



## A TIME TO RECALIBRATE DAVEN PRESGRAVES

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The Wissenschaftskolleg is just as advertised – an academic haven in the leafy outskirts of Berlin where one gets the quiet, the time, and the books to sink into a project. Before arriving, I was determined to make the most of it, to be cloistered, disciplined, and productive. During the year, however, there are the inevitable temptations: to attend German classes; to explore Berlin; to linger after lunches with economists, historians, sociologists, and philosophers; and to chase down readings that have nothing whatever to do with my project. Returning home, friends and colleagues want to know: “How was your trip?” But it's not a trip. It's a year of life – the ordinary and the extraordinary – that I've found impossible to summarize. So, instead of trying, I'll sample some highlights that have stuck with me from the personal, the professional, and the intersection.

First the personal. My wife, two children, and I arrived in Berlin in mid-August, travel-weary after a six-week trek along of the west coast of Vancouver Island, through

the Canadian Rockies, to the badlands of Alberta, ending with a long flight from Calgary to Berlin. What a relief, then, to settle finally into our lovely third-floor flat in the Villa Walther, with its windows that open into the treetops and look onto the Herthasee and its resident family of swans. After a few days, our kids began their own adventures, matriculating at the bilingual John F. Kennedy School in Zehlendorf; they would be stranded there for two hours after classes one day, as all local traffic was suspended to allow the transport and planned detonation of unearthed World War II bombs in the area. Welcome to Berlin, kids! As their year progressed, our effervescent sixth-grade daughter thrived (“You know, Dad, I could see myself living here someday...”), and our gloomy first-grade son did not (“God, I hate Germany...,” having stumbled over a cobblestone). My wife was thrilled to be in her “favorite city” and catalogued the ways in which Berlin life was easy, pleasant, and civilized. She schemed for ways to stay put. Meanwhile, after a few weeks of intensive German class, I settled into work: first, a grant proposal with an early November deadline, then my project. During the winter holiday break, I dragged the family on a pilgrimage – that’s the right word, I think, as an evolutionary biologist who teaches a course on human evolution – to the caves in the Lonetal, near Ulm, where Neanderthals dwelt ~125,000 years ago and, later, a modern human carved the exquisite Löwenmensch figure from a mammoth’s tusk ~40,000 years ago. By late February, the speaking and travel engagements that I’d pushed off came due. At year’s end, school let out and, after a monotonous and gray winter, we visited the sunshine in Crete – the palace at Knossos, the Samaria gorge, and the crystal-blue waters of the Libyan Sea. We returned home to the Villa Walther for a last, lugubrious week of goodbyes in Grunewald.

The year at Wiko prompted two professional recalibrations, one about priorities, the other about my project. As a graduate student and postdoctoral researcher in the sciences, one’s schedule is simple. The jump to a faculty position entails a jarring adjustment to a complex schedule, one fragmented by teaching duties, lab meetings, committee meetings, departmental duties, letter requests, review requests, editorial duties, grant writing, etc. A stay at Wiko licenses Fellows to slip these regular demands – to reclaim the simple. And doing so, I found that I did not miss most of the things that had previously crowded my calendar. I’ve returned to normal life intent to reclaim, and defend, a simpler schedule. The focus of my project likewise made a kind of return to student days. I began my graduate career studying behavioral ecology, a branch of evolutionary biology formerly known as “sociobiology” until overheated controversies about its implications for human nature prompted a rebrand. Sociobiological ideas can be deep and insightful, but the data

are often difficult to obtain, wanting in quantity or quality, and, consequently, less than compelling. I therefore pivoted to one of the “big,” classical problems of evolutionary genetics – speciation – where the experiments, data, and analyses are in general more rigorous and scientifically satisfying. Modern evolutionary genetics is based on the reconciliation of Darwinian natural selection and Mendelian genetics. Darwin’s natural selection gives organisms the appearance of design, and Mendel’s genetics involves heritable particles that are transmitted “fairly” – the paired gene copies in individuals (one from mom, one from dad) have *equal probabilities* of being transmitted to progeny. So long as Mendel’s rule of fair transmission holds, natural selection favors only genetic variants that enhance organismal adaptation. My project focuses, however, on mutations that *violate* Mendel’s rule, biasing transmission to more than their fair share (>50%) of progeny. These non-Mendelian mutations – known as “meiotic drive elements” – spread through populations by virtue of their transmission advantage, not by adaptation. In fact, they’re considered evolutionarily “selfish” as they can spread even if they undermine adaptation (by, for example, reducing fertility). Despite Mendel’s rule being a rule (or, often, a “law”), meiotic drive elements are found throughout the tree of life, including in many plants, fungi, insects, fish, and mammals. Their presence has been underappreciated because they’re hard to observe directly – their population dynamics are fast and they typically lack an easily detectable outward phenotype. (It’s worth noting that Darwin’s *On the Origin of Species* could report no *direct* observations of natural selection, for similar reasons.) However, as new model organisms come under laboratory scrutiny and more genome sequences accumulate, the evidence for meiotic drive has begun to pile up.

The initial aim of my project was to synthesize the growing empirical evidence, theory, taxonomic distribution, genomic consequences, and evolutionary implications of these selfish, non-Mendelian meiotic drive elements. I finished the year with less black-on-white prose than I’d hoped for – a few crudely drafted chapters – but encouraged that there’s more to the project than I’d envisioned. I’ve had to recalibrate. What began as a project prompted by new data has shifted to one that aims to resuscitate and redeploy some not-so-new ideas. And this brings me back to the sociobiology of my early student days, as the evolutionary conflicts of interest between selfish genes and their organisms are not unlike those between selfish individuals and their social groups. Put differently, just as we have to explain how individuals evolved sociality, we have to explain how Mendelian inheritance itself evolved. How, in particular, did the “society” of genes in the genome evolve into a cooperative collective characterized by division of labor and

regulated, fair transmission? The answers are in the particulars of how natural selection acts at different levels of biological organization – in ideas that crystallized during the sociobiology revolution of the 1960s and 1970s.

My closing highlights come from Wiko's carefully crafted culture. At first the social atmosphere is naturally more professional than personal, but of course by the end comes round to the reverse. Hastening that development, the intensive German courses serve as early, pretense-stripping levelers – German grammar instills humility. Friendships are made over wine and meals with visiting Fellows and permanent Wiko folks. (To my delight, the Wiko kids formed their own raucous cohort, together conspiring against the babysitters, hunting for Easter eggs, and playing hide and seek around the main admin building.) The Wiko seminar mandates are cleverly contrived. Having Fellows introduce Fellows fosters community, and inviting presentations on unfinished projects invites vulnerability and openness. With such a diverse and accomplished audience, presenters can strive to be maximally intelligible – to mitigate the Two Cultures' mutual incomprehensibility problem – yet still be unprepared for the range of questions. (After my own seminar on Darwinism and Mendelism, one of our philosophers observed, "I detect several vocabularies in your presentation..."; and, of course, he had identified something I hadn't noticed myself.) Another Fellow privately opined that the seminars should try to "teach us something or be beautiful." The most inspired seminars managed both: modern classical music inspired by Dante; prose by the true artists of our cohort; innovative schemes to feed a world with diminishing resources; and jokes excavated from 8th-century rabbinical texts that still work.

Wiko is a place of contradictions: quiet yet social; professional yet personal; serious yet playful. That Wiko seems to balance these contradictions so perfectly is an illusion; the trick is in the freedom we Fellows get to customize our experiences – we can choose to be hedgehogs or foxes (to borrow an allusion from yet another Fellow). Nothing I write here can express my deep gratitude for that experience: for the Wiko staff, who made life easy and my family feel at home; for the administration, who established a warm and stimulating atmosphere; and, of course, for the community of Fellows – a happily "boring" class – who through their intelligence, generosity, and good humor gifted me new memories, friendships, and perspectives.