



## WHAT DID I DO IN BERLIN? LUIS PUELLES

---

Born in 1948 in Santa Cruz de Tenerife, Spain. Medical studies at the University of Granada, 1965–71. Graduated in 1971. Doctoral degree in Medicine and Surgery (MD) from the University of Sevilla, 1973. Held a series of teaching and research positions in the Department of Anatomy and Morphological Sciences (Faculty of Medicine) of the Spanish Universities of Granada, Sevilla, Badajoz, Cádiz, and Murcia, now holding the tenured chair of Full Professor of Neuroanatomy in Murcia since 1983. Publications: “Brain Segmentation and Forebrain Development in Amniotes.” *Brain Research Bulletin* 55 (2001). “Thoughts on the Development, Structure and Evolution of the Mammalian and Avian Telencephalic Pallium.” *Philosophical Transactions of the Royal Society Ser. B Biol. Sci.* (London) 356 (2001). “Regionalization of the Prosencephalic Neural Plate”, with J. L. R. Rubenstein, K. Shimamura, and S. Martínez. *Annual Reviews of Neuroscience* 21 (1998). – Address: Department of Human Anatomy, Faculty of Medicine, Universidad de Murcia, 30100 Murcia, Spain.

I was originally attracted to the Wiko to participate in a group forming around my colleague in comparative neurobiology Georg Striedter, including as well Barbara Finlay and Tecumseh Fitch during my period of 4 months (October 2003 till end of January 2004). We were supposed to discuss *brain evolution* in developmental perspective, as we actually did a number of times, both jointly and privately. I do not recall that we made any major breakthroughs and we never attempted drawing a set of conclusions. We interacted closely with the other evolutionary biologists around (Kacelnik, Raubenheimer, Rodríguez-Gironés, Simpson, Hofinger) and had with them quite interesting conversations, which

probably opened a bit our respective conceptual spans. This naturally expanded to still wider scope thanks to the weekly seminars, the conversations on the most varied topics over meals, the frequent evening encounters and all sorts of activities organized or happening at the Wiko. In retrospect, I think I would have liked to spend more time talking on brain evolution with Georg, since our interests and viewpoints run rather close, but I sensed he was concentrating intensely on his book and I thus waited for his invitations to interact (sometimes he just wanted to play ping-pong).

As a private project, I wanted to sketch a book titled “Introduction to Neuromorphology for Molecular Neurobiologists”. The idea was to distil in as simple a format as seemed possible the approaches and insights I developed over the last 20 years on how to analyze morphologically the embryonic and adult brain of vertebrates. This sort of analysis aims to answer questions about how many different parts arise during brain ontogeny and phylogeny, and how these relate mutually; this is the background for understanding how these complex structures are caused to appear during both evolutionary change and developmental morphogenesis. I am confident that the paradigms I favor can be used by others for perfecting their interpretations of any structured patterns in the brain, including those shown by gene expression patterns. Most molecular biologists (and many neuroscientists as well) lack a training in neuromorphology and stumble upon the simplest neuroanatomical difficulties.

While the general aim of the work was clear in my mind, I was not so sure of the best way to approach it, this being quite a novel sort of book in the field. I am a slow writer, and am not precisely German in the way I systematize work ahead of me. Curiously enough, I did have a German school upbringing, where I was quite successful, but clearly Spanish culture also has its weight in me. Progress on this work while in Berlin was limited to tentative writing of two chapters, drawing a number of possible illustrations, a lot of agonizing on the plan of the work, and some success revising and preparing for independent publication the model of brain structure common to all vertebrates which I use as a *Bauplan* (it actually appeared in an opinion review piece in *Trends in Neurosciences* – Puelles and Rubenstein, 2003). During the same time, I wrote a book chapter on similar topics, included in the 3<sup>rd</sup> edition of *The Rat Brain*, edited by Georges Paxinos. San Diego: Academic Press, 2003, and continued work on a largish “Stereotactic Atlas of the Chick Brain” and two or three other research papers, one of them with a young German colleague I met in San Francisco, now working in Berlin.

On the other hand, curiosity about the German neuroembryologists and anatomists who provided earlier visions on neuromorphological topics during the late 19<sup>th</sup> century and before the World Wars led me to use extensively the Berlin library system, accessing thanks to the kind and efficient help of the library staff at the Wiko an enormous amount of relevant old literature, apart of much recent literature as well. My explorations allowed me to penetrate a completely new line of research in my field, namely the development of the brain in the most primitive mammals, the monotremes, now conserved exclusively in Australia. I discovered in Berlin practically everything ever written on this exotic topic (the topic has been dead for about 80 years now, and it is now practically impossible to obtain permissions for new embryonic monotreme specimens from the Australian authorities). I also discovered the *Zentrales Verzeichnis Antiquarischer Bücher (ZVAB)* and searched extensively this and other paths of interest, so that I obtained original editions from major authors on monotreme brains such as G. Elliot Smith, Theodor Ziehen and M. Hines. After returning from Berlin, I pursued further this line of interest, visiting two collections of comparative brain preparations in Lund and Utrecht, respectively, where I photographed monotreme embryonic brains, and actually got on loan several specimens conserved in "spirits" (80% ethanol) for the last 100 years! These I am currently studying histologically with immunochemistry. Preliminary data of these studies were reported in a symposium during the recent World Congress of Neuroscience held in Prague (September, 2003), and the conclusions will be prepared for publication soon. I am quite happy that this may result in the end the most salient positive scientific result of my stay at the Wiko, insofar as I hope to have here a significant breakthrough in our understanding of the early evolution of the mammalian cerebral cortex.

Dealings with the ZVAB led to the acquisition of a steady stream of books I never had thought were accessible (or existed), not only on brains, but also on Music, which is my second passion. My wife Margaret eventually thought that I pushed excessively our budget towards things we couldn't eat or drink. In any case, one of my fondest memories of Berlin is the quiet sitting in my armchair at the Villa Walther, hearing chamber music, sipping a nice wine and reading all those books. Now and then I would recline and fall into placid sleep. I was alone in the apartment most of the day, since Margaret, also a neuroembryologist, spent her time working in the Carmen Birchmeier lab at the Max Delbrück Center for Molecular Biology at Buch. The stay in Berlin also represented for her an opportunity for new contacts and initiating a novel line of research, which she has continued thereafter.

I prepared and gave three talks outside the Wiko. One was at the Max Planck Institute for Molecular Genetics in Berlin, another was at the Karolinska Institute in Stockholm, and the third was on my way back to Spain, in Utrecht (Medical School).

We did explore Berlin in a non-systematic way (streets, museums, concerts, food, music shops), and experienced with great curiosity and wonder our first winter with real snow (no skating for us, though). I discovered in a flea-market the songs of the Comedian Harmonists, which lift my spirits every time I hear them. Lasting memories remain from our visit to the Berlin Synagogue, where we attended a light cabaret-like concert among a vast group of Russian Jewish immigrants, or from the diverse concerts given at the neighbouring Cultural Delegation of Romania at Villa Walther. In both cases I appreciated the endearing atmosphere of simple love for music, without presumptions, and I revelled in the crossnational emotional ties felt among true music lovers. Concert culture in Berlin is naturally otherwise impregnated by respect and admiration for the high level artists, which is another sort of value we duly appreciated. In contrast, I really hated a rock spectacle to which I was brought by Tecumseh Fitch. Margaret and I left with the knowledge that Berlin, like Paris, is a city to which you have to return again and again.

I appreciated a lot the well thought and well staffed facilities at the Wiko. Social life was also excellent in many ways, and I loved the efforts coming from the kitchen. We had a small ping-pong competition, where I managed to lose most of my matches while leaving people impressed with the quality of my play. I think I talked with most other Fellows and learnt something from each of them. The concerts and special conferences were highly interesting, and it was a privilege to discover Kertész' books (well, I only read three of them) and talk to him personally. I also read with pleasure a book by Péter Nádas. I tried for insights on modern musical compositions as represented by Isabel Mundry, whose recordings available in the Wiko library I explored with interest, though probably without full understanding. However, I appreciated a lot her patient explanations, as well as her talk. Conversations about art with Herbert Molderings, Victor Stoichita and his wife were also illuminating and very friendly. We also made close friendship with Carlo Severi and his wife. Now and then in the evenings I plogged through the snow or rain to play the grand piano at the central hall (Bach, Schumann, Brahms and Richard Strauss, mostly). Sometimes Gesine Hofinger kindly added her beautiful voice and we did some early Italian arias and pieces by Händel, for which Lydia Goehr played the violin voice once. She was a bit self-conscious, but I liked her passionate way with the instrument; she seemed to open a time-transfer window to *Hausmusik* situations in the past.

Many persons I met in Berlin have thus left a lasting impression. I mean not only at the Wiko, but also elsewhere, in the neighboring supermarkets, the book- and music-shops, the laboratories I visited, the skaters on the lake, the waiters in some restaurants, the freezing Russian wind-sextet players at the door of the Philharmonic House.

It is hard to say whether I fulfilled in Berlin what I expected, or what others expected of me, but in any case that four-month period seems in retrospect stacked with events, ideas, feelings, books, music and persons to a fullness that defies imagination. I'd like to thank the Wissenschaftskolleg for this wonderful experience. After all, it must be a good sign that we would love to return.