

A photograph of three chimpanzees in a forest. One chimpanzee is on the left, looking towards the center. Another is in the middle, being groomed by a third chimpanzee on the right. The background is filled with green foliage.

Christophe Boesch

The Real chimpanzee

SEX STRATEGIES IN THE FOREST

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The Real Chimpanzee

Sex Strategies
in the Forest

**CHRISTOPHE
BOESCH**

*Max-Planck Institute of
Evolutionary Anthropology*



CAMBRIDGE
UNIVERSITY PRESS

CAMBRIDGE UNIVERSITY PRESS
Cambridge, New York, Melbourne, Madrid, Cape Town, Singapore, São Paulo, Delhi

Cambridge University Press
The Edinburgh Building, Cambridge CB2 8RU, UK

Published in the United States of America by
Cambridge University Press, New York

www.cambridge.org
Information on this title: www.cambridge.org/9780521110082

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First published 2009

Printed in the United Kingdom at the University Press, Cambridge

A catalogue record for this publication is available from the British Library

ISBN 978-0-521-11008-2 hardback
ISBN 978-0-521-12513-0 paperback

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The Real Chimpanzee

Sex Strategies in the Forest

The Real Chimpanzee encapsulates the fascinating behaviour of wild chimpanzees and discusses the differences observed in different populations across the species, and across the many levels of their social behaviour. It explains why sex competition and predation pressures in a forest chimpanzee population made the females of the group highly social and gave the males a high level of within-group solidarity, making them very xenophobic towards outsiders. Love is what makes war possible. Christophe Boesch brings back to the table the debate over ecological pressures and social organization, and the influence they have over issues such as the evolution of warfare, cooperation, altruism and the position of females. Written in an accessible style for a general audience, as well as for undergraduate and graduate students, he presents insightful views to give readers the background information to understand the struggle for survival of our closest living relative, the chimpanzee, and through this to find some keys to the ever-so-intriguing question of what makes us human.

CHRISTOPHE BOESCH is Professor and Director of the Department of Primatology at the Max-Planck Institute of Evolutionary Anthropology in Germany.

To my cousins in the forest, *Brutus, Kendo, Ondine, Loukoum*
Who were so patient with me
To my kids, *Lukas, Léonore*
Who lived through my passion of the forest
To my father, *Ernst Boesch*
Who enthusiastically challenged my interpretations
To my wife, *Hedwige*
Who made it all possible

Acknowledgements

As young people, many of us struggle to find out about our destiny in life, how to develop as an adult and in which field to find an interesting profession that, hopefully, also allows us to make a living. I was lucky enough to become inspired by some books around the age of fourteen. It was *King Solomon's Ring* by Konrad Lorenz which was the enlightening experience for me. I was so impressed by his intimacy with geese and jackdaws that my path was found – I wanted to work with or on animals. Some years later, I discovered *The Year of the Gorilla* by George Schaller, and then I simply knew! Incredibly enough, a few years later, as I had finished my biology studies, I was able to follow the same gorillas George Schaller had so much adored.

Observing animals is more than a passion, it is a profession. For me, the young Swiss scientist, the field of primatology was an irresistible attraction, much more so than any other one in biology. I was lucky enough to find mentors who made my reach into this exotic scientific field possible. It all started on a good track as one of my professors at the University of Geneva, Arianne Etienne, knew the late Dian Fossey personally, and she made it possible for me, in 1973, to start my first real experience of wild primates at the top with no less than the mountain gorillas, there in one of the pinnacles of nature, in the unforgettable world of the high mountains of Rwanda and eastern Congo. Following this experience, I had another stroke of luck. In Paris, I met the late French professor François Bourlière who mentioned some reports about remains of nut pounding in the forest block of Liberia and Côte d'Ivoire, entertaining the so far unconfirmed possibility that chimpanzees there might be using tools to crack nuts. Supported by the professors Hans-Jörg Hugel and Rudolf Schenkel from Geneva and Basel universities respectively, I was able to go to the Taï forest and, after many months of searching, could confirm with one single observation

that, indeed, it was the chimpanzees who were pounding these nuts. This one observation made my future as a primatologist possible.

In 1977, after this initiation into the world of chimpanzees in the African rainforest, Hans Kummer, professor at the University of Zürich, accepted the risk of supporting an unknown student, initiated me to the science of primate research, was my PhD director and then unfailingly supported me as we initiated the Tai chimpanzee project and went through the many years of habituating the chimpanzees to human presence, during which process scientific advances are often frustratingly slow. Hans Kummer's intellectual mix of rigour and keen striving for the unknown have marked my own attitude in science. My present involvement in primate research and conservation is part of the legacy he left me.

In 1991, Steven Stearns, professor at the University of Basel, after visiting the Tai chimpanzee project, offered me the possibility of an academic position at his institute while being able to continue the field study in the Tai forest. This generous offer allowed me after 12 years in the African forest to touch base with scientific progress and to intensify the Tai chimpanzee project as well as to develop my scientific career by being based in Switzerland. I am immensely grateful to Steve for this chance to participate in his challenging and stimulating research group.

I also wish to express here my deepest gratitude to Professor André Aeschlimann from the University of Neuchâtel, head of the Swiss National Foundation and President of the CSRS in Abidjan for many years. He supported the Tai chimpanzee project throughout the important early years and therefore contributed to its achievement as a long-time study now in its thirtieth year.

My wife Hedwige Boesch-Achermann was enthusiastic, curious and open to leaving the so-called civilized world. She accompanied me from the very first day and for more than 12 years of permanent life in the Tai forest. If the study of the Tai chimpanzees was successful, it is only because she was there to live and work with me during all these years. This transformed our life into an adventure, a long inquiry and discovery of some of the most intimate aspects of the life of our cousins from the forest. Most of the ideas developed in this book have matured over the years we spent together in the forest, but also afterwards, when she continued her work for the chimpanzees by staying in Europe. Trying to understand this elusive species and discovering the many aspects of their life was and is part of our life. Therefore, throughout the text, the use of 'I' should often be read as 'we' as the Tai

experience was a joint experience which moulded so many aspects of my scientific and personal way of thinking.

From the start we looked at our project as the new one compared with the famous long-time research projects of Jane Goodall and her colleagues on the chimpanzees of Gombe Stream National Park and of Toshisada Nishida and colleagues on the chimpanzees of the Mahale Mountains National Park, both in Tanzania. It was therefore a great honour to us when both Jane Goodall and Toshisada Nishida invited us to their study sites and encouraged us to compare our results from the Tai chimpanzees. Not only was this a wonderful opportunity for us but it was an eye-opener to what population differences in this species really means. I am, therefore, not only very grateful to both pioneers of chimpanzee research to have invited and supported me, but equally to Frodo, Fifi, Wilkie and Co., the chimpanzees from Gombe, as well as to Fanana, Alufo, Gwekulo and Co., the chimpanzees from Mahale to have taught me so generously about how chimpanzees behave in their distinct social physical world. Once the fascination about chimpanzee behavioural diversity was seeded in me, I was very lucky to be able to enjoy the generous attitude of colleagues who invited me to visit their sites and observe their study chimpanzees to continue my comparison on the behaviour of the chimpanzees. I am thus very grateful also to John Mitani and David Watts and the Ngogo chimpanzees, to Vernon Reynolds and the Budongo chimpanzees, to Crickette Sanz and David Morgan and the Goulalougo chimpanzees, and to Richard Wrangham and the Kanyawara chimpanzees, for accepting me at their sites and for guiding my vision into the fascinating individuals of these study communities.

As the Tai chimpanzee project developed, we have started to include both students and local field assistants to increase the number of observations to be done with the chimpanzees as well as to habituate three more new chimpanzee communities. This has made the Tai chimpanzee project the first one to study neighbours and their interactions. All of the many involved field assistants have our deep gratitude. I wish to single out a few. Grégoire Kohou Nohon was the first local assistant who joined us, at a time when most people close to Tai National Park considered the forest as dangerous. Grégoire overcame his natural fear and said right from the beginning that he would stay on. And so he did. After over 20 years, he is still working with us! Grégoire's example impressed many people in the region and thanks to him we have been able to find many more young men who all became dedicated chimpanzee observers. Not only were they willing

to spend 12 to 14 hours per day following the chimpanzees on their forays in the forest, often over 5 kilometres long, but they were spending nights out in the forest when there was a need to protect seriously ill chimpanzees from possible leopard attacks. And they were ready to keep going during the very unstable period of the civil war from 2002 to 2004, thereby actively protecting the study site and the chimpanzees. They have been our ambassadors in the local populations and made the development and continuation of the project possible during the 30 years since its start in 1979. We especially thank the senior field assistants Kpazahi Honora, Bolé Camille, Oulaï Nicaise Daurid, Bally Louis Bernard, Tahou Mompeho Jonas, Gouyan Bah Nestor, Gnahe Djirian Appolinaire, Yagnon Valentin, Tah Alain Pahi, Sioblo Arsène, Guy Sylvain, Guiro Ferdinand Thia, Kevin Charles Bally, Blaise Blé Téré, Ignace Dezaï, Camille Dji, Gabriel Gnombouhou Kouya, Gérald Gah, Benjamin Goullaon, Mathias Douosson, and Denis Lia.

At the same time, I thank the many students, far too numerous to be named individually, from all over the world who helped to follow and study the chimpanzees in the Taï forest for short periods. I thank all students and colleagues who were involved in projects for longer periods for their dedication and passion for the chimpanzees and their forest: Barbara Fruth, Paul and Nathalie Marchesi, Frédéric Joulian, Margaret Hoitink, Pascal Gagneux, Miriam Behrens, Gerd Radl, Christian Falquet, Diane Doran, Martina Funk, Rainer Neumeier, Andy Kurt, Penny Simpson, Brigitte Schmid, Suzanne Pieren, Ulrike Ratkjen, Annemarie Fränkl, Gregory Roduit, Paco Bertolani, Chloe Cipoletta, Dean Anderson, Nick Malone, Ilka Herbinger, Roman Wittig, Myriam Sele, Cathy Crockford, Steven Bada, Nicola Paterson, Daniel Hanus, Hjalmar Kuehl, Julia Riedel, Janna Rist, Melissa Tauber, Kathleen Beese, Sabrina Locatelli, Lionel Egger, Pola Abaza, Sandra Junglen, Rebecca Stumpf, Antoine N'Guessan, Zoro Goné Bi, Anja Blankenburg, Célestin Kouakou, Simone Ban Dagui, Nadine Eckhardt, Lydia Luncz, Livia Wittiger, Sonja Metzger, Svenja Schenk, Siva Aina Jensen, and Fabian Leendertz.

In any long-term projects, some difficult periods may occur that might have dramatic consequences for the chimpanzees we habituated to human presence. Thanks to the courage and altruism of some individuals, the worst – the disappearance for unknown reasons and/or the killing of the chimpanzees – was mainly prevented. My warmest thanks therefore to Claudia Steiner and Franca Donati who were present during the emotionally hard period of the Ebola outbreaks in the Taï chimpanzees in 1992 and 1994, to Thomas Pfluger who stayed

near the camp when, in 1991, unrest from Liberia spilled over into the Taï region, and to Emmanuelle Normand, Yasmin Moebius, Tobias Deschner and Cristina Gomes for having decisively contributed to keep the project going during some of the most difficult times of the civil unrest in Côte d'Ivoire during 2002 to 2004.

I am most grateful to Valerie Howe for her hard work with the language correction of this book. And I thank Hedwige Boesch, Tobias Deschner, Katerina Guschanski, Lydia Luncz, Kevin Langergraber and Heike Siedel for comments on an earlier draft.

Our long-term study in the Taï National Park was possible only with the constant and amicable support of the Ivorian authorities. Thirty years is a long period and by far exceeds the normal life of any government; nevertheless the support from the Ivorian government remained inflexible. We wholeheartedly admire the constancy of the support we received from all the different persons working in and heading the 'Ministère des Eaux et Forêts', as well as within the 'Ministère de la Recherche Scientifique', in particular those working and heading the 'Direction de la Protection de la Faune', of the 'Office Ivoirien des Parcs et Réserves', and of the 'Direction du Parc National de Taï' as well as the numerous park agents, especially those of the Taï Sous-Préfecture. The Taï National Park has been throughout our study subject to attacks from various directions, mainly in the shape of logging, poaching, civil unrest and farming, and this has threatened the survival of the forest and its fauna, including the chimpanzees. The Ivorian authorities have always taken the steps necessary to guarantee the survival of this precious park, and unfailingly supported the continuity of the project. The Centre Suisse de Recherches Scientifiques en Côte d'Ivoire (CSRS) has been our base in the capital Abidjan since our very first visit to the country in 1976, and they have always remained a key partner in the project. We thank all the successive directors and presidents for going out of their way to support us. In Taï, we profited a lot from the support of the directors of the Station d'Ecologie Tropicale and their staff, Denis Vivet, the late Théo Tiépkan Zoroa and Paul Zouhou respectively. Special thanks also go to my colleagues, professors and dean, of the University of Cocody and Abobo from Abidjan for supporting the collaboration between our institutions.

No scientific project can survive without financial support, and here we have to stress the continuous, generous and unvarying support we received for 19 years from the Swiss National Science Foundation and since 1999 from the Max Planck Society. Very few public funding organizations dare to support a long-term field project for so long, and

we are immensely grateful for their appreciation of such a study. We are grateful for additional funds from the Messerli Foundation, the Leakey Foundation, the Schultz Stiftung, the Jane Goodall Institute, the Wenner Gren Foundation, the Roche Foundation and the Freie Akademische Gesellschaft.

How dull would our life have been in the forest without all the encounters with the wonderful, friendly, helpful, curious and tolerant African people near and in our forest camp, and their joy in sharing their knowledge with us? What would our life have been throughout all these years without the friends and family from abroad who have visited, sent presents, letters, food, books, and stayed in contact while we were in Africa and back in Europe? Thank you, to all of you.

Last but not least, we thank all the chimpanzees who have tolerated our presence for so many years, allowed us to share so much of their life with us and made us wonder from day to day about our own species. In the process of habituation and following them we have at the same time inadvertently contributed to their confrontation with threats, such as diseases, and made them more vulnerable to poachers. This has been a constant worry for us from the beginning and I hope that this book, by increasing the standing of the chimpanzees in the scientific community and the public at large, will allow us to pay back some of the debts we owe them.

Contents

Acknowledgements

page ix

- 1 **Make love and war?** 1
From the dream of the hippies to the reality where sex and violence often intrinsically intermingle to produce some of the complex strategies used by both sexes to find partners and reproduce.
- 2 **Inconspicuous female superiority** 11
How the traditional image of females as the passive and submissive sex has changed into the sex determining and controlling reproduction to her advantage in the competition with more powerful males, and how a female manipulates males to select the best sperm for her offspring.
- 3 **The tyranny of the testis** 33
How males have been able to develop, within a system of dominance and aggression, close tight cooperative units that fight for the good of group members and how this has made altruism become one of the most impressive behaviors contributing to the survival of individuals.
- 4 **Odyssey through our forest past** 60
Sex and cooperation in the forest: what is life like as a large social primate in a dense tropical forest where the visibility is restricted to 20 metres and where most aspects of sociality have to be inferred and communicated by vocalizations?

5	Make war to get love	76
	From the individualistic struggle of both sexes to find suitable partners and resources to cooperative teams increasing reproduction and how that leads to both fatal violence and altruism, while females pursue sexual exchange that males cannot prevent.	
6	The real chimpanzee	109
	From a millennia-long past in Central African forests to adaptation into more open habitat regions in East Africa as well as in savannah-like regions – chimpanzees have conquered many regions and this expansion into more marginal habitats resulted in some dramatic shifts in males' cooperation and altruism as well as in the females' control over reproduction and social position.	
7	When sex becomes destructive	138
	Why humans, one of the most cooperative and altruistic species, became so destructive throughout their range and why some of the challenges solved peacefully by chimpanzees have become so destructive in humans.	
8	Postscript: Fédora's fate	160
	Will Fédora, the chimpanzee baby I saw develop and become a skilful tool user, survive the loss of her hand to poachers and be able to survive as a young successful mother? In remote areas, chimpanzees are tracked by humans; without decisive and rapid action they have no future, and our cousins, our roots to our past, will vanish before we get to know them.	
	<i>References</i>	164
	<i>Index</i>	174
	<i>Plate section between pp. 82 and 83</i>	

Make love and war?

Everyone is familiar with the hippy mantra 'make love, not war' – an ideal that inspired a generation. Looking at the world and our past, however, it is 'make love *and* war' rather than the 'flower power' ideal that seems to be the normal condition. Philosophers, such as Jean Jacques Rousseau and Thomas Hobbes, proposed that war is a natural state for humans resulting from the increasing competition in the growing human population following the advent of agriculture. Nowadays 'make love and war' seems to be the natural state for humans, whether it be in highly technically advanced and 'sophisticated' societies, such as those involved in the major regional wars of the twentieth century, or in less technically developed societies, like traditional hunter-gatherers, such as the Nuer and the Nimba of Sudan, the Australian Aborigines and the Batak of Asia or the Jivaro and the Yanomamö Indians of South America. Some traditional societies are constantly at war, while others have periods of relative peace, but it was shown that a state of war is characteristic of nearly 95% of all known human societies. When in our past did this situation start to prevail? What are the benefits of war? How did it happen that humans are so violent when at the same time showing so many cooperative and altruistic propensities? Do we see the same coexistence in chimpanzees? How can we learn from them to understand us?

I propose that by looking at our closest living relatives, the chimpanzees, our cousins of the forest, we can gain insight as to why altruism and aggression coexist in the same species. Knowledge acquired from other animal species can help us to improve the understanding of our own nature. The crucial point here is that in all communities of wild chimpanzees studied we saw from time to time extremely violent interactions with neighbours, and such conflicts can result in individuals being killed and groups annihilated. Chimpanzees are known,

with humans, for being the only primates able to make and use tools as well as to hunt for meat in groups. Warfare provides another similarity between humans and chimpanzees.

The similarities between chimpanzees and humans in these behaviours have been highlighted by previous authors, in such famous books as *The Naked Ape*, *Chimpanzee Politics*, *In the Shadow of Man* or *Demonic Males*. Classically, the origin of war has been proposed to result from an inbuilt drive for aggression in both human and chimpanzee males that produce high levels of violence. Male bonding was proposed to result from this common tendency for violence among males on which chimpanzees' ability to form alliances would be overlain. Arguments about humans' appetite for violent behaviour are presented that set humanity apart from the violence shown by other animal species. Humans' ability to incorporate tools into social conflicts would enhance the potential for this destructive and 'unnatural' aggression.

LOVE IS WHAT MAKES WAR POSSIBLE

I came to this very different conclusion after years of following the forest chimpanzees. At a first glance this may sound contradictory, but if you follow my reasoning, you will acknowledge, I hope, that there is some intuitive sense to such a proposition. To make war and to respect someone for killing other human beings, you must first have an extremely strong sense of belonging to 'one group', which leads to a disregard for the human dimension of outsiders. It is this 'dehumanization' of non-group members that makes war at the same time both special and disturbing. To me, this is the natural consequence once cooperation and altruism with, and towards, other group members have infiltrated every aspect of social life. Only then will outsiders be despised to such an extent that killing them will not only be acceptable but even sometimes applauded. Xenophobia, the hatred of outsiders, results from extended within-group solidarity. Thus, in contradiction to the hypotheses which propose that war is caused by destructive forces, I suggest that war results from strong within-group solidarity.

What makes solidarity within groups so important? The year-long observations of the chimpanzees of the Taï National Park in Côte d'Ivoire revealed how predation pressure forces individuals to seek protection among other group members and results in both sexes spending more time together than they would in the absence of predators. The more time one spends with other individuals, the less likely one is going to be singled out in a leopard attack. Once

individuals gathered to protect themselves from leopard attacks, two social innovations followed. First, the more individuals spend time together, the more they are going to compete with one another for access to food resources. This exemplifies the major dilemma of group living, as the cost of competition for food is inherent and increases with the number of individuals together. This could be alleviated by developing special relations with specific individuals through increased coalitions and friendships, so that such partners support one another in social conflicts. Second, cooperation and altruism between group members represent the best way to counter the negative effects of attacks by powerful predators such as leopards. Single individuals have hardly a chance when facing a leopard, while cooperation and altruism can be life-saving. Once established, the ability to cooperate can be extended to other aspects of social life and that is what we see in Tai chimpanzees.

In addition, in chimpanzees, within-group solidarity coincides with between-group hostility. The main reason is that females in long-lived and slow-growing animals, like humans and chimpanzees, are for the most part of their lives occupied with caring for dependent offspring, periods during which they are not fertile. Thus, adult males, even if they fight one another for access to females within the group, have a great common interest in joining together to win access to additional females from other groups. Thus, sex competition that is predominantly an individual challenge becomes a social challenge in slow-maturing species facing high predation pressure. This shift from individual to social is not limited to the sexual domain, as the pursuit of reproductive success does not restrict itself to mating. The acquisition of new mates plus stable social conditions and secure access to food resources are all needed to improve reproductive success and could be improved and secured through collective warfare. This duality between competition and cooperation is one of the key elements of male sociality, both in chimpanzees and in humans.

Both humans and chimpanzees are long-lived, slow-growing social primates that faced high predation pressure from, respectively, cave bears, lions and sabre-tooth tigers for the former and leopards or lions for the latter. Basic common biology in both species predestined them to respond similarly to high predation pressure. What I am proposing is that some salient environmental conditions experienced by chimpanzees in the rainforests of Africa are similar to those faced by our ancestors and that war resulted from such prevailing ecological and demographic pressures. It was the development of strongly affiliated

and supportive behaviours within the social group that resulted in warfare and this appeared very early in the shared human/chimpanzee evolutionary line.

TELL ME WHAT YOU WEAR, AND I WILL TELL
YOU WHO YOU ARE

Such a saying captures the significance of the environment to everyone. Not only does one have to wear different types of clothes in Scandinavia compared with the Amazon or the Sahara, but such climatic differences will force one to eat different types of food, and to hunt or extract food in different ways, and the amount of food that can be gathered will influence the size of a group of individuals able to survive on such resources. The paramount importance of the environment is too easily forgotten for humans like us living in heated or air-conditioned houses. Nonetheless, for others, it sets the basic conditions under which the struggle of survival unfolds. No one can escape it, and each one has to use all his or her physical and intellectual abilities to solve the daily challenges. Simple things like finding water, a safe place to sleep or escaping predators require dramatically different solutions depending upon the ecology encountered. It is the daily challenges faced during growing up that mould the individual and everyone is the product of such experience.

The hugely successful book by Frans de Waal, *Chimpanzee Politics*, in 1982 has made the complex social life of the chimpanzee familiar to a large audience. The heroes of his book lived in the zoo of Arnhem in the Netherlands, where they had the luxury to live in a large group with three adult males, a unique situation for zoos at the time. Frans de Waal's precise descriptions rightly emphasized the complex strategies males were following to climb up the dominance ladder in the group, but to a person familiar with the life of wild chimpanzees, the situation in the zoo remained strikingly simple. For one, food is being brought to the animals twice a day and they simply have to sit and eat what is given to them, while wild chimpanzees spend about 40% of their time, day after day, looking for and processing food. Sometimes, food is difficult to obtain, involving the need to use tools or to hunt to capture it. Second, in a zoo, a group of chimpanzees spends all their lives together within one enclosure, while all their wild counterparts live in fission-fusion groups where rarely more than a third of the group members are seen together at a time. This requires much greater flexibility and planning when it comes to social fights and coalitions