PRIMATE EYE

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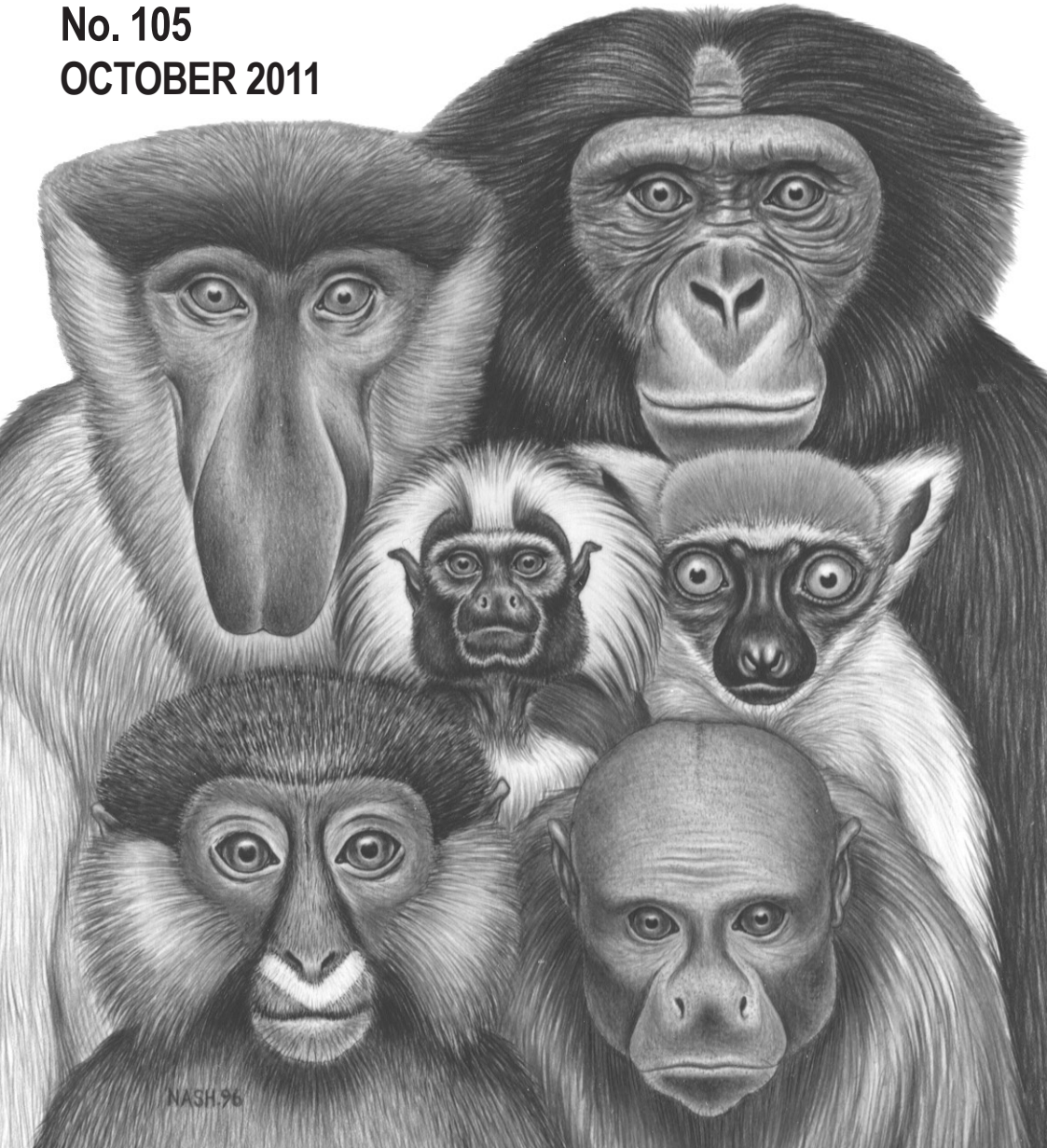

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EDITORIAL

So, lots of us are part-Neanderthal. It's amazing how much that little sentence can evoke. Most palaeoanthropologists have long accepted that Neanderthals were a separate species from ours, *Homo sapiens*. And yet, despite the fact that we know that *H. neanderthalensis* was a skilled toolmaker, that the species was around for a very long time, and that its brain was bigger (on average) than ours, we still tend to think of the Neanderthal as the quintessential 'cave man', dragging his knuckles (no, he couldn't) and pulling his unfortunate mate along by her hair. This popular perception is hard to shift; it doesn't seem to matter how many 'shaved' reconstructions in suits and ties you show people, the Neanderthal remains the archetypal primitive – the snarling, raw-meat-eating, uncivilized brute of a relative in our family tree. Only now we find out that (except for African humans) he's a bit of an ancestor, as well. I, for one, welcome this news. Not just because it represents some good science, but also because it may help in the public perception of both evolution and other organisms.

When I teach introductory lectures about non-human primates, I take great pains to emphasise that they are NOT 'partial people' or 'lesser' organisms. This is an attempt to nip a certain type of thinking in the bud; the idea that we, *Homo sapiens*, are the pinnacle of creation. The old Le Gros Clark diagrams of primate 'grades', which I try desperately to keep from my students, imply that other members of our order are somehow less than we are, not as 'evolved', striving but never managing to become human; this is persuasive because (I believe) it reflects a deep-seated feeling in people that their species must be superior in every way. Karl von Linné didn't name *his* order 'Primates' for nothing.

The new information does two things: it emphasises that we are a species that has evolved, in the difficult, messy way that all species have evolved, and that we have the identifiable residue of so-called 'primitive' species within us. The first is obvious in its utility; the more people think of themselves as the result of evolutionary forces, the less they may see themselves as superior to other organisms. The second point follows from Darwin's (1871: 405) statement, that the human species still bears "the indelible stamp of [its] lowly origin". The admission that Neanderthals could be in the ancestry of humans of Eurasian origin may force a rethink of what constitutes primitive, a process that may begin to include other organisms, as well. It may even lead to the abandonment of such non-sequiturs as "lower primates", "lesser apes", etc.

That any DNA could be extracted from a Neanderthal bone is extraordinary. For it to have come from several individuals is nothing short of breathtaking. For the genome to have been sequenced so quickly and compared so readily, however, is almost beyond belief. Even more

extraordinary, however, is that the results might help some people to recognise that they are just another species, and not masters of the universe.

Darwin, C. (1871) *The descent of man and selection in relation to sex*. London: John Murray

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The PSGB WebSite can be found at <www.psgb.org>.

PSGB WINTER MEETING 2011

Gardeners of the Forest: Primate Ecology and Forest Conservation

(held in conjunction with the Bristol Conservation and Science Foundation)
1st December 2011
Clifton Pavilion at Bristol Zoo Gardens, Bristol

Organisers: Dr Christoph Schwitzer, Dr Sue Dow and Charlotte Bryant (Bristol Conservation and Science Foundation), enquiries to: <cbryant@bristolzoo.org.uk>

The Primate Society of Great Britain has selected Primate Ecology and Forest Conservation as the topic for this year's winter meeting, which will be held jointly with the Bristol Conservation and Science Foundation <www.bcsf.org.uk>. In particular, the symposium will aim to bring together experts on both primate and forest conservation, to assess the role of primates for ecosystem functions and forest regeneration, as well as the nature and speed of global deforestation, and to explore how appropriate species conservation programmes and alternative land management practices can go hand in hand to preserve primate populations and their forest ecosystems.

This year (2011) is the UN International Year of Forests, celebrating the central role of people in the sustainable development of the world's forests. In addition, the European Association of Zoos and Aquaria (EAZA) Ape Campaign is currently aiming to raise awareness of apes, the issues they face and the need for urgent action to secure their survival. The symposium will serve to reinforce the message that forests are vital to the survival and wellbeing of people everywhere. Special emphasis will be placed on apes and the potential role of zoos in helping to mitigate the effects of forest clearance and the demise of primate populations.

The one-day symposium will be held in the Clifton Pavilion at Bristol Zoo Gardens, starting at 9.45 am and finishing at 5.30 pm. Registration fees are £70 per person and £45 for students and PSGB members, and includes a buffet-style lunch as well as coffee/tea breaks between the sessions and entry to Bristol Zoo Gardens. A list of accommodation in Bristol is available on request. To find out more, please check our website <www.bcsf.org.uk\symposium>, or send an email to <sdow@bristolzoo.org.uk>.

All of the latest information about the Winter Meeting can be found on the PSGB website <www.psgb.org/Meetings/Winter2011.htm>.

The Call for Poster Abstracts is presented below. The programme will include a mixture of invited and proffered oral presentations, poster sessions

and an evening social event. The PSGB will be running our merchandise stall at the conference, so come prepared for a bit of Christmas shopping! We will also be holding the traditional PSGB raffle, in aid of our annual conservation project.

In addition, we will be awarding no fewer than three Society medals:
David Windmill will receive the Occasional Medal for Special Contributions to Primatology
David Chivers will receive the Occasional Medal for Conservation
We will also be announcing the winner of the Napier Medal for outstanding PhD thesis
You may register for the meeting online <www.psgb.org/meetings>.

Invited speakers:

CONSERVING CHINA'S CRITICALLY ENDANGERED PRIMATES: CURRENT CHALLENGES AND FUTURE THREATS

Helen J. Chatterjee
Research Department of Genetics, Evolution and Environment, University College London, Gower Street, London, WC1E 6BT

China is one of the fastest developing countries in the world, with significant recent economical and industrial development and extensive deforestation due to increasing demand for land use. Escalating anthropogenic pressures on the environment in China have driven population declines, extirpations and extinctions in many species. The demise of the world's rarest primate, *Nomascus hainanus*, China's Hainan gibbon, is well documented with less than 25 individuals remaining in the wild, but information regarding the intrinsic and extrinsic factors affecting the species' success remain elusive. This paper describes current efforts to understand the ecological, behavioural and anthropogenic factors constraining the recovery of the Hainan gibbon. In addition to habitat destruction and other human impacts, the paper explores the use of ecological niche modelling as a means of predicting the future effects of human induced climate change on China's critically endangered primates, including the Hainan gibbon.

ASIAN APES – FORESTS, FOOD AND FRAGMENTATION

Susan Cheyne
Department of Zoology, University of Oxford, The Tinbergen Building, South Parks Road, Oxford, OX1 3PS

Forest clearance and degradation are key drivers of habitat loss for Asian apes (gibbons and orang-utans). Understanding the complex feeding ecology of the apes is vital to inform efforts to mitigate the effects of forest loss, manage timber extraction and to aid forest regeneration efforts. I will present data from a long-term project in Indonesian Borneo covering ape diets, nutritional intake and seasonal variation as well as data on the

efficacy of the apes as primary seed dispersers in a peat-swamp forest where secondary seed dispersal is minimal. I will highlight the conflict between the tree species consumed by the apes and those targeted by both legal and illegal logging activities. I will discuss fragmentation of habitat, the effects on ape populations and the increased pressure placed on populations remaining in fragments, leading to serious questions about the long-term survival potential of apes in isolated fragments. Finally I will discuss how detailed knowledge of the apes' diet has led to efforts to regenerate degraded areas around the forest edge. I hope to show how a multi-disciplinary approach involving behavioural ecology, habitat ecology, and an understanding of the ecosystem can be combined to combat habitat loss.

THE ROLE OF GIBBONS IN SEED DISPERSAL AND THE NATURAL REGENERATION OF FORESTS IN SOUTH-EAST ASIA

David J. Chivers and Kim R. McConkey
Wildlife Research Group, Anatomy School, University of Cambridge, Downing St., Cambridge CB2 3DY

Gibbons (Family Hylobatidae) are among the most important seed dispersers in the tropical forests of South-east Asia. Gibbons are consistently efficient seed dispersers as they swallow the seeds of most species and defecate them intact. Although they preferentially consume "primate" fruit, they include a wide range of other fruit types in their diet. This makes them generalist frugivores, with a flexible dietary strategy. Community-wide studies on seed dispersal interactions (networks) in Asian tropical forests are lacking, but gibbons are likely to feature as key parts of these networks because of the large number of interactions they make. Thus, gibbons are 'gardeners of the forest', but the world is changing. The dispersal role of gibbons is limited by several factors and these limitations may have important consequences for maintenance of their role in this changing world. We discuss the strengths and weaknesses of the gibbon's role in seed dispersal. Since they are among the most important dispersers in Asia, we examine how their role changes with various disturbances that threaten gibbons and their habitats (such as hunting and fragmentation). We identify the research needs to determine the impact of these changes.

LEMURS, OVERRATED GARDENERS OF MADAGASCAR -- REVISITING THE ROLE OF PRIMATES AS SEED DISPERSERS

Jörg U. Ganzhorn, Lucienne Wilmé, Eva Bienert, Horst Bienert, Joanna Fietz
Zoologisches Institut, Martin-Luther-King-Platz 3, 20146 Hamburg, Germany

According to conventional wisdom, seeds need to be dispersed away from parent trees in order to become established. Primates and other frugivores are supposed to play a major role in this process. This resulted in specific fruit syndromes that should have evolved in response to the morphological,

physiological and sensory traits of fruit consumers and primary and secondary seed dispersers. While we do not dispute the importance of seed dispersal by animals, we use Madagascar and the lemurs of the island to outline a few phenomena that question the importance attributed to animal seed dispersal.

First, Madagascar's forest ecosystems evolved for at least 88 million years in isolation. During this time, the forests became home to an outstanding diversity of tree species. Yet, the island is home to just a handful of frugivorous mammals and birds, resulting in the most depauperate tropical forests of the world in terms of frugivorous vertebrates. If vertebrates would contribute to the evolution of fruit traits adapted to be consumed by frugivorous vertebrates, we would expect about a handful of different fruit types that match the capacities of their consumers. This is not the case.

Second, fruit trees produce millions or even billions of seeds during their life. Yet, only one or two seeds need to survive to reproduction. Otherwise the world would be covered by layers of fruiting trees.

Third, different types of dispersal could possibly result in different distribution patterns of tree species. Yet, tree species with three different types of dispersal (animals, wind, no specific dispersal) all showed clumped distributions, irrespective of the mode of seed dispersal.

Fourth, there are some seeds that are too large to be swallowed by extant lemurs or birds. They might have been dispersed by *Pachylemur*. But this species went extinct long ago while the forest and the tree species with large sizes are still present.

Fifth, *Ravenala* is supposed to be pollinated and dispersed by lemurs, mainly *Varecia*. Yet, *Ravenala* is an indicator of disturbed forest while *Varecia* is an indicator of undisturbed forest. In addition, *Ravenala* has regenerated abundantly in areas where *Varecia* has been absent for decades or probably never occurred. Flying foxes could have dispersed these seeds, but then one would have to assume flocks of flying foxes excreting *Ravenala* seeds in flight over large areas because there were no trees where they would have been able to perch.

These phenomena do not negate the important role of seed dispersers. But they call for an extended view of the importance of seed dispersal for forest regeneration and the diversity of tree communities.

CHIMPANZEE SEED DISPERSAL IN THE NYUNGWE NATIONAL PARK

Nicole Gross-Camp
School of International Development, Faculty of Social Sciences, University of East Anglia, Norwich, NR4 7TJ

Chimpanzees are one of the largest-bodied forest-dwelling primates in Africa. Although well documented seed dispersers, relatively few studies have examined chimpanzee seed dispersal in montane communities where there are generally fewer fruiting tree species than in lowland forests. Our research describes chimpanzee seed dispersal activities in the tropical montane forest of Nyungwe National Park, Rwanda.

HOW IMPORTANT IS LONG-TERM SPATIO-TEMPORAL MEMORY OF FOOD LOCATIONS FOR PRIMATE CONSERVATION?

Karline R. L. Janmaat
Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany

When a forest is logged one does not only lose forest. A large reservoir of knowledge on the forest, stored within the mind of the former occupants, disappears with it. Losing information on food locations, fruit production histories, suitable travel routes and sleeping site locations is likely to complicate survival in damaged or new forests after migration or translocation. In this talk, I will present results of my study on long-term site fidelity of grey-cheeked mangabeys (*Lophocebus albigena albigena*) groups in Kibale National Park, Uganda. I will provide preliminary results of a three-years' study on the level of reuse of individual fruiting trees by foraging chimpanzees (*Pan troglodytes verus*) in the Taï National Park, Ivory Coast. Lastly, I will discuss how a lack of long-term spatio-temporal memories can affect ranging behaviour and foraging efficiency and could potentially decrease primate densities in tropical forests.

INCORPORATING BEHAVIOURAL FLEXIBILITY INTO PREDICTIVE MODELS OF PRIMATE DISTRIBUTION PATTERNS

Amanda H. Korstjens
The School of Applied Sciences, Bournemouth University, Fern Barrow, Poole, Dorset, BH12 5BB

Primates are behaviourally flexible animals, but it is difficult to incorporate such flexibility into distribution models. One aspect of behaviour that can easily be measured is time allocation to different activities. Time constraints ultimately determine primate survival under different climatic conditions. Changes in behaviour or grouping habits may be able to relieve time pressures and allow for a population's survival when their habitat changes. We developed genus-specific models in which we used climate as an

indicator for vegetation and time budgets as an indicator for competition and ecological stress. Unlike standard distribution models based on the direct relationships between climate and distribution patterns, these time budget models highlight some of the behavioural changes different species need to adopt to be able to survive in their current locations under changing climatic conditions.

SCIENCE, CONSERVATION, PEOPLE

Vernon Reynolds
Institute of Biological Anthropology, Oxford University, 58 Banbury Road, Oxford, OX2 6QS

The chimpanzees of the Budongo Forest in western Uganda are threatened by the loss of an essential nutrient, sodium, which they obtained until recently from the decaying pith of *Raphia farinifera,* the raffia palm tree. Tobacco farmers surrounding the forest have now destroyed most of these trees in the Budongo area. Chimpanzees have adapted by finding an alternative source of sodium, but this is poor relative to *Raphia.* In this talk I describe the approach taken by the Budongo Conservation Field Station to this issue. We are holding constructive meetings with two large tobacco companies, BAT and Continental, and with local farmers often reluctant to change from use of raffia, obtained cheaply in local markets, to alternatives such as cotton or jute twine, which cost more. The overall message from Budongo is that forest conservation necessitates in-depth discussions between primatologists, local communities, and large commercial companies. Each of these segments has its own interests and the differences between these interests need to be resolved if primates and the forests they live in are to be conserved.

UPDATE FROM RANOMAFANA NATIONAL PARK MADAGASCAR: TWENTY YEARS OF CONSERVATION

Patricia Wright
Department of Anthropology, Stony Brook University, Circle Road, Social & Behav. Sci. Bldg. 5th floor, Stony Brook, NY 11794-4364, USA

(abstract TBA)

CALL FOR POSTER PRESENTATIONS

In addition to the oral presentations by invited speakers, you are invited to submit abstracts for posters to be presented at the symposium. These should be relevant to the topic of Primate Conservation and Forest Ecology.

The deadline for abstract submission is 11th November 2011. Abstracts will only be considered if the registration fees have been received.

Abstract guidelines

Content and format should be as follows:

Content: The abstract should state the main objectives, hypothesis tested, location of study, species, sample size, results and conclusions in a single paragraph.

Format: Maximum length 500 words; use 10pt Arial font. Mention title, author(s), affiliations (including full institutional address, telephone contact number, email address of corresponding author) and up to five key words.

Please email the abstract as a word document, together with your registration to <sdow@bristolzoo.org.uk.>.

Posters

Posters should be in A0 OR A1 portrait format (maximum 119.2cm height x 84.4cm width). Landscape format can also be displayed, but please let the organisers know in advance.

We are very grateful to the following for sponsorship of the conference:

EAZA APE CAMPAIGN

INTERNATIONAL YEAR OF FORESTS · 2011

Bristol Conservation & Science Foundation

FUTURE MEETINGS

PSGB Spring Meeting 2012

Port Lympne, Kent
17th - 18th April, 2012

Organisers: Mark Kingston Jones, Aspinall Foundation and Tatyana Humle, University of Kent

PSGB Winter Meeting 2012

Primate Biogeography
date tbc
ZSL, London

Organisers: Sarah Elton, Hull-York Medical School and Helen Chatterjee, University College, London

OBITUARY - JOHN HURRELL CROOK (1930-2011)

Members of the primatological community will be saddened to hear of the death in July of John Crook, one of the original founder members of PSGB and the originator of the socioecological model that still underpins much research in primatology. His theory that social systems are determined by ecology was the product of extensive comparative field work on weaver birds undertaken for his PhD at Cambridge under Bill Thorpe and Robert Hinde during the early 1960s. When he subsequently took up a lecturership at the University of Bristol, his interests shifted to primates, and he carried out the first field study of gelada baboons in Ethiopia in 1965. His seminal paper with Steve Gartlan, published in *Nature* in 1966, established the general principles of primate socioecology, and motivated decades of research on the behaviour and ecology of primates, ungulates, carnivores and birds. In many important ways, it laid the foundations for modern behavioural ecology. During the later 1960s and 1970s, his research group in the Department of Psychology at Bristol University became one of the meccas for research on behavioural ecology, attracting young postdocs like John Goss-Custard, Martin Daly and Richard Wrangham, as well as a host of PhD students including myself. During the 1980s, his interests shifted into humans, and he was one of the first people to undertake behavioural ecology and evolutionary psychological studies of humans in a series of field studies of the Tibetan communities of the Ladakh Valley in the Himalayas. He took early retirement in the 1990s to devote himself full time to the study of Buddhism, during which time he continued to write and research on Tibet and Buddhism. For the past two decades, he has been an official teacher of Zen (Chan) Buddhism, and was founder of the Western Chan Fellowship. His recent books included Himalayan Buddhist Villages (with the geographer Henry Osmaston), Yogins of Ladakh (with James Low) and World Crisis and Buddhist Humanism. John died at his home in Somerset shortly after a gathering of his original Bristol research group to celebrate his 80th birthday.

See also <www.bristol.ac.uk/news/2011/7790.html>.

Robin Dunbar
University of Oxford

PhD ABSTRACT

Preliminary field survey of pygmy slow loris (*Nycticebus pygmaeus*) and Bengal slow loris (*Nycticebus bengalensis*); assessment of hunting pressure and local attitudes towards the two species in Veun Sai Forests, Cambodia

Awarded a PSGB Conservation Grant in June 2011

Night surveys are sparse in Southeast Asia and therefore only limited data are available on the distribution, densities and ecology of nocturnal animals. Two species of lorises are found in Cambodia. According to IUCN, Bengal slow loris (*Nycticebus bengalensis*) and pygmy loris (*N. pygmaeus*) sympatrically inhabit the northeast of the country. However, no confirmed sightings of *N. pygmaeus* west of the Mekong River and no reported sightings of *N. bengalensis* east of the Mekong River suggest that either this body of water provides a natural barrier or that the species have been expatriated from the large areas. In Cambodia both species face considerable anthropogenic threats in form of habitat loss and unsustainable off-take for traditional medicine. This study was conducted in Veun Sai Forests (VSF) of north eastern Cambodia and aimed at verifying sympatric coexistence and estimating densities of *N. bengalensis* and *N. pygmaeus* in the area as well as evaluating hunting pressure, economic importance and differences in hunting habits, knowledge and attitudes towards lorises by Kavet and Lao ethnic groups inhabiting VSF.

Loris densities were estimated through night surveys of seven freshly cut transects in evergreen, semi-evergreen and deciduous forest types and totalled 17.2 km. Densities were calculated using perpendicular distance of the animal from the transect line and took into account visibility along the transects. Ethnological aspects were examined through structured interviews with open-ended questions. A total of 62 interviews were conducted during the study in five local villages with equal representation of Lao and Kavet ethnic groups. Forty-two hunters and twenty users of traditional medicine participated in the study.

During the night surveys there were no *N. bengalensis* detected, and therefore their sympatric coexistence with *N. pygmaeus* in the area could not be confirmed. This indicates that despite presence of the suitable habitat east of the Mekong River, this body of water creates a natural barrier. The encounter rate for pygmy lorises was 0.29 animals km-1 (SD±0.35) with the mean density of 8.5 animals km-2. The densities of *N. pygmaeus* in VSF were found to be lower than in the previous study in the area but comparable with densities from other sites.

Habitat destruction in the area is evident and interviews with the local population indicated that hunting pressure is high. According to the local population, numbers of lorises in the area are rapidly declining. Lorises are amongst most desired species for hunters as they present high medicinal and economic value. Kavet people hunt, sell and use lorises as medicine more often than Lao. However, they are also more willing to use alternative means if they were available.

The study concluded that conservation measures and management of loris populations in VSF should take a multifaceted approach and concentrate on helping the local population to establish sustainable livelihoods, educate about the environment and alternatives to animal-based traditional medicines. All existing and future conservation agreements should be closely monitored with adequate law enforcement.

Tatiana Iseborn
Oxford Brookes University

BOOK REVIEWS

APES: GORILLAS, CHIMPANZEES, ORANGUTANS AND GIBBONS **BOOK REVIEWS**
Ray Hutchins (2010)
Merlin Publications
ISBN: 0-9543070-2-X (Hardback) £12.99

The most startling aspect of this book, before even opening the front cover, is the colour illustrations. The illustrations are nothing less than beautiful and stand in stiff competition with any justice photographs can do to these majestic primates. The book thoroughly represents each of the ape species in splendid detail, and uses the illustrations to compare morphology between the species, including humans. A relatively unseen, but incredibly useful, comparison.

A foreword from Professor Colin Groves precedes the main body of the book. Such accreditation serves to reinforce the validity of the taxonomies the author presents. Taxonomies, and indeed other encyclopaedic information, are thoroughly researched, and presented in such a way that makes this book extremely accessible to all, regardless of education level. Additionally, the inclusion of bright diagrammatic representations of ape habitats, and interesting historical fact boxes for each species, takes this book away from dense text and into an altogether 'lighter' understanding of our closest living relatives.

The author begins the book with an overview of what constitutes an ape and then continues with an in-depth look at each ape species and their associated subspecies. The gorillas set the investigation in motion, followed by the chimpanzees, the orangutans, and finally the gibbons. Many of the facts about these animals can seem repetitive, for example, the age range of many gibbons in the wild is similar. Hutchins deals with these repetitions by placing them in engaging 'Did you know?' boxes, each one worded differently enough to keep the reader entertained and interested in the more mundane facts, such as the animal's height or arm span.

The book concludes with a 'those who care' section detailing the efforts of pioneers in the field, such as Jane Goodall and Dian Fossey. This section is a particularly useful reference guide and includes a comprehensive list, with up-to-date contact details and website addresses, of the major conservation groups for each ape species and the broader protection agencies such as WWF.

This is a short book (80 pages) aimed at people who need a quick, reliable reference guide. However, the ability of this book to appeal to a vast audience is possibly one of its greatest assets. The book, both pictorially and factually, bring apes into your living room. One glance at the front cover invites further examination and most people would be unable to resist 'sneaking a peek'.

The illustrations are the story of this book. Each picture really does paint a thousand words. The book presents many of the facts and a large proportion of the information pictorially, making its interpretation simple, exciting and alluring. It is rare to encounter a book of such design with such a range of accurate information. Many books are either one or the other, text or illustrative. The crossover between the two, as presented in '*Apes*…' makes it relatively unique.

'*Apes*…' has mileage and could possibly be the first in a series of books. The author could potentially cover lemurs, New World monkeys and Old World monkeys using the same format. More so, other mammalian species could be incorporated, and even non-mammalian animals, should there be a market. The primate order, in general, sparks people's interest, whether at a professional or scientific level or as a curiosity. Therefore in many respects primates warrant a range of books that cover the entire order. Certainly a wealth of primate books exist, none however, quite like the work produced by Hutchins.

Tara Cooper
Queen's University

SPATIAL COGNITION, SPATIAL PERCEPTION: MAPPING THE SELF AND SPACE
Francine L. Dolins and Robert W. Mitchell (eds.) (2010)
Cambridge University Press
ISBN-13:978-0-521-84505-2 £80.00

Working on a topic such as this requires a mind that perpetually checks for assumptions. The ability to recognize ourselves in spatial relationship to other objects and entities is so essential a survival function that deconstructing it requires very clear thinking, precise definitions and very exact use of language. For experimental psychologists studying the phenomenon in primates, the problem is compounded by the inability to communicate with your subjects and the likelihood of making unrealized anthropomorphic assumptions about their processing abilities.

Across 24 chapters Dolins, Mitchell and 36 other authors consider both how external stimuli are perceived and then mapped internally, how internally perceived stimuli (such as position and visual images) are mapped, and how all of this affects behaviour. The book is divided into five sections, each one asking the kind of essential probing questions that anyone who has looked at another species for any length of time most likely has, at some time, asked themselves… What do animals know and how do they perceive external space? How do they perceive and remember landmarks? How do they learn these capacities? What is the mental basis for all this? And, perhaps inevitably, how do humans and other primates differ in their spatial cognition and perception?

The first section includes an overview by the editors of the development of the philosophy and psychological study of space, that is remarkable for being both very succinct (at one point it quotes Einstein, Descartes, Kant, Leibneitz, Berkeley and Newton all in a single page) while remaining thoroughly comprehensible. Ken Cheng provides a helpful chapter showing commonalities between spatial and other forms of cognition; these include representation of quantities, generalization and discrimination, and weighting averages from multiple sources of information. Cue competition is also considered. This is followed by a chapter by Emil Menzel which beautifully places the preceding chapters in context, relating the theoretical to the movements of a group of young chimpanzees in a semi-natural setting.
In section two Paul Garber and Francine Dolins combine field and lab data to examine how two *Saguinus* tamarins track the availability and distribution of scattered resources on both small and large scales, and encode the spatial information. Charles Menzel examines what *Macaca fascicularis* need to learn to effectively forage in their native environment. Testing the structure-guided hypothesis, it becomes a near-review of learning in primate foraging. Considering the evolution of human spatial cognition, Thomas Wynn considers in some depth the importance of stone knapping on hominin spatial awareness. Taking issue with some of the essential methodological assumptions of evolutionary psychology, Wynn concludes that spatial cognition, complete with Euclidian understanding of spatial relationships first occurred at the time of early *Homo erectus* and evolved under conditions very different from any in the modern world, especially since current forms of hunter-gatherer society are no more than 12,000 years old.

The fourth section brings in contributions from neurophysiologists, with chapters on hemispheric specializations of the brain (William Hopkins and Claudio Cantalupo), parietal area evolution (Leah Krubitzer and Elizabeth Disbrow), as well as reviews of movement as the generative source of spatial perception (Maxine Sheets-Johnstone) and neurophysiological underpinnings of spatial perception (Robert Mitchell, Sarah Creem-Regehr).

The final section is the one which would probably summon the most popular interest; comparisons of the spatial cognitive abilities of human and non-human primates. Here a series of fascinating chapters compares chimps and children (Judy Deloache and Megan Picard), including their abilities to understand scale models, as well as showing the outstanding path-finding abilities of captive sign-trained bonobos (Charles Menzel).

The book is not, however, entirely primate driven. The chapter on spatial perception by beluga whales and bottle-nosed dolphins is instructive for the mental gymnastics the researchers must have undertaken to work with a sense that we simply don't have for the experimental results and their interpretation. There is an elegant chapter on how ants map and navigate their world, using not pheromone trails, but a combined system of landmarks and path integration (itself a remarkable combination of odometer and sky compass that makes ants the envy of anyone who ever got lost while orienteering). Even artificial intelligence gets a look-in in Angelo Arleo and Laure Roni-Reig's chapter, where the importance of landmark permanence in navigation is explored with computer-based learning and the Kephera Robot.

Well referenced, clearly illustrated and very well laid out, this book is clearly a major contribution to the field, bringing together as it does acknowledged leaders in all aspects of spatial perception and cognition. It is clearly a major synthesis of the current state of the art.

My only carp is that there is an under-representation of studies on how the skills and abilities discussed and dissected with such length and precision are actually used by primates in their ecological day-to-day. True there is Paul Garber's tamarin chapter, and Charles Menzel brings a study of free-ranging macaques, but there is little attempt to relate the various foraging modalities and spatial realities that primates possess, and investigate how these reflect the spatial and temporal distribution of foods and the four dimensions a hungry primate must move through to find them. Requiring a fair amount of existing knowledge to get the full benefit of the authors' observations, the book is, as advertised on the back cover, clearly designed for postgraduate students and researchers.

Adrian Barnett
University of Roehampton

THE STORM LEOPARD
Martyn Murray (2010)
Whittles Publishing
ISBN: 978-184995-004-6 (softback) £19.99

The Storm Leopard is a factual account of a journey across Africa. From the opening chapter introducing us to the reasons behind Martyn Murray's need for the journey to the closing chapters, we are led to question current conservation thinking. This thought-provoking book seeks to address a dilemma facing all those wanting to ensure the survival of species into our future – balancing the needs of a modern lifestyle with the desire to protect the environment.

Martyn starts with the challenge set from conversation many years ago with a character described as 'the old timer', a safari operator working in Kenya who, with dramatic poise, states "You mark my words: they will all disappear one day. Every single wild place." Thus starts the author's trip to discern whether the wild places he knew still exist and to answer, if he can, the question "Why are we so destructive of nature?"

In his quest to answer this question, Martyn begins a wandering journey across the continent led by the stories he hears. The descriptive prose leads us on via bushman art and legends. On the way we stop for a discussion of lion fieldwork, the dilemma of elephant culling in protected parks and a healthy section of reminiscing on his own previous fieldwork with antelope, all underpinned with the imagery of the bushman's storm leopard moving across the continent.

Martyn is accompanied by his friend, Stu, who plays a cynical counterpoint to Martyn's own beliefs and attitudes. The interplay between the two travellers moves from the tension of differing viewpoints to the camaraderie of the campsite, with Stu's counter-arguments often proving the perfect foil for Martyn's perspective.

Throughout the book the descriptive prose brings to life the landscape and animals surrounding the journey, and gives a flavour to the message that Martyn is trying to put across to the reader. It's easy to feel immersed within the text, and develop a desire to see the places described.

In all, this book was a challenging read for me. Perhaps I should be classed as being as cynical as Martyn's travelling companion. Even so, I feel this book has tasked me to think more widely and look at my reasoning and beliefs, and I would always recommend that as a worthwhile process.

Kirsten Pullen
Paignton Zoo Environmental Park

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(Affiliated to the International Primatological Society and the European Federation of Primatology)

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