STEPPING BACK
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It's rare that we get the time and opportunity to step back and look at the big picture. Or, as is more often the case with scholarly work, to attempt to piece one together. As academics, we spend most our time focused on carving out our own niche, where we can develop expertise in order to make contributions to the Body of Knowledge. Stepping back is a risk, because now you must concern yourself with all the important things you don't know about. Work at this stage is more about input than output, so it's not an act to be risked without tenure, because you can work quite a lot and have little to show for it. Yet, we are compelled to do this, because it is the whole picture we seek, and that picture promises to offer more insight and understanding than the sum of the pieces.

In my own case, the picture is more of a vision. That is, an appealing theoretical framework that might not have reached its limit. The central thesis is that the perceptual circuitry that underlies animal behavior evolves until it reaches theoretical limits – limits that are imposed by principles of information processing and the physical constraints of the system. If true, it means that biological perceptual systems and all their daunting complexity can be understood on a more abstract level in terms of simpler principles. Moreover, the complex variations across animals are not the result of random adaptation, but represent different trade-offs among the underlying constraints. As an analogy, consider the eye. The eyes of animals are widely varied in shape, size, and other properties, but they all have to focus light. The principles of optics dictate that there are only a handful of ways to accomplish this. But an eye is no good without something to process the image, so just as the eyes evolved to focus light, so to must the biological circuitry have evolved to process the information. In any physical system, there are limits to the speed with which information can be processed. We already know that much of the biological information processing on the level of sensory coding can be explained by theoretical principles, but how far can this idea go? Are there computational principles that can explain the higher-level aspects of perception? What is the minimum set of principles that could describe the information processing in a biological perceptual system? With my colleague Bruno Olshausen, our goal was to start to layout a book that would summarize the current results of the field and to push these ideas further into aspects of perception and behavior that have not been analyzed from this theoretical viewpoint. Writing a book of this nature is necessarily a long-term project, and our time at the Wiko provided us with the opportunity to get it off the ground.

The Wissenschaftskolleg in Berlin (which even the Germans shorten to "Wiko") offers scholars a rare opportunity to reside in an environment where such reflective scholarship is not only encouraged but actively supported in a manner that is about as professional, comprehensive, and congenial as one can imagine. A key aspect of the Wiko is the support of working groups. It's nice to have people around who speak your own language. A corollary to this is that if the people around don't speak your language, or perhaps more to the point, you don't speak theirs, things can be tough going. I could be talking about German, but at the Wiko this metaphor works on many other levels. In most sabbaticals you select a place where you go to work with a colleague, and if you're lucky, they're in a good department with a lot of other interesting faculty. The problem with this, more typical, arrangement, however, is that everyone in the department is living

their normal academic life with all the concomitant responsibilities, and thus very little time for much beside what they're already doing. The working groups at the Wiko are different. Not only can you select your colleagues from wherever they happen to be, but they're all on sabbatical with you, in a place that's far removed from your normal academic life. In short, you are all pretty much free to do whatever you want, spend a lot of time doing it, and have people around to discuss it with.

The "Scene Analysis Working Group" (Cindy Moss, Annemarie Surlykke, Bruno Olshausen, and myself) also took advantage of the Wiko environment to step back and try to work out another big picture of common interest – a framework for describing the perceptual and behavioral aspects of scene analysis across a wide variety of animal systems. This group was particularly engaging for me, because collectively we had a diverse range of backgrounds and areas of expertise. In our regular meetings over the year, we had time to develop, understand, and refine ideas that I don't think could have taken form under any other circumstances. The project was even manageable enough that we got to the stage of producing output and are currently finishing up a paper for *Behavioral and Brain Sciences* with open peer commentary.

For the sake of posterity, I should say that life at the Wiko is not all roses. The overhead (mental and otherwise) of a foreign culture, city, and language is significant, especially for those with families. Then there's the rich social environment of the Wiko, which can be like shock therapy for the reserved. For the intellectually curious, it can be nearly fatal. A word of advice to future Fellows: there are so many interesting people around that curiosity needs to be tempered or you'll getting nothing done. But, then, it's a lot of fun doing it.