Currently, Edwin H. Morgens Professor of Ornithology at Cornell University. I obtained the doctorate degree at Ghent State University (Belgium). After working for the Food and Agricultural Organization of the United Nations in Madagascar and Western Samoa, I joined the faculty of Antwerp University in 1974. The research group I developed there studied population and behavioral ecology of birds, mammals, insects and plants, later expanding to include quantitative and population genetics. My own research focused mainly on field experiments involving blue and great tits, covering subjects such as territorial behavior, song, non-breeding social organization, intra-and interspecific competition, micro-evolution, extra-pair paternity, divorce, life-history evolution and effects of habitat fragmentation. I moved to Cornell University in 1994 as the director of the Bird Populations Unit at the Laboratory of Ornithology. I have served as visiting professor in Zaire, Algeria and Paris.

Astrid Kodric-Brown

Currently Professor in the Department of Biology, University of New Mexico. M.S. from U. of Michigan and Ph.D. from U. of Southern California, 1975. I am interested in the adaptive significance of social behavior with an emphasis on breeding systems in freshwater fishes. My research continues to address questions that focus on the mechanisms of female choice and the types of male traits females prefer, as well as the role of sexual selection in sympatric speciation.

Donated Subscription Programme

Please help colleagues in need. Every donation will help increase scientific contacts across the world. In a time when nationalism is again raising its ugly head, this is more important than ever. For details, see the newest issues of our journal Behavioral Ecology.

Spousal Membership

For $5 per year spouses of full members can become members of ISBE. Spousal members receive the annual newsletter and information concerning biannual meetings, but do not receive a subscription to the journal. Please see information in any issue of Behavioral Ecology.

Conferences

SPERM COMPETITION AND MATING SYSTEMS: report of a meeting at the Konrad Lorenz Institute for Comparative Ethology, Vienna, 18-19 August 1997

The sperm competition meetings at the Konrad Lorenz Institute (KLIVV), in Vienna are becoming a regular event, occurring every second year. This year, the meeting occurred as a satellite symposium of the XXV International Ethological Conference, and as usual was organized by Tim Birkhead and Herbert Hoi and this time, also by Bart Kempenaers.

I am always very fond of visiting the KLIVV, where I find a relaxed, friendly atmosphere which at the same time is scientifically vivid, making it an ideal place for relatively small meetings, like this one.

Perhaps the most distinctive aspect of this meeting was the diverse range of species in which sperm competition, or more generally, competition between male gametes occurs, ranging from violets to flatworms, and leaving bird people astonished at how such creatures could be so interesting!

Roger Hanlon (Woods Hole, USA) showed some exceptional images of sperm transfer and competition in squids. Niko Michiels (Seewiesen) told us about 'love darts', that feminize the recipient, making it more fertile, and other impressive invasive strategies performed by vicious flatworms, snails and sea slugs, trying to inject sperm on their conspecifics bodies, while trying to avoid receiving the same treatment. I. Skogmyr and A. Lankinen (Lund, Sweden) showed that in violets the male component of some individuals perform consistently better than others, a trait that seems to be heritable. However, different 'females' appear to do better with different 'males', which raises a handful of questions. Our commonly accepted view on sperm storage structures in spiders, based on two previously described schemes of spermatheca: the *cul de sac* and the *conduit*, which give rise to different sperm precedence mechanisms, was convincingly challenged by Gabriela Uhl (Bonn, Germany). She showed through a careful anatomical analysis, that not a single spider species she analysed could be easily allocated to either scheme.

Long term studies are essential to disentangle the intricacies of animal mating systems. Jane Brockmann (Gainsville, USA) gave a fascinating account of the behavioural strategies of male horseshoe crabs to secure fertilizations.

One puzzling aspect of the data on extra-pair fertilizations (EPF) in birds is its striking variation between and, as recently realized, within species. Dave Westneat (Lexington, USA) showed that although there is an effect of density on extra-pair copulation rate, the same is not true for EPFs. He then presented the basis for a model under development with Paul Sherman, based on constraints in spatial distribution and movement at different times of the breeding cycle of individuals.

Another puzzle arises form the pattern of distribution of cooperative breeding in birds. Species living in the same environments and sharing most behavioural and ecological features may have completely distinct breeding strategies. Ben Hatchwell (Sheffield, UK) is trying to address this by studying long tailed tits, namely by quantifying direct and indirect benefits for cooperation, with very promising results.

A hot topic in sperm competition is 'cryptic female choice', to which a recent book of William Eberhard (1996) has been devoted. Tim Birkhead used this topic to discuss several epistemological questions on behavioural ecology. After identifying four criteria necessary to demonstrate the existence of cryptic female choice, and applying it to the most recent studies that claimed to have shown it, Tim demonstrated that none has convincingly shown that females select sperm from different males. This does not mean that this form of cryptic female choice is not occurring, but it does mean that, in order to demonstrate it, more stringent criteria need to be fulfilled. This allowed for more general considerations on hypothesis testing in behavioural ecology, on the importance of repeat-

ing experiments, and a considerable criticism of the temptation to jump onto bandwagon and hastily make erroneous conclusions. Drawing a comparison between molecular biology and behavioural ecology, one important difference was emphasised: while in the first there is generally only one solution, in behavioural ecology there is often more than one solution for the same question. And this is something we shall have to cope with.

Many thanks to Tim Birkhead, Herbert Hoi and Bart Kempenaers for organizing such an interesting and enjoyable meeting.

Paulo Gama Mota
Department of Anthropology, University of Coimbra, 3000 Coimbra, Portugal

PRIMATE SOCIO-ECOLOGY MEETING: Causes and Consequences of Variation in the Number of Males

The German Primate Center (DPZ) will host a conference in Goettingen, Germany from 9 to 12 December 1997. This meeting aims to integrate various aspects of primate socioecology related to variation in the number of adult males across groups and taxa, but birds and other mammals will also be discussed. Invited presentations on the first three days will cover all primate taxa and address topics such as infanticide, reproductive skew, sex-specific reproductive strategies, sexual conflict, ecological influences on behavior, intra-specific variation, dispersal, competition and cooperation. Confirmed speakers include J. Altmann, T. Clutton-Brock, M. Cords, N. Davies, R. Dunbar, E. Heymann, C. Janson, P. Jarman, P. Kappeler, J. Mitani, C. Nunn, T. Pope, T. Rowell, B. Smuts, V. Sommer, L. Sterck, K. Strier, T. Struhsaker, J. van Hooff, C. van Schaik, D. Watts and R. Wrangham. For the last day, we invite submissions for contributed spoken papers (15 min). We also welcome poster contributions, which will be displayed throughout the conference. The conference is also open to guests without presentations. The deadline for submission of abstracts wishing to be considered for spoken papers or posters is August 1, 1997. Guests must also register in advance. Additional details available from Peter Kappeler (pkappel@gwdg.de) and the conference web site: http://www.dpz.gwdg.de/freiland.htm

Grants and Jobs

GRADUATE AND POST-GRADUATE RESEARCH GRANTS

The Biological Research Station of the Edmund Niles Huyck Preserve offers grants (max.= US$2500) to support biological research which utilizes the resources of the Preserve. Among the research areas supported are basic and applied ecology, animal behavior, systematics, evolution, and conservation. The 2000 acre Preserve is located on the Helderberg Plateau, 30 miles southwest of Albany. Habitats include northeast hardwood-hemlock forests, conifer plantations, old fields, permanent and intermittent streams, 10 and 100 acre lakes and several waterfalls. Facilities

include a newly expanded laboratory building, library, collections and houses/cabins for researchers. Deadline is February 1, 1998.

Application material may be obtained from Dr. Richard L. Wyman, Executive Director, E.N. Huyck Preserve and Biological Research Station, PO Box 189, Rensselaerville, NY 12147, USA.

VOLUNTEERS

Approximately 30 volunteer positions are open in 1998 at the American Museum of Natural History's Southwestern Research Station in Portal, Arizona. The volunteer program is run annually and offers students in biological sciences outstanding opportunities to observe and become involved with scientists doing field research. Food and lodging are provided to volunteers in exchange for twenty-four hours per week of routine chores, with the remaining time available for research activities. The program is open to both undergraduate and graduate students; the latter may pursue their own research projects. Faculty knowing of promising students should alert them to this opportunity for professional experience toward, development of, and evaluation of their career goals.

Volunteers are needed between March 15 and November 1. Appointments are for part of this period, with a minimum appointment of six weeks. Applicants for spring positions (March-May) should submit applications by February 15, summer volunteers (June-August) by April 1, and fall volunteers (September-November) may apply any time.

For applications, write: Dr. Wade C. Sherbrooke, Director, Southwestern Research Station, American Museum of Natural History, Portal, AZ 85632 USA; telephone 520-558-2396; e-mail: swrs@amnh.org

SOUTHWESTERN RESEARCH STATION STUDENT SUPPORT FUND

The American Museum of Natural History awards several grants each year of approximately $400-$800 to graduate students or postdoctoral students pursuing research at its Southwestern Research Station in the Chiricahua Mountains, Portal, Arizona. Information and application forms for this program and other Museum grant programs can be obtained by writing: Office of Grants and Fellowships, American Museum of Natural History, Central Park West at 79th Street, New York, NY 10024-5192. Application due date: Feb. 15, 1998. Address questions concerning the Station to: Dr. Wade C. Sherbrooke, Director, Southwestern Research Station, Portal, AZ 85632 USA; telephone 520-558-2396; e-mail: swrs@amnh.org

SEASONAL OFFICE ASSISTANT

Assist in operations of biological research station office and nature shop: taking reservations, answering phones, greeting guests, supervising volunteers, etc. Begin March 15, 1998, through September 1998. Five-day week; salary $220/wk, plus room (shared) and board. Applicant must be punctual, organized, enjoy people, and be interested in living in a remote setting (Chiricahua Mountains) and

working with biological researchers. Biological training an asset. Call and send résumé to: Dr. Wade C. Sherbrooke, Director, Southwestern Research Station, American Museum of Natural History, Portal, AZ 85632. Phone and fax: 520-558-2396; e-mail: swrs@amnh.org

Book Reviews

Behavioural Ecology: An Evolutionary Approach, 4th Edition. Edited by Krebs, J.R. and Davies, N.B. 1997. Blackwell Science Ltd., pp. 456.

Each volume of Behavioral Ecology has been extraordinarily successful at simultaneously defining the progress and state of our field and charting the most important and challenging questions yet to come. Krebs and Davies have now influenced a whole generation of scientists; as a case in point, my life history as a behavioral ecologist has been guided by, and to some extent has travelled in parallel to the changing focus of the 4 editions. I was first attracted to the field in a course I took in 1978 (the year of the 1st edition, but the text was Alcock's *Animal Behavior*). The 1st edition nevertheless had its impact when in 1982, as a beginning Ph.D student, I used it to develop my understanding of the basic approaches. The 2nd edition in 1984 came out just in time to be a critical aid, both in preparing for my oral exams - again, it defined the key questions of the day and helped me clear that hurdle - but also in shaping my research on mating behavior. The 3rd edition in 1991 influenced me differently. As I began to mature as a scientist, instead of eagerly absorbing whatever was written, I used it more as a dart board, picking and choosing parts either to cite as background or to target in attempts to extend the approaches described therein. The 4th edition now catches me (and the field) in a mood of looking for broader perspectives.

The new *Behavioral Ecology* (slightly jumping the gun on the 20th anniversary of the 1st) neatly captures this outward looking spirit. With a new organization, new chapter topics, and new authors, the book contains a section on traditional behavioral ecology sandwiched by an early section on the interface between function and mechanism and a later section on the ecological implications of behavior patterns. In chapter 1, Krebs and Davies provide a summary of the history of behavioral ecology, which charts some of the key approaches arising, predominantly in the 1960s and 70s, out of Tinbergen's evolutionary analyses of behavior. The next section of the book provides a comprehensive view of the ecology of mechanisms of behavior. Wehner presents a review of sensory systems with a good dose of functional analysis. Giraldeau provides the best integration of evolutionary analysis of learning and information gathering mechanisms I have read, and his chapter is full of intriguing ideas that cut across many if not nearly all subsequent topics. Sherman, Reeve, and Pfennig break recognition behavior into several distinct components and address our current understanding of the ways in which such components affect social interactions and in turn are influenced by social circumstances. Cuthill and Houston focus on a key underlying variable of import to foraging decisions - energy reserves - and discuss current empirical

and theoretical approaches to managing energy in light of knowledge of the physiology of energy reserves. Finally, Birkhead and Parker review information on the anatomy and physiology of reproduction in male and female insects and birds, and then integrate that with functional aspects of sexual conflict over fertilizations.

Part 2 is a pared down version of previous editions of this book (traditional behavioral ecology) with a strong emphasis on sociobiology. Johnstone first reviews functional aspects of animal signalling in situations in which cooperation is expected but mostly when signaller and receiver are in conflict. (The trio of chapters by Giraldeau, Sherman et al., and Johnstone together present a novel but highly sophisticated and integrative approach to questions about how animals gather and send information.) Ryan provides an update on sexual selection, with reviews of recent work on sensory bias, direct and indirect benefits, choice for mutiple traits, and mate copying. Bourke discusses kin selection and sex ratio studies, as well as new advances in applying the idea of reproductive skew, in the social insects. Emlen has greatly revised his previous contributions on cooperative breeding in vertebrates by focusing on family dynamics. He presents the empirical literature within a framework of predictions that arise out of explicitly considering how families as social units might differ in different circumstances. Pusey and Packer examine social dynamics, in particular the development and function of social dominance relationships and theoretical and empirical studies of reciprocity.

Finally, in a wonderfully entertaining and intriguing chapter, Haig presents many of the issues surrounding the levels of selection debates in a refreshingly (if sometimes perhaps a bit over-anthropomorphic) strategic analysis.

The final section of the book contains a hodge-podge of chapters generally describing intersections between behavioral ecology and other areas of ecology and evolution. Daan and Tinbergen examine the progress made recently in understanding how life history (the sequence of major behavioral and morphological changes through an organisms life) has been shaped by selection. Harvey and Nee explore both what we know about the phylogeny (evolutionary history) of behavior and how modern comparative methods can contribute to testing of hypotheses about the evolution of behavior patterns. Hewitt and Butlin weave a message both intriguing (the role of behavior patterns in affecting population genetic structure) and cautionary (historical changes in population structure may have limiting effects on local adaptation).

Finally, Goss-Custard and Sutherland examine the role of behavior (in particular the ability to make decisions) in population stability. They discuss (in more detail than I have seen before) how behavioral ecologists can contribute to conservation biology models predicting the influence of environmental changes on populations.

In sum, the new edition provides a dramatic new look at behavioral ecology. The excitement of the growing integrative nature of our discipline comes through more strongly than in previous editions. It is also a testament to the growing complexity of our field that the book is limited in several respects, two of which I wish to mention. First, because this book is a deliberate attempt to capture the ways in which behavioral ecology has reached out into other fields, much of the central

core of the field is presented in reduced form. Krebs and Davies' introductory chapter points out many of the underlying concepts, but in a cursory way. Inportant ideas such as the logic of conflicting demands using marginal value theory or ideal free distributions to behavioral decisions are largely missing. More importantly, although the ecology of behavior has clearly influenced nearly all the topics here, there are few new ideas about how patterns of resource distribution in time or space affect behavior. As an example consider the ecological constraints hypothesis (Chapter 10) for why individuals remain in a family and eventually help their parents raise young. Constraints exist in nearly all cases of cooperation and so seem a well-supported factor in explaining cooperation. However, constraints on breeding also often exist in non-cooperative species. For example, 2nd and 3rd year male red-winged blackbirds often are excluded from breeding because no territories are available. Why don't they stay at home and help rear siblings? This question leads us to think more precisely about more specific and quantitative aspects of ecological conditions that induce selection on behavior, which was a more conspicuous goal of early behavioral ecologistsat it seems today. (Note: I used the above example because I happened to be talking with a researcher of cooperative breeding just before writing this review. One could make similar statements about the ecology of sperm competition, sexual selection, social systems, parental care, spacing behavior, or dispersal).

Second, one area of promising research missing from the book that integrates behavioral ecology more fully with both evolutionary biology and genetics is the application of quantitative genetics to behavior. Studies investigating the potential evolutionary responses to selection on behavior have revealed complicated consequences of genetic correlations on evolutionary pathways. Specific applications of QG models, such as of maternal effects and plasticity, have considerable potential to provide powerful new conceptual and empirical approaches to traditional behavioral ecology.

Thus, although this edition beautifully captures many of the new and exciting directions within behavioral ecology, no one should view it as a complete description of our field (and Krebs and Davies make no claim that it does). New students of the subject must be advised that many chapters in previous editions remain valuable contributions; omission of particular focal topics in this edition does not mean those areas of research are of no current interest. In their preface, Krebs and Davies muse about the possibility of a 5th edition in 2004. I am positive there will be the need for one. The excitement of our field, so ably presented in this edition, is only growing as behavioral ecology increases in sophistication. This success, achieved by looking out at other fields and back into the past, and building upon the best insights of both, is likely to continue. I suspect describing the field in 2004 will be quite a challenge. Krebs and Davies have met that challenge every time so far - I look forward to seeing how they do it again!

David F. Westneat
Center for Ecology, Evolution, and Behavior
Morgan School of Biological Sciences
101 Morgan Building
University of Kentucky
Lexington, KY 40506-0225, USA

The Kingdon Field Guide to African Mammals. By Kingdon, J. 1997. Academic Press, San Diego-London, pp. 464, price £29.95.

He has finally done it - Jonathan Kingdon distilled his previous seven volumes of "East African Mammals" into one volume, expanded the coverage to the whole of Africa, updated the text, and included a selection of his delightful drawings and paintings from these as well as other volumes (e.g. from his "Island Africa" volume). Well, is it a *field* guide, and how good is it? We decided to test it, rigorously, in the field, i.e. we took it to Tanzania, used it ourselves, and asked a few long-term residents and mammal researchers to look up their favourite beast(s).

The unanimous verdict is that it is excellent; the most informative, instructive and visually pleasing guide on mammals that has appeared for ages. Previously widely used standard guides to African mammals were written by museum directors, and it showed. The pictures were mostly dreadful, and the accounts of taxonomy, behavior and ecology of species were out of date. In contrast, Kingdon has seen many, if not most, of the animals in the field, and that is clearly evident. Many of the drawings sketch typical behaviors of particular species and are easily recognized in the field, and the descriptions and color illustrations work well (try it out next time you see a porcupine or hare...). Perhaps the overriding impression is the care with which each species account has been written and illustrated. Species are not only described on their own; their position in a guild of species, evolutionary relationships between higher taxa and current ecological differentiation within and between guilds of species are also succinctly described. The distribution maps are impressive. There are hundreds of them, always covering the appropriate section of Africa for each species or groups of species and, as far as I can tell, up-to-date. Moreover, they are nicely colored, the distribution information is adjusted to the quality of information and population size, and range overlap of subspecies or closely allied species are depicted where appropriate.

Do we really need a new field guide? If you thought that all African mammals are taxonomically well sorted out, read on. The subspecies and species status of many groups were and are in a mess and although Kingdon cannot resolve these problems, his accounts consider the very latest research, some of it still unpublished, on taxa variously considered subspecies, species or superspecies. It is telling that in a conspicuous order such as the Primates we have 12 newly recognized species of bushbabies and 21 newly recognized baboons, guenons, mangabeys and colobus monkeys, and it is likely that more species are to come. Kingdon's sensible path through this thicket of uncertainties is to pay attention to subspecies, and describe for the relevant populations what the animals look like, where they occur and what their differences are to closely-related taxa. He frequently points out gaps in our knowledge and thus provides field workers with an approximate yardstick to assess how important or unusual their observations might be. His writing also conveys a sense of excitement that suggests that there are many taxa still waiting to be discovered and correctly identified. This book should be required reading for the training of African

conservation officials, mammalian researchers, conservation-related field surveys, expeditions to Africa, and it would not hurt even ornitho-maniacs to look at it. Although a paperback, it is sturdy and will stand up to roughing it as the binding is solid and the odd cup of spilled coffee will not destroy it.

Having praised it, where do we find fault? The inclusion or exclusion of some topics do not follow any plans but sometimes appear to be a bit haphazard. For instance, multispecies associations in primates are common but which species associate and which do not is not consistently mentioned. Some taxonomic uncertainties are described thoroughly, yet in other cases the Latin name chosen by Kingdon differs from the one cited everywhere else and there is no discussion of this difference at all (example: common zebra). Opinions were divided about the usefulness of the section on "conservation status". Some felt this should not be in a field guide and if taken out would allow for a less cramped typeface, others thought it served a useful function in reminding readers of how precarious the status of many populations are. Many German names are badly misspelt. I would be delighted to see more species with names from local languages. Having worked on spotted hyaenas for the past 10 years in the Serengeti I was naturally eager to look at the carnivore accounts and the hyaena accounts in particular and was disappointed that this part of the book is poorer than the others. It is not correct that zebras are underrepresented in the diet of spotted hyaenas (nor the reason given for that), the gorging on a carcass is only noisy in the very last stage when the carcass can be broken up into pieces, and given the strong dominance hierarchy, interference competition is more important than scramble competition. Litter size is 1-2, very rarely 3, not up to 4, androstenedione rather than testosterone is being held responsible for the masculinization of female genitalia, hyaenas do not keep their anal sacs closed during greetings "lest it send a contradictory, aggressive signal", and it is not true that "only the imperatives of mating (at the height of oestrus) overcomes the male's fear of the larger female".

All the scientists agreed that the sections on "adaptations" are perhaps the least successful part. Here Kingdon is not impartial but frequently describes his own pet hypothesis of the function of certain structures or behaviors and ignores alternative views (e.g., why do zebras have stripes?). Nor is it clear whether a particular explanation is a wild speculation, a reasonable hunch, a result based on careful scientific observations or even elegant experiments. Here, behavioral ecologists would certainly want to see clarification and references and then start to argue with him. References, however, are not found in this book (apart from a one-page list of the usual further reading), unlike his 7-volumes of East African mammals.

Heribert Hofer
Institut für Zoo und Wildtierforschung (IZW)
Alfred-Kowalke-Str. 17
D-10315 Berlin
Germany

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