Chapter 3
Follow the Breadcrumb Trail

Carla M. Penz

Ó grande tempo
O que é meu está guardado
Não está grudado no céu
nem colado no futuro
Só sei que contigo está seguro
Excerpt from Grande tempo, by Fatima Guedes

Porto Alegre was already a big city when I was born in 1961. Some time before my parents' wedding, my grandmother Morena (née Adelina) had her house remodeled into an upstairs–downstairs duplex, and the upper floor was designed for the newlyweds. She also had the entire backyard paved with a mosaic of uneven pieces of tricolored ceramic tiles. According to my mother Isolde, grandma was tired of the "dirt" that was dragged into the house under everybody's shoes. A few planters were left along the walls to house *Sansevieria, Asparagus,* and a *Rhapis* clump. Introduced European house sparrows roosted on a tall *Dracaena* that was fragrant at night when in bloom. Grandma also had a few large concrete planters cast to resemble tree trunks where *Anthurium* plants grew. From our house, the distant noise of a sawmill could be heard all day, and there was also the hustle and bustle of a Volkswagen car dealership located across the street. How could a biologist emerge from such an urban place?

At the top of an annex at the back of the property was a large trellis-enclosed patio where my father Rubem grew orchids. He had more than 200 plants up there (easily), all well tended and pampered. One of my jobs was to collect and wash the aluminum caps that were on glass milk bottles, which I would smooth out into neat labels with my thumbnail. My father wrote on them with a dull-tipped pencil to make intaglios containing names and numbers, which he gently wrapped around a pseudobulb of each plant. Every winter the whole structure was covered with thick transparent plastic, so it was warm and humid inside when the sun was high. The

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Fig. 3.1 In the backyard of my grandmother Clara's house, posing for a picture around my uncle's Vespa motor scooter. From *left* to *right*: myself holding a plant, my brother Rubem "Mano" Penz, cousin Paulo Henrique Seth, and sister Cristina Penz. Photo by my uncle, João Batista "Tito" Freitas

orchidarium was a place of quiet solitude for my father and for me too. I remember being there until dusk one day, when lights came on in our kitchen and in those of other houses announcing dinner time. I was about 5 years old. With my hand on the green-painted metal rail, I slowly moved down the stairs smelling the air, hearing distant noises, noticing that Venus was starting to glisten in the sky. I was overtaken by a sentiment that is vivid to this day: the absolute happiness of a perfect life. Our family, our house, the plants, the fact that I could read, the subject matters I learned in school and understood, and a deep sense of gratitude for all the good things that had happened thus far. I felt fortunate and prepared—and I knew people who were not that way. At that moment I stepped out of my childhood universe to contemplate societal life and my incipient role in it.

Of course I was a regular kid and played like one, particularly because every weekend we visited my maternal grandmother Clara who had a fantastic yard where ornamental flowers and edible plants intermingled. There were fruit trees; a swing, a ditch filled with tadpoles; a soccer ball; and plenty of space for my siblings, our cousins, and myself to get dirty, sweaty, and tired (Fig. 3.1). We children were shown how to cut internodes of elephant grass to make straws to blow soap bubbles (a lesson in plant anatomy, in retrospect). Back in our orchid refuge, my father was experimenting with hybridization, and by 4th grade I was helping with that and waiting for pods to mature—which took an eternity but eventually yielded seeds that looked gorgeous under my father's miniature microscope. Seed germination and plantule development were also too slow for a child's energy level, so I kept busy with other things, such as growing mosquitoes from larvae to feed *Drosera* plants collected during summer vacations at the shore. As a back-to-school gift, my

Fig. 3.2 Type specimen of *Papilio pyrrha* Fabricius, 1775 (Natural History Museum, London). *Actinote* is the first butterfly group I studied. The photograph of this historical, weathered specimen was kindly sent to me by Phil Ackery in 1982

father bought me a copy of Mario Guimarães Ferri's[1] *Botânica, morfologia externa das plantas,* and although the pages were filled with information too advanced for a 9-year-old, the comparative morphology illustrations were amazing, and I spent hours studying them. Using my book, I identified one of his plants, *Platycerium alcicorne,* to his great delight. Incidentally, that was one of the textbooks used in my first botany class at the university (and I still have it). My path had already been set, but it took me until 8th grade to approach my science teacher to say that I wanted to be a biologist and teach classes—like him. No, you should not aim to teach in a school, he said, research is what you want to do. As it turned out, I have done both.

Upon the start of my undergraduate program in biology in 1980, I naturally gravitated towards botany, while my friends joined the zoology crowd. The botany department was limping at the time: A highly esteemed systematics professor had taken health leave, a plant ecologist was in Germany for her PhD, and other professors seemed overworked. Serendipitously, as part of his genetics class, Aldo Araújo[2] took students to the field and showed us Müllerian mimics, *Heliconius* eggs on tendrils, lycaenids with false heads, silver markings on *Agraulis vanillae,* and other incredible natural history offerings. I was instantly hooked and started an internship in the natural history museum at my old high school in 1981. Thanks to the entomologist Jesuit Father Pio Buck S. J.[3], Museu Anchieta housed the best butterfly collection in town. Aldo supervised my bachelor's thesis on the genus *Actinote* (Fig. 3.2)—my own choice of research project prompted by finding a drawer of unidentified specimens (pure zoology, despite my association with the genetics department). This work was my initiation into systematics and comparative morphology. Jocélia Grazia[4] (a Heteroptera systematist) verbally explained how to dissect

[1] Mario Guimarães Ferri: Brazilian passionate botanist, pioneer ecologist, and gifted artist. Guimarães Ferri was a professor at Universidade de São Paulo.

[2] Aldo Araújo: Brazilian geneticist, also interested in science history. Araújo initiated a new era of butterfly research in Southern Brazil by teaching us to focus on evolution and natural history.

[3] Father Pio Buck S. J.: Swiss immigrant. Father Pio was the director of Museu Anchieta, where he developed a regional insect collection. He was also a close collaborator with botanists from a local Jesuit university.

[4] Jocélia Grazia: Brazilian entomologist, who works on Heteroptera and true bugs in the family Pentatomidae in particular. Grazia was a true mentor to many students, myself included.

male and female genitalia, and back at the museum, I put her words into practice. Through her guidance I became familiar with the work of Alexander Klots[5], Karl Jordan[6], Howard Hinton[7], and other amazing entomologists of the past. At that time, to earn a bachelor's degree in genetics, students were required to take eight courses in that area of concentration. In seven of those courses, I learned about, and read works by, the usual suspects Charles Darwin[8], Henry Walter Bates[9], Alfred Russell Wallace[10], and also the more recent (but still classics) J. B. S. Haldane[11], Ronald Fisher[12], G. Ledyard Stebbins[13], George G. Simpson[14], Ernst Mayr[15], and Verne Grant[16]. In other words, my peers and I were committed to studying hard and learned English simultaneously. That was also the time when I met Keith Brown[17] (he came to visit my alma mater) and read papers by and corresponded with Woody Benson[18],

[5] Alexander Klots: American lepidopterist, well known by his field guides to the butterflies of North America.

[6] Karl Jordan: German entomologist, who worked with Walter Rothschild and specialized on Lepidoptera, Coleoptera, and Siphonaptera.

[7] Howard Hinton: British entomologist, who worked on many groups but was fascinated by beetles. Hinton was a gifted morphologist and an early proponent of continental drift.

[8] Charles Darwin: British naturalist, whose work was a paradigm shift in biology. His voyages and interactions with other researchers led to the proposal of natural selection as a mechanism of evolutionary change, among many other important contributions.

[9] Henry Walter Bates: British naturalist and explorer. Bates travelled through the Amazon forest and described mimicry in butterflies among many other natural history accounts.

[10] Alfred Russell Wallace: British naturalist and explorer. Wallace's voyages through the Amazon and the Malay Archipelago allowed him to conceptualize natural selection independently from Darwin.

[11] J. B. S. Haldane: British-born Indian naturalized evolutionary biologist. Haldane developed both statistical methods and theoretical models still in use today.

[12] Ronald Fisher: British statistician and evolutionary biologist. Fisher's contributions to statistics have been used in all fields of science (e.g., analysis of variance) and he spearheaded the modern evolutionary synthesis along with Haldane, Stebbins, and Simpson, among others.

[13] G. Ledyard Stebbins: American botanist and geneticist. His integrative studies of plants were groundbreaking. Stebbins helped develop the modern evolutionary synthesis.

[14] George G. Simpson: American paleontologist, who was influential in the development of the modern evolutionary synthesis. Simpson was an expert on mammals and their global distribution.

[15] Ernst Mayr: German/American ornithologist and evolutionary biologist. Mayr expanded and popularized Theodosius Dobzhansky's biological species concept and pioneered studies of speciation.

[16] Verne Grant: American botanist. He made important contributions to pollination ecology, plant genetics, and evolutionary theory.

[17] Keith Brown: American/Brazilian chemist and self-taught butterfly biologist. Brown is famous for his studies of heliconiine and ithomiine butterflies. He greatly influenced the study of butterfly biology in Brazil.

[18] Woody Benson: American/Brazilian butterfly biologist. Benson's evolutionary approach to butterfly biology and species interactions (e.g., mimicry) is internationally recognized.

João Vaconcellos Neto[19], Dick Vane-Wright[20] and Phil Ackery[21], Olaf Mielke[22], and Mirna Casagrande[23] (all of whom I met years later). But an eighth genetics class needed to fulfill my degree requirements was not available, so I took Miriam Becker's[24] *Population Ecology* instead, and she used Richard Southwood's[25] *Ecological Methods* as the text. That course was a revelation to me and filled a big gap in my background. Although this is a good summary of my formative academic years, it is also significant to place them within a socioeconomic context. The military dictatorship was starting to weaken in Brazil, but there were still "rats" (government informers) among students at the university. Repression and censorship restrained Brazilian artists, especially poets and musicians, and many went into exile abroad. Several songs I heard in my youth, and memorized for life, are rich in obscure metaphors that disguised their real intent: to criticize the military government. The economy was fragile, inflation was a serious problem, and taxes on imported science books could be as high as 80 %—my gratitude goes to professors who shared important books with us students. Interlibrary loan services could be used to obtain research papers, but that was costly, and it took 2 weeks to 1 month for requests to be filled. In those days none of us would have made it through the undergraduate or graduate programs without the invaluable service of Xerox machines and their operators, not to mention numerous copyright infringements.

Going to graduate school was a given for my closest peers and myself. This was a time in which personal decisions had professional consequences. I wanted to go to Universidade Estadual de Campinas and work with Keith Brown, but romance kept me in Southern Brazil. In 1985 I married my university boyfriend, Roberto Reis[26], a fish systematist. Aldo Araújo accepted me as a master's student and suggested a research project on the inheritance pattern of two sex-limited mimetic color forms of *Papilio hectorides* (currently *Heraclides*). Real genetics! I did not waste time, read as much as I could, and wrote Sir Cyril Clarke[27] about the project, who

[19] João Vasconcellos Neto: Brazilian biologist, who works on the ecology of insect–plant interactions.

[20] Dick Vane-Wright: British butterfly biologist. Dick has published on numerous aspects of butterfly biology, from systematics to mimicry. He continues to be active in the field.

[21] Phil Ackery: British butterfly biologist. Phil worked at the Natural History Museum where he developed his classification of butterflies and their host plants in addition to helping every researcher who needed access to the collection.

[22] Olaf Mielke: Brazilian butterfly taxonomist. Mielke has published on several groups of Lepidoptera and specializes on skippers.

[23] Mirna Casagrande: Brazilian butterfly taxonomist. Casagrande's work mostly focuses on taxonomy and natural history of Brassolini.

[24] Miriam Becker: Brazilian ecologist who worked at Universidade Federal do Rio Grande do Sul.

[25] Richard Southwood: British ecologist and zoologist. His influential work focused on population and community ecology.

[26] Roberto Reis: fish systematist. Reis' research focuses mostly on catfishes, and he is a professor at Pontifícia Universidade Católica do Rio Grande do Sul.

[27] Cyril Clarke: British physician, lepidopterist, and geneticist. Together with Philip Sheppard, he pioneered genetics studies of Papilionid butterflies and the peppered moth.

promptly sent me an aerogram with good advice and a few hypotheses on the genetics of the *hectorides* color forms (for youngsters: here "promptly" refers to ca. 1 month between mailing a letter and receiving a response). After 2 years of juggling with diapausing and nondiapausing pupae that were reared side by side as larvae, hand-pairing adults, and doing my best to persuade females to lay eggs in captivity (which was rather tricky), a virus killed all my larvae in 1 week. That nearly got me out of graduate school altogether, and I felt despondent enough to question my career choice. It is odd to recount the big "die-out event" somewhat dispassionately here, given that it felt quite the opposite at the time. I knew the four local *hectorides* host plants from 2 years of field observations, and my fallback project therefore asked whether oviposition preference in the field matched larval development in the lab. It did not. That was the work I presented at the 1988 Simpósio Internacional de Ecologia Evolutiva de Herbívoros Tropicais organized by Thomas Lewinsohn[28] in Campinas, where I met Thomas, Larry Gilbert[29], Bob Marquis[30], Mark Scriber[31], Lissy Coley[32], Doug Futuyma[33], and many others. Larry was recruiting students and asked if I would be interested in doing a PhD in his lab. It was an exciting opportunity, so I applied for and was granted a graduate fellowship through a Brazilian funding agency (only four were given to zoology in the entire country, so my hard work paid off). I moved to Austin, Texas, in the August of 1989 with two suitcases of essentials, leaving everything else behind.

The first semester at the University of Texas (UT) was intense in all respects—classes, reading assignments, working on the manuscript from my M.S. research, hanging out with Mike Singer[34] and his lab members, and meeting so many people—it is hard to remember them all. I was not prepared for such a marathon, and considering my previous standards, I did poorly that semester. Dealing with all aspects of life in a foreign language took a lot of energy—I remember how hard it was to listen to the lecture and take notes at the same time. Speaking on the phone was surprisingly difficult (no body language to aid communication). Nonetheless, being

[28] Thomas Lewinsohn: Brazilian ecologist. His research initially focused on insect–plant interactions but now also encompasses community diversity and conservation.

[29] Larry Gilbert: American butterfly biologist. Gilbert's research on *Heliconius* butterflies spans the fields of ecology, evolution, and genetics.

[30] Bob Marquis: American evolutionary ecologist. Marquis' research focuses on tritrophic interactions of plant–herbivore systems and the ecology of plant resistance against herbivores.

[31] Mark Scriber: American butterfly ecologist. Scriber's research interests include nutritional ecology and insect–plant interactions, mechanisms of host plant resistance and insect counteradaptations, and color polymorphisms, among several other topics.

[32] Lissy Coley: American evolutionary ecologist. Coley works on the role of defenses in protecting plants from damage by herbivores and pathogens.

[33] Doug Futuyma: American evolutionary biologist. Futuyma's research ranges from insect–plant interactions to coevolution and sexual selection. His books are standards for students of evolution.

[34] Mike C. Singer: British/American butterfly behavioral ecologist. Singer's studies of host plant preferences in *Euphydryas editha* butterflies span several decades in California and constitute milestones in evolutionary ecology of insect–plant interactions.

surrounded by a fantastic group of people made a huge difference. Nancy Greig[35] was my first office mate and gave me a much-needed crash course of everyday words in English plus all sorts of other practical advice (e.g., go to the Goodwill thrift store to buy field clothes). Phil DeVries[36] and Peng Chai[37] were still at UT after finishing their PhD, and we became friends instantly due to shared scientific interests. During this time, I became involved with my lab mate Bob Srygley[38] who studied butterfly flight in collaboration with Peng. The Brazilians Evandro Oliveira[39] and Marcio Zikán Cardoso[40] joined the lab 1 year after I arrived, and Mirian Medina Hay-Roe[41] later came from Peru. We were a truly cohesive group of people who encouraged one another, collaborated in projects, and made comments and suggestions on each other's research manuscripts. Times were busy, the good kind of busy, and after my brain adjusted to a new language and faster pace, the graduate school experience became more pleasurable. For my PhD project, I decided to use comparative morphology to reconstruct a phylogeny of Neotropical Heliconiini. As a diagram that represents evolutionary history, a phylogeny provides the framework to ask biological questions about a particular group. For example, are the oldest heliconiine lineages associated with the oldest *Passiflora* host plant lineages? Phylogenies of butterflies and plants are required to answer questions such as this. Larry was a tad disappointed with my choice of data (morphology) because systematists were starting to use deoxyribonucleic acid (DNA) sequencing for phylogenetic analyses, and he thought I should do the same. Although I learned the basics of DNA sequencing, I stayed with comparative morphology because handling and dissecting specimens is the type of work best suited for me—a visual person fascinated with anatomical complexity. When placed in an evolutionary context, the study of morphological diversification encapsulates Darwin's concept of *descent with modification*—diversification in structure from ancestral to descendant life forms. This is what drove me to comparative morphology, and I will

[35] Nancy Greig: American biologist. Greig is the director of the Cockrell Butterfly Center at the Houston Museum of Natural Science.

[36] Phil DeVries: American butterfly biologist and ecologist. Phil is a keen and eclectic field naturalist. He is best known for his work on butterflies of Costa Rica, symbiotic associations between riodinid caterpillars and ants, and the community diversity studies of fruit-feeding butterflies.

[37] Peng Chai: Chinese/American biologist. Currently senior biostatistician at MDS Pharma Services, Lincoln, NE. Peng's butterfly palatability experiments and flight morphology studies are a landmark in butterfly biology.

[38] Bob Srygley: American biologist, who worked on butterfly flight and migration in Panama. Srygley is a research scientist at the United States Department of Agriculture (USDA) working on Mormon cricket and grasshopper management in addition to butterflies.

[39] Evandro Gama de Oliveira: Brazilian butterfly biologist, who worked on butterfly flight and migration in Brazil and Panama. Oliveira's research also includes community ecology of fruit-feeding butterflies.

[40] Marcio Zikán Cardoso: Brazilian butterfly biologist whose research focuses on the evolutionary ecology of *Heliconius* butterflies.

[41] Mirian Medina Hay-Roe: Peruvian/American butterfly researcher, who works on several aspects of *Heliconius* biology at the University of Florida.

Fig. 3.3 Carla watching butterflies at the forest edge along the River Cristalino, MT Brazil (2009; Photo by Phil DeVries)

never cease to be fascinated by the sheer richness of structural and color diversity in butterflies (Fig. 3.3).

I went to Costa Rica for the first time in 1990 with Larry Gilbert's field course. It was truly refreshing to walk around the forest without the fear of being mugged or hurt (my field site in Southern Brazil was not safe). I went to Panama and Ecuador multiple times during my graduate program, and I also did fieldwork near the Brazilian Amazonian state capitals of Manaus and Belém. The main point of my trip to Manaus was to find the larvae of *Neruda aoede,* but after extensive search their host plant, *Dilkea,* was nowhere to be seen. Aloísio, one of the seasoned fieldworkers from Instituto Nacional de Pesquisas da Amazônia (INPA), heard that I was looking for such a plant and came to talk to me. He told me that he never found it at the site where we were, but he had tagged one *Dilkea* specimen in an inventory plot at the next bio station up the road. Aloísio gave me detailed directions to locate it: plot number, distance from the beginning of a particular transect, noting that the plant would be three paces from the transect edge—to the right. He apologized for not remembering the specimen number but assured me that the plant was tagged. Luckily, I was offered a car ride by an agronomist who listened to the whole conversation and happened to be going that way. He seemed enthused by the narrative and wanted to see this mysterious plant. When we got to the proper place, the plant was actually three paces *to the left* of the transect, and my guide for the day shook his head. I said, "No problem, we found the plant anyway, but it is too bad that there are no eggs or larvae on it." That was not his point. He said, "Aloísio never ceases to amaze me. It has been 2 years since he has set foot in this place." Life allowed me to meet many remarkable people in vastly different places….

In Panama, I was looking for heliconiine early stages for my PhD research, but also reared larvae of other groups on the side. That was the purpose of my trip to Ecuador too, and the mission was to find and rear two species: *Podotricha telesiphe* (at mid elevation) and *Neruda aoede,* which had eluded me in Manaus. In Baeza (1500 m), I found *Podotricha* eggs almost by accident because they are nearly identical in size and color to those of a common josiine moth that oviposits on the same *Passiflora* host. *Podotricha* eggs are striated though, and they look opaque when you flip the host plant leaf (the moth eggs are smooth and slightly shiny). It takes about 2 months for *Podotricha* to develop from egg to adult, so I practically became

part of the family I stayed with in Baeza and was even dragged to mass every weekend by Doña Teresita, the owner of the hotel El Nogal de Jumandi. Instead of glass, the window of my hotel room was covered with plastic sheets that barely kept out the cold evening breeze, but the thick wool blankets were cozy and warm. Across the street from the hotel was Restaurante Gina, where I stopped for a cup of coffee and a *Manicho* cholocate bar with peanuts every day after fieldwork. People in Baeza were surprisingly familiar with transient researchers, especially botanists and butterfly biologists, and they showed me important landmarks (remnants of a stone-paved colonial times trail) and folk remedies (wax of a fulgorid nymph used to treat infected wounds). During the same trip, in my first walk through the lowland forest at Jatun Sacha Biological Station, I found a cluster of *Neruda aoede* eggs on a new shoot of *Dilkea* just a meter off the ground and right in the middle of a trail! As far as I know, Rev. Arthur Miles-Moss[42] had been the only other person to rear that species some 80 years before. Although *Podotricha telesiphe* and *Neruda aoede* are the two most remarkable caterpillars I have reared, every single species has been a gift. I could write pages and more pages about what happened during my 3 months of fieldwork in Ecuador in 1992, but these two short accounts provide a good depiction of how things went.

I had the opportunity to live in England for 1 year in 1993. During that time, I spent 1 day per month at the British Museum of Natural History and will never forget that Phil Ackery always came to chat at about midmorning, two cups of coffee in hand. It was a privilege to get to know Phil, learn from him, and to examine specimens collected by Bates and other heroes of mine. I also met Dick Vane-Wright, Miriam Rothschild[43] (Phil introduced us!), Bernard d'Abrera[44], Jim Mallet[45] and Sandy Knapp[46] plus their children, and reconnected with George Beccaloni[47] (who I had met at Jatun Sacha the previous year). Comparative morphology, phylogenetic systematics, butterfly behavior, evolution, and general biology were definitely at the very center of my life, and that was also the case for most of my friends and new acquaintances. The year in England was truly productive and opened new horizons for me, but it went by fast. It was time to return to my home base in Texas to finish my PhD project.

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[42] Rev. Arthur Miles-Moss: British vicar, artist, and amateur lepidopterist. His Parish spanned the Brazilian Amazon, which allowed him to travel throughout the region collecting and rearing butterflies.

[43] Miriam Rothschild: British amateur entomologist. Rothschild was an accomplished expert on fleas and made important contributions to the study of chemical ecology of Lepidoptera.

[44] Bernard d'Abrera: Australian amateur lepidopterist. d'Abrera is best known for his series of volumes on the butterfly fauna of the world.

[45] Jim Mallet: butterfly evolutionary biologist. Mallet's research focuses on *Heliconius* mimicry complexes.

[46] Sandy Knapp: American botanist. Knapp is a specialist on the family Solanaceae, especially in the Neotropics.

[47] George Beccaloni: British entomologist. Beccaloni studied Neotropical ithomiine butterflies for his PhD but now focuses on his real passion: cockroaches.

Not butterflies but a long-standing friendship brought Phil DeVries and me together, and we were married in 1997. In my opinion, however, there is no relationship more complete than that between two people who share intellectual passions. Indeed, individually and as a couple we have been criticized by family and friends for "doing nothing but work" (which is not exactly true). We both recognize that there is no line between our personal lives and our research, and Phil has been my greatest supporter, critic, and idea partner—with an occasional hint of aggravation to keep things interesting. It was during our partnership that my research approach matured and became more integrative.

When in Phil's lab at the University of Oregon, I started to work on the main manuscript from my PhD dissertation—the phylogeny of Heliconiini. When the study was finally published in 1999, I was excited to send out reprints to potentially interested colleagues. The list of recipients included Lt. Col. John Eliot[48], who replied with compliments, comments, and quite a few questions. We began what would become a regular correspondence, and John asked me to explain the basic principles of cladistic analyses, which I did. He replied with insightful remarks such as "not all structures have the same importance" and, of course, more questions. We continued to exchange letters even after Phil and I moved to Wisconsin to work at the Milwaukee Public Museum. At some point, I was late replying to one of John's letters due to a ridiculous amount of time devoted to a grant proposal. He sent me an aerogram explaining his urgency—he was dying of cancer. Needless to say, I wrote immediately with an apology, the answers, and sincere sorrow for what was inevitably happening to him. John responded that he was at peace with the circumstances (in fact he addressed *me* with comforting words). He thanked me for the information, which was needed for his final revision of Corbet and Pendlebury's *The Butterflies of the Malay Peninsula*. That was my last exchange with Lt. Col. John Eliot—a true gentleman—whom I never met in person, but felt in spirit.

In 2002 my first research project on *Morpho* butterflies was published, the largest and most celebrated butterflies I had ever studied. Exploring closely related groups seemed a natural course of action, and I started to look into brassolines and amathusiines, making good use of museum collections. This is the perfect place in my narrative to acknowledge field biologists for their efforts collecting specimens and museums for safekeeping and making them available to the research community. Without collections I could not do the work I do and definitely would not have become the person I am.

Phil and I moved to Louisiana to join the faculty at the University of New Orleans in 2004 (1 year before the infamous hurricane Katrina), where I continue to expand the research projects started long before. I gave a seminar about my work in Copenhagen early in 2005, when I had the honor to meet Niels Kristensen[49], his

[48] Lt. Col. John Eliot: British amateur lepidopterist, specialist in Oriental butterflies, and editor of Corbet and Pendlebury's *The Butterflies of the Malay Peninsula*.

[49] Niels Kristensen: Danish comparative morphologist and systematist. Kristensen's knowledge of structure and function spans the entire order Lepidoptera.

former PhD student Thomas Simonsen[50], and several other researchers. Timidly, I showed Niels a series of riodinid male genitalia drawings demonstrating that homologous anatomical parts had become fused in different ways along the diversification of the group. He smiled at the illustrations in genuine interest saying that the repeated evolution of such patterns within Lepidoptera never ceased to amaze him. Niels' words made my heart sing, given that they came from one of the most knowledgeable researchers in the field who has directly or indirectly touched the lives of all contemporary comparative morphologists working with Lepidoptera. It is always a pleasure to receive and read his publications, many of which are much broader in scope than what most researchers could ever hope to accomplish, myself included. For practical reasons, my work has become more focused, and during the past 15 years, Neotropical brassoline butterflies have been extremely generous to me. I have studied their morphology, phylogeny, and wing color variation at the tribal and generic levels. Diversification of projects is usually correlated with collaborative work with colleagues (old and new), and Phil and I have joined forces with good friends such as George Austin[51], Niklas Wahlberg[52], Russ Lande[53], and André V. L. Freitas[54]. After all, collaborative research allows each collaborator to do what we do best. Thank you George for being passionately obsessed with butterflies and sharing information and specimens; Niklas, for choosing DNA sequence as your preferred data source; Russ, for knowing a lot about numbers and just enough about butterfly biology; and André, for being a strong supporter of butterfly research in Brazil.

What about here and now? I feel my main research field for so many years, phylogenetic systematics, may not be enough to drive me forward. My career path seems to be doing a full circle back to natural history, which provided the original impetus to study butterflies. I will forever be in awe of their immense morphological and evolutionary diversification—a surprise in every dissection, every field observation, and every group. Butterflies are magnificent living sculptures that allow me to do creative work. They make me think and keep me awake at night (in a good way). Professional commitments and distance to Neotropical forests are making it

[50] Thomas Simonsen: Danish comparative morphologist and systematist. Simonsen was Niels Kristensen's student and has worked on both butterflies and moths.

[51] George Austin: American lepidopterist. Austin collected butterflies throughout the Neotropics, was thoroughly dedicated to collection organization and curation, and did transect counts in his own backyard every weekend. He was the foremost North American authority on Neotropical Hesperiidae.

[52] Niklas Wahlberg: Finnish butterfly systematist. Wahlberg pioneered modern phylogenetic studies of Nymphalid butterflies using deoxyribonucleic acid (DNA) sequence data. He is also interested in evolutionary diversification and biogeography of Lepidoptera in general.

[53] Russ Lande: American evolutionary biologist. Lande's work spans quantitative genetics, evolutionary mechanisms (genetic drift, selection), speciation, and phenotypic plasticity. He also works on community diversity in collaboration with Phil DeVries and other researchers.

[54] André V. L. Freitas: Brazilian butterfly biologist. Freitas was a student of Keith Brown. He is a prolific researcher, who has worked on the systematics and natural history of several Neotropical groups.

difficult for me to spend extended periods of time in the field, and as a result I have become even more aware of the importance of making rigorous and reliable field observations. Natural history observations provide the spark for everything else we seek to learn through either classical or advanced technological means. No matter how small, each of our (collective) butterfly studies brings us closer to the natural world—and that is the reason why I became a biologist. Academia has changed tremendously since many of us started our careers, and natural history museums seem to be at risk of extinction. So, I do think about the day when I may not be able to perform my work in a way that meets my own standards and satisfaction. That will not be tragic, but merely the conclusion of a fantastic journey that can be retraced by following the breadcrumb trail of my publications. My work is my history and my legacy.

Carla M. Penz has had an interest in biology from childhood and started to study butterflies as an undergraduate intern at Museu Anchieta in Brazil. She obtained her bachelor and master of science degrees at Universidade Federal do Rio Grande do Sul and her doctorate at the University of Texas at Austin. During that period she travelled to Costa Rica, Panama, Ecuador, and Brazil for fieldwork and more recently to South Africa and Peninsular Malaysia. She has also spent time in England as a visiting researcher at Cambridge University and the Natural History Museum. Carla worked as a curator of Lepidoptera (2000–2004) and Section Head of Invertebrate Zoology (2003–2004) at the Milwaukee Public Museum. She is currently an associate professor at the University of New Orleans (2004–present) and a research associate of the American Museum of Natural History, Milwaukee Public Museum, and Pontifícia Universidade Católica do Rio Grande do Sul. Her research focuses on two butterfly families, the Nymphalidae and Riodinidae. Given her broad interests, she has published research papers on various aspects of their biology, including comparative morphology, phylogenetics, feeding and mating behavior, and larval biology and morphology—all within the context of evolution. In particular, her work on comparative morphology of the Brassolini (owl butterflies) and Riodinidae (metalmarks) is the most detailed ever performed for these butterflies and sets new standards for research into their systematics. Carla is a proud gaúcha from Porto Alegre, where she goes every year to visit her family. She nourishes her inner self by listening to Brazilian music, playing percussion instruments, dancing, cooking, sewing, reading, and fondly watching the intellectual growth of her nephew and nieces.