

Daniel Robert

## The Nature of Inspiration



Fleurier, a little village at the top of a forested valley in the Swiss Jura, is where I was born in 1961. After having learned to walk on the same day as John Glenn first strode in space (my only known cosmic connection), I received my Master's degree in Experimental Biology (on the perception of gravity in arthropods) from the University of Neuchâtel in 1985, and a Doctorate (Dr. phil. II) in Neurobiology in 1989 at the University of Basel. A postdoctoral residency in Bioacoustics at Odense University, Denmark, taught me to handle sound fields with great care. During 10 months, in 1990, a welcoming troop of wild West African chimpanzees accommodated my presence to study their use of percussive tools and acoustic communication. From 1991 to early 1996, I was a postdoctoral fellow and a research associate at the Department of Neurobiology and Behavior at Cornell University, Ithaca, USA. In 1995, I was awarded a START fellowship (Swiss Talent for Academic Research and Teaching) from the Swiss National Science Foundation. My work focuses on the sensory biology of insects, with a particular interest in the sensory ecology, structural and functional morphology, biomechanics and evolution of the sense of hearing. – Address: Zoologisches Institut, Universität Zürich, Winterthurerstrasse 190, CH – 8057 Zürich.

“Men build too many walls, not enough bridges.”  
Isaac Newton

No doubt, an academic year spent at the *Wissenschaftskolleg* is a special year. Irrespective of the academic pedigree of the Fellow considered, the exceptional conditions of the place are bound to affect one's life, both academic and personal. While I was a temporary resident at Villa Jaffé, my roomy office instantly became very conducive to the reflective deep breath that experimentalists sometimes miss at their home institutions. For a second, time was mine. Plans of many kinds – in addition to all the reading

and writing I brought with me – unfolded expansively and quickly multiplied. As vast and boundless as they seemed to be at first, time and space soon shrunk to their familiar size. But did new dimensions appear during that agorapoetic process?

Some years ago, another great chance was offered to me to spend an exceptional ten months in retreat. I was the fortunate host of a remarkable society – that of a troop of wild chimpanzees in the West African Ivory Coast. What a privilege to experience such *changement de décor*, and what a temptation for the comparative sensory ecologist to reflect upon them. *Les voyages formant la jeunesse*; it is usually maintained that a change of geographical location is very conducive to the development of novel perception and sensitivity. By extension, one may also wonder what a phylogenetic relocation could bring in renewed insights into one's own position amongst creation, academic or natural. Interacting with another species or, more often several others, is not an exclusive privilege of the zoologist, although it certainly helps to be one. Immersed in novelty, it took me quite a bit of perceptual training to awaken to the reality of the vast forest, and put to sleep, at least temporarily, urban existence.

Hence, during my time in the jungle, the frequency of my contacts with human peers was forcibly reduced – although not in intensity and quality. Spending ten hours a day with Kendo, Ella, Darwin and their peers was a marvellous physical and intellectual challenge. In that new socioecological context, the humble apes exercised an impressive influence on my understanding of concepts also familiar to humans ... tolerance, compassion, deception, altruism, anger, curiosity ... In a more prosaic, but no less important way, the chimps made the jungle safe and accessible to me. They never failed to detect the ripe fruits, the menacing black cobra, the stalking leopard, the delicious termites, and the stingless bees long before I did. On one rather hilarious occasion, I found myself so at ease in the midst of the troop that I happily indulged in following their sensible tradition of siesta after the midday foraging time. I was to wake up two hours later, alone, lying on the leaf litter, feeling embarrassingly vulnerable and inadequate.

Deep in one of the last intact rainforests of West Africa, day by day, time spent with a troop of 40 chimps was also bound to mold one's views about the position of humans on earth. During one key moment, a spectacularly frenzied bout of predation on canopy monkeys, I came to realize that the closest relative the chimps had in their forest was me, a human being. As beautifully explained in Jared Diamond's book *The Third Chimpanzee*, chimps and humans have lots of evolutionary past and behavioural traits in common; in fact, we share about 99% of our genetic material. No matter how different I came to perceive them to be at first, we

were of the closest kind. Kinship develops from knowledge. Knowledge ensues from communication.

Communication was what I set out to study among them, and there surely was plenty of it. Scientifically, of course, strict rules of non-interference with their behaviour had to be observed, carefully avoiding entering into direct competition or displaying postural threats. But since, as psychoanalyst Paul Watzlawick put it, one cannot not communicate, the validity of my good intentions had to be met by my hosts' understanding and approval. With their trust, I could often approach close enough to witness and record their hoots, grunts and humms. Their Tuesday debates took place daily, and even though these were not always immediately intelligible to me, they were – in context – always fascinating, and made many important questions resonate in my mind. Whether their questions were the same as mine will remain forever elusive. Progressively though, their sociality became more and more familiar and, most fascinatingly, made intuitive sense. Was I bonding with the troop? Some implicit knowledge was being transferred to me. Social cohesion can be contagious.

If one large question about modern human society pertains to the urgency of knowing what constitutes the mechanics of communication between people, what about that between us and other species? Could one imagine, and work on the idea, that learning from nature is, incidentally, also learning about ourselves and our relation to the living world? Could we not benefit from a better understanding of animals and their complex socioecological interactions, and the processes by which those evolved?

My long-standing scientific curiosity about sensory perception and communication in animals has led me to actively study diverse model systems, leaping from the sensoriality of ticks and grasshoppers to moths and chimpanzees and, currently, to flies and mosquitos. Ideally, the list should be longer; only time sets limits to curiosity.

Whatever the instrument of curiosity and explorative creativity, a cello or an oscilloscope, the physical experience with the matter is constitutive of the mind. It seems, however, to remain quite true that a temporary deprivation of the familiar instruments of research elicits a unique process of reflection otherwise inaccessible. Coming to Berlin implied undertaking an experiment in not experimenting. In some sense, this learning by deprivation was an experience in itself. After all, if one cannot not communicate, it may equally be true that one cannot not experiment.

So much for theory.

The scientific and cultural milieu being remarkably rich in Berlin, I was delighted to explore this marvelous and multifaceted city, although the forest of cranes tended to hide the tree at times. I participated in a major international conference on acoustics, the largest and most diverse

ever held, co-organized by the Acoustical Society of America, the European Acoustics Association and the German Society for Acoustics. Held at the Technical University, the conference gathered an impressive cohort of 2200 acousticians of all sorts. My Zurich-based laboratory contributed with four poster presentations and an invited lecture. One of the posters, by Nathalie Ramsauer was awarded the first prize of the student presentation competition.

On several occasions, I visited and gave lectures at the Technical, Free and Humboldt Universities, establishing or further developing existing contacts and collaborations with colleagues in all three institutions.

The highlight of the year was the symposium held at the Wissenschaftskolleg titled: Inspiration from Nature: The Emerging Science of Biomimetics. Gathering 16 leading researchers in material science, biology, engineering, education, robotics and architecture, this symposium offered a platform for discussion on the general scientific methodology that allows the investigation and elucidation of efficient and useful mechanisms in nature. Remarkably, it was acknowledged that quite divergent fields of fundamental research such as molecular dynamics, composite material, aerodynamics and new artificial intelligence have – often independently – converged on the idea of looking more closely at natural systems for inspiration. Valuable knowledge is embedded in the forms and functions of (and relationships between) biological species and ecosystems; it is a fascinating and challenging task to learn how to interpret this knowledge. A more detailed account of this symposium can be found further along in this volume.

So much has so eloquently been said and praised about both the logistic and academic support provided at the Wissenschaftskolleg that all I can do is gratefully reiterate it. Much gratitude is indeed due to Gesine Bottmley and her team of fearless librarians. They repeatedly worked miracles to quasi-instantaneously deliver that odd article from that obscure and hardly available biological journal or that wrongly referenced book of unknown origin. Their smiles and friendliness mask the actual remarkable efforts put to the task. Also, the entire staff collectively deserves a thankful mention for the kindness, patience and courage necessary to put up with the troop. I have never been a big fan of zoos, but to this one, I will fondly return, with all my humanity.