
INTERNATIONAL SOCIETY FOR BEHAVIORAL ECOLOGY

ISBE NEWSLETTER

Newsletter Editor: Bart Kempenaers
Research Center for Ornithology
of the Max-Planck Society
Postf. 1564, D-82305 Seewiesen, Germany
Tel.: +49-8157-932232, Fax: +49-8157-932209
e-mail: B.Kempenaers@erl.ornithol.mpg.de

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From the president

Those of us lucky enough to attend the Zurich meeting will still be treasuring memories of a wonderful week. Zurich proved to be the perfect venue: a lovely city within striking distance of the spectacular Alps, and a street party and Cezanne exhibition timed to coincide with our visit. The conference talks and posters were of a high standard and the Irchel Campus provided excellent facilities for both the formal presentations and for informal gatherings. The large number of graduate students and young post-doctoral researchers at the meeting is a sure sign that our society continues to flourish. Congratulations and thanks to Paul Ward, Wolf Blanckenhorn, Barbara König and Paul Schmid-Hempel for their marvellous organisation! We shall forever link our fond memories of ISBE 2000 with this famous "gang of four". If you missed this meeting, then make sure you come to the next one in Montreal : the provisional dates are 8-12 July 2002.

In Zurich we paid tribute to W.D. Hamilton, who died on 7 March 2000 at the age of 63, from complications after contracting malaria during fieldwork in the Congo. Much of the intellectual excitement of our subject has stemmed from Hamilton's remarkable insights, especially his ideas on how natural selection shapes social behaviour and how parasite-host interactions maintain sexual reproduction and drive sexual selection. At the executive meeting of the society, we decided to commemorate this extraordinary scientist with a lecture, the "W.D. Hamilton lecture", to be given at our biennial conference, starting in Montreal.

In addition to our international conference, the other main activity of the society is to publish our journal, *Behavioural Ecology*, and it is good to see this flourishing too. Submissions have increased to such an extent that we have now appointed a third European editor. I am delighted to welcome Andrew Bourke to the

editorial team. He will be well known to you all from his elegant work on ant social behaviour and for his brilliant monograph, co-authored with Nigel Franks, and published in the Princeton monograph series. The journal's impact factor has increased, putting Behavioural Ecology fourth out of thirty eight journals in the Behavioural Sciences List, and ahead of both Animal Behaviour and Behavioural Ecology and Sociobiology. Thanks to Oxford University Press and their commissioning editor, David Prosser, for their good work on our behalf.

Finally, I'd like to thank our retiring Councillors, Rauno Alatalo and Mark Elgar, and retiring members of the editorial board, Rauno Alatalo, Steven Frank, Charles Godfray, Donald Kramer and Olof Leimar. In their place, we welcome Marty Leonard and Linda Whittingham as new Councillors and, on the editorial board, Liselotte Sundstrom, Joost Tinbergen, Scott Forbes, Anders Berglund and Rufus Johnstone. A large thank you too to Bart Kempenaers; this is his last newsletter before handing the editorial reins over to Ken Otter.



Nick Davies

Editorial

Over the past four years I have had the pleasure to serve the Society as the editor of this Newsletter. This will be 'my' last issue: I now hand on the torch to Dr. Ken Otter. You can contact Ken at the following address:

Ken Otter
Biology Program, University of Northern BC
3333 University Way
Prince George, BC, Canada V2N 4Z9
Phone +1-250- 960 5019
Fax +1-250- 960 5538
Email otterk@unbc.ca

I would like to sincerely thank all those who made this work interesting, and who contributed to the past issues. For this issue, I'm also grateful to Cheryl Bishop, Dr. Donald Blomqvist and in particular to Dr. Ken Otter. Working together with Ken to put this issue together assures me that the Newsletter is in good hands.

The next issue of the Newsletter will come out with the May/June issue of *Behavioral Ecology*, so copy that reaches Ken **before 15 March** can be included.

Bart Kempenaers
(ex)-Newsletter Editor

Current Executive

President

Nick Davies
Department of Zoology
Downing Street
Cambridge CB2 3EJ U.K.
Tel.: +44 (0)1223 334405
Fax: +44 (0)1223 336676
E-mail: n.b.davies@zoo.cam.ac.uk

Past-President

Stephen T. Emlen
Neurobiology and Behavior
Cornell University
Ithaca New York 14853-2702 U.S.A.
Tel.: +1 607 254 4327
Fax: +1 607 254 4308
E-mail: ste1@cornell.edu

President-elect

Malte Andersson
Animal Ecology
Department of Zoology
Göteborg University
Box 463
SE 405 30 Göteborg
Sweden
Tel: +46 31 773 3695
Fax: +46 31 416729
E-mail: malte.andersson@zool.gu.se

Secretary

Marion Petrie
Evolution and Behaviour Research Group
Department of Psychology
University of Newcastle
Newcastle-upon-Tyne NE1 7RU U.K.
Tel.: +44 (0)191 222 5126
Fax: +44 (0)191 222 5622
Email: marion.petrie@ncl.ac.uk

Treasurer

Walt Koenig
Hastings Natural History Reserve
38601 E Carmel Valley Road
Carmel Valley CA 93924
USA

Councillors

Anders Berglund
Dept. of Animal Ecology
University of Uppsala
Norbyv. 18d, S-752 36 Uppsala, Sweden
Tel. +46-(0)18 471 26 43
Fax +46-(0)18 471 64 84
E-mail: Anders.Berglund@zoologi.uu.se

H. Jane Brockmann
Department of Zoology
University of Florida
Gainesville, FL 32611-8525 U.S.A.
Tel.: +1 352 392 1107 (1297)
Fax: +1 352 392 3704
E-mail: hjb@zoo.ufl.edu

Andre Dhondt
Cornell Laboratory of Ornithology
159 Sapsucker Woods Road
Ithaca, NY 14850 U.S.A.
Tel.: +1 607 254 2445
Fax: +1 607 254 2415
E-mail: aad4@cornell.edu

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

Marty Leonard

Department of Biology
Dalhousie University
Halifax, Nova Scotia
Canada B3H 4J1
Tel: +1 902 494-2158
Fax: +1 902 494-3736
E-mail: mleonard@is.dal.ca

Dr. Linda A. Whittingham
Dept. of Biological Sciences
Lapham Hall, P.O. Box 413
University of Wisconsin-Milwaukee
Milwaukee, WI 53201 USA
Tel: +1-414-229-2252
Fax: +1-414-229-3926
e-mail: whitting@csd.uwm.edu

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*.

Society News

MINUTES OF THE GENERAL BUSINESS MEETING Zurich 10th August 2000

The President Nick Davies (NBD) said the purpose of the meeting was for the officers to present brief reports, to relay the decisions made at the executive meeting and to give the attending members a chance to raise any issues. Nick then asked Paul Ward to present the Local committee report and thanked Paul for organising a wonderful meeting.

Local Committee report-Paul Ward

Paul said he was happy with the way things had run so far and said that there were 610 registrants and 65 helpers from Zurich at the conference. Paul said that the conference budget target had largely been met and that the slight deficit would be paid for by the University of Zurich.

NBD thanked Paul and his team for all their efforts and Paul received a warm round of applause.

Oxford University Press report-David Prosser

David reported that the Journal *Behavioural Ecology* was doing very well. He reported an increase in the number of manuscripts submitted, an increase in the number of subscriptions, an increase in the impact factor (which had now reached 2.869) and that the number of hits on the journal's website maintained by OUP had reached 2000 per month.

He pointed out that personal subscribers were entitled to free on-line access to the Journal as were library subscribers.

NBD added that *Behavioural Ecology* had a higher Impact factor than *Behavioural Ecology and Sociobiology* and thanked David for his efforts in making the journal a success.

Financial report-Steve Emlen on behalf of Carl Gerhardt

Steve Emlen pointed out that the ISBE not a rich society and the society did not aim to make a profit.

He said that the society's finances were in slightly better shape as a result of a small profit made at the Asilomar meeting in 1998. He said that the goal of the society's executive was to keep the cost of the journal and meetings as low as possible.

Editor's report- Ron Ydenberg

Ron introduced his fellow editors Innes Cuthill, Gunilla Rosenqvist and David Westneat to the attending members. He said that in the last year the editors had received 283 submitted manuscripts which was up from 248 in the previous year. The editors had solicited 554 reviews from 444 different reviewers, and that a large proportion of the membership contributed to the editorial review process. After submitting a manuscript the average time to receiving an initial decision was 4 months and that the lag from acceptance to publication was 4-5 months. There was no queue to publication and the acceptance rate for 1999 was 35% and for 1998 was around 40 %.

Ron introduced some changes in the editorial process. These are discussed in detail in the Report from the Editor found in this Newsletter, are summarized as:

- 1) In future authors will be asked to provide a lay summary of their article for publication on the web and the instructions for this will appear in

the next issue.

- 2) In future the editors will operate a double blind reviewing system. So that, in principle, the reviewers will not know who authored the papers that they are asked to referee. The title page and the acknowledgements will be removed from all the manuscripts before they go to the reviewers.

Ron also reported that the success of the journal had meant that the editors were dealing with a lot more manuscripts, and that therefore a decision had been taken to appoint a 5th editor in Europe. He also reported that OUP were committed to introducing a web-based submission procedure which should reduce the administrative burden of dealing with the increase in submissions and may lead to changes in the editorial office.

NBD thanked the editors for their hard work.

Lay Summary Initiative-Steve Emlen (SE)

Steve reported that the idea behind asking authors to submit a 'lay' summary of their accepted manuscripts was to make the science of Behavioural Ecology more accessible to people outside the field (see Report from the Editor- this Volume). He said that the general public would have access to these summaries on the web site for the January issue in 2001. He hoped that all the authors would cooperate since it was in everyone's interest for the public to understand the importance and relevance of our field.

NBD thanked SE for spearheading this idea.

Newsletter editor's report-Bart Kempnaers

Bart reported that it had been a pleasure to serve as newsletter editor and was handing over the torch to Ken Otter who will begin as editor for Vol 13 (1).

He said that the purpose of the newsletter was to provide a forum for discussion as well as reviewing the society's business and any contributions would be welcome. He thanked the executive and all contributors for their help and NBD thanked him for his hard work.

ISBE 2002-Don Kramer

Don was introduced as one of the organisers of the next meeting which will be held at McGill University Campus in Montreal in Canada from July 8th-12th. The conference is immediately after an international jazz festival which will run from 30th June to 7th July. Montreal is the largest city in a beautiful part of Quebec. Pre- and Post-conference tours will be arranged, including whale watching. Accommodation will be offered in University Halls of residence (no air-conditioning) at current rates of \$26 for students alternatively there were many down town hotels close to the campus available at a price per night of between \$75 and \$100.

NBD thanked Don and Luc-Alain Giraldeau for agreeing to host the meeting.

W.D. Hamilton memorial lecture-NBD

Nick Davies reported that the executive had decided that there would be a lecture at every conference in the future in memory of Bill Hamilton, who tragically died earlier this year. There would be a small committee consisting of the president and the local organisers to decide who would be asked to give the lecture each year.

NBD then opened the meeting to the floor for discussion. Several matters were raised for clarification and then NBD closed the meeting by thanking the retiring officers Steve Emlen

(outgoing President), Carl Gerhardt (outgoing Treasurer) and Bart Kempenaers (outgoing newsletter Editor) and welcomed the new officers Walt Koenig (incoming treasurer) and Ken Otter (incoming newsletter editor).

Marion Petrie

Secretary October 2000

REPORT FROM THE EDITOR

One of the most important functions of the ISBE is the publication of its journal 'Behavioral Ecology', now in its 11th year. We (the four Editors: Innes Cuthill, Gunilla Rosenquist, David Westneat, and Ron Ydenberg) reported on the health of the journal at the Zurich meeting, and the highlights of that report are summarized here.

Between us we handled 283 submitted MSs in 1999, up from 242 in 1998. In doing so we collected some 554 reviews (in 1999), from 444 different reviewers. We thank the members of the Society for their co-operation and help in the review process, which was carried out (mostly) without complaint. The overall acceptance rate was just over 40% (and did not depend on which Editor handled the MS).

Those submitting an MS can (usually) expect an initial decision in about four months. Currently, there is no publication queue, so once your MS is sent to the press it is published in a further four months. Therefore, if revisions are handled promptly, your MS can be published within a year of submission.

The journal has enjoyed a lot of growth and success over the past two years. In addition to expanding its size and reducing the publication lag, subscriptions have increased, and the impact factor has climbed to its highest point ever. According to the latest Journal Citation reports, Behavioral Ecology ranks 4th in the Behavioral Sciences category, 14th in the very large Ecology category, and 4th in Zoology. Overall this is excellent performance, and both the Society and our publisher, Oxford University Press (OUP), are very pleased.

The full text of published articles is now available on the web, and with the help of OUP we'll be moving to fully electronic system of submission and review, hopefully next year. No details are available just yet, but stay posted. Also, as the result of decisions taken by the ISBE at the the last two conferences, we have embarked on two new ventures. Each published article will, beginning in January, 2001, be accompanied by a 'Lay Summary'. And very soon, we will initiate a system of blinded reviewing. Both are described elsewhere in this edition of the newsletter, and you're encouraged to read these pieces.

The Society continues to receive excellent support from OUP. Two names, in particular, deserve mention. Pete Hoffman toils on our behalf at OUP's offices in Cary, North Carolina. Pete has assisted us in one way or another for almost all of the 11 years we've been publishing. And David Prosser attended the Zurich meeting and spent much time with us and with the Executive dealing with Society business. Our thanks to both!

Finally, one Editor has completed a term of office since the last meeting in Monterey. Marc Mangel completed his five year term at the end of

1998, and much of the success the journal has enjoyed over the past five years is due to his leadership. The Society has been fortunate to have enjoyed the expertise of a series of excellent editors over its 11 year history, and Marc adds his name to the list that includes Don Kramer, Staffan Ulfstrand, Larry Wolf, and Paul Schmid-Hempel. To all these individuals the Society expresses its sincere thanks.

LAY SUMMARIES

Purpose

The International Society for Behavioral Ecology has undertaken to provide a Lay Summary of each paper published in Behavioral Ecology, beginning with the first issue of Volume 12 (2001).

The Lay Summary will appear with the electronic version of the article available on the Oxford University Press website. The purpose of a Lay Summary is to interpret the context and significance of our published papers in a manner intelligible to interested nonspecialists, thereby increasing the accessibility of our research work to the public at large, and to organizations and individuals whose main function may not be research, but who may nonetheless be interested in research findings.

Guidelines for Authors

A Lay Summary is a short (max. 250 word) statement that, in nontechnical language, provides a view of the paper from the perspective of the broad questions of the field, summarizes briefly the current state of knowledge - emphasizing what is not known or understood - and explains the contribution of the paper.

A Lay Summary is NOT a 'dumbed down'

version of the Abstract of your paper: its aims are rather different. Nor is a Lay Summary specifically about potential or real applications of the results (unless these were the topic of the paper). The Abstract of your paper emphasizes the findings for other specialists who know the history of the field and the context of your questions, who will understand and be interested in details of your Methodology, and who will be able to evaluate for themselves the significance of your results. Most of the readership of a Lay Summary will not be in this category.

Assume that the reader of your Lay Summary is an intelligent and interested person who may know something about behavioral ecology, but may not know the terms like EPC, MVT, altricial, phylogeny, minisatellite, etc. Therefore, avoid technical language and jargon. Many readers of the Lay Summary have not been schooled in the history of the discipline, so provide the necessary background, focusing on generalities rather than specifics. Generally, details of the methods are of little importance. Summarize succinctly what the paper contributed.

Format and Process

The Lay Summary is published on the Oxford University Press webpage where nonspecialists generally have best access. It is not required as part of the formal review process of a MS, but a complete and acceptable Lay Summary is required before a MS can be sent to the press for publication.

The Lay Summary (two copies, please) must accompany the final version of the MS on a separate sheet clearly labelled 'LAY SUMMARY', with the full title of the MS and author(s) names

identical to that on the MS. This sheet also should be included as a separate file entitled 'LAY SUMMARY' on the accompanying diskette.

Sample Lay Summaries

Garrison JSE, Gass CL. 1999. *Response of a traplining hummingbird to changes in nectar availability. Behavioral Ecology 10:714-725.*

Over the last thirty years, many aspects of hummingbird biology have been investigated by ecologists interested in foraging and energetics, who have demonstrated that hummingbird behavior is sensitive to the richness of nectar resources. Most studies have been of territorial species, and 'trapliners' have been less well-studied. Trapliners are not territorial, but travel on a regular circuit between widely-spaced clumps of flowers. On each visit to 'its' flowers, the hummingbird drains the nectar that has accumulated since the last visit. In theory, trapliners should adjust the timing of visits and the size of the trapline so that they harvest the most nectar with the least effort, balancing the larger nectar rewards of longer intervals against the loss if competitors (other hummingbirds, or bees) arrive before they do. In this study, long-tailed hermit hummingbirds (*Phaethornis longirostris*), a lowland forest species from Central America and suspected trapliner, were tested in a large outdoor enclosure at La Selva Research Station in Costa Rica. The experiments manipulated the timing and volume of sugar solution delivery to artificial flowers placed around the enclosure. Removals of nectar (mimicking competitors) were also carried out. The study showed that captive long-tailed hermits adjusted their behavior in response to the experimental manipulations much as predicted. They increased visitation rates to more profitable feeders (and vice versa), and responded to competition by returning more often to the feeder. However, these manipulated changes were likely relatively large compared to natural situations, and

it remains to be established how adept wild long-tailed hermits are at detecting small changes that likely occur simultaneously at multiple sites on their traplines.

Weatherhead PJ, Dufour KW, Loughheed SC, Eckert CG. 1999. *A test of the good-genes-as-heterozygosity hypothesis using red-winged blackbirds. Behavioral Ecology 6:619-625.*

In many animal mating systems, males contribute little or no resources to the care of the young, yet females seem very choosy about which male they mate with. It is unclear why females are choosy in these situations, and what traits females might evaluate in making such careful choices. One idea is that females evaluate the genetic quality of potential mates. This paper tested predictions of a hypothesis suggesting that females look for males that are genetically variable (high heterozygosity) because such males are thought to produce higher quality offspring. The hypothesis also predicts that genetically variable males are recognizable by the high symmetry (called low fluctuating asymmetry) of external traits (e.g. wings, tail feathers). In this paper the heterozygosity, symmetry, condition, and ectoparasite status of 67 wild red-winged blackbirds was measured. The data do not support the 'good-genes-as-heterozygosity' hypothesis. More heterozygous males were not in better condition, more symmetrical or less infected by ectoparasites. Furthermore, because larger and older males realize higher mating success in this population, but neither size nor age was related to heterozygosity, mating success is also unlikely to be related to heterozygosity. The conclusion is that this hypothesis does not explain mate choice or male quality patterns in this population.

BLINDED REVIEWING FOR *Behavioral Ecology*

At its meeting in Zurich, the ISBE decided, after extensive discussion, to initiate a policy of blinded reviewing, in which the identity of the authors will, as much as possible, be kept from reviewers. Similarly, reviewers' names are to be kept confidential. Authors will be encouraged to avoid explicit disclosure of their identity in the text of their MS, as for example, by use of a header. The practise will go into effect as soon as the editors are able to implement the necessary steps.

Many points were raised in the discussion about this issue, and the Society felt that, on balance, this step could enhance the review process. The Society decided that the practise would be evaluated at the 2002 meeting in Montreal, by which time the editors will have accumulated some direct experience. At that time a more detailed policy could be written to enact revisions, or the practise could be dropped if negative effects were perceived.

Editors and members of the Executive would be pleased to hear member's feedback.

CONFERENCE REPORT

The 8th ISBE Congress: research and prospects in behavioral ecology at the turn of the century

During the second week of August this year the 8th International Behavioral Ecology Congress was held at the University of Zurich, Switzerland. The meeting was very well organised and had the added benefit of being held in a beautiful city. Over the five days of the meeting, behavioral ecologists from around the world had the opportunity to hear about the latest research and meet with some of the most important players in the field.

There was a heavy focus at the meeting on sexual selection and reproduction. In particular, two of the plenary addresses pointed out the focus of behavioral ecology on mate choice and the interest in genetic factors related to choice. Marion Petrie began the meeting with a review of the study of mate choice over the last century, an outline of current research and predictions of future directions on the topic. Petrie devoted a good deal of her talk to work in the last decade relating genetic factors to female preferences. Bill Rice provided a complement to Petrie's talk in the final plenary session of the meeting. His talk dealt with intersexual conflict, pointing out how traits that make good males often make poor females and vice versa. Using examples from his work on *Drosophila*, Rice illustrated the importance of multiple mating for females to maximise the quality of both their sons and daughters. Rice further pointed to evidence showing the accumulation of genes under selection on the X-chromosome in a variety of species; because males

don't pass these chromosomes to their sons, females may not be able to assess the potential quality of their sons based on the phenotype of their mates. An interesting corollary to this comes when considering species with female heterogamety, such as birds and butterflies, where females may be able to choose mates for the phenotypes of their sons.

The emphasis on sexual selection was also evident in the regular paper sessions. There were 11 sessions devoted to the general topic of sexual selection and another 16 on topics related to sexual selection and reproduction out of 52 spoken paper sessions plus an additional six related poster session topics; this is comparable to the number at the 1998 meeting in Monterey, California where 33 out of 66 spoken paper sessions were related to sexual selection and reproductive behavior. Clearly the emphasis in behavioral ecology research continues to be on topics related to sex.

For me, one of the pleasures of behavioral ecology meetings comes in seeing presentations on a wide variety of organisms. All too often it seems that people become heavily entrenched in taxon specific literature. Coming together at ISBE meetings allows us to make broader contacts. This meeting was no exception. Although there was heavy emphasis on birds, there was also a good variety of talks on fish, mammals, amphibians, insects, spiders, crustaceans and molluscs. There were several papers that dealt with aspects of human behavior, and Joan Strassman presented a paper on conflict of interest in a slime mold, taking behavioral ecology beyond the confines of the animal kingdom.

Incoming president, Nick Davies, in his address on the last day of the meeting summarised the state

of behavioral ecology based on his impressions of the meeting. Behavioral ecology is being pursued by a large group of young researchers. Behavioral ecology studies combine an elegant mixture of experiments, field observations and theoretical studies, and behavioral ecologists are making efforts to broaden contacts with other disciplines. These observations suggest that behavioral ecology is well-poised to continue as a vibrant discipline for the years to come.

*Scott M. Ramsay
Department of Life Sciences
Indiana State University
Terre Haute IN 47809
USA*

Conferences

Fish Biodiversity and Conservation Fisheries Society of the British Isles Leicester, UK 9th – 13th July 2001

The summer meeting of the FSBI will focus on four themes that influence the conservation of fish biodiversity. These are: rarity and extinction of fishes, exploitation and fish biodiversity, taxonomic diversity and managing fish biodiversity. The meeting will be concerned with both freshwater and marine species and will seek to cover temperate as well as tropical habitats. At the symposium we aim to bring together people working on all aspects of fish conservation ranging

from studies of population decline and extinction risk to methods of managing populations and their habitats.

In addition to presentations from invited speakers, we will welcome submissions of abstracts for contributed poster and oral presentations. For further information please visit our web site www.leicester.ac.uk/biology/fsbi or contact:

Dr Paul Hart: pbh@leicester.ac.uk or Dr John Reynolds: Reynolds@uea.ac.uk

Grants and Jobs

VOLUNTEERS

Approximately 30 volunteer positions are open in 2001 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. The program is open to non-students as well, particularly in the spring and fall.

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
P.O. Box 16553, Portal, AZ 85632 USA;
phone/fax: 520-558-2396
e-mail: swrs@amnh.org

SEASONAL STAFF ASSISTANT

Southwestern Research Station, American Museum of Natural History has an opening for a seasonal staff assistant March 15 -September 2001 (end date flexible). Assist in operations of biological research station office, nature shop, and guest rooms: taking reservations, answering phones, greeting guests, working with volunteers in housekeeping, general staff assistance. Five-day week; salary \$245/week, plus room (shared) and board, and medical benefits. Applicant must be conscientious, organized, and flexible; must enjoy people, and be interested in living in a remote setting and working with biological researchers. Biological training an asset.

Call and send resume to:

Dr. Wade C. Sherbrooke,
Director, Southwestern Research Station
American Museum of Natural History
P.O. Box 16553, Portal, AZ 85632 USA
phone/fax: 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 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 contacting:

Office of Grants and Fellowships
American Museum of Natural History
Central Park West at 79th Street
New York, NY 10024-5192
<http://research.amnh.org/grants/index.html>
e-mail: rnavarro@amnh.org

applications due: Feb. 15, 2001.

Address questions concerning the Station to:

Dr. Wade C. Sherbrooke,
Director, Southwestern Research Station
American Museum of Natural History
P.O. Box 16553, Portal, AZ 85632 USA
phone/fax: 520-558-2396
e-mail: swrs@amnh.org

Forum

The Emperor's Codpiece: A Post-Modern Perspective on Biological Asymmetries

A. Richard Palmer¹ and Lois M. Hammond²

¹ *Department of Biological Sciences, University of Alberta, Edmonton, Alberta T6G 2E9 Canada*

² *Lois Hammond Communications, 7808 139 St., Edmonton, Alberta T5R 0G2 Canada*

Once again, an isolated culture has provided scientists with a living laboratory. The remote kingdom of Glücklichtal, nestled high in the European Alps, is proving a boon to anthropologists and sociologists, and may be the envy of the world. According to a preliminary report filed by a multidisciplinary team from Harvard, jointly funded by the National Institute of Mental Health and the Anthropology Directorate of the National Science Foundation, the people of Glücklichtal sustain an extraordinarily high level of mental and emotional health. The team, led by Dr. B. I. Latteral, is unravelling the source of this well-being.

"What the Abkhazia region in the Caucasus is to studies of aging, and the Pacific island of Guam is to neurological disease, Glücklichtal could become to mental health" asserts Latteral. "Our findings might just possibly alter the course of human civilization." The report relates how two humble tailors stumbled upon the relationship between symmetry and well being, and then convinced the

Emperor of Glücklichtal to mount a pioneering National Health and Education Plan (NHEP).

Sociologists first became aware of Glücklichtal when they followed up oral reports from itinerant tradesmen, travelling musicians, and restless emigrant youths displaying lip-thorns, nose-rings, and ear studs arrayed in precise symmetrical patterns. "This curious display of jewelry was the first clue to the surprising relationship between symmetry and well-being" reported Latteral. "Eventually, we traced the original discovery to two tailors, Andy and Randy Traumweber, known throughout Glücklichtal for their expert tailoring and loyalty to the Emperor."

The Traumweber brothers originally suspected the link between symmetry and well-being when the conductor of Glücklichtal's small symphony consulted them about his tuxedos. For years the maestro had noticed a puzzling correlation: audiences invariably seemed pleased with performances conducted in the Traumweber tuxedo, but dissatisfied when he performed in his imported tuxedo. On closer examination, Andy Traumweber discovered the imported jacket was less precisely made, most particularly in the tails: one was distinctly longer than the other. "Since the tails are the most prominent feature of a tuxedo, the Traumweber brothers surmised that tail asymmetry somehow signalled the maestro was not as well-suited to his task" says Latteral.

Intrigued by the tuxedo observation, the Traumweber brothers reviewed their meticulous records for additional evidence and discovered some customers were much more asymmetrical than others. More importantly, asymmetry seemed closely tied to well being: the greater the asymmetry, the less healthy, happy, and successful the

customer seemed to be. The tailors therefore suspected a universal principle: minor deviations from symmetry could unwittingly doom humans to physical, mental, and social mediocrity, if not misery.

Encouraged by these preliminary findings, the Trauweber brothers expanded their horizons with a casual search through the scientific literature. "We were astonished by their results" admits Lateral. "The tailors uncovered many correlations with subtle or fluctuating asymmetries that appear significant to human well-being". Some of the more intriguing ones include:

Symmetry and health

- An extensive literature review concluded that subtle deviation from symmetry "is an important marker of human health . . . where the sciences of evolutionary biology, developmental biology and medicine [are combined into an] . . . integrative framework [that] provides a significant addition to the growing field of Darwinian medicine" (Thornhill & Moller 1997) (this result prompted doctors in Glücklichtal to use calipers as a routine part of health assessment).

Symmetry and IQ

- More asymmetrical people had significantly lower IQ (Furlow et al. 1997), which led one scientist to note that therefore 17 to 50 per cent of the variation in IQ could now be attributed to the underlying causes of fluctuating asymmetry (Blinkhorn 1997).

Symmetry and attractiveness

- "The figure with . . . symmetrical breasts was

judged to be most attractive and youngest of all other figures. It appears that men use . . . breast asymmetry in judging attractiveness and being willing to develop romantic relationships" (Singh 1995).

- Humans evolved the ability to discriminate subtle differences in the symmetry of potential mates to ensure the choice of a healthy one: "Human physical attractiveness and judgements about human physical attractiveness evolved in the context of parasite-driven selection [such] that both adults and children have a species-typical adaptation to the problem of identifying and favoring healthy [symmetrical] individuals and avoiding parasite-susceptible [asymmetrical] individuals" (Thornhill & Gangestad 1993).
- Symmetry could even be detected indirectly: "Normally cycling (non-pill using) women near the peak fertility of their [menstrual] cycle tended to prefer the scent of [tee-]shirts worn by symmetrical men" (Gangestad & Thornhill 1998).

Symmetry and sexual satisfaction

- "Women with partners possessing low fluctuating asymmetry . . . reported significantly more copulatory female orgasms than were reported by women with partners possessing high fluctuating asymmetry" (Thornhill et al. 1995).

Symmetry and physical prowess

- "For human females, there is a positive correlation between body weight and [fluctuating asymmetry] in adults" (Manning 1995), which in part accounts for the attractiveness of slender female body forms in Western culture. Rather unexpectedly the

pattern was reversed for males, but this was readily explained since "male body weight is condition dependent in that it is only individuals with the best genes who are able to develop and maintain large size".

- "Symmetric subjects had higher rankings for athletic ability (nostrils, $p < 0.001$ and ears, $p < 0.001$), lower best 800 metre times (nostrils, $p < 0.05$ and ears, $p < 0.01$) and lower best 1500 metre times (3rd digit, $p < 0.01$ and ears, $p < 0.05$) than asymmetric subjects" (Manning & Pickup 1998).

Symmetry and genetic fitness

- In human females, "breast fluctuating asymmetry is a reliable predictor of age independent fecundity" (Møller et al. 1995).

Symmetry and ovulation

- Asymmetry of soft tissue in women varies over the menstrual cycle, which may explain a lot of the variation in male ardor. "[Asymmetry] is highest at the beginning and end of the cycle, when women are generally infertile, and low in mid cycle, when fertility is highest" (Manning et al. 1996). Also, "symmetry in four paired soft tissue traits [size of the left and right ears, 3rd, 4th and 5th digits] showed a marked increase on the day of ovulation" (Scutt & Manning 1996). "Temporal changes in [cyclical asymmetry] could therefore be used by males to indicate a female's position in the [menstrual] cycle" (Manning et al. 1996).

Emboldened by these findings the Traumweber brothers approached the Emperor with a visionary health plan for Glücklichtal. They proposed to

improve mental and emotional health by enhancing symmetry. Cleverly designed underwear and outerwear could create the illusion of symmetry in otherwise asymmetrical people. Similarly, make-up artists, hair stylists, and jewelers could rectify mismatches between sides of the body. Physical therapists and masseurs could contribute by stimulating muscle development in offending weaker, smaller muscles. Such adjustment mechanisms formed the core of the NHEP.

Lateral's team carefully documents the negotiations leading to the launch of the NHEP. Initially the tailors had difficulty selling the plan since the Emperor felt some of the reports seemed almost too good to be true. "Understandably, he also doubted that subtle deviations from symmetry could correlate so predictably with so many disparate phenomena" says Lateral.

But the tailors easily addressed the Emperor's concerns with compelling statistical and theoretical arguments:

- Meta-analyses consistently revealed significant overall correlations between subtle asymmetry and attractiveness, or between subtle asymmetry and fitness, for many organisms including humans (Leung & Forbes 1996; Møller 1997; Møller & Thornhill 1998). In addition, these correlations became more pronounced as sample sizes declined (Palmer 1999), thus confirming they were robust even when based on limited data.
- A theoretical analysis established the maximum potential correlation between attractiveness and subtle asymmetry in a particular trait (Gangestad & Thornhill 1999), thereby demonstrating decisively that 71 of the 140 tabulated

correlations in one meta-analysis (Møller & Thornhill 1998) exceeded the theoretical maximum. Clearly, the predictive power of subtle asymmetries far exceeded what the original authors had surmised.

- Although some scientists observed that subtle asymmetry in one morphological trait almost never correlated significantly with subtle asymmetry in another trait on the same individual, a major review nevertheless concludes that subtle asymmetries are reliably correlated with many measures of individual fitness, attractiveness or quality and are therefore of predictive value (Møller & Swaddle 1997).
- Dozens of researchers had explained how subtle asymmetries were extremely valuable for non-verbal communication because they were absolutely honest signals of fitness and well-being (Møller & Swaddle 1997). In other words, in the natural world, subtle departures from symmetry were so irrevocably tied to developmental noise — a relentless, inexorable, and universal process affecting all living things — that the level of subtle asymmetry simply could not be manipulated.
- Because humans are a product of the same evolutionary forces as other organisms, their nervous systems are likely hard-wired to interpret deviations from symmetry as honest signals of quality (Thornhill & Gangestad 1993) just like other animals are, which explained the original tuxedo affair.

Faced with such overwhelming scientific evidence, the Emperor agreed that subtle asymmetries were tightly coupled to perceptions of

attractiveness and well-being. Yet, unwilling to implement a costly social program based on limited and possibly biased information from a single source, he commissioned the Glücklichtal Academy of Sciences to conduct a Symmetry Survey within the kingdom and beyond.

Latteral's team is still analyzing the results of this survey, which yielded a bewildering variety of asymmetries in other organisms, such as:

- Extinct Miocene beavers built spiral burrows, but dextral and sinistral spirals were about equally common (Martin & Bennett 1977), and Recent mud shrimp do the same (Dworschak & Rodrigues 1997).
- Goats exhibit a curious tendency to start grazing on the right side in experimental studies of forage preference (Elston et al. 1996).
- Some hens prefer to cock their head to the left side to check for avian predators after hearing a recorded rooster alarm call, whereas others prefer to cock their head to the right (Evans et al. 1993).
- Toads consistently evert their entire stomach from the right side of their mouth when vomiting (Naitoh & Wassersug 1996), and tree frogs tend to jump to the left when startled because of slightly longer right legs (Dill 1977).
- Individual constricting snakes prefer to use the same side of their body when subduing prey (Heinrich & Klassen 1985).
- Corkwing wrasses, a small marine fish, have a significantly higher incidence of copepod parasites in the left side of their lateral line system (Donnelly & Reynolds 1994).
- Male phallostethid fishes possess stunningly hypertrophied clasping structures to hold

females during spawning; in some species they occur on either the right or left side, whereas in other species they are always on the same side (Parenti 1986).

- Dextrally coiled land snails can not mate properly with sinistral ones if their shells are flat-shaped, but coiling direction poses no problem for interchiral mating in tall-shelled species because of their different copulatory stance (Asami et al. 1998).
- Although honey bees detect smells symmetrically (Galizia et al. 1998), some bees within a hive prefer to waggle dance clockwise, while others prefer counterclockwise (Fergusson-Kolmes et al. 1992).
- Male spiders insert their pedipalps asymmetrically into the female when mating (Huber & Eberhard 1997).
- Palm trees in the northern hemisphere spiral to the left more commonly in the northern hemisphere but to the right more commonly in the southern hemisphere (Davis 1974), and this discrepancy increases with increasing latitude (Davis & Davis 1987).

The Lateral team is also assessing the significance of many other peculiar human asymmetries uncovered by the Glücklichtal Symmetry Survey:

- Human testicles are asymmetrical — the right is larger than the left — but the left tends to hang lower, as typically portrayed in antique sculptures (McManus 1976).
- Left-handers have shorter life spans than right-handers (Coren 1994).
- Fungal infections are more prevalent on the left

hand, perhaps because left hands are sweatier (Bender et al. 1988).

- "More gay men demonstrated leftward asymmetry [in fingertip ridges] than did non-gay men" (Hall & Kimura 1994).
- "Musical talent was related to left-handedness and to anomalous [hemispheric] dominance; immune vulnerability was found in female musicians, and in subjects with reversed dominance for language functions as well as in male left-handers, independently of musical talent" (Hassler & Gupta 1993).
- Chiropractors reported that "the functional short leg is confirmed as a stable clinical reality" and implored their colleagues to adjust their treatments accordingly (Jansen & Cooperstein 1998).
- Humans could preferentially enhance either the rational or the emotional side of their brain by breathing through only the right or left nostril (Shannahoff-Khalsa et al. 1991); another scientist suggested a similar effect could be achieved by beaming light in one ear (Jones 1998).
- Mucociliary transport rates often differ between the right and left nostrils, particularly in individuals with impaired breathing (Nuutinen 1996).
- The left ear "might be a finer sensor [and] more sensitive to noise" (Job et al. 1998), and "a left-ear advantage was found in the recognition of true statements" (Fabbro et al. 1993).
- "An increased incidence of minor physical anomalies and fluctuating asymmetries [were observed] in both left-handers and extreme right-handers", suggesting that extreme right-handedness may also be "associated with

reduced fitness, neurodevelopmental disorders, and reduced neuroanatomical asymmetry" (Yeo & Gangestad 1993).

"When considering these diverse, complex patterns, it is essential to distinguish subtle asymmetries from conspicuous or predictable asymmetries" says Lateral. "Subtle asymmetries (e.g., fluctuating asymmetries) are typically small, random departures from perfect symmetry that reveal instability in development, whereas conspicuous or predictable asymmetries (e.g., directional asymmetry or antisymmetry) reflect genetically determined departures from symmetry that are presumably adaptive." Therefore, in the examples above, conspicuous or predictable asymmetries do not signal reduced fitness like subtle or fluctuating asymmetries are thought to do.

Finally convinced, the Emperor approved the NHEP for enhanced well-being through enhanced symmetry.

In documenting implementation of the NHEP to promote symmetry, however, Lateral notes that the first intervention was rumored to have promoted asymmetry. According to a palace informer, the Emperor was particularly anxious about his imperial private parts, which he felt were so asymmetrical that they deviated too far from the norm. Fortunately, the Traumweber brothers were able to allay his fears with a profound revelation: in certain very special cases, increased expression of a predictable asymmetry actually signals increased fitness, and one of those cases is testicles (Møller 1994), at least if men are like birds. That's why they subsequently fashioned the Emperor's codpiece to enhance his already conspicuous asymmetry, and thereby assure his subjects he was indeed most intelligent and fit for his job.

EDITOR'S NOTE: Until the Harvard team releases its final report, more detailed information about the asymmetry studies reported above, and others, can be found at:

<http://www.biology.ualberta.ca/palmer.hp/asymp/Curiosities/Curiosities.htm>

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Book Reviews

Promiscuity. An Evolutionary History of Sperm Competition and Sexual Conflict.

Tim Birkhead. Faber and Faber, London, 2000. 272 pp. ISBN: 0-571-1936096.

Before leaving his castle, the lord asked his wife to put on her chastity belt. With the belt locked and the key around his neck, he was able to avoid the trade-off between mate guarding and joining a crusade. In the Middle Ages, a woman travelling on her own risked unpleasant encounters with men. To avoid harassment or worse, she wore a chastity belt. Although historians now think the first story is a myth, the two stories illustrate our thinking of sexual behaviour from either the male or the female perspective.

In his new book *Promiscuity*, Tim Birkhead shows that the history of the study of sperm competition followed much the same path. Not too long ago, sperm competition was seen as a continuation of the battle among males for access to females. As seemed logical (from the male scholar's perspective?), the focus was on males. Thus, they guarded their partner and pursued copulations with other females. However, it became exceedingly clear that mate guarding can be very ineffective- as females may choose to be actively promiscuous. This demanded new evolutionary explanations.

Why are females promiscuous? I doubt that we have a general explanation, but what we do have is a wealth of data on male and female tricks to control the outcome of sperm competition. This book marvelously describes the amazing diversity

and utter sophistication of reproduction and places it all in the context of current evolutionary thinking. It is a vivid account of the battle of the sexes, written for a general audience, but with a minimum of concessions to scientific *rigoroso*. Birkhead has taken on the challenge to 'translate' his research field into a readable account for a general public, and he has mastered the fine balance between avoiding jargon-ridden sentences, without simplifying to the point where scientific integrity can be questioned. He also masterfully describes the process of science, the way in which discoveries are made, and the ingenuity or beautiful simplicity of some of the experiments. How do the eggs of a catfish species that 'copulate' in a T-position with the female's mouth latched to the male genital opening get fertilized? By releasing a tiny drop of blue dye into the water beside the male's genital opening at the right moment, Japanese biologists saw how the dye was sucked into the female's mouth, only to emerge, ten seconds later, from her genital opening and on to her eggs.

The book's first chapter paints the history of sperm competition and sexual selection with Darwin, Bateman, Trivers and Parker in the key roles. The first chapter is also used to finish off (once and for all it seems) Baker & Bellis' work on human sperm competition. The style of writing does not leave an inch of doubt about the author's feelings about this research and the media attention it received. Humans are left out of the picture in most of the rest of the book, and that is a pity. A sexy story on human sexual behaviour is *Gefundenes Fressen* for the media, but good scientific work on the subject should be encouraged.

The second chapter discusses paternity: from how we can measure it to how males try to protect it. Then come several chapters to provide an overview of the reproductive machinery: the female reproductive tract as an obstacle course for the sperm, but also as a safe haven (ie: storage site); the penis as a tool not just to deposit sperm, but also to remove it or copulatory plugs from rival males; the testes with a certain pre-occupation with size. Finally, the sperm and eggs themselves, the latter of course the bigger with the nutrients to feed the future embryo, but the former still winning all the medals for extravagance in size and shape. A single sperm can be almost 40 times longer than the body of the animal it inhabits, but it can also lack a tail and use knobby processes to crawl to the site of fertilization.

The following chapter describes the events of copulation, insemination and fertilization: not so well studied and understood as one might assume for such basic biological processes. And when studied, by reproductive physiologists, then often without the idea of sperm competition in mind. Well, that should change after this book! Sperm competition happens when sperm of more than one male compete for the fertilization of the eggs. But what happens exactly, in particular when fertilization is internal, is the exciting story told in Chapter 6. Who wins the competition? There is plenty of evidence that numbers and quality of sperm and timing of inseminations play a role, but what about the influence of the female on the outcome? Cryptic female choice is a hot topic, and a difficult one to investigate.

The final chapter of the book poses the one question that many readers will have been waiting for. Why are females promiscuous? Many plausible

hypotheses are explained, combined with some more or less convincing data and some great anecdotes, but we are still far away from a complete understanding. The book ends with the inevitable *synthesis* after *thesis* and *anti-thesis*: it's not male dominance, not female control, but a battle between the sexes, an evolutionary see-saw of adaptation and counter-adaptation.

Promiscuity is a beautiful book and a great read. An attractive cover, a text filled with natural history gems, and great pictures to illustrate the most spectacular examples. The photos deserved a higher print quality, but that is all there is to complain about. Even though I am familiar with the topic, I was still left amazed and with a sense of beauty. The latter came when I realized how nicely this reproductive diversity with all its intricate complexities can be 'summarized' within the simple framework of evolution. With superb scholarship, Tim Birkhead puts it all in place, but there is still space for further discoveries. What, exactly, led to the evolution of the 20-cm spiny penis of the Argentine Lake Duck (Auk 117:820-825)?

Bart Kempenaers

Research Center for Ornithology of the Max Planck Society

Postfach 1564

D-82305 Starnberg (Seewiesen)

Germany

Behaviour and Conservation

Gosling, L.M. & W.J. Sutherland (eds).
Cambridge University Press, 2000. 438 pp.

The disciplines of behavioral ecology and conservation biology have burgeoned over the last few decades but tend to have done so on parallel rather than intertwining streams. Part of this may have arisen from a view by behavioral ecologists that it is difficult to mix a research program that combines a firm theoretical basis in evolution with the applied nature of conservation management. However, this viewpoint is changing and behavioral ecologists are increasingly becoming aware that their involvement in wildlife conservation can have significant impacts. Yet rather than emphasising why conservationists require our input (Curio 1996, Arcese et al. 1997), Caro (1999) asserts that the onus is upon us to show conservation biology what we can contribute. Gosling and Sutherland's new edited volume in Cambridge University Press' *Conservation Biology Series* presents the latest culmination of this effort, and a significant maturity in how behavioral ecologists are integrating interesting basic research with an applied focus.

The book consists of 19 contributed chapters, stemming from papers presented at a joint meeting of the Association for the Study of Animal Behaviour and the Zoological Society of London in December 1997. The book is divided into four broad sections: Conservation Impact of People; Habitat Loss and Fragmentation; Sexual Selection, Threats and Population Viability; and Conservation Applications of Behavior. Apart from the final section, however, there is a fair degree of overlap in the content and approaches adopted by the

authors of the various chapters.

This book illustrates a growing trend towards the use of individual-based behavioral models in extrapolating the effects of ecological disturbance on population. These models build on the population models commonly used in conservation biology which assume population growth is controlled primarily by extrinsic factors and individuals have equal likelihood of contributing to the next generation. Behavioral models incorporate socially mediated factors which affect population growth, such as dominance relationships, dispersal, and response to prey depletion, and may give higher predictive value in assessing the response of populations to disturbance factors. This is the primary focus of Pettifor, Norris & Rowcliffe's chapter *Incorporating behavior in predictive models for conservation* and its use is proved both popular and effective in chapters by Durant - *Dispersal pattern, social organisation and population viability*, Piersma & Baker - *Life history characteristics and conservation of migratory shorebirds*, Goss-Custard, Stillman, West, McGroarty, Durell & Caldow - *The role of behavioral models in predicting the ecological impact of harvesting* and Gill & Sutherland - *Predicting the consequences of human disturbance from behavioral decisions*.

Modelling continues its dominant theme in the book, incorporating many of the standard techniques of behaviorists. Mace uses modelling to determine individual decision rules in planning of family sizes that maximizes individual wealth in *The evolutionary ecology of human population growth*. Game theory is used in an interesting fashion to test the idea of the "ecologically noble savage" in Borgerhoff Mulder & Ruttan's

Grassland conservation and the pastoralist commons. The authors conclude that sustainable resource use among pastoralist societies may evolve through long-term payoff benefits to individual herders, even when cheating strategies are investigated. Boswell, Franks & Britton use spatial models to determine metapopulation structure in fragmented landscapes in *Habitat fragmentation and swam raiding army ants*. They investigate not only the local extinction rates within increasingly isolated patches, but provide recommendations for the spatial configurations of corridor entrances that maximize the probability that ants will utilize these tracts.

Others focus on summing ongoing behavior projects which assess the impacts of disturbance on various species, such as Thomas, Baguette & Lewis' *Butterfly movement and conservation in patchy landscapes*. Caro discusses the debate surrounding the status of cheetah populations in *Controversy over behavior and genetics in cheetah conservation*, while Møller speculates on the impacts of overlooking intense competition in mate choice into conservation and reintroduction programs in *Sexual selection and conservation*. J.D. Reynolds & Jennings, in the only chapter devoted to marine systems, discuss the use of shoaling behavior, seasonal movement patterns, and feeding behavior of marine species to determine both their susceptibility to commercial harvesting and mechanisms of reducing by-catch mortality in *The role of animal behavior in marine conservation*.

These chapters nicely lead the book to its concluding section on the applied side of behavior research. In some respects, this is the most encouraging section of the book, as it deals with

the current applications of our research into conservation in a practical sense. McGregor, Peake & Gilbert's *Communication behavior and conservation* assesses the potential for using individual variation in vocal signals to track individuals. Encoded within these signals is information on the condition of males, breeding status on individuals, and gene flow across populations. Cowan & J.C. Reynolds explore the potential to use classical conditioning in both averting predators from sensitive species and preventing endangered predators from attacking domestic livestock in *Reducing predation through conditioned taste aversion*. The successes and failures of captive breeding programs are reviewed by Wallace in *Retaining natural behavior in captivity for re-introduction*. In *Consequences of social perturbation for wildlife management and conservation*, Tytens & MacDonald discuss the problems that arise when unforeseen behavioral responses occur in species during post-management periods, such as the retention of yearling pups in social groups of coyotes when dispersal potential is limited. This chapter clearly outlines management policies should pre-test their plans to determine how management will affect the dynamics of the affected populations, or at least monitor these responses on an ongoing basis after management plans have been implemented. The book ends with an analysis of the ethical dimensions of conservation management in Bradshaw & Bateson's *Animal welfare and wildlife conservation*.

The volume is professionally produced with clear and consistent formatting in graphics and text. I was, however, disappointed to find that references were collated at the end of the book,

rather than the end of each chapter. This format in edited volumes is not problematic for those purchasing the volume - which comes in either hard or soft cover and is reasonably priced - but proves frustrating when users wish to copy only selected chapters.

Caro's (1999) assertion that behavioral ecologists must define their contribution to conservation biology is clearly outlined in this volume. However, to date much of our involvement appears to be in the form of revising and fine-tuning predictive models, and less in the on-the-ground research. With the growing number of conservation studies and projects underway worldwide, the potential for behavioral ecologists to establish long-term studies within these projects is increasing. As this volume outlines, it is possible to establish interesting research programs based on theoretical evolutionary questions that still have bearing on the applied aspects of conservation biology.

Ken Otter

Biology Program

University of Northern BC

Prince George, BC, Canada

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