



TIME TO THINK THINGS THROUGH GEORG STRIEDTER

I was born in Berlin in 1962, emigrated to the US in 1978, and then studied “Neurobiology and Behavior” at Cornell University, at the University of California in San Diego, and at the California Institute of Technology. Since 1995, I have been an Associate Professor in the Department of Neurobiology and Behavior at the University of California, Irvine. One of my two major research interests is neuroethology, which may be defined as the study of those neural mechanisms that underlie natural, species-typical behaviors. Specifically, I investigate the neural mechanisms of vocal imitation in parrots and other birds. My second major field of research is the study of how brains develop and evolve. Hence my goal for this fellowship year, which was to write a book tentatively entitled “Principles of Brain Evolution”, in which I try to synthesize those interests and set a possible agenda for further research. – Address: Department of Neurobiology and Behavior, University of California at Irvine, 2205 Bio Sci II, Irvine, CA 92697-4550, USA.

Berlin – 2 weeks to go: Back in college, I often wished for more time so that I could give “my best” more often. Studying for exams, writing term papers – even photography – I often felt I had to stop before I had done the best I could (at least, I often *thought* I could do better if I had more time ...). In graduate school and as a postdoctoral fellow, this frustration eased, but professorhood made life speed up again. I didn’t know it would be so full of scheduling conflicts and competing priorities. There’s always something that needs doing right away, rarely time to chase down vague ideas that might or might not bear fruit, and too little time for sustained assaults on difficult questions. Yet, part of me always wants

to do just that: to think *through* many of the questions I had thought *about* for years. But where and how? The Wissenschaftskolleg turned out to be the ideal place.

I arrived in Berlin with the desire to write a book but no experience in actually writing one. I had an outline, numerous notes, two sample chapters, and a book contract – but could I really pull it off? I wasn't sure. I envisioned a book on “principles of brain evolution”, but what were those principles? I was sure that brain evolution is not the outcome of “mere chance”, but I also knew that brain evolution is not “law-like” in any simple sense. I sensed a middle ground but had not explored it in detail. Would a year be enough to clear away the fog? I took that question seriously because, as a fairly junior research scientist, I could not afford to have half a book hanging over me at year's end. Thus, I began last summer with both enthusiasm and anxiety. What did I have to say, whom did I want to say it to, and what style should I use? So many questions to resolve, so much to keep in mind at once – a confusing time. Fortunately, I gradually settled down and began simply to write, following the sequence of my original outline, trusting that my plan was well conceived, hoping that I would be able to solve unforeseen problems along the way. Happily, I think my trust was not misplaced. The outline had to be modified in merely minor ways and the book's structure actually forced me to think through some issues that I had not previously thought about. That was good fun – discovery!

The book is not yet finished, but I can see the end of my tunnel. I wrote about five chapters, each containing roughly 15,000 words and 15 illustrations. When I print it all out, it is a reasonable “pile”. So the daily “paragraphs or two” actually added up to something after all – as a Darwinist, I should have known they would! The gnarly chapter about “laws, principles and regularities” is still sketchy, but becoming clearer in my head. Similarly, the chapter about human brains is incomplete but taking shape inside of me. Thus, assuming I stay on track, I should have a readable draft of the whole book by Christmas. That cheers me up! Of course, as is typical of me, I am now becoming increasingly nervous about what “others” will think. How will the experts react to passages in which I have simplified complexities? Will the non-experts feel overwhelmed by the details and citations? Will my editor want an entirely different kind of book? Who knows ... but I do care: why write if you don't? Fellow Fellows Barb, David and Stefano kindly read some of my chapters and their reactions give me hope, but the nervousness persists. I suppose time will tell; I know I have worked hard.

Can I summarize my all-but-book in a nutshell? I guess a summary would go like this: As one might expect, given that all vertebrates descended from a common ancestor,

vertebrate brains are all built according to a common plan. That plan is extremely sketchy, however; species differences abound. One way of dealing with these species differences is to describe and catalog them, but that is not enough. A more interesting way to look at species differences is to reconstruct how they came about in evolution – to become a historian of brains. But even that is not enough for me: I want to explain how and why the various changes in brain structure occurred. This is difficult, of course, but not impossible. Advances in functional neurobiology allow us to estimate how changes in brain structure might have altered behavior; and that, in turn, allows us to construct plausible scenarios about why natural selection favored those changes. In addition, we can try to explain species differences in adult brain organization by showing how brain development was modified in evolution (after all, adult species differences always result from changes in development). This approach fascinates me because it yields hypotheses that can be tested by means of comparative and/or experimental embryology. It also opens the door to explaining why some kinds of evolutionary change have occurred repeatedly. Specifically, I propose that many regularities in the process of brain evolution can be explained in terms of regularities in brain development. In some cases, we can even explain the exceptions to the “evolutionary rule” in terms of changes in developmental mechanism. That, at least, is the approach I try to promote in the book.

On to life at the Wiko. As I said, it is an ideal place in which to tackle major projects in an unhurried way. The library services were excellent, my office large and quiet, and the computer services nearly ideal (since computer support staff tend to be noticed only when something goes wrong, I want to extend a special thanks to them). The near-daily lunches took some time to get used to, since I tend to be quiet when I eat (at least in the middle of the workday, with half-baked paragraphs still coursing through my brain) but the food was good and I got hooked on those tasty espressos after lunch. I also came to appreciate talking with some of the other Fellows over lunch. Two of them I had known previously, but the others were pleasant new discoveries. Steve Simpson and David Raubenheimer, in particular, became new friends: we “click” both as people and as biologists – and I had known neither one before I came to the Wiko. So a special thanks for that! Several “spouses”, particularly Lesley Simpson and Frouke Wieringa, were also great company and, incidentally, worked their hearts out to help us all put on a stylish farewell party. It should be no surprise that interesting Fellows also tend to have interesting partners! Unfortunately, I never heard those “spouses” ask questions during the Wiko seminars and colloquia. Perhaps they didn’t feel that it was their place to speak, and perhaps that is

indeed the tradition, but I still wonder what they thought at times (particularly when the conversation turned to topics that I knew they knew a lot about).

Which brings me to the most hallowed of all Wiko institutions – the Tuesday colloquium. I really enjoyed 9 or 10 of them – they found a place in my closely guarded long-term memory. Invaluable experiences, but one must wonder: why didn't I appreciate more of those colloquia? Is it just that I'm a narrow-minded neuroscientist? I think not, since four of my favorite talks were by social scientists and one by an art historian. Indeed, I think the supposed dichotomy of natural versus social scientists was not as palpable to me as it was (apparently) to other Fellows. I didn't care whether the talks were given extemporaneously or read out loud, illustrated with colorful slides or barely an eye blink, data-heavy or purely theoretical. What mattered to me was whether the speaker constructed a logical argument that I could follow. When logic broke down or was explicitly subverted, I became annoyed. I suppose I like stories, explanations, anything to make sense of what is going on out there. And those kinds of explanations are not limited, I think, to the world of "natural objects". In fact, my favorite talk of all was Herbert Molderings' attempt to explain why Marcel Duchamp created his "ready-made" sculptures – that was a tightly reasoned argument about a fascinating subject. I wish there had been more of those – perhaps then the discussions would have been more argumentative as well. As it was, too many discussion periods felt like a diversity of monologues. Perhaps I am too critical – I know I am less patient than I want to be.

Did my interactions with the Wiko's social scientists, artists and philosophers influence my "life and work"? Not very much – at least as far as I can tell right now – and certainly less than the degree to which I was influenced by fellow biologists. However, I did not seek interdisciplinary interactions because, as I stated above, I explicitly wanted to think in peace, to stew in my own juices as it were. And I was not alone in that – as Reinhart Meyer-Kalkus once said, ours seemed to be "the year of the book". We had no epic struggles between disciplines (except for a recurring debate about "metaphors in science" that I considered silly soon after it began). Nor did I participate in, or take notice of, long evenings of intense multilateral debate. Perhaps I missed it all! In any case, I did keep my ears open and probably absorbed more than I think. Furthermore, I suspect that what I learned from (and about) the non-biologists will influence me "down the road" and in spheres beyond "just work". For example, I am pleased to report that I began to think about philosophy again, learned something about how historians work, and glimpsed how Isabel Mundry composes her music. I also received my first exposure to Muslim perspectives on the world,

a particularly useful experience during this trying time of avoidable war in Iraq. All of these influences, combined with the new social ties that formed, must have changed my life in ways that I cannot yet foretell. As Wolf Lepenies once said (if I recall correctly): the Wiko's influence on a Fellow is probably best measured ten years after the fellowship year ends. I suspect he's right – and I shall be happy to fill out any future questionnaires.

Thus, in most respects the Wiko was really wonderful. Despite my misgivings about the colloquia, I would not change them much (I would limit discussions to one question per turn, but that would be utopian). There is, however, one serious suggestion I want to make. After receiving, as Fellow-speaker, numerous questions from other Fellows and their families, I realized that most of these could have been avoided, or cleared up quickly, if the communication between staff and fellowship (including partners) had been more effective. Therefore, I recommended that selective staff members meet with the Fellow-speaker(s) and other interested parties at regular intervals (e.g. monthly) and from the beginning of the year. That way issues can be discussed before they become “complaints”. In general, we Fellows are so grateful to the Wiko for its offerings that we dare not ask questions that might be perceived as critical. Such behavior can create tensions down the road and, as a chronically tense Californian, I feel obliged to speak out against tensions of any kind. Moreover, I found most of the staff to be quite receptive to the idea of regular contacts: they did meet with us, communication improved, and helpful changes were implemented. Thus, I write these words not to “complain again” but to encourage any future Fellows (should they be reading this) to reach out to the staff, either directly or through the Fellow-speaker(s), early on in the year. The Wiko is a magnificent institution but it must remain responsive to a changing world, and the Fellows and, increasingly, their families are an integral part of that dynamic.

Finally, a word about spending a year in the Grunewald with family. I was actually born in Berlin but left when I was 3 (not that I had a choice!) and have lived in the US for the last 25 years (I'm 41 now, you do the math ...). It was interesting, therefore, to get to know Berlin and Germany again. I loved getting *Brötchen* in the morning and (occasionally) drinking good beer in Berlin's many gardens or sidewalk cafes; I hated all the dog poop on the street and the cranky old ladies on the bus. In other words, it was an interesting time, with many pros and some noteworthy cons. But that's okay – I wouldn't want all countries and cultures to be “the same”. I am eager now to return to California because I miss my house, my friends, my car, my kitchen sink (it's amazing what you start to miss after a year!), but I think it won't be long until I feel the urge to travel again. Would my

family come along as well? I don't know. It wasn't easy for them here – a year in an apartment with someone else's furniture is difficult when you are used to your own house; and a winter in Berlin is no picnic when you're from Southern California. However, they, too, had many good times. For the first time in years, Anna (my wife) didn't work and thus found time to read, explore Berlin, travel, and socialize intensively with family and some new friends. Ian (my now 9-year-old son) also found excellent new friends and learned German like a champ. As I said, we're ready to go home, but I know we'll be looking back fondly soon. Already, I miss some of my new friends and we haven't even parted yet. Being at the Wiko was a powerful once-in-a-lifetime experience, and I shall always treasure it for that. Go, Wiko, carry on!