WRONGING RIGHTS
SETH BARRIBEAU

Seth Barribeau is a postdoctoral fellow and occasionally a lecturer at the ETH Zurich. Born in 1980 in Ithaca, New York, he grew up on an avocado farm in South Africa and then in a permanently damp but lively fishing town in Oregon. He received a B.Sc. with dual majors in Zoology and Psychology from the University of Canterbury, Christchurch, New Zealand and remained there to complete his Ph.D. in Zoology in 2007 exploring the environmental, social, and genetic factors that influence disease susceptibility in frogs. He then had a brief stint as research assistant at Kyoto University in Japan, catching and radio-tracking snakes, moonlighting by teaching English to infants, and proofreading medical articles about charming things like oral syphilis. He then took a taxonomic leap to working on insects at Emory University, Atlanta, Georgia in 2008, where he co-led the analysis of the immune complement of the pea aphid genome and studied life history responses to parasitism and how phenotypic plasticity can influence immunity and the costs of immunity. Since 2010, he has been working at the ETH Zurich on bumblebee host-parasite interactions, coevolution, genomics, and more generally how the allegedly simple immune system of insects is able to achieve complex tasks like specific resistance and memory. – Address: Department of Biology, Howell Science Complex, Mail Stop 551, East Carolina University, Greenville, NC 27858-4353, USA. E-mail: seth.barribeau@gmail.com

My brief time at the Wiko emphatically reminded me of something I already suspected: how little I know. My academic experience has, thus far, been fairly insular. I know some of the people within my discipline, the familiarity increasing with academic overlap. Being exposed to the work of other biologists at the Wiko was hugely rewarding and a

great deal of fun, but learning from the work of those in fundamentally different fields provided a novel glimpse into areas of academic enquiry that I had had little exposure to. I was also very encouraged to realize how much I enjoyed learning about these new (to me) fields, approaches, and questions. The Wiko managed to remind me of something else that I was perhaps less aware of. It seems that I am still curious. I found great pleasure in learning about areas that were completely foreign to me. This was, no doubt, driven by the caliber of the Fellows, their willingness to explain their work in an approachable way for outsiders – not just from their particular discipline, but also from across the somewhat formidable divide between the arts and sciences – and their skill in making their work engaging, lively, and often quite humorous.

Inversely, I felt that I learned a great deal about how we, as life scientists, present our work. This served to illustrate to me the dangers of our internal shorthand, which reduces the complexity of the language but at the expense of clarity if you don't know the cheat sheet of terms, processes, and principles; how the different layers of subtext allow our terms, and thus arguments, to drift into very different interpretations, depending on the background of the listener. Our descriptions of natural selection often sound inherently directional. Simon Teuscher illustrated how the concept of kinship is itself a topic of study that has changed markedly in European thought. These are ideas that, in biology, are not often thought of as being unclear, but are riddled with ambiguity, or worse, when heard from different backgrounds. Science communication is important not just for transmitting ideas that we see as valuable or informative, but also to justify our academic existence within a wider sphere. Seeing where this communication breaks down in a fairly safe microcosm in which we can return to these points to better explain the processes is a valuable training ground to reduce this risk.

I was also pleasantly surprised when other Fellows took interest in my work or the work of others outside their field, not just as a conversation piece during our meals, but realizing that it might really be of interest to them. That the costs of having and using an immune system are analogous to those of having a police force was an insight that I think may always color my view of my work, and I hope it was of some use to Emmanuel Didier who suggested it. In turn, he took an interest in the fact that social insects, too, police their society. These were ideas that might have been very unlikely if not for our interactions at Wiko and the collegiality and breadth of the Wiko community.

I had come to the Wiko with a project that aimed to understand how the immune system changes with the evolution to increased sociality. I was predominantly relying on

the most famous examples of sociality outside humans, the social insects like bees, ants, etc., and comparing the complement of immune genes encoded in their genome to those of solitary living relatives. Because these social species were able to use forms of social protection from parasites like communal hygienic behaviors, grooming, etc., the need for individual protection lessened and the genes behind these personal mechanisms may atrophy and be lost over evolutionary time. I predicted that, as sociality increased, the set of canonical immune genes that protect an individual from infection would winnow down to the bare essentials, with social forms of protection taking over the lost individual defenses. In the initial surveys it did seem that I was on to something. Ants and bees have relatively few immune genes. Even naked mole rats, the only eusocial (having distinct reproductive and worker castes) mammal, appear to have fewer immune genes than their closest sequenced relative, the guinea pig. This was all very encouraging except that there aren't too many species out there that I could use at the moment. That number is growing rapidly but is disproportionately rich in the hymenoptera, the group of insects that include bees, ants, and wasps. In the course of my Wiko work, I found that even solitary or primitively eusocial species of this group have the same limited set of immune genes as the members with advanced sociality.

So, in the course of working on my Wiko project, I realized that I was wrong. But this illustrates an important aspect of the Wiko fellowship. The Fellows in the College for Life Sciences did not have quite as long as the other Fellows, but it was billed as an opportunity to "gain time to think". This chance to think about a new topic or wrap up old ones without the incidental demands of normal lab life was immensely valuable, but it was not only a time to think, but also a time to be wrong. There is a tendency to work on safe projects and to design projects that are likely to yield publishable results. Being wrong suggests that you are trying something that is risky, something that might be outside of your immediate domain, or something that seems absurd but might just be worth a shot. This view of the importance of being wrong may just be a convenient soothing balm for the ego, but I don't think it's entirely without merit. The Wiko affords its Fellows an opportunity not just to think, but also to try things that could well fail. I don't think that the idea behind my project was itself fatally wrong, but rather that the grist for my study is not yet there. These resources will appear over the coming years, and I will be ready to try again once they do.